ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2013

WEDNESDAY, MARCH 14, 2012

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

The subcommittee met at 2:31 p.m., in room SD–192, Dirksen Senate Office Building, Hon. Dianne Feinstein (chairman) presiding.

Present: Senators Feinstein, Murray, Johnson, Reed, Tester, Alexander, Cochran, Collins, Murkowski, and Graham.

DEPARTMENT OF ENERGY

STATEMENT OF HON. STEVEN CHU, SECRETARY

OPENING STATEMENT OF SENATOR DIANNE FEINSTEIN

Senator FEINSTEIN. Good afternoon, ladies and gentlemen.

Mr. Secretary, welcome to the Energy and Water Subcommittee's budget hearing on the Department of Energy's (DOE) fiscal year 2013 budget request.

DOE has requested $27.2 billion for fiscal year 2013. That is an increase of $1.5 billion, or 5.7 percent, from fiscal year 2012.

Approximately $535 million—that is about one-third—of the $1.5 billion increase is for the National Nuclear Security Administration's (NNSA) nuclear weapons nonproliferation and naval reactor programs. This is a 5-percent increase. The subcommittee will explore NNSA's budget request with Administrator D'Agostino next week.

The rest of the Department's proposed increase is largely, as we understand it, for the Office of Energy Efficiency and Renewable Energy (EERE) projects, Advanced Research Projects Agency-Energy (ARPA–E), and basic energy research.

The budget request clearly prioritizes some programs while making difficult choices to cut funding to other programs. This is where we have a lot of questions. The Congress must now determine whether or not we can agree on those priorities.

Mr. Secretary, I hope you will highlight the administration's priorities today and make the case for the choices that you have made.

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

First, the single largest increase would be for EERE which would see an increase of $512 million, or 28 percent. A significant portion

of this increase would be used for the new advanced manufacturing program.

The second, ARPA–E, would see an increase of $75 million, or 27 percent. As the Secretary says, ARPA–E holds the promise of advancing high-risk, high-reward technology. An early indicator of success has been that 11 projects, which received $40 million from ARPA–E, have now secured more than $200 million in outside private capital investment to further develop these technologies, and that is good news. So we would like to encourage the Department to continue tracking these projects and demonstrate how Federal investments have developed more energy-efficient technologies and potentially new industries.

Third, the Office of Science would see an increase of $118 million, or 2.4 percent. The science budget has clearly prioritized the subprograms exploring materials research, advanced computing, and biological research. So the Department is making its priorities clear there.

However, in the non-priority subprograms, it is more difficult to understand the administration's position because the Department has failed to prioritize activities within the very limited funding.

One example is fusion energy science. The overall budget for fusion energy science is not large enough to accommodate our commitment to the International Thermonuclear Experimental Reactor (ITER) project in France while at the same time maintaining our domestic program. The difficult decision was apparently made to cut funding to the fusion facility at Massachusetts Institute of Technology (MIT). The budget, though, fails to fully fund the commitment to ITER. This will likely increase our total contribution to ITER in the future and delay the project. I understand the decision not to prioritize fusion energy sciences in a tight budget environment, but if we are making that decision, then we need to follow through and make the tough decisions within the program itself and not leave them floundering around. It now appears that we are simply going to cripple both our domestic and international efforts.

While renewable energy, ARPA–E, and the Office of Science saw increases in the budget, there are two energy programs that were cut. The proposed budget for the Office of Fossil Energy (FE) is $428 million. That is a decrease of 20 percent, or $106 million. The single largest cut in fossil energy comes from zeroing out the fuel cells subprogram, and we would like to know the reason.

The proposed budget for the Office of Nuclear Energy is $675 million, excluding security costs. This is a cut of $93 million, or 12 percent. The major cuts in nuclear energy come from the advanced reactor program, which is largely focused on fast reactors and high-temperature reactors.

Today, I am sure we will hear various opinions about the decisions made in the administration's budget request for energy, but this is an important first step. I know the choices are difficult for you, Mr. Secretary. Before welcoming you and having your presentation, I would like to ask for the remarks of the ranking member.

STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. Thank you, Madam Chairman.

Mr. Secretary, welcome. It is a pleasure to work with the Senator from California always, and it is a pleasure to work with you, Mr. Secretary. We appreciate your service to the country. It is a long way to go home for you, I know. So we appreciate that. You have attracted some very good people to work with you.

There are a great many areas of the President's proposal, your budget, that I support. In a recent visit to Sandia, the science director told me that it would be hard to think of any major advance in the biological and physical sciences in our country that had not had some Government research support and most of it through our 17, I guess is the number, laboratories and our great research universities, which are in my view our secret weapons in a very competitive world economically where we are a country that has only 4 or 5 percent of the population but regularly produce 23–24 percent of the wealth. That is going to be harder and harder to do to keep our standard of living, and those will help us do that.

And your Office of Science is identified as an important part of our America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (America COMPETES) initiative which our Congress has passed in a bipartisan way and reauthorized in a bipartisan way and funded to a great extent over the last several years. And I am glad to see a priority there.

I applaud your energy hubs. We have talked about that many times before, but I was calling them mini-Manhattan projects and you are calling them hubs. I think it is a very good way to manage and to organize around priority areas. The idea of installed solar at a kilowatt hour with clear metrics about each of these areas—and I would be interested to hear from you, as we go along, what your metrics are for each of your hubs. In other words, how will we know when we succeed? And as my experience in Government teaches me, that is a pretty good way to take a big, complex program like you have and establish some clear priorities. So I would like to talk more about the hubs.

I am a strong supporter of ARPA–E, a major recommendation of the America COMPETES legislation, and we do not know if ARPA–E will be successful, but it would not have to be nearly as successful as the Defense Advanced Research Projects Agency (DARPA) to be a great success. It does not have the same kind of customer that DARPA has at the Defense Department. But the early signs are promising, very talented people there. And I hope we continue to support it.

I am increasingly of the view that—I support the idea and made an address last week saying that we should double over the next several years Federal support for clean-energy research. I know that is a priority of yours. The question quickly comes up, well, then how would you pay for it. I think the way we pay for it is get rid of long-term subsidies for energy such as those for big oil and I would add to that big wind. We had $14 billion of Federal subsidies for wind programs over a 5-year period which we are in the midst of. More than $6 billion are the production tax credit. I think we should let that credit expire and take $2 of the savings and reduce the debt and $1 of the savings and add it to the energy research budget and do the same for the oil subsidies that oil compa-

nies have that other companies do not have. Sometimes we get a little clumsy when we talk about oil subsidies because they have manufacturing tax credits. Well, so do many other manufacturers have manufacturing tax credits. So I would like to talk about that too. Clean-energy research, yes. Long-term subsidies, no. And in between what are those technologies that we seek to jump start for a limited period of time? The small modular reactors might be one. The electric car incentives that we are now in the midst of might be one. ARPA–E might be one. But they should be specific and limited.

You have recommended funding for the Blue Ribbon Commission (BRC) on Nuclear Waste. That is a concern that Senator Feinstein and I share equally. My passion for it does not equal hers because I do not think anyone's does, but it is right up there with hers. And it is something that we are working on with Senators Bingaman and Murkowski, and we appreciate your cooperation on that. We intend to make some progress on it.

Finally, in our State, if I may make an additional point, Madam Chairman, we are concerned about environmental cleanup. Over the last year, the Government has made a lot of progress in cleaning up radiological waste in Oak Ridge that is left over from the hot war and World War II and the cold war ever since. And you have begun to remove the waste and get it out of Oak Ridge and the cleanup is scheduled to be completed in 5 years. And it is very expensive. It is hundreds of millions of dollars. And once it is gone, it will reduce the cost of operating the facilities in Oak Ridge and reduce the risks.

But we now need to go to work on mercury, and we have talked about that. To date, there are more than 2 million pounds of mercury unaccounted for and the continued releases of mercury in Poplar Creek that run through the town. This is a dangerous substance. It is going to take a long time to do an appropriate job of cleaning it up, but we need to get started. And I would like include in the record, Madam Chairman, an article by Frank Munger from the Knoxville News Sentinel today entitled "Mercury's Priority is Rising, but Cleanup is Years Away."

So I thank you for what we are doing on radiological waste. I look forward to working with you to getting started on cleaning up the mercury.

And I thank the chairman for her generous allocation of time.

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

It is now my pleasure to introduce the Secretary. He hails from my home State. I think it is fair to say he is brilliant. I do not think you win a Nobel unless you can have that appellation attached to your name. He is from Lawrence Berkeley Lab, and it is with a great deal of pleasure, because there will be a lot of hard questions, that I boost your ego a little bit before we begin.

I know it has been hard to adjust to life here, but we want to warmly welcome you, Mr. Secretary. Please proceed with your remarks.

SUMMARY STATEMENT OF HON. STEVEN CHU

Secretary CHU. Well, thank you, Madam Chairman, and also Ranking Member Alexander. I should say my reputation for intelligence has taken a downturn since I have accepted this job.

But in any case, I am happy to be here today and be given the opportunity to discuss the President's fiscal year 2013 budget request for DOE.

To promote economic growth and strengthen national security, President Obama has called for an all-of-the-above strategy that develops every source of American energy. The President wants to fuel our economy with domestic energy resources while increasing our ability to compete in the clean-energy race.

The Department's fiscal year 2013 budget request for $27.2 billion is guided by the President's vision, our 2011 strategic plan, and our inaugural quadrennial technology review. It supports leadership in clean-energy technologies, science and innovation, nuclear security, and environmental cleanup.

Decades ago, the Energy Department's support helped develop technologies that have allowed us to tap into America's abundant shale gas resources. Today, our investments can help unlock the promise of renewable energy and energy efficiency. The budget request invests approximately $4 billion in energy programs to advance progress in areas from solar to offshore wind to carbon capture utilization and storage to smart grid technologies. It develops next-generation biofuels, advanced batteries, and fuel-efficient vehicle technologies to help reduce our dependence on foreign oil.

As the President and I have said, there is no silver bullet. We can and must pursue a long-term, all-of-the-above approach that diversifies our transportation sector, protects consumers from high gas prices, harnesses American resources, and creates jobs here at home. That is exactly what this budget does.

The budget also invests $770 million to help develop the next generation of nuclear power technologies, including small modular reactors. It includes funding for continuing nuclear waste research and development (R&D) which aligns with the recommendations of the Blue Ribbon Commission (BRC) on America's Nuclear Future.

America's fossil fuel energy resources continue to play an important role in our energy mix. The budget request includes $12 million as part of a $45 million research and development initiative by the Departments of Energy, Interior, and Environmental Protection Agency (EPA) to understand and minimize the potential environmental, health, and safety impacts of natural gas development through hydraulic fracturing.

The budget also promotes energy efficiency to help Americans save money by saving energy, and it sponsors R&D on industrial materials and processes to help U.S. manufacturers cut costs.

To maximize our energy technology efforts in areas such as batteries, biofuels, and electric grid technologies, we are coordinating research and development across our basic and applied research programs and ARPA–E.

And to encourage manufacturing and deployment of clean-energy technologies, the President has called for extending proven tax in-

centives, including the production tax credit, the 1603 program, and advanced energy manufacturing tax credit.

As industry, the Congress, and the American people make critical energy decisions, it is also important that we adequately fund the Energy Information Administration.

Competing in the new energy economy will require our country to harness all our resources, including American ingenuity. The budget includes $5 billion for the Office of Science to support basic research that could lead to new discoveries and help solve energy challenges. These funds support progress in materials science, basic energy science, advanced computing, and more.

The budget request continues to support the Energy Frontier Research Centers which aim to solve specific scientific problems to unlock new clean-energy development. It supports the five existing Energy Innovation Hubs and proposes a new hub in electricity systems. Through the hubs, we are bringing together our Nation's top scientists and engineers to achieve game-changing energy goals.

Additionally, the budget request includes $350 million for ARPA–E to support research projects that could fundamentally transform the way we use and produce energy. ARPA–E invests in high-risk, high-reward research projects that if successful could create the foundation for entirely new industries.

In addition to strengthening our economy, the budget request strengthens our security by providing $11.5 billion for the NNSA. As the United States begins the nuclear arms reduction required by the New Strategic Arms Reduction Treaty (New START), the science, technology, and engineering capabilities within the nuclear security enterprise will become even more important to sustain the U.S. nuclear deterrent. That is why the budget request includes $7.6 billion for weapons activities. It also includes $1.1 billion for the naval reactor program. Additionally, it supports NNSA's work to prevent nuclear terrorism, one of President Obama's top priorities. It includes $2.5 billion to implement key nuclear security, nonproliferation, and arms control activities.

Finally, the budget request includes $5.7 billion for the Office of Environmental Management to clean up radioactive legacy waste from the Manhattan Project and the cold war. This budget request builds on the program's progress. By the end of 2011, the program has reduced its geographic footprint by 66 percent.

PREPARED STATEMENT

The budget request made strategic investments to promote prosperity and security. At the same time, we recognize the country's fiscal challenges and are cutting back where we can. We are committed to performing our work efficiently and effectively. Countries in Europe, Asia, and throughout the Western Hemisphere recognize that energy opportunity and are moving aggressively to lead. This is a race we can win, but we must act with fierce urgency.

So thank you. And I now welcome your questions.

[The statement follows:]

PREPARED STATEMENT OF STEVEN CHU

INTRODUCTION

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 2013 budget request for the Department of Energy (DOE).

To promote economic growth and strengthen national security, President Obama has called for "an all-out, all-in, all-of-the-above strategy that develops every source of American energy—a strategy that is cleaner and cheaper and full of new jobs." The President wants to fuel our economy with domestic energy resources while increasing our ability to compete in the global clean-energy race.

Although the United States has reclaimed the title of world leader in clean-energy investments, we are at risk of falling behind again unless we make a sustained Federal commitment to supporting our domestic clean-energy economy. To compete globally, America has to do more than invent technologies, we also have to produce and sell them. Our country faces a stark choice:

—we can create jobs making and exporting the energy technologies of tomorrow; or

—we can cede leadership to other countries that are investing in these industries.

As President Obama reiterated in his State of the Union Address, passing a clean-energy standard is a vital step that the Congress can take to broaden our clean-energy market and promote U.S. leadership.

Making the most of America's energy resources is a pillar of the President's economic blueprint to build an economy that lasts. The Energy Department also supports other key elements of the President's agenda including leading in innovation, reducing our dependence on oil, cutting costs for families, businesses, and manufacturers through energy efficiency, and reducing nuclear dangers worldwide.

Guided by the President's vision, the Department's 2011 Strategic Plan and our inaugural Quadrennial Technology Review, our fiscal year 2013 budget request of $27.2 billion invests in the following priorities:

—Accelerating the transformation of America's energy system, and securing U.S. leadership in clean-energy technologies;

—Investing in science and innovation to promote our Nation's economic prosperity; and

—Keeping Americans safe by enhancing nuclear security through defense, nonproliferation, and environmental cleanup.

These priorities will be enabled through a continuing commitment to fiscal responsibility and management excellence.

LEADING IN THE ENERGY TECHNOLOGIES OF THE 21ST CENTURY

Last year, a record $260 billion was invested globally in clean energy, and trillions of dollars will be invested in the coming decades. To seize this market and job-creation opportunity, the President's budget request invests in programs that advance research, development, manufacturing, and deployment of the energy technologies of the future.

Decades ago, support from the Energy Department helped to develop the technologies that have allowed us to tap into America's abundant shale gas resources. Today, our investments can help us advance technologies that will unlock the promise of renewable energy and energy efficiency.

The budget request invests approximately $4 billion in our energy programs. It supports the Department's SunShot initiative to make solar energy cost-competitive with any other form of electrical energy, without subsidy, by the end of the decade. It advances technological progress in areas ranging from offshore wind to carbon capture, utilization, and storage to smart grid and energy storage. And it helps reduce our dependence on oil by developing the next generation of biofuels and accelerating research in advanced batteries and fuel-efficient vehicle technologies. Families, again, are feeling the pinch of high gas prices. As the President and I have said, there is no silver bullet to this challenge, but we can and must pursue a serious, long-term, "all-of-the-above" approach that diversifies our transportation sector, protects consumers from high gas prices, harnesses American resources, and creates jobs here at home. That's exactly what this budget does.

Leadership in nuclear energy technologies is also essential to our ability to compete globally. The budget request invests $770 million in the nuclear energy program to help develop the next-generation of nuclear power technologies, including small modular reactors. It also includes funding for continued research and development (R&D) on the storage, transportation and disposal of nuclear waste, which also

aligns with the recommendations of the Blue Ribbon Commission on America's Nuclear Future.

As we move to a sustainable energy future, America's fossil energy resources will continue to play an important role in our energy mix. President Obama is committed to developing our oil and gas resources in a safe and sustainable manner. Last year, our oil import dependence was at its lowest level in 16 years, oil production reached its highest level in 8 years and natural gas production set a new record. Building on this progress, the Energy Department's budget request includes $12 million as part of a $45 million priority research and development initiative by the DOE, the Department of the Interior, and the Environmental Protection Agency to understand and minimize the potential environmental, health, and safety impacts of natural gas development through hydraulic fracturing (fracking).

The budget request also promotes energy efficiency to create jobs and to help Americans save money by saving energy. It supports home weatherization and calls for passage of the HOME STAR program to provide incentives to homeowners to make energy-efficiency upgrades. It also invests in research and development to improve building efficiency and supports the President's "Better Buildings" initiative to catalyze private sector investment in commercial building efficiency. Finally, the budget request sponsors R&D on industrial materials and processes to help U.S. manufacturers cut costs and improve their global competitiveness.

To maximize our energy technology efforts, the Department is breaking down silos and coordinating R&D across our program offices. Modeled after our SunShot initiative, we're bringing together our basic and applied research programs and Advanced Research Projects Agency-Energy (ARPA–E) to harmonize their work in areas including batteries, biofuels, and electric grid technologies.

And to encourage manufacturing and deployment of clean-energy technologies, the President has called for renewing and extending proven tax incentives including the Production Tax Credit, the 1603 cash payment in lieu of tax credit program, and the Advanced Energy Manufacturing Tax Credit (48C).

As industry, the Congress and the American people make critical energy decisions and require greater understanding of domestic and international energy markets, it's important that we adequately fund the Energy Information Administration (EIA), the Nation's premier source of independent statistical information about energy production and use. That is why the budget request includes $116 million for EIA.

UNLEASHING U.S. INNOVATION TO CREATE JOBS AND LEAD IN THE GLOBAL ECONOMY

Competing in the new energy economy will require our country to harness all of our resources, including as the President said, the "one critical, renewable resource that the rest of the world can't match: American ingenuity." A key part of our country's success has been our leadership in science and technology, but we can't take that leadership for granted. According to the National Science Foundation's "2010 Science and Engineering Indicators" report, from 1996 to 2007, the average annual growth of R&D expenditures in the United States was about 5 to 6 percent compared to more than 20 percent in China.

To help keep the United States at the forefront of science and technology, the budget request invests in cutting-edge research that could spur new jobs and industries. This includes $5 billion for the Office of Science to support basic research that could lead to new discoveries and help solve our energy challenges. These funds support progress in materials science, basic energy science, advanced computing, and more. They also provide America's researchers and industries with state-of-the-art tools to help take their work to the next level.

The budget request continues to support Energy Frontier Research Centers (EFRCs). The EFRCs are working to solve specific scientific problems to unlock new clean-energy development. So far, the EFRCs have published more than 1,000 peer-reviewed papers and filed more than 90 patent applications or patent/invention disclosures. Researchers are reporting multiple breakthroughs in areas ranging from advanced battery technology and solar energy to solid-state lighting and nuclear power.

The budget request also supports the five existing Energy Innovation Hubs and proposes a new Hub in electricity systems. Through the Hubs, we are bringing together our Nation's top scientists and engineers to achieve game-changing energy goals. The Hubs continue to make progress. For example, the Modeling and Simulation for Nuclear Reactors Hub has released the first versions of its software that, upon completion, will simulate a virtual model of an operating physical reactor. The Fuels from Sunlight Hub has filed multiple invention disclosures and published scientific papers. And the Energy Efficient Building Systems Hub is developing ad-

vanced building modeling tools and has built one of the country's first 3–D building design labs.

Additionally, the budget request includes $350 million for the ARPA–E to support research projects that could fundamentally transform the ways we use and produce energy. ARPA–E has invested in roughly 180 high-risk, high-reward research projects that, if successful, could create the foundation for entirely new industries. These companies and research teams are working toward a prototype of a battery that has double the energy density and one-third the cost of batteries in 2010, bacteria that use carbon dioxide and electricity to make fuel for cars, grid-scale electricity storage, and other potentially game-changing breakthroughs. Eleven projects that received $40 million from ARPA–E over the last 2 years have done such promising work that they have now received more than $200 million in combined private sector funding.

Taken together, our research initiatives will help rev up America's great innovation machine to accelerate energy breakthroughs.

NUCLEAR SAFETY AND SECURITY

In addition to strengthening our economy, the budget request also strengthens our security by providing $11.5 billion for the Department's National Nuclear Security Administration (NNSA). NNSA plays a key role in achieving President Obama's nuclear security objectives.

As the United States begins the nuclear arms reduction required by the New Strategic Arms Reduction Treaty (New START), the science, technology, and engineering capabilities within the nuclear security enterprise will become even more important to sustaining the U.S. nuclear deterrent. The budget request includes $7.6 billion for weapons activities, a 5-percent increase more than the fiscal year 2012 enacted levels. This increase provides a strong basis for transitioning to a smaller yet still safe, secure, and effective nuclear stockpile. It also strengthens the science, technology, and engineering base of our enterprise.

The budget request also includes $1.1 billion for the naval reactors program to ensure the safe and reliable operation of reactors in nuclear-powered submarines and aircraft carriers and to fulfill the Navy's requirements for new nuclear propulsion plants that meet current and future national defense requirements.

Additionally, the budget request supports NNSA's critical work to prevent nuclear terrorism—one of the most immediate and extreme threats to global security and of one President Obama's top priorities. It includes $2.5 billion to implement key nuclear security, nonproliferation, and arms-control activities. It supports efforts to detect, secure, and dispose of dangerous nuclear and radiological material around the world. And it will help the Department to fulfill its role in accomplishing the President's goal of securing all vulnerable nuclear materials worldwide in 4 years.

Finally, the budget request includes $5.7 billion for the Office of Environmental Management to protect public health and the environment by cleaning up hazardous, radioactive legacy waste from the Manhattan Project and the cold war. This funding allows the program to continue to clean up and close sites and positions it to meet its fiscal year 2013 enforceable agreement milestones. This budget request builds on the significant progress that has been made by the program. By the end of 2011, the program had reduced its geographic footprint by 66 percent—far exceeding its goal of 40 percent.

FISCAL RESPONSIBILITY AND MANAGEMENT EXCELLENCE

DOE's fiscal year 2013 budget request makes strategic investments to promote our country's future prosperity and security. At the same time, we recognize the country's fiscal challenges and our responsibility to invest in much-needed programs while cutting back where we can. That is why the President's budget request eliminates $4 billion in inefficient and unnecessary fossil fuel subsidies.

Given the urgency of the challenges we face, the Department is committed to performing our work efficiently and effectively. We are streamlining our organization to improve performance and save taxpayer money. For example, the Department achieved approximately $330 million in strategic procurement savings in fiscal year 2011. We are taking several other steps such as reducing the size of our vehicle fleet, cutting back travel costs, and consolidating Web sites.

We are also breaking down barriers to make it easier for businesses to move technologies from our national labs to the marketplace, which can help the United States seize technological leadership and create jobs. For example, we've started a program which makes it easier, quicker, and less costly for start-up companies to sign option agreements to license national lab technologies. And to make it easier to work with the labs, we've reduced the advanced payment requirement and

streamlined the Cooperative Research and Development Agreement contract and approval process.

Throughout American history, the Federal Government has played a critical role in supporting industries that are important to our prosperity and security, from aviation and agriculture to biotechnologies and computer technologies. We should continue to do so today to lead in the new clean-energy economy. Countries in Europe, Asia, and throughout the Western Hemisphere recognize the energy opportunity and are moving aggressively to lead. This is a race we can win, but we must act with fierce urgency.

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

MESOSCALE

Senator FEINSTEIN. Thank you very much, Mr. Secretary.

I will begin with, hopefully, three rather short questions.

The largest increase in the Office of Science is for a program called mesoscale science. It is not defined. I do not know what it is. I do not know why it is a priority, and I do not know why we need to start a new $42 million program called mesoscale science. Can you explain that?

Secretary CHU. Sure. First, some definitions.

You understand what is the atomic, molecular, and so-called nanoscience. This is of the scale of maybe a few hundred nanometers and below. It is largely at a molecular scale.

Then you have another branch, the macroscopic size. If you think of a hunk of silicon that has certain electronic properties and things of that nature, you go smaller and smaller and smaller. There is this intermediate scale, not quite nano scale, but bigger than that at the thousand nanometer to sub-millimeter scale, microns scale, which we see popping up in very many things, from the properties of semiconductors to the new advanced materials, for example, high-strength steel. To understand this whole gradation of sizes is very important.

So I would not say it is a new area so much as a recognition that while we have made great progress in the nano scale and we know what bulk materials are, there is this middle gap where many of the properties of materials seem to lie.

Senator FEINSTEIN. Why is it necessary now?

Secretary CHU. We always knew that there are these size scales and that different things affect these different size scales. As we understand more about advanced materials and as we develop these diagnostics and see what are the material properties and what is the size scale that they are due to, we are finding out that the mesoscale is an important part of that.

Senator FEINSTEIN. We are going to have to talk more about it later.

Secretary CHU. I would love to brief you.

FUSION—INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR

Senator FEINSTEIN. Let us go to fusion and ITER and the $150 million this year with the United States contribution to ITER subject to grow to $300 million. Now, this is going to take money away from domestic fusion programs—they are already concerned about it at National Ignition Facility (NIF)—and also other scientific priorities such as materials and biology research.

Here is the question: Should the United States consider withdrawing from ITER or at least reducing the United States' con-

tribution? If we do continue to fund it, where will the $300 million come from?

Secretary CHU. Well, Senator, you are asking a very important question that we have asked ourselves. But first, let me assure you that the program at NIF is not actually competing with ITER. NIF is supported by the NNSA budget, and we want to make sure that that NIF program goes forward.

Now, ITER is an international science collaboration. In the view of the fusion community, it represents the most advanced, best chance we have of trying to control plasmas in a way that can potentially bring about controlled fusion for power generation. And it is an international cooperation. We want this to go forward. We want to be seen as reliable international partners, but we are also very cognizant of the spending profiles and we are working with the fusion community in the United States, as well as internationally, to see if we can satisfy both the needs of the fusion community in the U.S. and this ITER commitment. In these tight budget times, it is tough.

Senator FEINSTEIN. Yes. At a later time, I want to know where the $300 million is going to come from. If we keep continuing and do not know where we are going to get the money next year, that is a serious concern.

WASTE ISOLATION PILOT PLANT

The last question: Waste Isolation Pilot Plant (WIPP), New Mexico, currently operates to dispose of transuranic waste from DOE cleanup sites. We provided $215 million for WIPP operations. With this total amount of funding, the Department decided to put $37 million of it toward characterization activities. The fiscal year 2013 request for WIPP is $198 million, with $23 million allocated for characterization.

I have met with members of the Carlsbad community and force who are concerned that this total level of funding is not adequate. Can you speak to that? Is it in fact adequate?

Secretary CHU. Well, again, it is a very tight budget situation, but we believe it is. We enjoy the support of the Carlsbad community, and a lot of what we are doing there is very important not only for the disposal of the transuranic waste, the low-level waste, but potentially that type of geological strata could be useful.

Senator FEINSTEIN. Yes. I think Senator Murkowski has been working on this, as have Senator Alexander and myself. I think we would agree with that, and WIPP is really the only thing that we have at this time, it seems to me. So what I want to be sure of is that it is adequately funded. Can you say categorically that it is?

Secretary CHU. Well, we believe it is, but we understand your concerns with that. Again, it is one of several types of geological sites that we would be very interested in exploring vis-á-vis the BRC report.

But again, I am going to make it very clear. We have not even set up a process for actually doing sites, but just the research of salt and the research in the ability of salt to contain high-level waste is something we are looking at very seriously and following the recommendation of the BRC.

Senator FEINSTEIN. Senator Alexander.

Senator ALEXANDER. Thanks, Madam Chairman.

Two nuclear questions, Mr. Secretary, quickly if I may.

You have a decrease of 12 percent for nuclear energy, and most of it comes from reactor concepts which focuses on advanced reactors like fast reactors. Are those not essential if we are going to deal with the question of nuclear waste?

Secretary CHU. Well, we are going to have to deal with the question of nuclear waste. Period.

Senator ALEXANDER. But in the end, we will have to have a fast reactor. Will we not?

Secretary CHU. We may and may not. The verdict is not in. We do want to look at research, the idea that the fast reactors use high-energy neutrons that help burn down transuranic waste and greatly reduce the amount of eventual waste as compared to the electricity generated.

Senator ALEXANDER. Yes. And my second is you have $65 million for the small modular reactor, and I appreciate the chairman's willingness to support this while we take seriously the waste problem at the same time. But this is $30 million short of what we described last year. How does that meet the needs of the 5-year $452 million program that you outlined last year?

Secretary CHU. Well, again within our budgets, we are trying to move forward on this. We believe the money we asked for in fiscal year 2013 will help with the engineering design of two of these reactors. There are a number of companies that are gearing up. They see this as an opportunity for them, and so we are going to have to make some tough decisions.

If I may, I just want to go briefly back to the advanced reactor concepts.

Senator ALEXANDER. I have two or three more questions I want to ask you. So if I may, I just want to highlight these areas during the time allotted to me.

I mentioned in my opening remarks you have made good progress on cleaning up the radiological waste in Oak Ridge, but to date there are more than 2 million pounds of mercury unaccounted for and the continued releases of mercury in Poplar Creek run through the town. Do you have a plan for addressing mercury and its cleanup in Oak Ridge? And what steps should we begin to take to keep it from getting into the water?

Secretary CHU. First, you are quite right to be concerned about this. We have already taken some steps in the sense that when there are rains, we have a holding pond for the storm water so that the solids get deposited before it is returned to the river, and we know that this is mitigating this problem. But we eventually have to address this problem. It is a very important problem, and it is very much on our radar screen.

Senator ALEXANDER. Well, I appreciate your making it a priority. And Governor Haslam of our State and I and you—we have met on this, talked about it.

As we finish the cleanup job on radiological waste in Oak Ridge, I want to make it an increasing priority to develop a plan to clean up the mercury. And I look forward to working with you on that.

Because you visited there, you know this very well. This is not a remote site way out in the desert somewhere. This is a very highly metropolitan area which makes mercury in the water even more of an issue.

ENERGY EFFICIENCY AND RENEWABLE ENERGY INCREASE—WIND TECHNOLOGY

One other question: This is a time for priority setting. A 29-percent increase in energy efficiency seems to me to be not something we are likely be able to do this year, especially given the other important priorities in your budget.

But I want to ask you one other question. You said that you recommend extending the production tax credit and the 1603 cash grants which go primarily to wind developers who do not want to take the production tax credit. The Treasury Department says that over the 5 years between 2009 and 2013, that that cost taxpayers—those two things together cost $14 billion. The Joint Tax Committee says the production tax credit is $6 billion and the cash grants are $8 billion. Now, that is about $3 billion a year and we only spend a little more than $5 billion a year on energy research in our Government. I would like to get that energy research number up to $10 billion.

You have testified that wind is a mature technology. If it is and if we are in a time of priorities and if we need to double our funding for energy research, why would it not be a good idea to phase out these long-term subsidies. The production tax credit started as a temporary tax credit in 1992. Why would we not phase those out and use it for research, for your hubs, for solar, for carbon recapture, for offshore wind, but not to subsidize a mature technology?

Secretary CHU. I think there is not that much disagreement between you and the wind industry in the sense of allowing a phase-out period. But the wind industry has made great progress. It is becoming a mature technology, as they note. The good news is that their costs are becoming comparable to any new form of energy. They are still more expensive than new natural gas, but they are within striking distance. To actually begin to think of a way to phase this out is something that even the representatives of the wind industry acknowledge should happen.

Senator ALEXANDER. Well, that is an encouraging comment. My reading of history suggests that long-term subsidies—and 20 years is long-term—tend to cause costs to stay high instead of introduce the competition that cause costs to go lower.

But I have used all my time, Madam Chairman. Thank you.

Senator FEINSTEIN. Well, thank you very much, Senator Alexander.

Senator Johnson and then Senator Murray, Cochran, Murkowski, and Collins.

Senator JOHNSON. Secretary Chu, welcome and thank you for being here today.

As you know, over the past year, operations of South Dakota's Homestake mine have been moving forward and tremendous progress has been made on the development of the Sanford underground research facility. Given major scientific discoveries recently announced in the field of high-energy physics, it is more important

than ever that the U.S. invest in a domestic underground research facility in which we can provide global leadership in science and technology.

Unfortunately, it is my understanding that the Department's request would reduce funds for sustaining operations by about one-third below the fiscal year 2012 level. This reduction would likely result in layoffs at the lab and undermine confidence of our long-standing State, international, and private partners that have dedicated significant funding to this project.

How does the Department plan to sustain this critical U.S. underground research facility to continue to attract international interest and keep dedicated private and State partners together given the current budget request?

Secretary CHU. Well, Senator, we want very much to have this underground laboratory continue. We recognize the leadership of your State, actually of Mr. Sanford as well. We are completing plans for exactly what type of detector we are going to be putting in there for this long baseline experiment. There has been a shift. There have been new technology developments, and the Office of Science tells me that they think that a liquid argon detector might be the best detector. So what we have done is we have said, "All right, let us continue studying this liquid argon detector."

We do want to move forward on this type of work and this experiment. Despite all of the strains in our budget, we do believe that you cannot really tell where basic research will give us new insights and new opportunities. And high-energy physics, nuclear physics, cosmology, these are areas that are essentially flat, but we still treasure them and want to continue them.

Senator JOHNSON. The administration has been focusing on a broad energy policy to address high-energy costs which includes expanded domestic oil and gas production, alternative fuels, and energy efficiency. I do agree that oil and gas production can and should be increased in a safe and responsible way where we can.

But as you know, the United States has about 2 percent of the world's oil reserves and we account for about 21 percent of the world's petroleum consumption. Our current level of dependence on oil, no matter where it is from, subjects us to the price volatility of world oil markets and the shocks that come from both real and threatened supply disruptions. Accordingly, I would like to focus on the importance of diversity on our energy mix and specifically advances in biofuels that can be developed in rural America.

BIOFUELS

Could you elaborate on efforts in the budget both within DOE and across agencies, for example, with the Department of Defense (DOD) and United States Department of Agriculture (USDA), to drive development and commercialization of advanced biofuels?

Secretary CHU. Well, Senator, we share your enthusiasm for advanced biofuels. We think that research, development, and demonstration of those advanced biofuels is something very much in the interest of the United States so that we can diversify our supply of transportation energy. Liquid transportation energy will be with us in this century, and there is a great deal of pain that our citizens businesses feel if oil is the only source.

Now, the good news is that there has been remarkable research in transforming, biowaste feedstocks, feedstocks that do not necessarily compete with prime agricultural land for food. We are very bullish on this because this is one of the most rapidly advancing areas in science and technology.

We have these bio-energy centers that were started in the previous administration under Sam Bachman's leadership that are going great. As a measure of how well they are going, just this last year agreements with about 23 companies to share technology, now totaling about 50. In this ramp-up period over 3½ years, you just see it ramping up, but lots of people in the private sector have gotten very interested and are taking this technology. So that is a very good sign. That is a measure of success.

But we want to actually diversify not only for the biofuels but also so that electrification can take some of the load. Natural gas can take some of the load, that will also bring relief to Americans.

Senator JOHNSON. Thank you, Dr. Chu.

Senator FEINSTEIN. And thank you very much, Senator Johnson.

Senator Murray.

Senator MURRAY. Thank you very much, Madam Chairman.

And, Secretary Chu, welcome. Thank you.

You probably think all I care about is Hanford and the Waste Treatment Plant (WTP) because every time you are in front of us and we talk, I bring that up. And there is actually a real reason for that. It is one of the most difficult projects that DOE has ever undertaken, and the Federal Government, as you well know, signed a consent decree legally obligating itself to complete the cleanup of the Hanford site with very specific milestones.

It has been very frustrating over the past couple years. The funding needs that were identified by DOE have changed, and those milestones have not changed. And you can expect that the Congress does not like to be surprised. So it has been challenging. And over time, it has become even more difficult to understand how much annual funding you believed we were actually going to receive as you wrote that agreement, but it is pretty clear now that the Congress does not have ever-increasing funding to apply to one project.

WASTE TREATMENT PLANT

So as you draft a responsible spending profile as you again re-baseline the WTPs, I really caution you to be mindful of that and to work with all of us and consult with the Hill as you work on that.

But I did want to ask you, as you do work to re-baseline this funding profile, how will you make sure that your agency meets its obligations that were set forth in that consent decree and under the Tri-Party Agreement? And actually, what will happen if DOE fails to meet those?

Secretary CHU. Well, Senator, as you know, this has taken a lot of my personal attention, the attention of the Deputy Secretary, and the attention of the Under Secretary. We have made some changes in the program. I think we have brought in some very good people, and we are balancing the tank farm and the WTP project as much as we can. We are certainly working very hard and recog-

nize our obligations. We feel in fiscal year 2013 our obligations are going to be met. But you are quite right to be concerned, and we will work with you going forward.

Senator MURRAY. Well, what happens if the DOE does not meet the consent decree requirements?

Secretary CHU. First, we do not know for sure, but it really depends a lot on the budgets we do get from the Congress and what we can do with those——

Senator MURRAY. And what budgets the administration sends to us, I would add.

Secretary CHU. Right. Yes, it is a combination of both of those.

Senator MURRAY. Well, we need to be consulted as that moves forward. It is extremely important.

But, you know, the WTP has been under construction now for over a decade and has progressed to nearly complete design and more than 60 percent of the construction work is finished. Yet, here we are, well into this project, and there have been several significant technical issues raised about the WTP. These issues have been raised by people working on the site, by outside interests, and even the Department itself. Now, we all know the WTP is a one-of-a-kind construction project and some twists in the road are expected, but it is time to move here and inside those black cells, there is no room for error. And I wanted to ask you how confident you are that you have identified all of the major technical issues and that those can be resolved.

Secretary CHU. Well, the technical issues that have added to the budget demands are issues that were known several years ago, I think even known before I became Secretary. We are trying to resolve those issues with the Defense Board, with our people. We agree with you that once that goes hot, you want to make sure it is going to work. So that is why we, for the sake of prudence, agreed that we should do additional testing, for example, with the pulse jet mixers so that we have some confidence that there would be no unforeseen event that could occur that would mean we would have to go in once it is hot. There are several other issues, and we worked through those issues.

Senator MURRAY. What is your level of confidence?

Secretary CHU. I think with the pulse jet mixing, there are many ways of doing it. So we can buy additional insurance. It has to do with the solid waste and the suspension of the solid waste in the tank farms, and there are different ways of doing that. We could essentially pre-filter so that not all the solid waste goes in. So there are things like that just to give us added confidence.

In the meantime, we have a very rigorous way of testing whether it is going to work or not. So it is a program that we are going to be doing. Until we actually go through and then do the testing, I cannot really say.

FEDERAL ENERGY REGULATORY COMMISSION—BONNEVILLE POWER ADMINISTRATION

Senator MURRAY. Okay. Well, my time is almost out, and I did want to mention that you know that the Northwest is really struggling last spring with too much hydro and wind generation. And Federal Energy Regulatory Commission's (FERC) December ruling

caused more uncertainty. I am concerned about suggestions that FERC-mandated regulations are the best way to resolve renewable integration issues, and I expect to be consulted if at any point you or your staff are considering any policies that would increase FERC jurisdiction in the Northwest, directly impact our Northwest ratepayers, or affect our Bonneville Power Administration (BPA) rates. So I just wanted to make sure you knew that.

Secretary CHU. Absolutely. We will consult with you.

Senator MURRAY. Thank you very much.

Thank you, Madam Chairman.

Senator FEINSTEIN. Thank you very much, Senator Murray.

Senator Cochran.

Senator COCHRAN. Madam Chairman, we appreciate the Secretary's presence before our subcommittee today and thank you for your cooperation with us since your confirmation as Secretary of the Department of Energy.

I do not know of any hotter seat in the country right now than yours, looking at the gasoline prices at the pumps up and down the roads and streets and trying to imagine the challenges being faced by people who depend upon using their vehicles in business or for whatever purpose they have to use that vehicle. They have no other options. No mass transit in some cities and towns. People have to rely on that as their primary source of mobility. And once you start thinking about the consequences of ever-increasing costs of energy, including gasoline, in the operation of vehicles, we are going to be in really serious trouble. A lot of people individually are suffering terribly right now, losses of income and downturns in economic activities. Some businesses are becoming obsolete because they cannot function as they used to on gasoline that was more reasonably priced.

OIL PRICES

What is your outlook right now? What should we be doing as the Congress and you as the Secretary of Energy to turn this thing around?

Secretary CHU. Well, Senator, first I feel the pain of the American public, the personal stresses, as you very clearly described. There are many situations where you are in a certain situation. You have no other choice and you have to pay for that increasing gasoline bill. As the President has made it very clear, we are looking at every tool we have in order to try to bring down those prices.

In the tools that I have personally, we are all looking at, short- and mid-term, but they are rather limited. We are going to look at all those tools, but in the longer term the first thing is to help U.S. auto manufacturers build more efficient cars so that people can have those vehicles and have their mobility but not have to spend as much at the gasoline station.

We are very much trying to offload some of the things where we can offload. Natural gas—liquid natural gas vehicles for long-haul trucks already makes good commercial sense. So we at the Department of Energy (DOE) are encouraging this. Private enterprise is willing to fund a concern we know of, more than $300 million in liquefied natural gas stations because long-haul trucks that use diesel and go 100,000 miles consume 20 percent of our petroleum

energy for transportation in the U.S. So you can make a significant dent in that because of the fact that you do not need a service station at every corner. You need key service stations on interstates.

We are just announcing that we intend to—we are asking for comment right now, and we are going to put out a FAR on the street so that we can get compressed natural gas down in cost. The biggest cost is the storage tank in a delivery van vehicle or in a personal vehicle. So we are going to be looking at ways to reduce the cost of that storage tank, either better materials for the high-pressure tanks and research that allows us to use adsorbates in the tank so that you are going to have the same range with the same volume. If we can get that to occur, then we can offer to the public at large, not only the American public but the world a different kind of flex fuel. You can fill it up with natural gas or you can have gasoline or diesel. The same engine will burn both. So depending which cost of fuel is less, you have that opportunity.

We are doing anything we can do—we talked about biofuels. Batteries. Batteries are very expensive, but the research we have supported have done a great deal. Very recently one of our grantees has announced that they have just doubled the world record of energy storage in a lithium-ion battery where we think that the cost of manufacturing will be no greater. So we have just literally halved the cost of the battery. That company thinks they can halve it again. At that point, electric vehicles that have the same range as today's electric vehicles or plug-in hybrids become the low $20,000 range, and that would be fantastic because the costs of ownership would then be competitive and be even better than competitive with internal combustion engines.

So we are working very hard. We are very focused on this problem.

Senator COCHRAN. Well, I cannot think of another higher priority on our list of challenges that we face in the domestic economy than the cost of gasoline in operating vehicles, private family vehicles, those that are used in work and business. It is very disturbing, and I think we need to come together, the Congress and the executive branch, with a strategy that produces some results. You made an impressive list off the top of your head of things that are being done by the DOE, and I would just urge you to do more. Let us get on with it.

Senator FEINSTEIN. Thank you, Senator.

Secretary CHU. Can we just——

Senator FEINSTEIN. Go ahead.

Secretary CHU. We just had a quadrennial technology review, a very thoughtful report led by Steve Koonin, the Under Secretary of Energy. We made it quite clear in that report we have to reapportion the amount of money we are spending. We were spending far too little on transportation energy, and it was very clearly stated in that report that we have to refocus.

Senator COCHRAN. Thank you.

Senator FEINSTEIN. Thank you.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Madam Chairman.

And following on the discussion here, I think we recognize that there is no one silver bullet. We recognize that there is a—it takes

a long time to translate what you have been talking about into a difference in the market, the price to the consumer. They say that recognizing that it takes decades for a tree to grow to maturity, the best time to plant a tree is now.

We have faced the argument for decades now that, well, if you bring on additional oil out of Alaska's North Slope, particularly Arctic National Wildlife Refuge (ANWR), it is going to take too long to impact the price of oil or the price at the pump. And again, I am just reminded that it does take a long time to make it happen. So we should have started decades ago. That is my little pitch.

HYDRAULIC FRACKING

I am now going to talk about hydraulic fracking, if I may. And this is in regards to a comment that came from one of the members of the advisory board, your advisory board, Mr. Secretary, that looked at hydraulic fracturing. And we had had a presentation before the Energy Committee by the board. I thought it was a very informative report, and I was pleased to learn of their outcomes.

But one of the members, Mr. Zorbach from Stanford, said—his words, "We think the mystery surrounding hydraulic fracturing has actually been exacerbated and people have been paranoid really for no reason."

There is a lot of discussion right now going on about hydraulic fracturing and for lots of good reasons. We are seeing an incredible boon across the country in the Marcellus and the Barnett, and it is all because of the technologies that are out there.

I came from a hearing this morning where we had the head of the Bureau of Land Management (BLM), Mr. Abbey, speaking to what United States Geological Survey (USGS) is doing with their hydraulic fracking study, the rule that they will be promulgating sometime in April I believe. EPA is also doing a study.

The question that I would have to you—I understand in your budget, you are asking for $17 million to again review the process. You have clearly spent money to do this review, and the board has considered that. So I guess the question is: Do we need to spend an additional $17 million within the DOE budget when we have got other agencies that are also looking at it when you have already done it, and at least when one of your members has said there's really no reason for this mystery and the paranoia. So are we overlapping here?

Secretary CHU. Well, I sincerely hope not. The whole intent of having several agencies, Interior, EPA, and DOE to work together is so we do not overlap.

Senator MURKOWSKI. Are you working together I guess is the question that I am asking.

Secretary CHU. We have begun this process.

But as far as DOE's role, we with USGS, within the Department of the Interior, are pretty knowledgeable about how fluids move around in rock. We have gotten a lot more knowledgeable about oil and gas since the events of two summers ago. And our focus is let us help industry develop; let me also say they are making great leaps and improvements in their technology. So to continue to help industry improve their best practices so we can develop this very important natural resource in an environmentally responsible way.

So we see ourselves as technologists that can help understand when you frack, exactly what is happening, help control so that you do not over-frack.

Senator MURKOWSKI. Let me ask then on that because the process has been around for decades. It has been around for about 40 years. So what are you looking at within DOE in terms of the technologies that you are finding is new or unusual or can be enhanced or what have you?

Secretary CHU. Let me give you a couple of examples. Seismic sensitivity has been increasing over the last decade. So you know exactly how much to frack, when to stop. We think we can help with using potentially different fluids if there is a source of carbon dioxide. Carbon dioxide as a fracking fluid might be a good substitute for water if there is a readily available source; there may be in many regions because carbon dioxide is produced with oil and natural gas, things of that nature.

I think actually that is well under hand because industry has taken a leadership there already. You need antimicrobials. Some of the older antimicrobials could have a worse environmental impact. So industry, again, has gone in the right direction.

The subcommittee you spoke about talked about helping assemble data so that the industry can use it and know because best practices improve year by year. Those are some of the things we are thinking of.

Senator MURKOWSKI. Well, it is something I think—it is important for those of us that are looking at this from different agencies to understand that there is a different perspective that is ongoing because otherwise there is a lot of studies out there on a technology that, again, has been around for a long period of time, and we want to make sure that you are talking from agency to agency to understand what the purpose and the goal of your reports are.

Senator FEINSTEIN. Thank you, Senator.

Senator Collins.

Senator COLLINS. Thank you, Madam Chairman.

Secretary Chu, welcome to the subcommittee.

As you might suspect, I do want to talk to you today about deep water offshore wind and the demonstration project. But I want to begin my questioning today talking to you about the weatherization assistance program.

WEATHERIZATION PROGRAMS

There are four factors that make weatherization programs particularly important for the State of Maine. First, we have the oldest housing stock in the Nation. Second, some 80 percent of our homes use home heating oil, and with the price of oil going sky high, that places a real burden. Third, we are a low-income State with a lot of elderly individuals. And fourth—and I know my colleague from Alaska also has been concerned about this—has been the harmful reduction in the Low-Income Heating Assistance Program (LIHEAP). So the weatherization effort becomes even more important.

What we have found in Maine is that if you weatherize one of these older homes, the homeowner can save approximately $500 annually in heating costs, and that is real money that we are talk-

ing about. I know the Department's estimate is heating bills could be reduced by about 32 percent. Thanks in part to a grant from DOE, there are three new weatherization training programs at our community colleges and a technology center. And that is important because we need to train people who know how to do the weatherization effectively.

My question to you is: How committed is the Department to ensuring an adequate level of funding for weatherization. It has sort of gone up and down over the years. There was a big increase in the American Recovery and Reinvestment Act (ARRA). Then in 2011, it was $171 million. It dropped substantially last year, and now you are requesting about $136 million, which is way better than last year's final number, which was cut by the House, but it is still substantially below the fiscal year 2011 number.

Secretary CHU. Well, Senator, this is a very important issue. In fact, not only in your State, but in the entire Northeast, there is a lot of homes on home heating oil. I see several thousands of dollars worth of heating bills when you are on home heating oil, which is very, very scary.

So what are we doing? Well, within our budgets, we are trying our best. But there is something else I think we can do within our limited budget, and that is to look at ways to stimulate investments. Many of these people do not have the cash on hand, and yet, if they could get moderate cost loans, their out-of-pocket expenses would be zero, but their monthly expenses in the savings from the heating bills could be less—those savings could be greater than the payment of the interest and the principal. So if done right, we believe that is possible.

So what would be the structures in order to do this? Some States already have them. The utility companies could be a supplier of the capital, as long as the utility companies are allowed to make a return on that investment to help their customers. Home heating oil is not actually attached to utility companies, but utility companies do have access to capital. There may be other businesses that have access to low-cost capital.

We are also looking at Maine. It is already a brisk business, and we are looking at how can we help in the wood chip/wood pellet because there, if done right, you are using your forests in a recycled way. So your net carbon is zero in terms of that. It is much less expensive right now than home heating oil. We are also doing research on taking biomatter in what is called a pyrolysis. It does not convert it into diesel or gasoline, but that is a technical issue that we have to stabilize that, but it could be a direct subsidy for home heating oil.

So, we are looking at it in a number of ways to bring relief to much of the Northeast. Even with this expansion of natural gas, we look very hard into is it possible to run natural gas lines. In many places we find it is not. They are either too remote, the ground is too rocky—there are many, many reasons why you cannot do that. So we are looking at all the ways to bring relief to Americans with respect to heating.

Going back to efficiency, it is really getting a financial mechanism in place where people who do not have the $5,000 or $10,000 can they get something where the repayment of that debt is less

than the savings that they make on a yearly basis. We all recognize that we will not have the ability to invest the way we did during the ARRA days. This is some of our thinking.

Senator COLLINS. Thank you. I will wait for the next round for the next question.

Senator FEINSTEIN. Thank you very much, Senator Collins.

Senator Tester.

Senator TESTER. Yes, thank you, Madam Chair.

Real quickly, Dr. Chu. You are a smart guy, a researcher. From what you know about fracking right now—because I get different input from different folks, I do not know if either one of them knows exactly what they are talking about. But from what you know about fracking right now, is it having negative impacts on our water?

Secretary CHU. Well, I would say from what I know about fracking, you can develop it in an environmentally responsible way.

Senator TESTER. Is it being done that way now?

Secretary CHU. Well, I cannot guarantee that everyone who is fracking is doing it that way, but certainly what appears to be is that a lion's share of the people are doing it responsibly.

TECH TRANSFER

Senator TESTER. I am interested in developing and expanding tech transfer from research agencies throughout Government to the private sector. I think it is important. In recent years, DOE has done a great job, probably the best of any agency. In 2009, your agency had 15 times the number of active licenses as the Defense Department.

With those successes that you have had in tech transfer, have you been able to recommend to other agencies a way to implement—to repeat your success as far as tech transfer goes in other agencies?

Secretary CHU. We are always talking to other agencies, as we are also trying to improve the way we transfer technology even within the DOE. Thank you for that praise, but we can actually do better ourselves and are very focused on that because, as I think Senator Alexander said, our research universities and our national labs are an incredible asset.

Senator TESTER. And I appreciate that. I think you do a good job. I think you probably just admitted you can even do a better job. I would just encourage you to share any sort of information that you have to other agencies so that they can do as good a job as you.

FUEL CELLS

In the 2012 State of the Union Address, President Obama exhorted the Congress to not let other countries win a race to the future, saying that he would not cede the wind, solar, or battery industry to China or Germany because we refused to make the same commitment here. Given that Germany, Japan, and South Korea's commitments, among other countries, to fuel cell electric vehicles and hydrogen infrastructure, are we ceding to other countries?

Secretary CHU. Well, this goes, I think, back to the statement of Senator Alexander again. There was a question about our FE budget and our solid state fuel cells. We still want to continue the sup-

port of fuel cells for transportation. We think solid state fuel cells are in a stronger position. Industry is investing pretty heavily in it—United Technologies Corporation (UTC), Rolls, others. And so again, with a tough decision, we think solid state fuel cells are actually getting to the point where they, especially for backup power and a substitute for emergency diesel, look increasingly promising. So we do not want to cede fuel cells.

I would also say that through DOE investments, there has been remarkable progress in fuel cells themselves in reducing the costs and increasing the longevity. It is not completely there yet, but there has been remarkable progress there.

The bigger issues have to do with the storage of hydrogen, something that we still want to work on because it is compressed hydrogen. We now have an additional incentive, as I said before, about the adsorbate natural gas storage. So we see those as real opportunities.

Senator TESTER. So you are still moving forward on your commitment to fuel-cell technology.

Secretary CHU. Yes. But the solid state ones are in a better technological place, a more mature place.

Senator TESTER. Have you had the opportunity to meet with industry to ask them whether the policies that you have are adequate to keep the industry here?

Secretary CHU. Several times. They are very concerned, and they have convinced me that we want to keep this program going.

BONNEVILLE POWER ADMINISTRATION—PUMPED STORAGE HYDRO

Senator TESTER. Real quickly because I am about out of time. I want to talk about pumped storage hydro, and I will not go through all this. But 2 weeks ago, you testified in front of the Senate Energy and Natural Resources Committee that you are pushing BPA to do more pumped storage hydro. I am sure you know the background on this. Does this mean that you will reconsider the project awaiting investment which will push aside last year's by BPA in Montana?

Secretary CHU. Well, that is trickier. You are absolutely right. I am pushing BPA to begin. They have within their series of dam within their jurisdiction, they can pump from one dam to another. And the first pass, they have looked at it, and they said there were other ways of solving this problem. But they are looking at pumped hydro. It does get trickier once you are pumping from someplace in Montana. Legally they are permitted to do it. That is my understanding, but I have to get back to you on that.

We are also very much committed to very inexpensive forms of utility-scale storage at the cost of compressed air or pumped hydro, but anywhere in the world is something that would be very important for the development of our grid system.

Senator TESTER. Thank you, Madam Chair.

Thank you, Dr. Chu.

Senator FEINSTEIN. Thank you, Senator Tester.

Senator Graham, welcome.

Senator GRAHAM. Thank you, Madam Chairman.

Are you having fun, Secretary Chu?

Secretary CHU. Oh, sometimes and sometimes not. Sometimes they are more fun than others. Thank you for asking.

Senator GRAHAM. Thanks for being willing to serve. I know it is tough at times.

YUCCA MOUNTAIN

I want to talk to you about a couple things very quickly. Yucca Mountain. Do you envision President Obama being able to certify that Yucca Mountain will be the central repository for spent fuel?

Secretary CHU. Do I envision that? Well, I think——

Senator GRAHAM. Probably not?

Secretary CHU. Probably not.

Senator GRAHAM. Okay. Well, that is an honest answer, and I agree with you. I disagree with his conclusion, but I think that is probably where he will be.

So I have legislation. There are $35 billion sitting in a trust fund that is being collected from ratepayers all over the country to deal with the spent fuel issue, and we got a big hole in the ground and nobody is going to use it at least for spent fuel. So I have got legislation that says that 75 percent of the $35 billion will be rebated back to the consumer through the utilities so people can get a reduction in their power bill for the money they have already paid, and the other 25 percent will be used to upgrade on-site storage facilities in a manner to make sure they are safe. If we do not have a central repository, we are going to have to use existing facilities at least for a while.

Does that make sense to you?

Secretary CHU. Well, Senator, I am going to side with the BRC on this one. I think that we have a spent fuel problem, and the BRC has recommended, we are collecting a lot of money directly from the people who generate that power. We would like that money to go directly to this issue so that we actually begin to solve this.

Senator GRAHAM. How much did Yucca Mountain cost thus far? How much have we spent on Yucca Mountain?

Secretary CHU. Certainly billions, but I do not know exactly. We can get the number back, but I think you have it.

Senator GRAHAM. Well, I do and I will not share it with you. I will tell you later. It is not $35 billion. I guess my point is that I do not see any system costing $35 billion. So we would like to work with you to get some of this money out of the trust fund back to the ratepayers and in all seriousness improve on-site storage because there is not going to be anything new in the next 5–10 years.

Senator FEINSTEIN. Oh. We will talk.

Senator GRAHAM. Okay. She is going to fix it.

Assuming that Senator Feinstein does not fix it in the next 5 years, I think we need to improve on-site storage. So I would like to talk with you about how to do that with existing funds.

NUCLEAR REACTOR LOANS

The loan guarantee program. I am very impressed with the administration's embracing the nuclear power. Quite frankly, I think you have been very pro nuclear as Secretary of Energy. Do you still support the loan guarantee program for nuclear power reactors?

Secretary CHU. I do.

Senator GRAHAM. And the couple that are being built now in South Carolina and Georgia—you would urge the country to stay behind that program, building these two reactors?

Secretary CHU. Yes. I think it is important, with the good Senator from California here as well, I think it is important that we have a diversity of energy sources. I think the power countries themselves do not want to be——

Senator GRAHAM. I do not want to speak for her, but I think her concern is what do you do with the spent fuel because if you build more reactors, you got more spent fuel. So if we can solve that problem, we kind of help her.

So I appreciate you supporting the loan guarantee program. I think as a temporary program, if we can get a handful of these things up and built, the private sector will have more confidence in building reactors.

So the other issue is the Savannah River site has—you have got $15 billion underfunded pension plans. We are going to transition in January 2013 to a new healthcare retiree benefit plan, and we are working with your office about how to do that gradually and fair to people on fixed incomes. So I am going to personally visit with you on this to make sure that we can transition to a new healthcare benefit without putting people who have won the cold war in unnecessary jeopardy.

Secretary CHU. I would be glad to.

Senator GRAHAM. Will you please tell the people at the Savannah River site we are talking?

Secretary CHU. Yes.

Senator GRAHAM. Okay, good because I hope they believe me, but we are. We are really working hard on that.

OIL/GAS

Now, let us talk quickly about gas. You are for small modular reactor research? That could be the future?

Secretary CHU. I think it is going to be a very important part of our energy option.

Senator GRAHAM. Okay. I could not agree with you more.

Now, how many barrels of oil do we use a day in America?

Secretary CHU. Barrels of oil we use a day. I have to work backwards. We are producing about——

Senator GRAHAM. What if I said 20 million?

Secretary CHU. That is about right.

Senator GRAHAM. So how many do we produce here at home?

Secretary CHU. Petroleum liquids generalized.

Senator GRAHAM. Oil.

Secretary CHU. Oil includes petroleum liquids as long as it goes into a refinery. About 12, almost 11.5 million barrels if you include just the petroleum liquids.

Senator GRAHAM. I was told 7 million.

Secretary CHU. That is why I was so careful.

Senator GRAHAM. Well, the bottom line is I know what Senator Murkowski said was true about planting a tree, but I am of the opinion if we announced tomorrow that we would embrace responsible extraction in ANWR, reopen the eastern Gulf in a robust way,

and signed the Keystone Pipeline agreement with Canada and made it a reality, that the market would respond positively to that because that would create 3 million barrels of domestically produced oil or bought from Canada, one of our best friends. Do you think those three announcements would have a positive effect on oil prices in our efforts to be energy dependent?

Secretary CHU. As we announce more tracts of offshore oil and Federal lands open for exploration and bids, that directly does not seem to have as big an effect as one might think.

Senator GRAHAM. I do not want to take time away from Senator Reed. He has waited patiently.

I just cannot believe that it would be a positive. I do not think it would be a negative thing. I just cannot believe that you cannot say yes because clearly, if we opened up more domestic production and bought oil from Canada and created 3 billion barrels that we do not have today, people would see that as a positive sign. I just encourage you to look at those three things.

Thank you for your service.

Senator FEINSTEIN. Thank you very much, Senator.

Senator Reed.

Senator REED. Thank you, Madam Chairman.

Thank you, Mr. Secretary, for being here.

I want to associate myself with the comments that the Senator from Maine made about weatherization. I thought she was particularly eloquent and precise about the importance of the program. And I appreciate your response which is, you know, we are trying to compensate for the fact that we will not see this money go up again. We all understand, as Senator Collins pointed out, there was a big burst of funding under the Recovery Act. It took a while to get out.

WEATHERIZATION

But I think there is an important point to be made. The studies I have seen suggest that for every $1 we invest, we get $2.51 back in terms of demand reduction, in terms of avoided costs. We have also put, as you certified last December—we met the Recovery Act goal of 600,000 homes weatherized; 14,000 jobs were supported. Up our way, this is not just an issue of demand reduction and compensating for the LIHEAP. This is good work for people who are really out—you know, they are carpenters and they are tradesmen and women, et cetera.

So I appreciate your very thoughtful ways of trying to get around a lack of funding, but I think the point that I would make—and I hope you would agree—is that this is a program that can be justified based upon its cost benefits, its job creation, its demand reduction. And I do not think either she or I or Senator Murkowski—I will just speak for myself—are going to just simply sit back and say, well, that is not worth pursuing. I think we have got to pursue this weatherization more aggressively. And so your comments.

Secretary CHU. As we rebuild the infrastructure, weatherization, and energy efficiency in buildings I see as something we could be doing for the next 30, 40, 50 years creating jobs at home and helping American families and businesses save money. It is one of the big opportunities we have to grow our economy, to grow our jobs,

to help us save money. That money goes directly back into the economy. So it is a very big deal, and we will be looking at spending a lot of time on programs such as the Better Buildings program, programs that we can actually get off the ground because it can be leveraged. I see a leverage of 100 to 1, a much bigger leverage, and I see the opportunity for decades of growth.

Senator REED. Well, I do too, and I think that is why we—I will speak again for myself—we are going to push very hard to get more resources for weatherization.

The other irony is it took such a long time to get these programs up and running. If we let them atrophy, which this budget will, we will be right back where we started from in 2009 which is the States were not prepared to spend the money. We did not have the certified weatherization people. Now we are ready to move. I mean, you demonstrated that when you concluded we finally met the Recovery Act goal and we have supported those jobs.

So I think we are just going to ask you, in your internal counsels, be aggressive about not just alternatives to weatherization but weatherization.

RESEARCH AND DEVELOPMENT EFFORTS

Let me ask you another question, Mr. Secretary, just as a general comparison. I cannot think of anyone more superbly qualified to lead our research efforts when it comes to R&D in sophisticated energy technologies. How is your budget and how are we doing relative to other countries? And is that a source of concern to you or confidence?

Secretary CHU. No. It is a concern to me. If I look at other countries and how they are borrowing from our playbook—we have a long history of funding our research and development through our national labs, through our universities, and even in some companies. They see this as a great way to speed up their development, their competitiveness.

If I look at, for example, a random country, China—not quite random—the Chinese Academy of Sciences have been increasing their efforts, it is not an honorific society there. It is a funding agency. Their budget, 20 percent per year over the last decade. They are thinking of going to 30 percent per year. When you are compounding at 20 and 30 percent per year, this is remarkable. The number of undergraduates who graduate with degrees in engineering, in the physical sciences has gone up fourfold, fivefold. Ours is roughly flat. These are disturbing trends.

Senator REED. Just a final point. It sort of reminds me of the United States in the 1950s and 1960s where we were, through NASA, through the National Science Foundation, spending, relative to the rest of the world, huge amounts of money, and we were benefitting from it for the last 20–30 years, and now the wheel is turning, I think, the wrong way.

But thank you very much, Mr. Secretary.

And thank you, Madam Chair.

Senator FEINSTEIN. Thank you very much, Senator Reed.

OIL/GAS

Now, one question on gas. I have been reading articles that say there is ample supply to meet the demand in America today, and in fact, companies are selling oil from America abroad. Are both of those statements correct?

Secretary CHU. Well, if you look at the net import of——

Senator FEINSTEIN. I do not want to waste a lot of time. Can you say yes or no?

Secretary CHU. Right now, the net export/import of refined products has tipped a little bit towards export. We refine a lot of diesel that we do not use here we ship to, for example, Europe and we import gasoline.

The net import of petroleum and petroleum products—we are still importing 48 percent roughly.

Senator FEINSTEIN. So it is not fair to say that we have ample supply for current demand.

Secretary CHU. We do not have ample domestic supplies of oil or petroleum products today. That is correct.

Senator FEINSTEIN. Thank you very much.

NUCLEAR SAFETY

Now, let us go to the nuclear stuff. When all the reactors except for two went off line in Fukushima, it really caused me to think. One of the things that I have learned is that you cannot out-guess Mother Nature, and therefore going beyond design specification in these reactors is important.

We started last year trying to help you by including money to work with industry to improve fuel cladding, and you had mentioned fuel cladding and the small modular reactors and accident-tolerant fuel. We did this because experts believed zirconium fuel cladding played a role in Fukushima, and that when the ability to pump water into the reactor was lost at Fukushima, the zirconium cladding failed and then likely released the uranium pellets. Once the rods reached more than 1,200 degrees Celsius, the zirconium is believed to have interacted with the steam to produce hydrogen which accumulated and then exploded. Is that a fair statement?

Secretary CHU. That is certainly what we suspect. First, lots of things will melt at very high temperatures, but zirconium is known to interact at very high temperatures with water to create hydrogen. And there were hydrogen explosions.

Senator FEINSTEIN. So I think Senator Alexander mentioned that we had that meeting. I remember it well on December 14 with you and the two chairs of the BRC, and the four of us resolved that we would work together, the authorizers and the appropriators. We will shortly have another meeting and try to move from there.

This is disjointed, but the other day, the chief executive officer (CEO) of Pacific Gas and Electric Company (PG&E) walked in and said that they are ready to move nuclear waste now. I mentioned that to staff. They said so are others. Senator Murkowski's State has had big quakes. Oregon has had big quakes. We in California have had big quakes. We have two huge reactors right on the coast. I am where I am and we have to do something about it, and it is so hard to move this.

I am very frustrated by it because we know what we have to do. I think Senator Alexander, at least, and I will likely be in strong agreement that we have to move it, and we have to enable people to move their waste. Everybody talks about nuclear. It is 20 percent of what we have, and it is 70 percent of the clean energy. But if it is not safe and if we cannot do anything with the fuel other than store it next to a reactor, count me out. I mean, I do not want to be there. I now know that a 30-foot tsunami hit, and people say, "Well, do not worry. It is not going to happen on the California coast." I do not know that and you do not know that. And getting rid of the waste—securing the waste, to me, is all important.

So if there is anything that you need in this budget to do it quicker, faster, to make the decisions quicker, faster, at least I want to advocate for it.

So here is my question. Do you have what you need to get a new nuclear waste policy and find a repository and/or storage to move all of this burgeoning waste?

Secretary CHU. We would need your help and support, the help and support of this subcommittee, because as the BRC noted, in order to move forward in an expeditious way and an effective way, would require a modification of the Nuclear Waste Act. Meanwhile, we share your sense of urgency, that is why when I spoke with both of you we were taking steps to begin the standards and get licensed not only on the dry cast storage but the container that you can use to ship it and get the Nuclear Regulatory Commission (NRC) to license several of these things, we are on our way to doing that. There are a few standardized designs. The spent fuel in your sites is in very large casks not suitable——

Senator FEINSTEIN. All I know is what the CEO told me——

Secretary CHU. Right.

Senator FEINSTEIN [continuing]. That they are ready to transfer.

Secretary CHU. In addition, the BRC pointed out that there are sites where you no longer have operating nuclear reactors and yet we are spending a lot of money to guard that material. They said you can begin to consolidate those sites, which means you have to begin to work towards getting NRC-licensed containers for the dry cask storage. There are several vendors who have these designs. We are, within the Department, working towards that. So we can begin to consolidate. We have 104 operating sites, and there is probably half a dozen that are no longer in operation. It is a terrible burden to be having guards and guns for those sites.

Senator FEINSTEIN. We have a no earmarks policy. I feel passionately about this. I want to find a way to get you what you need. Can you put on a piece of paper what you need? We are to have a meeting. The chairman of the authorizing committee has already taken some action and done a lot of work, and we will be meeting and talking with him and with Senator Murkowski about that. I would like to bring to the meeting what, if we took an aggressive position, could be done from the Department.

Secretary CHU. I would love to do that. As we talked about before, there are things that we can do now this year and next year, but we would also like to get moving on things that we can do to set up this public/private that we also talked about and how to get that going as well and begin to have access to the yearly take of

the money that we are charging ultimately the ratepayers so that one has direct access to that. But we agree in the first year or so, it would need DOE action and what can we do to get it started. In the longer term, I think the recommendation of the BRC should be taken very seriously about this.

Senator FEINSTEIN. And we do.

Secretary CHU. You know, private partner organization.

Senator FEINSTEIN. I think we are both in agreement. Are we?

Senator ALEXANDER. Well, yes, sure. We are agreed on taking it seriously. Absolutely.

Senator FEINSTEIN. Well, that is what he said.

Secretary CHU. I mean, the exact design we do not really know, but all of us should be considering that very seriously.

Senator FEINSTEIN. Well, if WIPP can be used for a repository, if the State wants to do that, it seems to me that there may be other places too. But you have got to go on a search. We have got to look and I think move relatively quickly.

Secretary CHU. The good news is there are other States who are beginning to show interest.

Senator FEINSTEIN. Well, that is good. Then we need that process. So if you would do that——

Secretary CHU. Right.

Senator FEINSTEIN. That is a commitment.

Secretary CHU. Right, it is a commitment.

Senator FEINSTEIN. Thank you.

Senator Alexander.

Senator ALEXANDER. Well, I appreciate the chairman's comment. There is a scientific principle that I have forgotten which basically—I think it starts with an S which says that when you can, you try to do something the simplest way possible, not the hardest. Maybe if you want a loaf of bread, you do not go to San Francisco and then to Alaska and then down to the corner grocery store. You walk straight to the grocery store and come back.

And I think one of the things that we need to do—and I am absolutely committed to work with——

Senator FEINSTEIN. I know you are.

NUCLEAR WASTE STORAGE AND DISPOSAL

Senator ALEXANDER [continuing]. The Senator from California on this—is we need to be really creative and think of what is the simplest way to do this right, not what is the most complicated way to do it right, and look at a variety of options.

I mean, we have a really ridiculous situation here. I mean, the $35 billion just in a pile that we cannot spend. We are collecting $750 million a year, some number, that we cannot spend, and we should not be collecting it if we are not going to spend it. And the practical thing would be to probably do this in some stages because there are some closed sites where it is very expensive to have all the security just to guard some used fuel. There are some other sites, such as the two reactors in California, where they would like to get rid of their used fuel probably more rapidly than some other sites. And we ought to be able to figure out a simple way to accommodate that.

So I am looking forward to this. I am thinking of this particularly since I have such a strong ally here—I am a strong ally of hers. I think we can figure this out, and I am determined to set in motion a process that begins to deal with this problem. And I appreciate the help you have given us so far.

I want to switch gears a little bit. I have two questions I want to ask.

ADVANCED COMPUTING

One is about advanced computing. Is it your goal that the Office of Science have the world's most powerful supercomputer?

Secretary CHU. It is our goal that we not only have the most powerful supercomputer but that it is put to the maximal use. The ability to now simulate things that we could never have dreamed of simulating 10 years ago and 5 years ago are helping industry immensely. Our first hub—you call them mini Manhattan Projects, I wanted to call them Bell Lablettes——

Senator ALEXANDER. That would be good.

Secretary CHU. Because it was a mixture of the Manhattan Project and the radar lab at MIT and what I saw at Bell Laboratories.

Our very first hub was computer simulation for nuclear because anything you do in nuclear takes a long time, very expensive, NRC approval. For example, simulation so we can make safer fuel rods to the Senator's point.

Senator ALEXANDER. Well, we agree, Dr. Chu, that we ought to have the most powerful computer if we are going to maintain our competitive position in the world. When I first got here, Senator Bingaman encouraged me to go to Japan and see their simulator. At that point, Japan had the most powerful computer, and thanks to Senator Bingaman—and I was involved—we introduced legislation and pretty soon the United States had taken over the lead, and we held it for a while. Now China has the most powerful computer.

Secretary CHU. We are third.

Senator ALEXANDER. And we are third. Japan first, China.

Secretary CHU. We are third. We have five of the top 10——

Senator ALEXANDER. Well, the point I am getting to is there was a reduction of $11 million for the leadership computing facilities, and I am concerned about that. I would like to look for other parts of this budget and fill that back up because I am afraid that might interfere with our goal of having the world's most powerful supercomputer for all these goals that we share I think.

Secretary CHU. Well, we will certainly work with you and the Congress.

You may not know. We just had a workshop to help improve the transfer of technology of the national labs with industry. There was one on materials and there was one on high-performance computing. I attended both of them and gave talks at both of them.

Senator ALEXANDER. Good.

Secretary CHU. I outlined during my, I think, 35-minute talk some of the incredible achievements that we have been able to do with high-performance computing in industry to give us technological advantage.

Senator ALEXANDER. I am agreeing that they are very important. I just want to make sure that we upgrade the new leadership class of supercomputers so we can maintain that lead.

I have one question I would like to ask and that will be it for me.

EFFICIENT AUTOMOBILES

I had an interesting visit not long ago with the chief executive officer of a major automobile company who produces electric vehicles. And I said to him, well, I guess you have told your engineers that you want a 500-mile battery. He said, no, I have told them I want a $20,000 car because people who drive—and I am one who does—electric cars now on the average drive it 30 or 40 or 50 miles a day. Until we satiate that market, it is more important to me commercially to have a $20,000 car rather than a 500-mile battery.

What would your comment be on that?

Secretary CHU. I absolutely agree with you. It could go up a little bit to $23,000. When you are in that range, guess what. It is cheaper to own that car and operate it than it would be to own a $16,000 gasoline car. That is what will generate real excitement.

Senator ALEXANDER. Cheaper to own it than a what?

Secretary CHU. Than an internal combustion car. If you drive 10,000 miles and let us suppose that your internal combustion car has reasonably good mileage, combined city and highway of, let us say, 30 miles to a gallon, in today's prices you are paying $1,400 a year in gasoline. If you take a Nissan LEAF—and how much are you paying for electricity? Well, it depends, but if it is 10 cents a kilowatt hour, you are paying $300.

Senator ALEXANDER. I have a LEAF and I plug it in in my apartment at night.

And I think back—if Senator Collins will excuse me for telling a story on her time, but we never know what the marketplace will tell us. I remember when Federal Express first saw a fax coming in in the 1980s, they wondered how it would affect their business. And so Fred Smith, who is almost always right, came up with the idea of putting a FedEx fax machine on every corner, and you would walk down to the corner and send your fax and get your fax. Of course, that was not the way it worked. People got them at their homes and their offices.

And I wonder about the charging stations. I do not mean to get you in a long discussion about it. But I just plug my LEAF into the wall at night on 110-volt battery and that turns out to be plenty for me. I do not have a charging station which is recommended by most people. My guess is that it is likely that instead of a lot of charging stations everywhere, which I have supported in the past, that we will get the battery up to a certain level, the people will just plug it in at home and at work, and that will be it for 95 percent of the plug-ins.

Secretary CHU. I am with you. I think if you get a 100–150 mile range, that is going to make it work, there are people in rural areas who need more range, of course. But once you get a cheap battery, then the plug-in hybrid also becomes very inexpensive.

Senator ALEXANDER. Yes, that is true. That may be the way the market goes.

Thank you.

Secretary CHU. Well, either way, we are very pro that.

Senator FEINSTEIN. Thank you very much, Senator Alexander.

Senator Collins.

Senator COLLINS. Thank you, Madam Chairman.

And, Senator Alexander, that was a very interesting discussion, and I think that you raise a good point.

I am looking to generate that electricity for your LEAF through the production coming from deep water offshore wind energy to help provide the electricity to charge your LEAF and other electric cars.

Secretary Chu, I want to thank you again for coming to the University of Maine and seeing the consortium of public/private partnership that we have there that truly has the potential to position America as the global leader in the field of clean-energy development, as well as creating a lot of jobs in the manufacture of composite wind turbines.

OFFSHORE WIND

And it has been a very long road, as you know, to get to this point, but I am very pleased that the Department has made good on its commitment to dedicate $20 million for offshore wind demonstration for this fiscal year. I really do not want to see other countries in the world, which are making investments in offshore wind energy, beat the United States because we did not make sufficient investments to spur the kind of private investment that is going to be needed.

With the funding opportunity announcement for offshore wind advanced technology demonstration projects, we have an opportunity to really position our country well. And I know that the commitment is for $160 million over the next 5 years. To reach what I understand is the ultimate goal of the $20 million for this fiscal year, $160 million over the next 5, of $180 million over 6 years, what portion of the fiscal year 2013 EERE budget request do you plan to devote to offshore wind demonstration projects?

Secretary CHU. Well, Senator, my trusty staff just gave me the numbers.

Senator COLLINS. You have good staff.

Secretary CHU. Yes, I do.

So offshore wind funding in the fiscal year 2013 request is $36.2 million; fiscal year 2012 enacted, $37.2 million. It is essentially flat.

We do want to concentrate on offshore wind. In fact, we shifted it completely to offshore wind, as you well know, because as the good Senator from Tennessee knows, it is a mature technology.

Senator COLLINS. For onshore wind.

Secretary CHU. But he can probably get his offshore wind from the Great Lakes. But in any case, we remain committed to developing this technology.

Senator COLLINS. I do think it is very important and that it is going to require a sustained, clear Federal investment in order to secure the matching private investment and bring this to fruition.

I have learned that many other countries such as the United Kingdom, Canada, Germany, and Portugal have established test

sites for ocean energy, and they are funding the environmental permitting. They are providing the electrical infrastructure, including the undersea cabling and the grid interconnection for these test sites. And then private industry comes in and has these ready sites to build on and to test the advanced offshore wind turbines.

Do you see the Department as developing plans that would be similar to other countries and, in particular, to help them develop these offshore sites that have the grid interconnection?

Secretary CHU. I think certainly you are correct, and many of the countries in Europe which have very limited land and the ability to construct large wind farms on their land look to offshore for the same reasons we look to offshore. If you can bring the cost down, it is certainly, in terms of the impact on people, a lot less.

We would have to look at that. There was for a while—I think it is still alive—a consortium that was looking at, along the Atlantic coast, having a direct DC line in part because by constructing a DC line from—I think it is—Virginia, someplace around that, up to the mid-Atlantic States, that could be actually funded by just the ability to transmit electricity and then when people can put their turbines. So we would certainly consider looking at these partnerships to do something like that.

Senator COLLINS. I very much hope you will since that infrastructure does not exist now as you go further north, and when you look at where the population centers are, there really is great potential for tapping the offshore winds which are so strong off the coast of Maine.

Madam Chairman, I would like to, since my time has expired, submit for the record some questions that I have on modernizing nuclear weapons, a whole different issue. I was a supporter of the New START treaty. I was one of the Republicans who did vote for the treaty. And my decision was influenced in part by the administration's commitment to modernize the U.S. nuclear weapons complex, and I am concerned about the dollar levels in this budget not matching the commitment that I thought we received. So that is a complicated issue and rather than trying to get into it today, if I could, with your permission, submit those questions for the record.

Senator FEINSTEIN. Absolutely.

Both Senator Alexander and I were aware of what was involved in that. The problem is our allocation. Our allocation does not allow it because there is the security part of the budget, and there are the other portions, energy, Army Corps of Engineers. The security part is always expanding and it is pushing out the other part of the budget. So it is complicated and difficult.

But thank you.

Senator COLLINS. Thank you, Madam Chairman.

Thank you, Mr. Secretary.

Secretary CHU. You are welcome.

BLUE RIBBON COMMISSION RECOMMENDATIONS

Senator FEINSTEIN. Before we let you off the hot seat, I think you are aware that the fiscal year 2012 bill directs you to develop a strategy for the management of spent nuclear fuel 6 months after

publication of the BRC report. So I want to politely, respectfully, and in awe remind you that the clock is ticking.

I understand you have set up a task force within the agency to develop that strategy. Could you tell us a little bit about the progress you have made so far?

Secretary CHU. Well, we have stood it up. This is also, as you might guess, an interagency issue as well, and there must be lots of discussions with the other relevant parts of our Government to move forward on this. I think both of you know where I stand on it. We do want to move forward on this issue. It is a solvable problem, and I would agree with Senator Murkowski. The full quote that I remember is it takes 20 to 30 years to grow a tree, so you better plant it today.

Senator FEINSTEIN. Right. We also provided funds to jump start the BRC recommendations——

Secretary CHU. Right.

Senator FEINSTEIN [continuing]. To study management models, to begin characterizing potential geologic media for a repository, and to develop new transportation aging and disposal casks. Are you using that money, and if so, for what?

Secretary CHU. We have contracted Research and Development Corporation (RAND) to look into the details of any design of what organization might be. So we have contracted RAND.

We are in discussions with the University of Chicago to look at what would be a good business model. There are serious questions having to do with Government-liability issues. You cannot have an organization not have the liability and the Government have the liability and they go off and do something. They have to have the liability. But ultimately it is the Federal Government, DOE's responsibility, but you have got to design it right. Otherwise you can get into a very perverse situation where you have an organization doing something. Oh, by the way, they do not have the liability. So we have done things like that.

As I said before, we are looking at how to proceed with at least consolidating the storage sites. As Senator Alexander said, there are sites that are motivated to move it off their site. There are other sites, if properly compensated, would not mind. So that is part of the simple walk to the grocery store.

Senator FEINSTEIN. Have you spent the 2012 money?

Secretary CHU. I cannot say how much of it we have spent, but we have not been idle. We can give you a detail of some things we have done.

Senator FEINSTEIN. I think somebody behind you knows.

Secretary CHU. Pardon?

Senator FEINSTEIN. I think somebody behind you knows.

Secretary CHU. All he said is we have the base financial report. We will give it to you.

Senator FEINSTEIN. Yes. I really want to know. Do you need continuation of the funding in 2013 or do you have enough funds?

Secretary CHU. We can supply you with all that information.

But within our jurisdiction now, we are not sitting idly by. And the things that we hope the Congress will allow us to act on—we are moving forward on these things because many of the rec-

ommendations we believe are sound recommendations. The details need to be spelled out.

Senator FEINSTEIN. Well, could we receive in writing how these monies have been used this past year——

Secretary CHU. Sure.

Senator FEINSTEIN [continuing]. And what the plan is for 2013?

Secretary CHU. Yes.

Senator FEINSTEIN. Thank you very much.

Senator Alexander.

Senator ALEXANDER. It is the law of parsimony which is succinctness or economy. The simplest answer is the best. It is the idea of walking to the grocery store instead of going through San Francisco and coming back. That is what Spencer Wells—I first saw that in the work he—he is a National Geographic explorer who has done all the work about DNA archaeology, and he talks about the law of parsimony. I think we should apply that to what we are doing and use the creative talent of our Nobel Prize winning Energy Secretary to say, now, just forget about all the hoops we have to jump through, you know, the Congressional Budget Office.

All those things can theoretically be changed by law. So if we did not have to think about all the problems that we have, as we jump through this, what would be the common sense, simple way to accelerate finding a safe, adequate place, maybe step by step, to put used nuclear fuel? And then what steps would we need to take as Members of Congress to get it done? And I bet if we thought about it that way, that we might surprise ourselves with a simpler answer.

So I am going to try to apply the law of parsimony to the problem of used nuclear fuel.

Senator FEINSTEIN. I agree with you on the law of parsimony. I also know this is an election year, and this is controversial. We want to make progress, so it is very frustrating. I think what Senator Alexander is referring to is just tell us what you think, disregard everything else. Tell us what you think straight on.

ADDITIONAL COMMITTEE QUESTIONS

Secretary CHU. I think we had a great session in your office, and I would love to continue that because we were exploring our ideas in that session.

Senator FEINSTEIN. Okay.

No other questions?

[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

HEALTH, SAFETY, AND SECURITY

Question. Secretary Chu, you are proposing to eliminate the Illness and Injury Surveillance Program (IISP), the only active surveillance program across the Department of Energy (DOE) and National Nuclear Security Administration (NNSA) that allows for an immediate evaluation and monitoring of potential health effects of working at these nuclear sites. This program benefits active works—both Federal and contractor employees—who put their lives on the line on a daily basis working with nuclear material. The IISP currently monitors the health of approximately 79,000 current Federal and contract workers at 13 DOE/NNSA sites across the

country, but this budget proposes to shift the funding for this important program to the National Institute for Occupational Safety and Health (NIOSH) for unrelated health studies, which would not actively monitor and survey workers.

Can you please explain the reasoning behind your proposal to eliminate this program and shift work to NIOSH?

Answer. The reference to the Department of Health and Human Services (HHS) in the Office of Health Safety and Security (HSS) fiscal year 2013 budget request is specifically associated with the public health studies activity. That funding supports the conduct of public health studies and other activities performed by HHS on behalf of DOE through NIOSH, the National Center for Environmental Health, and the Agency for Toxic Substances and Disease Registry to provide third-party objectivity regarding the effect of DOE operations on communities surrounding DOE sites. The public health studies activity is not associated with the epidemiological studies or IISP.

DOE Office of Health Safety and Security (HSS) has re-examined every aspect of its budget to identify opportunities to reduce spending. Programs are assessed to determine:

—overall value to the health, safety, and security posture of the Department;
—if HSS is the proper organization for funding responsibility versus the DOE Program offices, other staff offices, the sites, or another department or agency; and
—overall priority among activities for which HSS has funding responsibilities.

Upon examination of the IISP, HSS determined that the program is:

—redundant of other mandatory corporate injury and accident data collection systems, such as the Occurrence Reporting Program System (ORPS) and the Computerized Accident/Incident Reporting System (CAIRS);
—better conducted and paid for by the site organization(s) since it is voluntary; and
—of a lower priority than other programs for which HSS has sole or primary responsibility, such as nuclear safety and cyber security oversight.

BONNEVILLE POWER ADMINISTRATION

Question. Secretary Chu, as you know, 19 out of 21 bipartisan members from the Pacific Northwest recently sent you a letter describing our view that the Bonneville Power Administration (BPA) environmental redispatch policy issues should be resolved in the region, where we have a long tradition of working together to resolve difficult challenges. The Northwest delegation has a long history of working together across State and party lines to support the work our region does. Let me reiterate to you that I fully expect you to consult me should you or your staff consider any proposal that would increase Federal Energy Regulatory Commission (FERC) jurisdiction in the Northwest, impact Northwest ratepayers, or affect BPA's rates.

As I told you, I am concerned about suggestions that FERC-mandated regulations are the best way to resolve this issue and other renewables integration issues. As you know, the Northwest suffered as a result of out-of-control energy markets during the West Coast energy crisis. And, our region has thrived without this additional layer of Federal regulation—for example, my understanding is that there is now more than 4,000 MW of wind connected to BPA's system.

Do you support regional solutions to renewables integration issues?

Answer. Yes, I have supported BPA's collaborative working relationships with its customers and stakeholders to seek regional and legally sustainable solutions to the environmental redispatch policy issues and other regional issues. My understanding is that BPA also is working collaboratively with its customers and stakeholders to develop open access transmission tariff provisions that address renewables integration issues in a manner that recognizes the diversity of interests involved and seeks to develop a regionally acceptable balance of them.

Let me assure you we are very supportive of maintaining the excellent and effective cooperation that Bonneville has developed with regional stakeholders, including the Northwest Congressional delegation. You and the rest of the Northwest delegation will continue to be consulted on these issues to ensure that the concerns of your constituents are understood and appreciated.

Question. Some potential solutions are short-term and others long-term. Are you aware of all of the short-term solutions BPA has taken the initiative to implement to deal with these new operational challenges?

Answer. Yes. My staff and I are familiar with many of BPA's activities, starting with reconvening the Wind Integration Forum Steering Committee to analyze solutions and their costs and benefits. My understanding is that BPA and regional stakeholders have developed a significant number of new operating tools and business practices over the past 24 months. These include:

—regulation sharing;
—intra-hour transmission scheduling;
—a new electronic bulletin board for intra-hour transactions;
—new scheduling protocols for wind generators;
—improved wind forecasting;
—flexible bilateral contracts; and
—a new dynamic scheduling system.

There have also been initiatives developed to explore ways to leverage diversity in variable energy resources between balancing authorities. These tools will be evaluated in various combinations as a further extension of the region's bilateral markets. The region has also looked at potentially reconditioning the Keys Pump Generating Plant.

Question. What additional short-term actions have not been explored in your view?

Answer. I have confidence that BPA and the many regional stakeholders involved have scoped all viable options and that all of the short-term actions have been or are currently being explored.

Question. Do you agree that long-term solutions need to make sense operationally and economically?

Answer. As with all significant infrastructure, longer-term solutions, such as new storage, additional transmission, and better utilization of the grid, can be expensive and could affect grid reliability and safety. Before deciding which long-term solutions are appropriate, I agree that BPA and the region must determine how they might affect current system operations, whether they are cost-effective and, if so, how to fairly allocate those costs consistent with law.

Question. Mr. Secretary, I have seen statements from you and your senior staff that there is a general need for more transmission. This Committee supports our Nation's energy infrastructure and wants to assure it is clean, adequate, reliable, and safe. I am concerned, however, about views that transmission isn't being built in my part of the West.

The Northwest has a long history of building transmission when it's necessary and economically sound to do so. I am aware of transmission projects that are being built or are in environmental review by various entities, including BPA. In fact, BPA recently completed the 75-mile McNary-John Day transmission project, and is looking at more transmission in the region based on need.

If there was a market for more transmission, wouldn't those additional projects already be reflected in what currently is being studied?

Answer. I have been very appreciative that utilities in the Pacific Northwest, including BPA, have been very active in planning, siting, financing, and constructing new transmission lines, and we are very pleased with BPA's completion of the McNary-John Day line under budget and ahead of schedule. I know that BPA also pioneered the Network Open Season model to determine the market demand and business case for transmission system expansion, and BPA is working with regional customers to continue to refine that model. I also want to challenge BPA and other utilities to maximize the capability of existing transmission infrastructure to gain efficiencies. We are committed to overcoming any significant barriers to construction and financing of additional transmission capacity in those cases where there is a legitimate business need for transmission.

Question. The Northwest, including British Columbia, has a long history of mutual cooperation to operate one of the largest clean power systems in the United States. I'm hearing from my constituents that you may have a differing view.

What specifically would make you conclude that there isn't operational cooperation?

Answer. I understand that there is a long history of cooperation among utilities within the Pacific Northwest. At the same time, the generation landscape in the Northwest and the rest of the United States has evolved to the point where non-utility developers play a very significant role in the wholesale power market. I am interested in challenging all utility and non-utility participants within a regional grid to work together to maximize opportunities to gain efficiencies and otherwise promote the public interest.

I believe there is significant operational cooperation between the utilities, wind developers and advocates, policy makers, and regulators in the Pacific Northwest, but there is always room for improvement. The Nation can look to the Pacific Northwest as a model for such cooperation and improvement. We want to promote parties' interests in pursuing even greater cooperation to enhance their own systems as well as building on the legacy of operational coordination that has been going on for decades.

If there are efficiencies to be captured from operational improvements in the West, what specifically do you believe they are, and who do you see as the financial beneficiaries of any savings?

Answer. Efficiencies may be achieved by a more reliable and cost-effective system with lower costs of managing system variability with more efficient use of available assets. However, issues and efficiencies will vary by region and should be worked out by an inclusive regional committee. I believe the efficiencies will bring broad benefits, but decisions must be informed by rigorous cost-benefit analyses involving all relevant stakeholders in the region.

FUEL CELL AND HYDROGEN PROGRAM

Question. Secretary Chu, this committee expressed its support last year for "stable and consistent funding, now and in the future," for fuel cell and hydrogen energy technologies.

Why was the budget for these programs cut by more than 40 percent overall? Why was the budget for these programs in Energy Efficiency and Renewable Energy (EERE) cut by 20 percent while EERE overall was increased by more than 25 percent?

Answer. The budget request for hydrogen and fuel cells has been reduced as part of rebalancing the Department's portfolio of advanced technologies. However, hydrogen and fuel cells remain an integral part of that portfolio. The budget request for fiscal year 2013 allows the Department to focus on hydrogen and fuel cell activities that will yield technology advancements in key areas—including ongoing reductions in the cost and improvement in the durability of fuel cells, reductions in the cost of renewably produced hydrogen, and improvements in systems for storing hydrogen. Within EERE, funding has been reduced for aspects of the program with less impact on research and development (R&D) progress, such as technology validation, codes and standards, and market transformation. Rebalancing the portfolio will allow the Department to focus on nearer-term transportation technologies while maintaining a robust longer-term effort in hydrogen and fuel cells to address fuel cell vehicles in the 2015 timeframe and beyond.

Question. The Obama administration has championed regulations to reduce pollution from power plants and from idling trucks. The Solid State Energy Conversion Alliance (SECA), the solid oxide fuel cell (SOFC) program in the Office of Fossil Energy, is developing and commercializing technology to address these issues that will result in highly efficient power from gasified coal and natural gas, and eliminate idling emissions with auxiliary power units

Why did the budget request propose elimination of SECA, which meets this important goal?

Answer. The Clean Coal Research Program has prioritized development of near-term carbon capture utilization and storage (CCUS) technologies, to be available for demonstration in the 2015 timeframe. As a result, fiscal year 2013 funding for longer-term fuel cell technologies has not been requested. Some SECA Core Technology R&D will continue in 2013 using prior year funding. Industry team work on fuel cell stack technology to enable low cost, 50 percent-plus efficiency, 99 percent carbon capture power generation systems will also continue—at reduced scale. Work will focus on improving fuel cell stack reliability and endurance and on preparing for the manufacturing of a 250 kilowatt (kW) SOFC system module. Demonstration and testing of this system module, which represents a building block of future multi-megawatt coal-based power plants, will be delayed from 2013 to 2015. Development and demonstration of commercial-scale fuel cell systems, as a CCUS transformational technology, can still remain on schedule for 2020, dependent upon future program funding.

As you may be aware, South Korea has made SOFCs a major part of their clean-energy plan. Additionally, the United States recently negotiated a free-trade agreement with South Korea.

Question. As I am sure you are aware, South Korea has made SOFCs a major part of their clean-energy plan. We just completed a free-trade agreement with South Korea last year.

Are you concerned that eliminating support for this technology will drive the industry overseas?

Answer. Although support for SOFC technology has been deferred to allow funding for higher priority CCUS technologies, both Core Technology and Industry Programs will continue to be supported in fiscal year 2013 using prior year funding. Industry teams have communicated their commitment and domestic investment in R&D to make progress towards improving fuel cell stack reliability and endurance.

OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY

Question. Mr. Secretary, you have called attention to the Nation's chronic underinvestment in R&D supporting the modernization of the electric power grid. I am referring specifically to grid-scale energy storage technologies and other control technologies that will enable the integration of larger shares of renewable energy, give operators better tools to manage the grid in real time, and make it more reliable and efficient.

Moreover, DOE's Quadrennial Technology Review (QTR) emphasized grid modernization and related R&D as critical to many of the strategic areas highlighted in the Review. So, I am concerned and puzzled by the substantial cuts to the Office of Electricity Delivery and Energy Reliability's (OE) R&D budgets in your budget request. For example, the Smart Grid R&D budget request for fiscal year 2013 is 40 percent lower than the fiscal year 2012 budget, and the request for energy storage R&D is 24 percent lower than last year.

It appears that some $20 million is carved out from existing OE R&D programs for an Electricity Systems Innovation Hub. I strongly support the inclusion of the Innovation Hub, but I am not comfortable with the proposal to fund it by reducing other OE R&D programs that are strategically critical to achieving many of our national energy policy goals, that have been—by the Department's own acknowledgement—historically underfunded, and that are already being reduced in the fiscal year 2013 budget request.

Could you explain your strategy for the Office of Energy Delivery, as it is reflected in the budget request?

Answer. The fiscal year 2013 budget request of $143 million for the OE supports the President's commitment to an "all-of-the-above" energy strategy that includes critical investments in innovative technologies, tools and techniques that will enhance the capabilities of a modern power grid. As such, strategic decisions were made to prioritize activities providing a balanced portfolio of projects and activities that increase electricity reliability and security nationwide by taking a systems-level approach to grid modernization, developing the computational capabilities to improve system planning and operations, and emphasizing cybersecurity. Fiscal year 2013 also reflects our ongoing efforts to continue to leverage funding throughout the Department, with other Federal agencies and the industry to maximize cost effectiveness.

Question. How is this request consistent with DOE's emphasis in the QTR and elsewhere, in which grid modernization has been identified as a key priority for DOE and the Nation?

Answer. The fiscal year 2013 request factors in grid-related R&D investments across the Department such as storage, power electronics, and control architectures that are being explored within Advanced Research Projects Agency-Energy (ARPA–E) programs. Strategic priorities and tradeoffs were made to maximize resources and results while at the same time minimizing programmatic impacts. Investing in the Electricity Systems Hub will allow us to focus on the seam between transmission and distribution—a pinch point of grid modernization where power flows, information flows, policies, and markets intersect—to tackle the critical issues and barriers associated with integrating, coordinating, and facilitating the numerous changes that are happening system-wide. The Hub activities will accelerate adoption of new technologies within a policy and regulatory framework that allows efficient utilization of assets and capital investment, including minimizing consumer costs for grid modernization.

Question. What steps will the Department take to ensure that any Electricity Systems Hub funding does not come at the expense of key ongoing OE R&D priorities, including energy storage, advanced modeling, and smart grid analytics?

Answer. The Grid Tech Team, with DOE-wide representation, has been established through the Office of the Undersecretary of Energy to focus on improving communication and coordination across the Department on grid-related R&D. This diverse group is tasked with developing an internal strategy and identifying priorities for grid R&D. The Electricity Systems Hub is one of many topics that are under the purview of this group and efforts will be made to balance strategic priorities and limited resources. The Electricity Systems Hub will serve as a platform that can support ongoing OE R&D priorities, including energy storage, advanced modeling, smart grid analytics, cybersecurity, as well as the ARPA–E investments in power electronics and control architectures.

Question. Mr. Secretary, I am likewise concerned that DOE is proposing to fund multiple Electricity Systems Innovation Hub with a $20 million budget, while each of DOE's previous innovation hubs has been funded at $20–$24 million each. In the Pacific Northwest, we are keenly aware that "one-size-fits-all" solutions to electric

grid issues don't work—there are simply too many key differences between regional systems.

But at the same time, the Northwest and its institutions have a history of pioneering technologies and grid management paradigms (such as Phasor Measurement Unit deployment and some of the earliest real-world experiments in demand response) that have been subsequently and successfully exported to regions across the country and other nations across the globe. Moreover, the stated purpose of the hub concept is to accelerate innovations that can deliver national outcomes, such as enhanced energy security, and to enable new markets and technologies that will bolster U.S. leadership in global energy markets.

Please describe the steps the Department will take to ensure that the effectiveness of any Electricity Systems Innovation Hub(s) will not be diluted by the proposed budget number, coupled with the concept of multiple hubs. If the Congress chooses to fund the hub(s) as proposed, will the Department seriously consider limiting the number of hubs to a manageable, non-dilutive number?

Answer. Ideally, the Electricity Systems Hub will be comprised of two to three regional hubs that will communicate, coordinate, and collaborate on a regular basis. Linking activities and comparing results from the different regional hubs will help identify solutions that can be applied across the Nation while simultaneously addressing unique regional challenges. The decision to pursue one, two, or three regional hubs will ultimately depend on the cost-share generated to leverage the Federal investment and the quality of the applicants.

Question. Likewise, will DOE consider a mechanism that allows for linkages or participation in multiple hubs, in order to maximize learning, innovations, and commensurate benefits for consumers?

Answer. Regional hubs are expected to routinely communicate, coordinate, and collaborate in order to identify innovative solutions that are broadly applicable. The Electricity Systems Hub will produce valuable information that will be disseminated to various stakeholders to ensure shared learning.

Question. DOE's proposed 3-to-1 industry-to-Government cost share for the Electricity Systems Innovation Hub sets a potentially high hurdle and, by some accounts, will be prohibitive to the assembly of successful public-private partnerships given the patchwork of regulatory requirements under which electric infrastructure owner/operators including utilities currently operate. Please explain the Department's rationale in requiring such a high private sector cost share: can the Department cite successful precedents?

Answer. DOE recognizes that a 3-to-1 cost share is an ambitious target, but the ratio has been proposed to ensure stakeholder commitment to the regional hubs. Teams are expected to apply with representation from industry, academia, national labs, utilities, States, and other relevant stakeholders. DOE believes there will be sufficient interest in the Electricity Systems Hub to generate significant cost-share which includes direct funds and contributions in-kind. However, we understand your concern about this significant a cost-share requirement, and DOE will evaluate this factor as it develops the solicitation.

WATER POWER PROGRAM

Question. Secretary Chu, as you well know, my State of Washington relies on hydropower for the majority of its electricity supply. Hydro is the main reason the Northwest as a whole has a lower air emissions profile and enjoys some of the lowest electricity rates. Northwest projects are at the forefront of innovation, employing new technologies, operating regimes, and environmental enhancements—some of which resulted from the DOE waterpower program.

You have indicated your support for the potential of hydropower as an "incredible opportunity" that our "lowest cost, clean energy option," and the thousands of jobs it can create across our country.

The Water Power Program also supports R&D on emerging technologies in the marine and hydrokinetics arena. Washington State has tremendous potential for this technology, and if we can get this off the ground, this work could provide the basis for a base load source of clean energy—a consistently stated priority of yours and the President.

But despite these factors, your budget yet again proposes to cut the program—this year by 66 percent from fiscal year 2012 levels.

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

Answer. A robust $59 million budget in fiscal year 2012, a nearly 70 percent increase over fiscal year 2011, has allowed the Department to continue and complete a number of important water power technology R&D projects. The $20 million requested in fiscal year 2013 would allow the Department's Water Power Program to

complete the majority of its ongoing research efforts to advance water power technologies and accelerate their market adoption. This funding level would allow DOE to support a number of water power technologies for both conventional hydropower and the emerging marine and hydrokinetic (MHK) energy technologies. For hydropower specifically, DOE selected 16 new innovative hydropower technology development projects for funding in fiscal year 2011, and that work will continue into fiscal year 2012 and fiscal year 2013. Additionally, DOE expects to continue its efforts to analytically quantify the benefits that conventional and pumped-storage hydropower provide to the electric grid, which can also support the integration of variable renewable resources like wind and solar. For MHK technologies, fiscal year 2013 activities will focus on developing and demonstrating a suite of technologies that harness the energy from wave, tidal, and current resources. Specifically, MHK research is expected to focus on development and maintenance of advanced open water test infrastructure for MHK devices (including at the Northwest National Marine Renewable Energy Center) and research into the costs and performance of innovative, early-stage MHK systems and components. Finally, the Department anticipates completing resource assessments in fiscal year 2012 and fiscal year 2013 to accurately characterize all opportunities for water power development. DOE intends to use data from ongoing techno-economic MHK assessments to establish baseline levelized energy costs for these new devices, which DOE will use along with resource assessments to evaluate the opportunities for further innovative water power R&D. The identification of potential future water power research needs for beyond fiscal year 2013 will consider available opportunities and the progress of ongoing research efforts.

Question. You recently characterized the Department's intention to continue to support the development of hydrokinetic renewable energy as distinct from run-of-river hydropower and new hydro at existing dams, which you described as "very mature technologies."

However, there are no currently active solicitations under the Department's Water Power Program, for hydrokinetic or any other technologies.

Can you clarify when the Department intends to issue new funding opportunities for hydrokinetic technologies, and what aspects of hydrokinetic development will be supported by these solicitations?

Answer. DOE is pursuing an aggressive research, development, and demonstration effort to determine the technical and economic viability of a wide range of MHK technologies. We seek to advance the technology readiness of MHK systems through cost-shared industry research and demonstration projects. DOE is currently supporting more than two dozen such projects and has recently notified two applicants whom had been selected as alternates for previous funding opportunities that they will now receive funding. The Department is currently evaluating options for future funding opportunities for MHK technologies and will notify interested parties via a Notice of Intent or Funding Opportunity Announcement when more information becomes available.

The Department also intends to complete a comprehensive techno-economic assessment in 2013 that will assess the viability of MHK systems and identify strategic opportunities to develop and deploy these systems in the near term. DOE is also addressing environmental and permitting issues in order to proactively address environmental performance issues and lower these costs to developers. Finally, the Department has also established three National Marine Renewable Energy Centers that are centers of excellence for ocean energy, and these Centers will cost-effectively support industry demonstration and performance monitoring (technical and environmental) efforts. In fiscal year 2012, we are investing heavily in testing infrastructure for these Centers as directed by the Congress, and the Northwest National Marine Renewable Energy Center recently began its first rounds of in-water testing.

QUESTIONS SUBMITTED BY SENATOR MARY L. LANDRIEU

STRATEGIC PETROLEUM RESERVE

Question. Mr. Secretary, I see that in your budget you propose using the $2.4 billion remaining in budget authority related to the 2011 Strategic Petroleum Reserve (SPR) selldown to purchase 27 million barrels of oil to replenish the reserve. I am very interested in the management of the SPR, not only because of its great importance to national security, but also because it is located on the gulf coast and largely stocked with oil produced on the gulf coast. I will point out that this purchase of 27 million barrels—which will not even refill the reserve—is coming at a time when oil prices are relatively high. Given that I opposed the initial sale of oil from the

SPR, I am concerned about your plans to both manage and refill it, particularly in light of continued threats of unrest in the Middle East.

Will this remaining balance of $2.5 billion be adequate to replenish the emergency supplies of oil we so quickly sold off last summer, given that $2.4 billion will purchase roughly 24 million barrels of oil, which is short of the 27 million you intend to buy and the 31 which were actually sold out of the SPR?

Answer. The SPR will develop an oil acquisition plan to repurchase, over a 5-year period beginning in 2013, 27 million barrels of the 31 million barrels sold using funds available in the SPR Petroleum Account, which will provide the Nation with sufficient import protection.

Question. With the threat of further unrest in the Middle East, will the Department of Energy be recommending a further selldown of the SPR, and if so will it propose a timely replenishment of the stocks sold off?

Answer. The United States and the International Energy Agency are monitoring the global markets and are in daily communication on supply and distribution issues. The SPR has not been directed to sell additional stocks and we cannot speculate about the replenishment of supplies.

Question. Mr. Secretary, I also see that funding for both Research and Development activities—activities like developing both new reactor technologies and ways to extend the life of our existing fleet—are being cut by 35.9 percent. With this funding being used to develop the next generation of reactor technologies, including Small Modular Reactors and the Next Generation Nuclear Plant (NGNP), and extend the life of existing reactors, I am concerned about the effect this cut will have on nuclear technology into the future.

Where does this reduction in funding leave our efforts to develop new reactor technologies?

Answer. The Advanced Reactor Concepts research and development program remains an important program for the Department. Reflecting difficult resource allocation choices, R&D activities associated with lead/lead-bismuth and fluoride high temperature reactors will be significantly reduced. The energy conversion R&D, which includes supercritical CO_2 turbomachinery and related heat exchangers, will be consolidated under the Small Modular Reactor Advanced Concepts R&D Program in fiscal year 2013. Impacts to sodium-cooled fast reactor R&D will be minimized as much as possible given this concept's potential role in addressing fuel cycle issues, and in order to sustain collaborations conducted under international programs such as the Generation IV International Forum and various bilateral international agreements. Fuel development efforts that support sodium-cooled fast reactor technology also continue under the Fuel Cycle R&D budget. The funding request for the Next Generation Nuclear Plant Demonstration Project is sufficient to fund the research activities in fuels and graphites, including essential irradiation and post-irradiation examination.

Question. What effect will this have on our existing reactor fleet, given that these funds are also used to extend the life and improve the performance of existing reactors?

Answer. The Light Water Reactor Sustainability (LWRS) program is extremely valuable for addressing both the safety and economic issues that could affect how long our existing fleet of nuclear power plants operates. Under an austere budget, we made some very difficult prioritization decisions. To reduce costs, we are maximizing opportunities for cost-share with industry by working very closely with the Electric Power Research Institute (EPRI). DOE believes the budget request maintains the necessary research on the most critical issues to support the continued operation of our existing nuclear fleet.

QUESTIONS SUBMITTED BY SENATOR FRANK R. LAUTENBERG

Question. The fiscal year 2013 budget dramatically cuts funding for the Princeton Plasma Physics Laboratory (PPPL) and general fusion research. In response to these cuts, DOE's Fusion Energy Sciences Advisory Committee (FESAC) sent a statement to the Office of Science stating that "real damage" would be done to U.S. fusion research. In addition, the committee said the proposed funding levels would not support a viable fusion research program and that U.S. scientific leadership would be jeopardized.

How do you respond to the concerns of the scientists on the FESAC?

Answer. The fiscal year 2013 budget proposal was developed with a long-term vision for the U.S. fusion energy sciences program. When viewed within the context of competing national priorities for energy research, the fiscal year 2013 budget addresses the highest priorities in the realm of fusion energy research.

With the fiscal year 2013 budget request, the U.S. continues to have a strong investment in fusion research. The United States is a partner in the International Thermonuclear Experimental Reactor (ITER) Project, which is designed to be the first magnetic fusion facility to achieve self-sustaining ("burning") plasmas and, thereby, open a new era in fusion energy science. The proposed budget will sustain a viable U.S. program that will continue to make significant contributions to resolving vital issues in fusion research and, thereby, contribute to building the scientific foundation needed to develop a future fusion energy source.

The fiscal year 2013 budget positions the fusion program to maximize the scientific return on our investment in ITER; address gaps in materials science, required for harnessing fusion energy; continue to steward the broader plasma sciences, taking advantage of cross-agency synergies and provide opportunities for U.S. scientists to conduct research on a $1 billion-class of new international superconducting facilities. Although the proposed budget will present challenges, it will allow the U.S. to continue to have a dynamic domestic fusion program.

Question. DOE administers the Weatherization Assistance Program (WAP), which creates jobs and helps reduce energy costs for low-income families. Due to reductions for the program in fiscal year 2012 appropriations, you chose to allocate funds for project year (PY) 2012 based on remaining funding from the American Recovery and Reinvestment Act (ARRA). Unfortunately, since the Christie Administration was slow to spend the ARRA funding, New Jersey received zero funding under the WAP for project year 2012. Last month, I sent you a letter asking you to reconsider DOE's decision to eliminate weatherization assistance funding for New Jersey for project year 2012.

Have you decided whether to adjust the funding formula for project year 2012 to ensure that New Jersey and other States will receive at least some weatherization funding this year?

Answer. The 2012 Consolidated Appropriations Act provided $65 million to WAP for allocation of formula grants to grantees for the 2012 fiscal year—a funding level that is less than one-third of the amount provided in the 2011 Appropriations for the WAP. The Congress also provided the Secretary of Energy with the authority and a strong recommendation in House Report language to use an alternate methodology other than the formula established in regulation to distribute the available funding—taking into consideration unspent ARRA balances and other resources available to grantees in 2012 from the U.S. DOE.

The Secretary exercised this authority and allocated program year 2012 funds to ensure two major outcomes:

—grantees that spent their ARRA funds on time have adequate DOE funds to maintain their operations at post Recovery Act levels; and

—all grantees have adequate funds to operate throughout program year 2012, given the fund balances that are already allocated but remain unspent.

The allocations were based on the following criteria:

—Use of an appropriation amount of $210 million as the base "PY12 Target Allocation" for establishing funding for each grantee. This is the amount that would have been awarded to grantees through the funding formula as established in the regulations based on a $210 million Appropriation by Congress in 2010.

—Whether a significant portion of the "PY12 Target Allocation" was available in ARRA balances for at least one-half of the program year 2012. Program year 2012 "Target Allocations" were adjusted downward for grantees with significant ARRA balances.

The DOE contacted the New Jersey Department of Community Affairs explaining the alternate formula and DOE's determination to allocate zero funds to the State of New Jersey, which has a total of $26.2 million in unspent WAP funds as of August 2012.

QUESTIONS SUBMITTED BY SENATOR JON TESTER

FUEL CELLS FOLLOW UP

Question. You stated that you have met with members of the fuel cell and hydrogen energy industry "several times" to discuss the industry and if you are taking adequate measures to keep it from moving overseas.

Please provide the dates of the occasions that you have met personally with members of the fuel cell and hydrogen energy industry to discuss these issue, and a list of attendees at those meetings.

Answer. The Secretary met with members of the fuel cell and hydrogen energy industry on the following occasions:

September 29, 2009: Tour and meetings at Rolls-Royce Fuel Cell Systems in North Canton, Ohio;

March 3, 2010: Meetings at United Technologies Research Center included meetings on Fuel Cells;

April 13, 2010: Met with Jadoo Power, as part of a constituent event with Rep. Doris Matsui;

August 22, 2011: Met with the South Carolina Hydrogen and Fuel Cell Alliance;

January 9, 2012: Meetings on Fuel Cell Technology with manufacturers at the Detroit Auto Show;

March 5, 2012: Visited the Fuel Cell Research Lab at Indiana University-Purdue University, Indianapolis; and

May 10, 2012: Meetings and panel discussion with the Hydrogen and Fuel Cell Technical Advisory Committee.

Question. In your answer to my question regarding our commitment to this technology compared to that of Japan, Germany, and South Korea, you spoke only about stationary fuel cells.

What are you doing to support the introduction of fuel cell electric vehicles and hydrogen infrastructure, does industry believe it is sufficient, and if not, are you prepared to cede this industry to overseas competitors?

Answer. The Department includes hydrogen and fuel cells as an integral part of its advanced transportation technologies portfolio, maintaining the necessary pace of advancement in anticipation of fuel cell electric vehicle (FCEV) commercialization in the 2015 timeframe and beyond. To support the introduction of FCEVs and hydrogen infrastructure, the Department is focusing on critical research and development (R&D) to address the key barriers of hydrogen production and delivery, as well as key analyses to determine technology gaps and focus areas. For example, the Department actively monitors the efforts and plans of Japan, Germany, and South Korea along with other countries, through the International Partnership on Hydrogen and Fuel Cells in the Economy, which is comprised of 17 nations and the European Union, as they relate to deployment of FCEVs and hydrogen infrastructure. Domestically, the Department coordinates closely with similar FCEV and hydrogen infrastructure planning efforts and State initiatives including in Hawaii, California, and New York. The Department also provides critical analysis of issues related to FCEV deployment and hydrogen infrastructure and continues to support data collection from FCEVs and key refueling infrastructure technologies ($2.4 million for five projects announced on July 18, 2012). In addition, the Department plans to continue analyses and workshops to leverage synergies with natural gas infrastructure.

HYDRAULIC FRACTURING

Question. Mr. Secretary, both your Advisory Board Shale Gas Production Subcommittee and the National Petroleum Council have released reports about Hydraulic Fracturing and domestic production of oil and gas. These reports provides suggested steps Government, industry, and researchers need to take to assure that we have a balanced regulatory regime to protect development and citizens. If there isn't public trust that this technology can be used safely, that will inhibit future development. I believe the industry is starting to recognize it.

With this new input on from these independent panels, what is your agency doing to implement the recommendations?

Answer. The Department of Energy (DOE) is working with the Environmental Protection Agency (EPA) and United States Geological Survey (USGS) to identify research priorities and collaborate on research associated with development of our Nation's abundant unconventional natural gas and oil resources. Each agency has a different combination of experiences, research strengths, personnel, resources and mission mandates, leading to complementary research core competencies. The three agencies fiscal year 2013 budget request to support this work is $45 million, with DOE requesting $12 million. In addition, the Appalachian Shale Recommended Practices Group (ASRPG), a consortium of 11 of the Appalachian Basin's largest natural gas and oil producers, have announced the creation of the Recommended Standards and Practices for Exploration and Production of Natural Gas and Oil from Appalachian Shale. The ASRPG Recommended Standards and Practices are consistent with the key recommendations of both the U.S. Secretary of Energy Advisory Board's (SEAB) final report issued in November 2011, and the National Petroleum Council's (NPC) Prudent Development report issued in September 2011.

Question. What do you still need to do?

Answer. The administration created a new Interagency Working Group to Support Safe and Responsible Development of Unconventional Domestic Natural Gas Resources. This new partnership will help coordinate current and future research and

scientific studies, better positioning the Obama administration to ensure that continued expansion of natural gas and oil production happens safely and responsibly as part of an all-of-the-above approach to American energy.

Question. Do you believe that States and companies are taking the proper steps to fulfill these recommendations as well?

Answer. I do believe States and companies are addressing environmentally prudent methods for shale gas development. Fundamental to ensuring public safety and community health is the commitment to excellent environmental performance and continuous improvement that must be maintained by industry and Government. Shale gas development is subject to multiple Federal and State regulations. The States understand the local geology and hydrology. They are regulating hydraulic fracturing effectively and continue to get better by working with public and private agencies. State oil and gas commissions and many operators are collaborating on the development of a public Web site to report chemicals used in their hydraulic fracturing process based on the Interstate Oil and Gas Compact Commission and Ground Water Protection Council chemical disclosure submission. The industry is educating operators on industry best practices. It supports the disclosure program created by the Ground Water Protection Council for listing chemicals in fracturing fluids on the Web site registry called FracFocus, which already includes data for 16,000 wells from more than 200 companies. Five States have adopted FracFocus in their rules. Also, the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) is a nonprofit, multistakeholder organization whose purpose is to assist States in documenting the environmental regulations associated with the exploration, development, and production of crude oil and natural gas. Since its initiation, the state review process has completed the reviews of 21 State programs responsible for the regulation of more than 90 percent of the domestic onshore production of oil and natural gas. In addition, the industry is establishing regionally focused councils of excellence in effective environmental, health, and safety practices.

Question. Much of these reports, in particular the DOE Advisory board's two 90-day reports focus on fracking being used for shale gas.

Do you believe the same suggestions apply to fracking for oil, like in the Bakken?

Answer. Safety and environmental sustainability underpin our Nation's energy security concerning both oil and natural gas. Some of the results from ongoing research by the DOE, EPA, and USGS may have application to the use of hydraulic fracturing of both oil and gas shale formations.

Question. Your budget includes only a small increase of $2 million for the natural gas technology R&D program.

Do you think your budget request is sufficient to address the recommendations of the previously mentioned committees and continue the needed research to better understand fracking?

Answer. DOE's fiscal year 2013 Natural Gas budget request for shale gas will focus on the research recommendations received from the Subcommittee of the Secretary of Energy Advisory Board, including the study of methane migration, chemical interactions between fracturing fluids and different shale rocks, induced seismicity triggered by hydraulic fracturing and injection well disposal, development of green fracturing techniques, and improved casing and cementing integrity.

OFFICE OF INSPECTOR GENERAL REPORT ON THE DEPARTMENT OF ENERGY LAB CONTRACTING COSTS

Question. Mr. Secretary, the Office of Inspector General (OIG) cited in their Special Report of Management challenges at the Department of Energy that a $1 billion is spent annually to employ 4,000 staff to protect sensitive sites and labs around the country. These protective services are provided by 25 different contracts that Government Accountability Office (GAO) labeled (in a separate process), ". . . not uniformly managed, organized, staffed, trained, or compensated." Not only do questions like these raise concerns about the security of these sites they also raise questions about the use of Federal funds.

OIG suggested three options to help reduce costs: A master contract, consolidating by region and/or federalizing the protective force.

Understanding that not all these options are acceptable to DOE, what actions are you taking to implement the recommendations of the OIG report and reduce the contracting costs?

Answer. As the OIG report contends, there are nearly 4,000 protective force staff involved in providing security for DOE physical, nuclear, and information security assets throughout the complex. Approximately one-half of those work under the purview of the National Nuclear Security Administration (NNSA). DOE/NNSA has taken the lead in implementation of graded protection and risk-informed decisions

that will yield significant efficiencies in the use of Federal funds that are necessary for ensuring the maintenance and security of our indispensable national nuclear security deterrent. Similarly, DOE's Office of Science (SC) has developed a Baseline Level of Protection, based on national standards and rigorous peer reviews, which provides a common starting point for SC in ensuring adequate physical controls, development of the site-specific security posture of each of the SC laboratories, and streamlined budget formulation and execution processes that minimize the burden on the sites while providing sufficient information to advocate for security program resources and maintain the flexibility to allocate resources.

DOE/NNSA agrees with IG–858 and previous GAO reports with respect to the lack of uniformity and consistency regarding the contracting of protective force services at DOE/NNSA sites. The Office of Defense Nuclear Security (DNS) recently completed a detailed analysis of the various contracting models currently in place throughout the nuclear security enterprise and confirmed that, while the type of contract has no bearing on the effectiveness of security, separate prime contracts; i.e., those that are procured separately from the management and operating contractor, are generally more cost-effective for procuring contractor protective force services.

Informed by that analysis, NNSA initiated the procurement of a consolidated protective force contract for security services at the Pantex Plant and Y–12 National Security Complex in November 2011. This procurement is running largely in parallel with the consolidated management and operating contract procurement at the same sites, and is expected to yield proportionally similar cost savings and efficiencies. With respect to the overall protective force contracting approach, DNS is working with the NNSA Office of Acquisition and Project Management to implement a more consistent contracting approach for future protective force contracts throughout the nuclear security enterprise. The pros and cons associated with regional contracts or the creation of a "master" contract for all sites remain under consideration. Important factors that must be weighed include the distinction between nuclear and non-nuclear sites, and the need to balance consolidation and cost-efficiency efforts with aggressive Departmental small business goals.

There remains no evidence of cost-benefit or performance-related enhancements associated with federalizing fixed site protective forces. Rather than suggesting a fresh look at the situation as suggested by the OIG report, the current budget environment affirms the Departmental decision to minimize long-term governmental obligations by maintaining the current fixed site contractor guard force arrangement. The "potential benefits" of federalization cited by the OIG report are being successfully addressed under current contracting models through the implementation of Enterprise-wide Mission Essential Task List (EMETL)-based training, standardized uniforms and equipment procurement initiatives, and renegotiation of collective bargaining agreements that are coming due in 2012. Through the "Implementation Plan for the 29 Recommendations of the Protective Force Career Options Study Group" dated January 2011, DOE/NNSA has taken decisive action toward achieving its goals of fulfilling the needs of the Government in terms of effectively and efficiently contracting for protective force services at its fixed nuclear security sites, while simultaneously addressing the critically important needs of the contractor employees who perform these essential tasks.

IG–858 recommended the engagement of external public sector security experts to review the issue of protective force configuration with a view toward reigning in the Department's cost structure. DOE and NNSA have been actively engaged in a nuclear security collaboration effort to "harmonize" the manner in which nuclear security operations are implemented throughout the Government. Although the Department of Defense and DOE/NNSA have significantly different challenges in terms of their respective physical security work forces, the similarity of tasks has helped to inform the manner in which NNSA approaches its tactical, budgetary and contractual approaches toward accomplishing the nuclear security mission. As existing contracts come up for renewal, DOE and NNSA are invoking more consistent and cost-efficient strategies. In addition to the ongoing Pantex/Y–12 procurement, work has begun to initiate a review of the acquisition strategy for protective force services at the Sandia National Laboratories, Lawrence Livermore National Laboratory and Los Alamos National Laboratory. SC has also conducted a separate independent benchmarking study comparing SC laboratory security to security at research institutions operated by other Federal agencies and the private sector. The result of these efforts was the SC Baseline Level of Protection, a streamlined budget formulation and execution process, and program management approach to implement technologies where possible and reduce recurring contractor costs.

GEOTHERMAL ENERGY BUDGET

Question. Secretary Chu, I firmly believe geothermal power has the potential to be a significant part of our base load energy portfolio in the future. Senator Murkowski and I have a bill which would greatly expand our understanding of geothermal potential, expand use of enhanced geothermal systems and allow to co-leasing of geothermal and oil wells, helping to secure our energy future.

Massachusetts Institute of Technology (MIT) estimates, ". . . that with a reasonable investment in R&D Enhanced Geothermal Systems could provide 100 GW of cost-competitive generating capacity in the next 50 years." That is why I am excited to see a 72-percent increase in Geothermal funding in the department's requested budget and an expanded area of study.

Could you talk in detail about the new focus and long-term plan for the geothermal office?

Answer. In 2011, the Program convened a Blue Ribbon Panel comprised of renowned geothermal experts from industry, academia, and the national laboratories. The panel recommended that the Program continue to invest in the promising potential of Enhanced Geothermal Systems (EGS) but to also fund critical research needed to increase exploration success for hydrothermal resources.

Consistent with these recommendations, the Program's technology portfolio focuses on two closely-related areas, which balance a near-and long-term investment strategy: hydrothermal and EGS. Innovative exploration technologies and tools support risk reduction for both near-term hydrothermal systems and long-term EGS. Additional ongoing investments in economic and systems analysis will help identify ways to reduce nontechnical costs associated with these efforts.

The Program budget request for fiscal year 2013 reflects confidence that EGS can be a viable and significant-scale baseload energy resource: in fiscal year 2012, the first of several EGS demonstration projects funded by DOE has clearly shown the potential to produce 5 MW from an engineered reservoir in a deep, impermeable, and unproductive rock body, with far greater additional potential at this site. This partially achieves a critical program goal 8 years ahead of the original forecast. Therefore, the program will pursue the development of innovative technology solutions through closely managed strategic R&D, industry-run EGS demonstration projects, and a Government-led EGS test site(s) focused on EGS optimization and validation. Simultaneously, the program will advance technologies needed to reliably identify new hydrothermal resources, thus developing a lower and more predictable risk profile for the industry to accelerate deployment in the near and long term. Concurrently, the program has initiated a first-ever project to build broad-scale geothermal resource maps that can be used by industry to lower the risk of finding new prospects.

At the same time, the Program maintains a complementary effort on low-temperature and co-produced geothermal resources, and will commence a field project in fiscal year 2013 to actively collect operating data from a new coproduction site to better frame this broad area of potential.

Question. Could you also discuss your plans for increasing investment in this technology?

Answer. To bring more clean energy online in the near-term, the detection and imaging of subsurface geothermal reservoirs needs to be reliable and cost-effective. Upfront risks related to unsuccessful exploration activities are also a major barrier to increased development of geothermal resources in the United States. Accordingly, a major objective of the Program is to increase the probability of success of finding geothermal resources, and to lower the attendant cost. Lowered risks and costs and greater certainty of outcomes has a profound impact on the sector's ability to secure attractive financing and backing for renewable energy projects.

Some of the most promising technologies include innovative geophysical and geochemical exploration technologies, which will allow the prediction or location of hidden hydrothermal resources. These technologies will allow more reliable and predictable subsurface temperature, physical rock properties, and permeability.

The program is particularly interested in faster and less costly drilling technologies (spallation or laser drilling), zonal isolation or diverter technology development, and monitoring tools. These and other technologies are currently funded through our EGS program. The ability to develop sizeable and scalable fracture networks through which fluid can circulate and pick up heat is integral to EGS reservoir sustainability.

Another example of promising work that has the potential to benefit a variety of other sectors is geothermal mineral extraction technology. Strategic minerals, such as lithium used in advanced car batteries, are often dissolved in the geothermal fluids that are pumped to the surface to produce power. This technology extracts

lithium from the geothermal brine, combined with electricity generation, before the brine is re-injected into the subsurface.

In addition, the Program is pursuing development of a Government-led EGS test site (Site) focused on EGS optimization and validation. The goals of the Site include testing new technologies, and demonstrating the ability to drill and complete the first-ever horizontal well in a geothermal reservoir. The Site is a critical step towards creating a commercial pathway to EGS, as it will promote transformative and high-risk science and engineering that the private sector is not financially or operationally equipped to undertake. This investment is in fact similar in scope and potential impact to the ground-breaking DOE investments in shale gas from 1978 through 1991, which led to the shale gas revolution.

HYDRO BUDGET

Question. Mr. Secretary, in March of 2010, you signed a memorandum of understanding (MOU) with the Army Corps and the Department of Interior to identify existing Federal dams with the potential to sustainably install or retrofit them with hydropower. In evaluating 530 sites in this process, 191 sites were identified as having some hydropower potential and 70 have economic potential for retrofitting or installing to create 225 MW of power.

This MOU also agreed to continue research in traditional hydro to create more fish-friendly and efficient turbines to update our infrastructure (since many of these improvements only take a few years to pay themselves back).

Yet this year's budget cuts the Water power budget by two-thirds, shifting almost entirely towards marine and hydrokinetic power.

My question is does this budget request support your commitments made in the 2010 MOU for developing advanced hydropower technologies?

Answer. A robust $59 million budget in fiscal year 2012, a nearly 70-percent increase over fiscal year 2011, has allowed the Department to continue and complete a number of important water power technology research and development projects, including a nationwide assessment of energy opportunities at nonpowered dams across the United States. The $20 million requested in fiscal year 2013 will allow the Department's Water Power Program to continue and complete a number of its ongoing projects to advance water power technologies and accelerate their market adoption, including several efforts that have been coordinated and conducted jointly with the Bureau of Reclamation and the Army Corps of Engineers. These efforts include demonstrations of new, innovative hydropower technologies including the Alden Fish-Friendly Turbine as well as low-head small hydropower technologies at Bureau of Reclamation facilities, the Water Use Optimization Toolset and various water quality modeling efforts to aid in the prediction and improvement of water quality at Federal hydropower facilities, and new and refined assessments of opportunities to develop new hydropower facilities. Based upon the results and evaluation of ongoing efforts, especially the identification of new hydropower development opportunities and the potential for hydropower and pumped storage technologies to help integrate other sources of renewable energy into the electric grid, the Department will determine the needs and opportunities for future water power research beyond fiscal year 2013.

GEOTHERMAL HEAT PUMPS

Question. Mr. Secretary, it's my understanding that buildings dominate our Nation's energy use, consuming more than one-half of our electricity and natural gas. Buildings also account for more than 40 percent of carbon emissions in the United States. With that being the case, I think the Department of Energy ought to be doing more to focus on the steps we can take to reduce the energy we use to heat and cool our buildings and homes, including promoting proven technology like geothermal heat pumps.

What steps does the Department plan on taking to address the market barriers that prevent commercial building managers and homeowners from investing in energy efficient technologies like geothermal heat pumps (GHP)?

Answer. Key barriers to market penetration of energy-efficient technologies like GHPs include high first costs, limited design and installation infrastructure, and lack of awareness among consumers, policymakers, and regulators about technology benefits. The Department is supporting initiatives that seek to overcome these barriers through technology development and demonstration, education and training, and policy analysis. Through the Recovery Act, the Department is currently funding 26 GHP demonstration and analysis projects and 30 Energy Efficiency and Conservation Block Grant projects that involve GHPs. These projects, as well as input from industry experts and stakeholders, will inform future efforts, which will be de-

scribed in a report to the Congress that is in the final stages of preparation. The report describes the Department's GHP research, development, and demonstration activities and plans, as well as plans to promote the use of GHP technologies; analyze policies that affect consumers and manufacturers of GHPs; and collect, analyze, and disseminate publicly available data and information about these products.

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 U.S. 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 U.S. in 2009 was manufactured domestically and much of that manufacturing activity occurred in economically challenged rural areas.

In fiscal year 2010, the 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. While the Department has recently increased its emphasis on less mature wind technologies such as those used in offshore applications, it should be noted that wind technology innovations and improvements supported by the DOE Wind Program are likely to benefit a variety of sizes and applications across the wind industry, and small- and medium-sized wind remain priorities for the Program. The Department plans to continue ongoing efforts to support small- and medium-sized wind, and has also identified several market barrier removal, deployment, and technology optimization activities as areas for investment to accelerate the deployment of wind technologies used in distributed applications and to increase the speed of technology transfer from low-wind speed utility-scale technology to distributed systems.

The recent growth and maturation of the U.S. small wind industry has seen a large number of new products enter the market without a framework for verifying manufacturer claims about turbine performance, reliability, noise, and safety. Product certification is essential for providing consumers, utilities, policy makers, and lenders with transparent, third-party-verified small wind turbine performance, durability and safety information, and DOE views certification as a way to provide manufacturers with the parameters for communicating transparent and credible information to stakeholders. To address these concerns, DOE supported the development of a technical standard that can now be used voluntarily to test small wind systems to performance and safety criteria. DOE has also supported the establishment of four small wind turbine regional test centers and the Small Wind Certification Council, which provides accredited third-party verification of test results in accordance with internationally adopted technical standards for testing. DOE plans to continue to support activities related to achieving its small wind technology goal, which is to increase the number of small wind turbine models certified to performance and safety standards from a 2010 baseline of 0 to 40 by 2020. The fiscal year 2012 milestone of five models certified has been achieved, and State renewable energy programs are establishing lists of qualified small wind turbines for incentive programs based on the process for certification developed with support from DOE.

The Department is also currently supporting research, analysis, and modeling to establish near-term cost of energy targets for midsize turbine technology and utility scale technology used in distributed applications, with the goal of being competitive with national average retail electricity rates. Work activities related to achieving this goal include economic analysis, next generation midsize turbine R&D, standards development, and technology transfer support. Future activities in support of this goal might include research to reduce the balance of station costs, studies of distribution grid integration, and the development and verification of site assessment tools.

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

Answer. The DOE Wind Program has identified several market barrier removal, deployment, and technology optimization activities (outlined below) as areas for in-

vestment to accelerate the deployment of wind technologies used in distributed applications and to increase the speed of technology transfer from low wind speed utility-scale technology to distributed systems.

Resource Characterization.—Research and develop predictive modeling/site assessment and resource characterization tools to reduce project performance uncertainty. Reducing uncertainty will improve access to lenders and help mitigate system underperformance. Distributed wind resource characterization work might include developing and verifying site analysis tools, developing best practices for cost-effective distributed wind resource characterization, and developing predictive economic modeling tools based on these site analyses and resource characterization tools using certified turbine models.

Grid Integration.—Research and assess distributed wind penetration on distribution grids. Increasing interconnection access to distribution grids operated by publicly owned utilities will increase installed capacity of distributed wind. Distribution grid integration work might include updating the distributed generation toolbox, reporting on how wind installations impact regional distribution grids, assessing the potential to penetrate distribution grids with distributed wind and other variable generation, and quantifying available capacity on the distribution grid.

Market Acceleration and Deployment.—Provide tools and unbiased information on distributed wind energy impacts, benefits, and project development processes to help stakeholders (homeowners, communities, utilities, and local/State governments) decide if wind energy is right for them, and to reduce upfront time and costs for those pursuing projects. Information provided would vary regionally based on that region's needs and might include:

—model zoning ordinances or permitting requirements;
—guidelines for navigating the permitting process;
—lists of certified turbines and installers;
—policy comparisons tools;
—reports on turbine noise, wildlife, or grid impacts;
—interconnection guidelines and tools;
—site analysis and resource characterization tools;
—turbine siting guidelines;
—case studies; and
—predictive economic modeling tools for project assessment.

Technology Performance Optimization.—R&D to improve small and midsize turbine performance, reliability, safety while reducing capital costs is critical for market growth. Small wind technology R&D activities might include a competitiveness improvement project with funding awarded for certification testing, noise-mitigating technology, component improvement and sub-system optimization, system performance optimization, and innovative manufacturing. Midsize wind technology R&D activities might include developing standards, establishing a certification framework, developing and testing prototypes, and testing for certification.

Question. Often times DOE is focused on large deployments or breakthroughs of significant scale, and less on deployment of small scale or distributed technologies. What are you doing to continue to focus on distributed energy and expanding deployment at the small scale?

Answer. While the Department has recently increased its emphasis on less mature wind technologies such as those used in offshore applications, it should be noted that wind technology innovations and improvements supported by the DOE Wind Program are likely to benefit a variety of sizes and applications across the wind industry, and distributed energy remains a priority for the Department.

The recent growth and maturation of the U.S. small wind industry has seen a large number of new products enter the market without a framework for verifying manufacturer claims about turbine performance, reliability, noise, and safety. Product certification is essential for providing consumers, utilities, policy makers, and lenders with transparent, third-party-verified small wind turbine performance, durability and safety information, and DOE views certification as a way to provide manufacturers with the parameters for communicating transparent and credible information to stakeholders. To address these concerns, DOE supported the development of a technical standard that can now be used voluntarily to test small wind systems to performance and safety criteria. DOE has also supported the establishment of four small wind turbine regional test centers and the Small Wind Certification Council, which provides accredited third-party verification of test results in accordance with internationally adopted technical standards for testing. DOE plans to continue to support activities related to achieving its small wind technology goal, which is to increase the number of small wind turbine models certified to perform-

ance and safety standards from a 2010 baseline of 0 to 40 by 2020. The fiscal year 2012 milestone of five models certified has been achieved, and State renewable energy programs are establishing lists of qualified small wind turbines for incentive programs based on the process for certification developed with support from DOE.

The Department is also currently supporting research, analysis, and modeling to establish near-term cost of energy targets for midsize turbine technology and utility scale technology used in distributed applications, with the goal of being competitive with national average retail electricity rates. Work activities related to achieving this goal include economic analysis, next generation midsize turbine R&D, standards development, and technology transfer support. Future activities in support of this goal might include research to reduce the balance of station costs, studies of distribution grid integration, and the development and verification of site assessment tools.

Question. Are you willing to commit to working with your sister agencies to identify opportunities to expand opportunities for distributed technologies?

Answer. The U.S. Department of Energy would be willing to work with other interested agencies to identify opportunities for distributed technologies, including Federal and State agencies.

COORDINATION WITH OTHER AGENCIES

Question. While DOE is certainly the premier Federal agency for energy research, development, demonstration, and deployment, many other agencies—the Department of Agriculture, the Department of Defense, the Environmental Protection Agency, and the Department of Interior—also have authority and resources to support energy development and deployment. Along those lines you've teamed up with the Department of Agriculture to work on the development of biofuels and you have an MOU with interior on retrofitting existing hydro assets. That's a good first step.

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?

Answer. We have a number of formal and informal avenues for coordination with other Government agencies. For example, the Advanced Research Project Agency—Energy has partnered with the Department of Defense to develop innovative technologies for energy storage that can be used on ships as well as at naval installations. In addition, the Department, through the Office of Energy Efficiency and Renewable Energy, has been a co-lead with the Department of Agriculture on the inter-agency biofuels group that sets priorities for and oversees Federal investments biofuels development. There are many of examples of such collaboration. In both of these cases, we are working hand-in-hand on solicitations and commercialization opportunities, casting as broad a net as possible to harness the best ideas in science and technology. As we do so, companies, universities, and research institutions in rural America, who are often closest to these challenges, will be critical participants and we are actively working to include them in our efforts.

Question. How are you working to assure that rural businesses and researchers are participating and winning solicitations from DOE?

Answer. As you know, the Department of Energy, like other agencies, does significant work in rural America by virtue of the locations of its key facilities like National Renewable Energy Laboratory in Colorado and the Idaho National Laboratory in Idaho. Our laboratories become geographic centers for engineering, scientific, and economic activity as a matter of our ongoing operations. In addition, we reach out to local small businesses, community colleges, and other entities to help develop technical expertise and human capital to support not only the labs themselves, but also the new industries that the labs create.

PUMP STORAGE HYDRO AND POWER MARKETING ADMINISTRATION COORDINATION

Question. The Power Marketing Administrations and Tennessee Valley Authority (TVA) 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?

Answer. The Power Marketing Administrations (PMAs) are separate and distinct wholesale electric utilities within the Department of Energy. Each PMA is headed by an administrator who is a career employee of the Senior Executive Service. The administrator positions are not Senate confirmed. The PMAs do not have boards of

directors. Each of the PMAs has its own organic statutes governing its Federal power marketing mission in the regions that it serves. While the missions of the PMAs are similar, their statutory responsibilities vary. For example, while BPA has a statutory responsibility to promote energy efficiency in the Pacific Northwest, the other PMAs do not have a similar statutory responsibility. While the PMAs are operating utilities, they do coordinate with the Department of Energy and other administration officials on Federal energy policy as is appropriate and consistent with their governing Federal statutes.

The Tennessee Valley Authority, a corporation owned by the U.S. Government, provides electricity for 9 million people in parts of seven southeastern States at prices below the national average. TVA, which receives no taxpayer money and makes no profits, also provides flood control, navigation, and land management for the Tennessee River system and assists utilities and State and local governments with economic development.

TVA's Board of Directors are appointed by the President and are Senate confirmed. The Board guides TVA in achieving the objectives and missions established by the TVA Act for the benefit of the people of the Valley.

As provided by the TVA Act and the TVA Bylaws, the principal responsibilities of the Board are to establish the broad strategies, goals, and objectives, long-range plans and policies of TVA and to ensure that those are achieved by the TVA staff led by the Chief Executive Officer. Each Director takes an oath to faithfully and impartially perform the duties of office. Directors serve part-time.

The PMAs coordinate with TVA from time to time as they do with other electric utilities on energy policy and electric energy regulatory matters. The Bonneville Power Administration (BPA) and TVA also coordinate from time to time on Federal budget related matters and other Federal administrative issues related to self-financed entities.

Like other electric utilities, the PMAs strive continuously to operate reliable power and transmission systems. The PMAs routinely maintain their systems and invest in capital upgrades to maintain high reliability and efficiency. Their customer utilities understand the value of highly reliable power system and pay the costs of those investments either through rates or direct customer investments. These investments also are at no cost to taxpayers. My understanding of TVA is that their operations and maintenance approach is similar.

Question. Specifically you released a proposal last year 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. This project is located in a county with higher than the State average of unemployment and a construction project of this size would bring significant benefit to the BPA system and to the community.

Again just 2 weeks ago when you testified in front of the Senate Energy and Natural Resources Committee you are pushing BPA to do more pump storage hydro.

Does this mean you'll reconsider the permitted project awaiting investment which was push aside last year by BPA in Montana?

Answer. BPA's primary statutory mission is to market and transmit electric power to serve the load requirements of its preference customers. BPA also is an open access transmission provider. BPA's only authority to acquire the output of generating resources is for those customers' load service needs. To my knowledge, the only pumped storage project BPA has investigated to date is a rehab of the existing John Keys III Pumping Project. BPA has not received any formal request to partner with any private developer of pumped storage projects, and consequently, has not turned down a pumped storage project development.

RENEWABLE ENERGY STANDARD

Question. Secretary Chu, there are a lot of proposals out there to increase the market share of Renewable Energy Standard (RES). For example, I carried and passed Montana's Renewable Portfolio Standard (RPS) while in the State Senate. That effort brought more than $1 billion of investment to Montana to develop renewable energy. There are economic, social, and environmental benefits to this kind of investment, but RPS or RES isn't the only option.

Other members are promoting a Clean Energy Standard which requires that 80 percent of domestic energy come from clean sources by 2035. Still experts extol the benefits that tax credits and loan guarantee programs to expanding development. A recent Congressional Budget Office (CBO) report stated that imposing a carbon tax would be the strongest market signal.

With all these proposals on the table, what do you believe is the best option to help strengthen the deployment of Renewable Energy?

Answer. Many of the policy mechanisms mentioned represent viable approaches to strengthen the deployment of renewable energy and have been tested in various situations in the United States and around the world. With the support of current State and Federal policies (such as Montana's renewable portfolio standard), the President's goal of doubling renewable electricity generation was met in January of this year.[1] In addition, the President has proposed a Clean Energy Standard to meet the goal of doubling the share of clean electricity including renewables by 2035.

One important factor in selecting policy mechanisms to advance the deployment of renewable energy is to provide long-term market certainty. Providing market certainty will also allow a strong and viable renewable energy industry to grow in the United States, with the potential to export into the growing global renewable energy market.

In keeping with the President's "all of the above" energy strategy, a portfolio of policies may be an effective approach to strengthen the deployment of renewable energy.

QUESTIONS SUBMITTED BY SENATOR RICHARD J. DURBIN

FERMILAB AND HIGH ENERGY PHYSICS

Question. Prior to the shutdown of the historic Tevatron facility last year, scientists at Fermi National Laboratory may have detected the Higgs Boson particle, a long-sought-after particle that is critical to explaining the fundamentals of our universe. The lab is now focused on probing new scientific frontiers with the Long Baseline Neutrino Experiment (LBNE).

Despite this landmark discovery and other promising results, funding for Fermilab was cut $30 million (an 8-percent cut). This cut would result in 140 layoffs. This is in addition to the 90 layoffs that occurred this year due to previous budget cuts. These decisions only further encourage our best scientists and research facilities to leave the United States for European facilities, crippling our future in particle physics.

Given this, what is the Department of Energy (DOE) prepared to do to ensure a robust future for U.S. leadership in high-energy physics and discovery science research?

Answer. The Office of High Energy Physics (HEP) believes the P5 framework of three frontiers of particle physics represents a compelling vision for U.S. particle physics. The U.S. will participate in the Large Hadron Collider (LHC) program at CERN for the Energy Frontier. HEP will support research on dark energy and dark matter on the cosmic frontier and HEP plans to center a world-class Intensity Frontier program at Fermilab. The Intensity Frontier program will utilize the Fermilab accelerator complex to produce neutrino, muon, and kaon beams for studies of neutrino oscillations, Charge Parity (CP) violation, and provide rare decays that test fundamental symmetries of nature. This program can start with the current complex at Fermi, but the complex would need to be upgraded in the future.

LBNE has been part of the roadmap for the particle physics field for the last 4 years.

Question. After extensive review, the National Academies of Science and National Research Council urged the U.S. to have a domestic underground research facility. What is the Administration's plan for the Long Baseline Neutrino Experiment?

Answer. LBNE has been a key part of the HEP strategy since the 2008 High Energy Physics Advisory Panel report, "US Particle Physics: Scientific Opportunities A Strategic Plan for the Next Ten Years." Since 2010, when the National Science Board withdrew National Science Foundation (NSF) support for Deep Underground Science and Engineering Laboratory (DUSEL), HEP has been seeking a cost-effective solution to pursuing the physics discoveries that could be produced by the LBNE. The most recent conceptual design presented to the Office of Science in January was deemed to take too long to build and had unsupportable peak costs. The Office of Science has charged Fermilab to develop phased alternatives to deliver science sooner with lower-peak costs. Fermilab's response will be submitted to the Office of Science by July 1, 2012.

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[1] Goal is relative to end of 2008. 143,425 GWh in the 12-month period ending in January 2012 compared to 71,067 for the 12-month period ending in December 2008. Data from Energy Information Administration (EIA) annual energy review early release: http://www.eia.gov/electricity/data/eia860/index.html.

ARGONNE AND SUPERCOMPUTING

Question. High-performance computing is a key capability of America's national laboratories. The Leadership Computing Facility at Argonne National Laboratory houses one of the world's fastest supercomputers and provides world-class computational capabilities. This enables breakthrough scientific research in fuel efficiencies, aerodynamics, drug discovery, nuclear energy, and climate change.

Funding for the Leadership Computing Facilities, like the one at Argonne, are critical for continuing our path towards exascale computers, which would be 1,000 times more powerful than today's best computers. In the past 2 years we have seen significant investments by China, Japan, and the European Union in their computing capabilities.

Can you describe how the DOE will invest to regain and maintain U.S. leadership in supercomputing in the future?

Answer. To address critical missions in Science, Energy and National Security, the Department of Energy (DOE) in its 2011 Strategic Plan has set a goal to maintain "leadership in computational sciences and high-performance computing." The targeted outcome is to continue to develop and deploy high-performance computing hardware and software systems through exascale platforms. To accomplish this ambitious goal, DOE will draw upon proven successful programmatic and technical strategies that have established the Department as the premier leader in innovative high-performance computing systems over the past half-century. These strategies consist of three thrusts:

—research, development, and engineering (RD&E) to ensure timely availability of hardware, software, and mathematical technologies including improved cybersecurity;

—more reliable science and engineering simulations that will ensure U.S. economic competitive leadership; and

—acquisition, deployment, and operation of the most capable computing systems on a predictable cadence and budget.

Some of the exascale relevant research was anticipated by DOE and has been underway for a few years. These investments include core computer research efforts, uncertainty quantification research and the start of three co-design centers to ensure scientific computing challenges are informing architecture designs while critical DOE applications also stay informed with regard to hardware developments. These long lead-time efforts have hinted at some options and tradeoffs, but much work remains to be done. Advanced Scientific Computing Research (ASCR) supports several significant steps toward exascale in fiscal year 2012, including the start of investments in critical technologies and the installation of our first hybrid computing system at the Oak Ridge Leadership Computing Facility and the Blue Gene Q at Argonne National Laboratory. These computers will be critical for our researchers working on exascale technologies. In fiscal year 2013, we will complete upgrades to both of the Leadership Computing Facilities to take each facility to at least 10 petaflops. Both machines will provide new capabilities to the research community, including industry, to deliver new science and engineering insights. Upgrading the Leadership Computing Facilities will enable DOE to continue to lead in a number of areas of science and engineering, including materials, chemistry, earth science, nuclear physics, and engineering.

FUTUREGEN 2.0

Question. With coal providing 50 percent of U.S. electricity generation and close to 80 percent of the electricity in China, it seems to me that we can't fight climate change without cutting greenhouse gas emissions from coal.

As you are aware, DOE selected Morgan County, Illinois, to site the FutureGen 2.0 project. The project's goal is to develop a near-zero emission coal-fired power plant—reducing greenhouse gas emissions and generating tremendous economic opportunity at the same time.

How is FutureGen 2.0 progressing and how does it fit into the larger strategy of the DOE's Office of Fossil Energy?

Answer. The FutureGen 2.0 project consists of two cooperative agreements:

—repowering an existing electric generating unit in Meredosia, Illinois, owned by Ameren Energy Resources (Ameren) with a purpose-built oxy-combustion and carbon capture technologies; and

—constructing a pipeline and injection system that would sequester the carbon dioxide captured from the unit in a deep geologic formation beneath Morgan County, Illinois.

The second project is managed by the FutureGen Alliance (Alliance); the first project is currently managed by Ameren, but it has decided not to pursue its project beyond Phase 1 (preliminary design).

Phase 1 of both cooperative agreements is almost complete. The analyses undertaken during this phase resulted in an increased estimate of total program cost from $1.3 to $1.65 billion. This increase is attributable to identification of an additional $365 million in costs for Ameren's project scope. DOE understands that Ameren's decision not to proceed beyond Phase 1 was based in part on these cost increases.

The Alliance informed DOE that it intends to ask the Department to transfer the Ameren cooperative agreement to the Alliance and to authorize the Alliance to take both cooperative agreements into Phase 2. DOE's decision on these requests depends on the Alliance's ability to demonstrate that it has the technical, managerial, financial, and other capabilities needed to pursue all requirements of both cooperative agreements. The Alliance's demonstration will be contained in "decision point applications" that it intends to submit to DOE in June 2012.

FutureGen 2.0 is an important part of the Office of Fossil Energy's research and development program aimed at enabling more efficient capture processes and ultimately bringing down the cost of carbon capture, utilization, and storage (CCUS). The cost of CCUS and coal-fired electricity is ultimately a function of significant market factors, well outside the control of the Department. However, the Department does conduct research and development on advanced clean coal technologies that will bring costs down over time. As part of this effort, the Department conducts large scale research and demonstration projects, such as the FutureGen project, that allow first-of-a-kind clean coal technologies to be utilized on a commercial scale. These activities have been shown to reduce costs over the long run, and allow for more efficient, cleaner, and more affordable technologies to be used in the marketplace.

QUESTIONS SUBMITTED BY SENATOR LAMAR ALEXANDER

HUB QUESTIONS

Question. The President's budget request includes $19.4 million for a new Electricity Systems Hub and there are plans for 3 additional Hubs to begin in future years. Based on budget constraints, do you still believe it makes sense to grow the hubs to a total of 9 over the next couple of years?

Answer. The current Hubs have helped demonstrate the value of integrating the work of multiple researchers across various disciplines in tackling significant grand challenge problems. The Hub approach ensures that research efforts are coordinated at the most direct possible level, by ensuring that the relevant researchers are directly collaborating on a single, coherent team.

Question. Do you believe the hub concept has been successful?

Answer. The three existing Hubs have made robust progress in creating a critical mass of multidisciplinary research in their respective areas, enabling new approaches to challenging, high-priority technical barriers. In accordance with language in House Report 112–331 to H.R. 2055 (the Consolidated Appropriations Act of 2012), the Department of Energy (DOE) will soon be providing a report to the Congress detailing milestones and performance goals for the Hubs.

Question. Where will the funds come from assuming a flat-lined budget?

Answer. The Department's mission of addressing America's energy challenges through transformative science and technology solutions requires careful analysis and deliberation to develop a balanced portfolio of basic science and research, development, demonstration, and deployment. To ensure the right funding profile, DOE uses strategic analysis to identify and prioritize the most appropriate portfolio, as identified in the fiscal year 2013 budget request.

Question. Do you have plans for additional Hubs beyond the 9 that have been proposed?

Answer. In general, the Hub model is appropriate for addressing focus areas where:

—the problem represents a significant grand challenge, where major advances would be likely to have a material impact on energy production or consumption and on reducing greenhouse gases; and

—a coordinated, large-scale, multidisciplinary, systems-level approach is needed to accelerate the pace of innovation.

To determine which problems meet both these criteria and would thus be appropriate for the focus of a Hub, DOE draws on extensive technical and strategic dis-

cussions with industry, academia, other Federal agencies, and the technical expertise within the National Laboratories.

Question. How did you (DOE) decide the Electricity Grid hub was the most important hub to start next year, rather than solar, carbon sequestration, or extreme materials?

Answer. The Congress provided funding for a Critical Materials Hub in fiscal year 2012, and a funding opportunity announcement was released in May 2012. The goal of the Critical Materials Hub will be to reduce U.S. dependence on critical materials and ensure that the deployment of domestic energy technologies is not hindered by future materials supply shortages.

Solar and carbon capture use and storage (CCS) continue to be high priorities at DOE, as indicated by the Sunshot Initiative and the continued commitment to the deployment of 5–10 large scale CCS demonstration projects by 2016.

NUCLEAR WASTE QUESTIONS

Question. Can you describe what the Department is doing to address the waste problem, and how it complements the Blue Ribbon Commission's recommendations?

Answer. If we are going to ensure that the United States remains at the forefront of nuclear safety and security, nonproliferation, and nuclear energy technology, we must develop an effective strategy and workable plan for the safe and secure management and disposal of used nuclear fuel and nuclear waste. That is why I asked General Brent Scowcroft and Representative Lee Hamilton to draw on their decades of public service and expertise to lead the distinguished Blue Ribbon Commission (Commission) to conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle.

The Commission's recommendations outline a sensible and practical approach to solving the challenges associated with the management and disposition of commercial and defense nuclear materials. The consensus report they produced is a critical step toward finding a sustainable approach to disposing used nuclear fuel and nuclear waste. The Commission made it clear that, in its judgment, any workable and lasting solution for the final disposition of used fuel and defense high-level nuclear materials must secure and sustain the consent of the communities, States, and/or tribal nation governing officials and the public they represent.

Following the completion of the Commission's report, I asked the Assistant Secretary of Nuclear Energy to lead a departmental review of its recommendations and develop a strategy that builds on the Commission's excellent work. Those efforts are well underway. A strategy and action plan that accounts for the Commission's recommendations will be conveyed to the Congress by the end of July of this year.

Finally, the President's fiscal year 2013 budget calls for a $60 million program to support used nuclear fuel disposition. This program will build on the fiscal year 2012 $60 million efforts and both are in alignment with the near-term activities recommended by the Commission during the interim period leading to a renewed national policy and strategy.

Question. Are all of these activities consistent with your authority in the Nuclear Waste Policy Act?

Answer. Yes, these activities being conducted and proposed for nuclear fuel disposition in fiscal year 2012 and 2013 are consistent with my authority under the Nuclear Waste Policy Act.

NUCLEAR ENERGY AND SMALL MODULAR REACTORS QUESTIONS

Question. Is $65 million of small modular reactors (SMR) licensing support enough to continue on the 5-year schedule with two reactors, or will the schedule slip or are you now only allowing for one reactor design?

Answer. Yes, the Department believes that $65 million is an adequate budget for fiscal year 2013, and does not expect the schedule to slip for two reactor projects based on this amount. Because the program was not authorized to start until the end of calendar year 2011, and is currently executing a complex and lengthy financial assistance process, the Office of Nuclear Energy (NE) anticipates having to carry over most of the fiscal year 2012 funding into fiscal year 2013. At that point, approximately $130 million will be available to invest in SMR certification and licensing efforts through fiscal year 2013. NE believes that this budget can sustain the program through fiscal year 2013, but we will need to increase the budget requests in the outyears in order to meet the program goals of accelerating the completion of the certification and licensing for the awarded projects. If additional funding were to be provided in the fiscal year 2013 budget, there may be opportunities to accelerate the SMR licensing schedules.

Question. Why isn't SMR licensing support just another subsidy, and how you plan to leverage the financial resources from private industries?

Answer. The partnerships with industry will be executed as financial assistance cooperative agreements that will require our selected awardees to contribute 50 percent of the costs involved in the design, engineering, and licensing efforts conducted under the project scope. The Government contribution is expected to help our industry partners accelerate their timelines toward licensing and deployment of these SMR reactors. This cost-shared funding arrangement ensures that industry is fully sharing the investment risk, and the Department will track the projects closely to ensure that our partners are executing the work scope and meeting the milestones outlined in the cooperative agreements. If the Department finds evidence that the partners are not meeting their project commitments, DOE has the option to discontinue funding under the agreement.

Question. Do you believe the United States will benefit from this SMR partnership not only domestically but also internationally?

Answer. Yes, DOE believes that the development of a domestic SMR industry can create an economic ripple-effect as SMR units are certified and licensed for deployment. Large-scale, fleet level deployment of SMRs can act as an engine for domestic economic growth. The development of SMRs may be critical as replacements for dozens of old coal plants that are expected to be decommissioned within the decade. The manufacturing, on-site fabrication, and operation of these SMRs can create thousands of mid- to long-term, high-paying jobs. All of the domestic SMR designs can be manufactured using existing U.S. infrastructure and capability, something that cannot be said of the large light water reactor (LWR) designs. The U.S. currently does not have the ability to fabricate the large reactor pressure vessel and some steam generator forgings. Growth of a domestic SMR technology and manufacturing capability may also create an opportunity to increase U.S. presence in the nuclear technology export market as U.S.-designed and built SMRs are sold overseas.

Question. Can you discuss what impact of the 50-percent cut to the advanced reactor concepts program would be, and how that could impact us in the international arena?

Answer. The Advanced Reactor Concepts R&D program remains an important program for the Department. Impacts to sodium-cooled fast reactor research and development will be minimized as much as possible given this concept's potential role in addressing fuel cycle issues, and in order to sustain collaborations conducted under international programs such as the Generation IV International Forum and various bilateral international agreements. Fuel development efforts that support sodium-cooled fast reactor technology also continue under the Fuel Cycle R&D budget. We consider it a priority to maintain these advanced reactor research international relationships so that we can leverage our efforts by sharing the research of our international partners. Reflecting difficult resource allocation choices, R&D activities associated with lead/lead-bismuth and fluoride high temperature reactors will be significantly reduced. The energy conversion R&D, which includes supercritical CO_2 turbomachinery and related heat exchangers, will be consolidated under the Small Modular Reactor Advanced Concepts R&D Program in fiscal year 2013.

OFFICE OF SCIENCE QUESTIONS

Question. Why should we continue to fund International Thermonuclear Experimental Reactor (ITER) if we can't afford it?

Answer. We entered the ITER project to take the next step toward development of a practical and virtually inexhaustible energy source. We understood that no one nation had the financial, technical, and scientific resources to build this project on its own. The only practical solution was to negotiate and implement an international cooperative approach for fusion, which is the ITER Project. The conditions that convinced us to join ITER are still valid today.

The United States has worked with the other country members and with the ITER Organization to maintain schedule and cost of the ITER Project. DOE has faced and overcome some challenges with ITER, and we are confident that the project has the management team in place to carry us efficiently through construction. The key to keeping ITER affordable is proper management that helps us achieve cost control and keep to the schedule. DOE will continue to maintain a close watch on the project, both at the ITER Organization and domestically, to ensure that we get the maximum value for the taxpayer's money, while working to achieve our goal of practical fusion energy.

Question. In a time of limited resources and the knowledge that our budgets won't realistically grow much over the next few years, why are you proposing such a big

new project in Facility for Rare Isotope Beams (FRIB) for something that is such a low priority?

Answer. FRIB was identified as the highest priority for new construction in the 2007 Nuclear Science Advisory Committee Long Range Plan and is also one of two targeted outcomes in the DOE 2011 Strategic Plan. The DOE strategic outcome is to "Complete construction of nuclear physics facilities by the end of the decade at Jefferson Laboratory and Michigan State University to test quantum chromodynamics, the theory of nuclear forces, and produce exotic nuclei of relevance in astrophysical processes."

A total of $51 million has been appropriated for the design and construction of FRIB from fiscal years 2009 through fiscal year 2012. FRIB will provide an important new capability for nuclear physics research in the United States. FRIB will provide intense beams of rare isotopes, i.e., short-lived nuclei not normally found on Earth. This will enable scientists to make discoveries about the properties of these rare isotopes in order to better understand the physics of nuclei, nuclear astrophysics, fundamental interactions, and applications for the United States. FRIB will increase the number of isotopes with known properties from about 2,000 observed over the last century to about 5,000 and will provide world-leading research capabilities. The fields of nuclear structure and astrophysics will be studied at FRIB to provide the link between our understanding of the fundamental constituents of nature and the understanding of the matter of which we, the Earth, and stars are made. FRIB is essential for maintaining a U.S. core competency in nuclear structure and astrophysics, which is at the heart of the national nuclear physics program. Expertise in these areas is also central to applied fields such as energy, security, and medicine.

STREAMLINING AND REDUCING COSTS QUESTIONS

Question. Is there a better way to centralize the way the individual labs buy goods and services that would better leverage DOE's buying power?

Answer. The Office of Management and Budget (OMB) by memorandum dated May 20, 2005, mandated the use of strategic sourcing on a Federal Governmentwide basis. This directive required all Federal Government agencies to implement the concepts of strategic sourcing; "a collaborative and structured process of critically analyzing an organization's spending and using this information to make business decisions about acquiring commodities and services more effectively and efficiently, to the maximum extent practicable."

In 1997, prior to issuance of the aforementioned OMB guidance, DOE recognized a majority of its procurement dollars flowed through its laboratory contracts and subsequently through subcontracts. To better leverage DOE's buying power, the Department established the Integrated Contractor Purchasing Team (ICPT), comprised of DOE management and operating contractors collaborating to produce acquisition ordering instruments for common products and services used across DOE. This complex-wide, contractor-led strategic sourcing program has achieved tens of millions of dollars in savings over the years. DOE has continued to emphasize use of the established ICPT commodity agreements, which contain pre-established favorable pricing, and are available for all DOE sites to purchase commercially available supplies. The National Nuclear Security Administration (NNSA) also determined it needed an enterprise-wide organization to address the needs of its unique supply chain. Consequently, in 2006 it established a contractor-led, strategic sourcing organization called the Supply Chain Management Center (SCMC). The SCMC's mission is to implement the NNSA strategic sourcing strategy of operating as an integrated nuclear complex. The SCMC has improved efficiencies and economies across the complex and is saving considerable amounts of money through the use of commercial best practices, shared software solutions, and leveraging NNSA's purchasing power.

In 2010, Deputy Secretary Poneman issued a memorandum to all Heads of Departmental Elements, directing them to adopt a corporate approach to purchasing that necessitates close collaboration between the DOE programs and the contractor community. It noted the successful implementation of NNSA's Supply Chain Management strategies and discussed the potential benefits of expanding the initiative across the Department. Coordinating commodity management across the complex would help to achieve better pricing from suppliers, ensuring uniform prices for comparable goods and services, and streamlining and reducing the total cost of acquisition. The structured process of analyzing spending patterns across the entire department and utilizing this information to acquire commodities and services more efficiently could ultimately result in even greater cost savings.

In 2012, the Office of Environmental Management (EM) determined it would be advantageous to utilize the SCMC to integrate its supply chain to achieve similar

results. Although early in the implementation process, success is already being realized at EM sites. EM also avoided duplication of costs by utilizing the existing SCMC capabilities and infrastructure rather than developing and deploying a separate comparable program.

Question. You have had success using the Supply Chain Management Center for NNSA, why can't this model be applied to all the national labs?

Answer. Office of Management and Budget (OMB) memorandum dated July 29, 2009, mandated that Federal agencies improve Government acquisition by developing more strategic acquisition approaches to leverage buying power and achieve best value for the taxpayer. Specifically, it directed agencies to; "increase their participation in government-wide strategic acquisition initiatives, including strategic sourcing initiatives that reduce costs for all agencies by leveraging the Government's buying power and, where appropriate, expand their use of enterprise-wide strategic acquisition initiatives that offer significant savings opportunities from both business process improvements and access to lower product and service costs."

DOE might improve upon its success by applying the SCMC model to the remaining national labs, but it is not known to what extent it is feasible to do so. As discussed in the response to question 28–2, EM has determined it would be advantageous to utilize the SCMC to integrate its supply chain in an attempt to achieve similar results. Although early in the implementation process, success is already being realized at EM sites. The Office of Science (SC) has made a determination that its labs already have a sufficient Strategic Sourcing Program in place and it would not be cost effective to implement the SCMC model at its sites. In a study completed by the Office of Science, it determined that; "given the evolved state of supply chain activities at many SC labs, combined with available commercial resources, a parallel structure tuned to the differing SC mission is a better alternative than wholesale participation in SCMC." The report concludes that through the strategic efforts of its labs, "SC successfully generates equal or better savings on commodities, as compared to the SCMC eStore." It also concludes that the "SC labs obtain competitive and negotiated cost savings on par with the results of the SCMC eSourcing tools," although they concede "they may benefit from selected use of a reverse auction tool." Essentially, SC has determined that by utilizing the existing Integrated Contractor Purchasing Team (ICPT) commodity agreements and the labs' own internal site specific sourcing capabilities, it is as effective as the SCMC at leveraging the SC buying power and ultimately generating sufficient cost savings.

Coordinating commodity management across the complex would help to achieve better pricing from suppliers, ensuring uniform prices for comparable goods and services, and streamlining and reducing the total cost of acquisition. The current process includes cross-representation between the ICPT and the SCMC to ensure an enterprise look at spend data. The structured process of analyzing spending patterns across the entire department and utilizing this information to acquire commodities and services more efficiently could ultimately result in even greater cost savings.

QUESTION SUBMITTED BY SENATOR THAD COCHRAN

Question. The Department is targeting a significant amount for investment into high-risk, high-reward renewable energy alternatives, perhaps at the expense of research at the national labs and in partnership with institutions of higher education. In the biofuels arena, many of these technologies require significant developments and investment in feedstock supply infrastructure. Mississippi, for example, has a surplus of southern yellow pine that remains readily available and proven commercial viability.

Might it be more prudent to invest in alternatives that have the necessary components for economic viability in the near-term while using the research sector and National Lab system to further refine and advance technologies until they are much closer to commercialization?

Answer. The Department of Energy invests in research, development, and deployment across a wide variety of technologies at many stages of development. The Office of Science is the lead Federal entity supporting fundamental scientific research for energy and the Nation's largest supporter of basic research in the physical sciences. Advanced Research Projects Agency-Energy (ARPA–E) focuses exclusively on high-risk, high-payoff concepts, filling a former gap in the Department's portfolio. For applied energy technologies, the Office of Fossil Energy, Office of Nuclear Energy, Office of Energy Efficiency and Renewable Energy, and the Office of Electricity Delivery and Energy Reliability carry out targeted, use-inspired research and development, as well as a variety of deployment projects for energy sources that have

strong potential for economic viability in the near-term. In each case, the blend of activities is selected through careful program management and regularly re-evaluated for effectiveness. These programs also work with a variety of university, National Lab, and private company partners based on the maturity and characteristics of the technology or system.

Biomass resources are available in every county in the United States, making them one of the most universal opportunities. However, as with the yellow pine in Mississippi, many specific geographic and technical issues need to be explored for different location. The Office of Biomass Program works on feedstock logistics issues in partnership with local universities and companies. Some example projects are described in this fact sheet: http://www1.eere.energy.gov/biomass/pdfs/feedstocks__four__pager.pdf.

QUESTION SUBMITTED BY SENATOR SUSAN COLLINS

Question. Secretary Chu, my support for New Strategic Arms Reduction Treaty (New START) was influenced in part by the administration's commitment to modernize the U.S. nuclear weapons complex. During Senate consideration of the treaty in November 2010, the President announced his commitment to increase funding for nuclear modernization activities by $4.1 billion during the next 5 years.

However, the budget request for fiscal year 2013 for Weapons Activities is $372 million less than was projected in the President's Section 1251 Plan as delivered in November 2010. If we fund Nuclear Weapons Activities at the amounts proposed in the President's budget request for the next 5 years, the total investment to the nuclear complex will be $4.3 billion less than the President committed to Senators during the debate on New START. This is where we were before New START.

As you can imagine, this change of course in the investment in the safety, security, and reliability of our nuclear stockpile raises doubts and concerns about the administration's commitments.

Secretary Chu, how would you respond to the concern many of us have on this issue?

Answer. The administration, including the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) leadership, remains committed to programs and capabilities outlined in the 1251 report and fiscal year 2012 Stockpile Stewardship and Management Plan.

If approved by the Congress, the President's budget for fiscal year 2013 will be the third consecutive increase in Weapons Activities, resulting in an 18.6 percent increase for Weapons Activities since the fiscal year 2010 budget. While this is less than projected in last year's budget submission and the 1251 report, the request reflects a new fiscal climate in Washington, embraced by both the Congress and the administration.

Last year, the Congress passed the Budget Control Act (BCA), which limits discretionary spending for the next decade, and caps national security spending in fiscal year 2012 and 2013. In fiscal year 2012, the Congress also reduced NNSA's request for Weapons Activities by $416 million below the President's request, or 5.4 percent.

NNSA must adjust to this new reality. But the agency and the administration remain committed to necessary investments in nuclear capabilities and the nuclear complex.

QUESTIONS SUBMITTED BY SENATOR LISA MURKOWSKI

Question. As you are aware, the authorization in Public Law 106–392 to use power revenues to fund the Upper Colorado Recovery Implementation Plan expired at the end of fiscal year 2011. Currently, the Congress is working on legislation to address the reauthorization of this Program. However, the administration's fiscal year 2013 budget addresses this funding, saying "In the absence of legislation to extend this specific authority, Reclamation may rely on existing authority to continue the use of Center for Revolutionary Solar Photoconversion (CRSP) hydropower revenues or use appropriated funds to ensure full base funding."

Is it the intent of the administration to continue to use power revenues without an authorization?

Answer. This question should be redirected to the Department of the Interior for a response. The referenced administration language comes from the U.S. Bureau of Reclamation's fiscal year 2013 budget submission and they would be the most appropriate agency to address questions related to that request.

Question. If so, please describe what "existing authority" is being referred to in your budget request.

Answer. This question should be redirected to the Department of the Interior for a response. The referenced administration language comes from the U.S. Bureau of Reclamation's fiscal year 2013 budget submission and they would be the most appropriate agency to address questions related to that request.

SUBCOMMITTEE RECESS

Senator FEINSTEIN. Thank you very much, Mr. Secretary.

The hearing is adjourned.

[Whereupon, at 4:26 p.m., Wednesday, March 14, the subcommittee was recessed, to reconvene subject to the call of the Chair.]