

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2010

TUESDAY, MAY 19, 2009

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

The subcommittee met at 10:22 a.m., in room SD-138, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Murray, Feinstein, Reed, Tester, Bennett, Cochran, and Alexander.

DEPARTMENT OF ENERGY

STATEMENT OF HON. STEVEN CHU, SECRETARY

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. I'm going to call the hearing to order. This is a hearing of the Energy and Water Subcommittee of the Appropriations Committee. Dr. Chu, we welcome you to the subcommittee this morning. I'm sorry for the inconvenience. We're starting a few minutes late. I think probably all three of us were on the floor of the Senate, waiting for a 10 or 10:15 vote to occur, and we were just informed it won't occur now, but will occur sometime in the future, either in the short term or the longer term, any moment, or perhaps sometime today. So that's the reason I was a bit delayed.

We have asked Secretary Chu from the Department of Energy to come and present and discuss the 2010 budget. My expectation is that we will be truncated a bit and probably be interrupted with a short recess for a cloture vote. I want to note that we will have Administrator D'Agostino before the subcommittee on June 2, to discuss the National Nuclear Security Administration's budget request. We're free to discuss any of that today as well, but I simply want to remind members that there will be further opportunity to discuss that in 2 weeks' time.

This year's budget of \$27.1 billion for the Department is basically flat compared to 2009 appropriation numbers. A substantial sum of money, a great deal of money, was provided—\$38.7 billion as a part of the American Recovery and Reinvestment Act. Those numbers, of course, were not intended to be a substitute for the regular budget. They were intended for the purpose of moving money around the country, getting people to work, getting contractors working and building projects and doing things that are of substantial value, and creating assets for the future.

I was a bit surprised when I received the President's budget. Because I felt that with the economy recovery funds, a very substantial amount of money, \$38.7 billion, to the Department, that we might see a very different approach in trying to deal with the priorities in the Department. And I'm going to talk to you today about some of the strengths that I see in the budget request and some of the concerns that I have.

I think there are some good stories in the funding increase proposals. I think we have to maximize the capability of renewable energy in our country. In order to do that, we not only have to say, "Here's where the country's headed," and plot a map to get there, but we have to create the capability to have an interstate transmission capability that connects all of America. That's not easy, that's very difficult to do.

The science budget is robust. There's also a proposal for eight new Energy Innovation Hubs, which I view as a means of helping the Department of Energy address what normally people call the Valley of Death, the dilemma of getting technology transferred from basic science to applied research and then out into the marketplace, so that it accomplishes what we intend to accomplish in the field of energy for our country's future.

I'm going to just truncate my statement. I will, during the questioning, have an opportunity to go through a wide range of subjects with you, Secretary Chu. I think what I'd like to do, with the permission of our colleagues, is call on Senator Bennett for a brief opening statement, call on the Secretary to make a presentation. Perhaps about that time, we'll have to go over for the cloture vote. And then come back and have substantial opportunity this morning to ask questions of the Secretary.

If that is all right with my colleagues, let me call on the ranking member, Senator Bennett.

OPENING STATEMENT OF SENATOR ROBERT F. BENNETT

Senator BENNETT. Thank you very much, Mr. Chairman. I will abbreviate my opening statement. Mr. Secretary, welcome to the subcommittee. We're glad to have you here in your first experience in defending your budget. And having served in the executive branch myself, I know that this isn't entirely your budget, that the OMB has had a few suggestions, shall we say. And you may or may not be pleased with those, but I won't call on you to defend or comment on those.

Just a few highlights, you apply additional resources to programs that appear to already enjoy some surpluses, but fail to address chronic pension shortfalls that have been created by the poor market performance. Now, I understand that these could not be foreseen, but I don't think it's acceptable to ignore the estimated \$500 to \$600 million shortfall spread across the Department and the impact that that will have in undercutting scientific and cleanup missions.

I continue my interest in NNSA and the labs, and would be interested in talking to you about that and some of the comments that you've made there. The Office of Science and Renewable Energy has received nearly 50 percent of the stimulus funding, and it seems unlikely that this will be spent before the 2010 deadline.

So we could talk about how that could be shifted, it's not a matter of I don't favor this kind of thing, but you can only shovel so much money out the door in certain circumstances, and that's one thing that I would look at.

Funding for environmental cleanup is down \$161 million. There are two other factors that significantly increase the deficit of this program. It fails to fully fund the pension shortfalls that will reduce environmental cleanup by an estimated \$400 million in fiscal year 2010, and I've included an amendment to the budget resolution to mitigate the impacts that budgets will have on the cleanup. And I'm grateful, Mr. Chairman, for your support in that effort.

The budget includes a \$200 million tax on uranium fuel to be paid by utilities, offsetting this to our overall budget authority. If we don't do this—and it's frankly a little bit of a budget gimmick—it creates a \$200 million shortfall in our bill. And this revenue isn't necessary, as there is \$4.5 billion in existing balances. Those kinds of details, we would talk through.

So with that, Mr. Chairman, I will leave it there and do the best we can to move the hearing forward.

Senator DORGAN. Senator Bennett, thank you very much. Mr. Secretary, I know that you personally worked hard on the budget that was presented to us, but you did so with very limited time and also with very limited staff. I regret that a good number of your nominations are all being held up. I have spoken to the Senator that has the hold. It's a hold that's very Byzantine, as far as I'm concerned, because that Senator has been promised a hearing date, which is what he wanted. So I hope that you get those nominations through so that you can have a full complement of staff.

But having done what you have done, please tell us the justification for the administration's budget proposals for the Department of Energy. Mr. Secretary, thank you for being here.

STATEMENT OF HON. STEVEN CHU

Secretary CHU. Okay, thank you. Chairman Dorgan, Ranking Member Bennett, members of the subcommittee, I am pleased to be before you today to present President Obama's fiscal year 2010 budget request for the Department of Energy.

The President's 2010 budget seeks to usher in a new era of responsibility, an era in which we invest to create new jobs and lift our economy out of recession, while laying a new foundation for our long-term growth and prosperity.

President Obama's 2010 budget invests in clean, renewable sources of energy, so we can reduce our dependence on oil, address the threat of a changing climate, and become the world leader in new, clean energy economy.

The 2010 budget request for the Department of Energy is \$26.4 billion, essentially flat compared to fiscal year 2009, and it complements the significant energy investments in the American Recovery and Reinvestment Act. This budget request emphasizes science, discovery, and innovation to support the key missions of the Department.

My written testimony includes an extensive breakdown of this budget, and I'd like to use this time briefly to highlight a few numbers and areas of particular importance. To promote nuclear secu-

rity in the President's ambitious non-proliferation goals, the budget requests \$9.9 billion for the National Nuclear Security Administration.

To continue to accelerate legacy cleanup of our Nation's nuclear weapons production, the budget requests \$5.8 billion for the Office of Environmental Management. To bolster the Department's commitment to scientific discovery, the budget requests \$4.9 billion for the Office of Science. And fostering the revolution in energy supply and demand while positioning the United States to lead on a global climate change policy, the budget includes requests for a range of energy investments, including \$882 million for the Office of Fossil Energy, \$845 million for the Office of Nuclear Energy, and \$2.3 billion for the Office of Energy Efficiency and Renewable Energy.

That clean energy funding includes several notable strategic investments, even as this budget holds the line on spending overall. Solar power will receive \$320 million, an increase of 82 percent. Wind energy is funded at \$75 million, an increase of 36 percent. Funding for clean vehicle programs is up 22 percent to \$333 million, and funding for building technologies is increased by 69 percent to \$238 million.

Another significant increase is in the Office of Electricity Delivery and Energy Reliability, which received \$208 million, 52 percent more than in fiscal year 2009, as it works to develop a new smart electric grid. The request also includes funding to implement the Loan Guarantee Program and Advanced Technology Vehicle Manufacturing Loan Program.

With that brief overview, I want to turn to one of my top priorities in the budget as Secretary, amplifying the Office of Science's fundamental research with innovative approaches to solving the Nation's energy problems. Specifically, this budget request includes three initiatives designed to cover a spectrum of basic to applied science to maximize our chances of energy breakthroughs. The fiscal year 2010 budget will launch eight Energy Innovation Hubs, while the Energy Frontier Research Centers and the ARPA-E were launched last month.

Let me briefly explain the differences among these initiatives and why I believe launching these hubs is so important. The EFRCs are small-scale collaborations, predominately universities, that focus on overcoming known hurdles in basic science that block energy breakthroughs, not on developing energy technologies themselves.

ARPA-E is a highly entrepreneurial funding model that explores potentially revolutionary technologies that are too risky for industry to fund. The proposed Energy Innovation Hubs will take a very different approach. They will be multi-disciplinary, highly collaborative teams, ideally working under one roof to solve priority technology challenges, such as artificial photosynthesis, or creating fuels from sunlight.

A few years ago, I changed the course of my scientific work to focus on solving our energy and climate challenges because of the urgency of this issue and because I remain optimistic that science can offer better solutions than we can imagine today. But those solutions will only come if we harness the creativity and ingenuity and intellectual horsepower of our best scientists in the right way.

I'm convinced that launching Energy Innovation Hubs is a critical next step in this effort. Bringing together the best scientists from different disciplines in a collaborative effort is our best hope of achieving priority goals, such as making solar energy cost competitive with fossil fuels, or developing new building designs that use dramatically less energy, or developing an economical battery that will take your car 300 miles without recharging.

These are the breakthroughs we need, and the Energy Innovation Hubs will help us achieve them. I saw the power of truly collaborative science like this firsthand during my time at Bell Laboratories. I believe that to solve the energy problem, the Department of Energy must strive to be the modern version of Bell Laboratories in energy research, and this is what these hubs will do. These investments will pay for themselves many times over and enhance America's competitiveness on the green energy jobs of tomorrow.

A final initiative in the fiscal year 2010 budget is a comprehensive K-20+ science and engineering effort called RE-ENERGYSE, standing for REgaining our ENERGY Science and Engineering Edge, funded at \$115 million. Through RE-ENERGYSE, the Department will partner with the National Science Foundation to educate thousands of students at all levels in the fields that contribute to our fundamental understanding of energy science and engineering systems.

PREPARED STATEMENT

It is my firm belief that the short-term impact of the Recovery Act, combined with the long-term vision in President Obama's fiscal year 2010 budget, will lay the necessary groundwork for a clean economy. Both President Obama and I look forward to working with the 111th Congress to make this vision a reality. I appreciate this opportunity to appear before you, and I'm happy to take questions at this time.

[The statement follows:]

PREPARED STATEMENT OF HON. STEVEN CHU

Chairman Dorgan, Ranking Member Bennett, members of the subcommittee, I am pleased to be before you today to present President Obama's fiscal year 2010 budget request for the Department of Energy.

The President's 2010 budget seeks to usher in a new era of responsibility—an era in which we invest to create new jobs and lift our economy out of recession, while laying a new foundation for our long-term growth and prosperity.

The fiscal year 2010 budget request of \$26.4 billion provides the next critical investment in a multi-year effort to address the interconnected challenges of economic uncertainty, U.S. dependence on oil, and the threat of a changing climate by transforming the way our Nation produces and consumes energy. Meeting these challenges will require both swift action in the near-term and a sustained commitment for the long term to build a new economy powered by clean, reliable, affordable and secure energy. We will also train the next generation of a technical workforce and the scientific researchers needed to maintain the United States' preeminent position in science and technology. At its core, this budget request emphasizes science, discovery, and innovation to support the key missions of the Department.

I want to note at the outset that in developing the fiscal year 2010 request the Department considered that the \$38.7 billion of American Recovery and Reinvestment Act of 2009 (Recovery Act) funding received by the Department allows for the acceleration of a number of important commitments. The Recovery Act makes investments in energy conservation and renewable energy sources (\$16.8 billion), environmental management (\$6 billion), loan guarantees for renewable energy and elec-

tric power transmission projects (\$6 billion), grid modernization (\$4.5 billion), carbon capture and sequestration (\$3.4 billion), basic scientific research (\$1.6 billion), and the establishment of the Advanced Research Projects Agency-Energy (ARPA-E) (\$400 million). These investments will help jumpstart the economy, save and create jobs, and serve as a down payment on addressing fundamental energy challenges, while reducing carbon emissions and U.S. dependence on oil.

INVESTING IN SCIENCE TO ACHIEVE TRANSFORMATIONAL DISCOVERIES

The fiscal year 2010 budget request supports our strategic framework by:

- Investing in science to achieve transformational discoveries;
- Fostering the revolution in energy supply and demand while positioning the United States to lead on global climate change policy;
- Increasing American economic competitiveness;
- Maintaining the nuclear deterrent, reducing the risk of nuclear proliferation, and advancing nuclear legacy cleanup; and
- Improving the management of the Department.

The President has committed to doubling Federal investment in basic research over 10 years. The Department will support this commitment by investing in basic and applied research, creating new incentives for private innovation, and promoting breakthroughs in energy. Our Nation's ability to sustain a growing economy and a rising standard of living for all Americans depends on continued advances in science and technology. Scientific and technological discovery and innovation are the major engines of increasing productivity and are indispensable to ensuring economic growth, job creation, and rising incomes for American families in the technologically-driven 21st century.

As Secretary, one of my top priorities is to amplify the fundamental research undertaken by the Office of Science with novel approaches to solving the Nation's energy problems. While the Department has made important contributions over the years, despite almost three decades of effort, we are still confronted by the fundamental problems of energy security and environmental degradation from our energy use. That is why I am proposing new approaches to solving the energy question. Specifically, this budget request includes three initiatives designed to cover the spectrum of basic to applied science to maximize our chances of energy breakthroughs. The fiscal year 2010 budget will launch eight Energy Innovation Hubs, while the Energy Frontier Research Centers (EFRCs) and ARPA-E were launched last month.

Let me briefly explain the differences and why I believe launching these Hubs is so important.

EFRCs are small-scale collaborations (predominantly at universities) that focus on overcoming known hurdles in basic science that block energy breakthroughs—not on developing energy technologies themselves.

ARPA-E is a highly entrepreneurial funding model that explores potentially revolutionary technologies that are too risky for industry to fund.

The proposed Energy Innovation Hubs will take a very different approach—they will be multi-disciplinary, highly collaborative teams ideally working under one roof to solve priority technology challenges, such as artificial photosynthesis (creating fuels from sunlight).

A few years ago, I changed the course of my scientific work to focus on solving our energy and climate challenges. I did so because of the great national and global urgency of this issue—but also because, as a scientist, I remain optimistic that science can offer us better solutions than we can imagine today. But those solutions won't come easily; they will only come if we harness the creativity and ingenuity and intellectual horsepower of our best scientists in the right way.

Having dedicated the last several years of my work to solving the energy challenge, I'm convinced that launching Energy Innovation Hubs is a critical next step in this effort. Bringing together the best scientists from different disciplines in collaborative efforts is our best hope of achieving priority goals such as making solar energy cost competitive with fossil fuels, or developing new building designs that use dramatically less energy, or developing an economical battery that will take your car 300 miles without recharging.

These are the breakthroughs we need—and the Energy Innovation Hubs will help us achieve them. I saw the power of truly collaborative science like this firsthand during my time at Bell Laboratories. I believe that to solve the energy problem, the Department of Energy must strive to be the modern version of Bell Labs in energy research, and that is what these Hubs will do.

The scientific collaboration the Hubs will foster will be unique and indispensable, and must be backed by a meaningful and sustained investment. These investments

will pay for themselves many times over, ensuring American leadership and American competitiveness when it comes to the green energy jobs of tomorrow.

The following is additional information about the three initiatives:

—*Energy Innovation Hubs*.—In fiscal year 2010 the Department proposes to fund eight multi-disciplinary Energy Innovation Hubs, at a total of \$280 million. Modeled after the Department's Bioenergy Research Centers, the work of the Hubs will span from basic research to engineering development to commercialization and a hand-off to industry. Each Hub will be funded at \$25 million per year, with one-time additional start-up funding of \$10 million in the first year for renovation, equipment and instrumentation.

The Hubs will support cross-disciplinary research and development focused on the barriers to transforming energy technologies into commercially deployable materials, devices, and systems. They will advance highly promising areas of energy science and technology from their early stages of research to the point that the risk level will be low enough for industry to deploy them into the marketplace. While the intent is to provide a funding stream that is more dependable than the standard funding mechanisms, renewal after 5 years will not be automatic. To receive renewed funding, Hubs will be expected to be delivering exceptional scientific progress.

The research Hubs will explore the following topics: Solar Electricity; Fuels from Sunlight; Batteries and Energy Storage; Carbon Capture and Storage; Grid Materials, Devices, and Systems; Energy Efficient Building Systems Design; Extreme Materials; and Modeling and Simulation.

—*Energy Frontier Research Centers*.—In fiscal year 2010 the Department of Energy will continue to support Energy Frontier Research Centers (EFRC). Currently there are 46 EFRCs, funded at \$2 to \$5 million per year. These centers enlist the talents and skills of the very best scientists and engineers to address current fundamental scientific roadblocks to clean energy and energy security. Roughly one-third of the centers are supported by Recovery Act funding. These centers, involving almost 1,800 researchers and students from universities, national labs, industry, and non-profit organizations from 36 States and the District of Columbia, address the full range of energy research challenges in renewable and low-carbon energy, energy efficiency, energy storage, and cross-cutting science. EFRC researchers take advantage of new capabilities in nanotechnology, light sources that are a million times brighter than the sun, supercomputers, and other advanced instrumentation, much of it developed in collaboration with the Department of Energy's Office of Science.

—*Advanced Research Projects Agency-Energy (ARPA-E)*.—ARPA-E is a new Department of Energy organization modeled after the Defense Advanced Research Projects Agency, created during the Eisenhower administration in response to Sputnik. The Recovery Act provided \$400 million and the fiscal year 2010 budget requests \$10 million for ARPA-E. The purpose of ARPA-E is to advance high-risk, high-reward energy research projects that can yield revolutionary changes in how we produce, distribute, and use energy. It will ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.

ARPA-E seeks out the best ideas and assembles teams that can move quickly to help bring the idea to market, and funds this work through grants that range between \$500,000 and \$10 million. Most projects will be funded with seed money that sunsets after 3 years. Research teams are expected to either make exceptionally rapid progress or bring their technology to the point the private sector can pick it up within that time.

These initiatives will be augmented with a broad educational effort that cuts across DOE program offices to inspire students and workers to pursue careers in science, engineering, and entrepreneurship specifically related to clean energy. This education effort will help to develop the scientific and technical expertise to sustain the new energy economy and increase American competitiveness.

—*RE-ENERGYSE (REgaining our ENERGY Science and Engineering Edge)*.—As part of President Obama's recent address before the National Academy of Sciences on reinvigorating scientific research and innovation in the United States, the President announced a joint education initiative between the National Science Foundation and the Department of Energy to "inspire tens of thousands American students to pursue careers in science, engineering and entrepreneurship related to clean energy."

As part of this initiative, the Department will launch a comprehensive K-20+ science and engineering initiative, funded at \$115 million in fiscal year 2010, to educate thousands of students at all levels in the fields contributing to the fundamental understanding of energy science and engineering systems.

This initiative, which complements the Department's other education efforts, will provide graduate research fellowships in scientific and technical fields that advance the Department's energy mission; provide training grants to universities that establish multidisciplinary research and education programs related to clean energy; support universities that dramatically expand energy-related research opportunities for undergraduates; build partnerships between community colleges and different segments of the clean tech industry to develop customized curriculum for "green collar" jobs; and increase public awareness, particularly among young people, about the role that science and technology can play in responsible environmental stewardship.

Office of Science

The fiscal year 2010 budget requests \$4.9 billion for the Office of Science, a \$184 million increase over fiscal year 2009. In general, the 2010 request will focus on breakthrough science while developing and nurturing science and engineering talent. It will also increase funding for climate science and continue America's role in international science and energy experiments. The budget also invests in the next generation of America's scientists by expanding graduate fellowship programs in critical energy-related fields. This funding builds upon the \$1.6 billion provided in the Recovery Act for basic science programs at the Department of Energy.

The Office of Science supports investigators from more than 300 academic institutions and from all of the DOE laboratories. The fiscal year 2010 budget request will support about 25,000 Ph.D.s, graduate students, undergraduates, engineers, and technicians. Approximately 24,000 researchers from universities, national laboratories, industry, and international partners are expected to use the Office of Science's scientific user facilities. The fiscal year 2010 request supports the President's plan to increase Federal investment in the sciences and train students and researchers in critical fields, to invest in areas critical to our clean energy future, and to make the United States a leader on climate change.

Two of the Department's eight Energy Innovation Hubs are requested in the Office of Science in fiscal year 2010 (\$70 million). These Hubs will bring together teams of experts from multiple disciplines to focus on two grand challenges in energy: the creation of fuels directly from sunlight without the use of plants or microbes and advanced methods of electrical energy storage.

The Office of Science supports a diverse number of research programs including:

- High-Energy Physics (\$819 million)
- Nuclear Physics (\$552 million)
- Biological and Environmental Research (\$604 million)
- Basic Energy Sciences (\$1.7 billion)
- Advanced Scientific Computing Research (\$409 million)
- Fusion Energy Sciences (\$421 million)

FOSTERING THE REVOLUTION IN ENERGY SUPPLY AND DEMAND WHILE POSITIONING THE UNITED STATES TO LEAD ON GLOBAL CLIMATE CHANGE POLICY

U.S. dependence on oil is a national security challenge. Furthermore, the United States has a responsibility to curb carbon emissions to mitigate the effects of global climate change. The fiscal year 2010 budget request will expand the use of low-carbon and renewable energy sources and efficiency, and support the Smart Grid. Deploying these technologies will position the United States to lead on global climate change policy.

Energy Efficiency and Renewables

Achieving these goals requires changes to both the demand and supply of energy. DOE is addressing both by improving the Nation's energy efficiency to reduce energy demand and by investing in technologies and approaches to transform energy supply and transmission. The fiscal year 2010 budget request of \$2.3 billion for the Office of Energy Efficiency and Renewable Energy (EERE) will transform the Nation's energy infrastructure by investing in a variety of renewable sources of electricity generation and deploying technologies to reduce our dependence on oil and decrease energy use in homes, transportation, and industry. These sources of energy will reduce the production of GHG emissions and usher in a revitalized economy built on the next generation of domestic production. Investments in efficiency R&D, grants to States and weatherization assistance will have immediately tangible benefits by reducing energy use, lowering energy bills, and reducing GHG emissions and helping to create jobs across the country.

This budget request for EERE provides a diverse portfolio of solutions to our energy and environmental challenges. This starts with improving energy efficiency, which can be one of the cheapest, cleanest means of reducing greenhouse gas emis-

sions. The budget includes significant increases in several programs in support of the President's efforts to promote energy efficiency, including these increases:

- Building Technology Program \$238 million (+ \$98 million or 69 percent)
- Vehicle Technology Program \$333 million (+ \$60 million or 22 percent); and

The budget continues the shift to clean and renewable energy, including these increases:

- Solar Energy Program \$320 million (+ \$145 million, or 82 percent);
- Wind Energy Program \$75 million (+ \$20 million, or 36 percent); and
- Geothermal Program \$50 million (+ \$6 million or 14 percent.)

The budget also has funding for:

- Fuel Cells Technology (\$68.2 million)
- Biomass and Biorefinery Systems R&D (\$235 million)
- Water Power (\$30 million)
- Industrial Technologies (\$100 million)
- FEMP (\$32.3 million)
- Weatherization (\$220 million)
- State Energy Program Grants (\$75 million)

Electricity Transmission and Reliability

The Nation's ability to meet the growing demand for reliable electricity is challenged by an aging electricity transmission and distribution system and by vulnerabilities in the U.S. energy supply chain. Despite increasing demand, the United States has experienced a long period of underinvestment in power transmission and infrastructure maintenance. The majority of the power delivery system was built on technology developed in the 1960s, 1970s and 1980s and is limited by the speed with which it can respond to disturbances. This limitation increases the vulnerability of the power system to outages that can spread quickly and have regional effects. Deploying the next generation of clean energy sources will require modernization of U.S. energy infrastructure which will rely on digital network controls and transmission, distribution and storage breakthroughs.

The proposed fiscal year 2010 Office of Electricity Delivery and Energy Reliability budget provides \$208 million, an increase of 52 percent over fiscal year 2009, and builds on the "smart grid" investments and other activities to modernize and secure the electric grid provided by \$4.5 billion of Recovery Act funds, supporting the following areas:

- Clean energy transmission and reliability (\$42 million)
- Smart grid research and development (\$67 million)
- Energy storage (\$15 million)
- Cyber security for energy delivery systems (\$50 million)
- Permitting, siting and analysis (\$6.4 million)
- Infrastructure security and energy restoration (\$6.2 million)

Fossil Energy

The fiscal year 2010 budget request of \$882 million for the Office of Fossil Energy (FE) will help ensure that the United States can utilize traditional domestic energy resources in a clean and affordable manner. The United States has 25 percent of the world's coal reserves, and fossil fuels currently supply 86 percent of the Nation's energy. Low-carbon emissions coal plants and production of methane (natural gas) from gas hydrates will help allow fossil fuels to be used as abundant and low-carbon emitting energy resources. In direct support of the Department of Energy's Energy Security mission, \$229 million of the \$882 million has been requested to provide operations, maintenance and repair funding for a Strategic Petroleum Reserve program that is environmentally responsible and fully responsive to the needs of the Nation and the public, protecting against potential disruptions in foreign and domestic petroleum supplies.

The Department is committed to advancing Carbon Capture and Storage (CCS) technologies in order to promote cleaner and efficient use of fossil fuels. The \$3.4 billion in Recovery Act funds, combined with \$222 million requested in fiscal year 2010 for CCS research and development, is the keystone of the Department's clean coal research program which seeks to establish the capability of producing electricity from coal with dramatically reduced atmospheric emissions of carbon dioxide.

In fiscal year 2010, the Energy Innovation Hub for CCS will focus on enabling fundamental advances and discovery of novel and revolutionary capture/separation approaches to dramatically reduce the energy penalty and cost associated with CO₂ capture.

The fiscal year 2010 budget request for FE funds the following areas:

- Coal (\$403.9 million) including \$179.9 million for carbon sequestration
- Fossil energy research and development (\$617.6 million)

- Naval Petroleum and Oil Shale Reserves (\$23.6 million)
- Strategic Petroleum Reserve (\$229.1 million)
- Northeast Home Heating Oil Reserve (\$11.3 million)

Nuclear Energy

The \$845 million budget request for the Office of Nuclear Energy (NE) recognizes that nuclear energy is a fundamental component of the energy mix which currently supplies approximately 20 percent of the Nation's electricity and over 70 percent of low carbon emitting electricity.

In order to research and develop nuclear energy technologies that could help meet non-proliferation and climate goals, and to maintain the national nuclear technology infrastructure, the fiscal year 2010 budget request for NE funds the following areas:

- Nuclear Power 2010 (\$20 million)
- Generation IV (\$191 million)
- Fuel Cycle Research and Development Program (\$192 million)
- Radiological Facilities Management (\$77 million)
- Idaho Facilities Management (\$203 million)

Loan Guarantee Program

In fiscal year 2010, the DOE will continue to accelerate the availability of loans for innovative technologies through the Loan Guarantee Program, while ensuring taxpayer interests are protected. The Department requests \$43.0 million in funding in fiscal year 2010 to operate the Office and support personnel and associated costs. This request will be offset by collections authorized under title XVII of the Energy Policy Act of 2005 (EPACT 2005). Additionally, the fiscal year 2010 budget provides \$20 million for administrative costs to help enable the Advanced Technology Vehicle Manufacturing Loan Program to support up to \$25 billion in loans to automobile and automobile part manufacturers for re-equipping, expanding, or establishing manufacturing facilities to produce advanced technology vehicles or qualified components.

MAINTAINING THE NUCLEAR DETERRENT, REDUCING THE RISK OF NUCLEAR PROLIFERATION, AND ADVANCING NUCLEAR LEGACY CLEAN-UP

Nuclear Security

The National Nuclear Security Administration (NNSA) continues significant efforts to meet administration and secretarial priorities, leveraging science to promote national security. The fiscal year 2010 President's budget request is \$9.9 billion, which is \$815 million more than the fiscal year 2009 request, to meet defense and homeland security-related objectives.

The United States continues a fundamental shift in national security strategy to address the realities of the 21st century. The fiscal year 2004 directed reductions to the U.S. nuclear weapons stockpile were completed in 2007, 5 years early. Today's nuclear weapons stockpile is now the size envisioned for 2012, and by 2012 it will be almost 15 percent less than that—a total that is just 25 percent of what it was at the end of the cold war. Consistent with the administration's Nuclear Posture Review, the Department of Energy has created a vision for a revitalized nuclear weapons complex that is significantly more agile and responsive, and will allow further reductions in the nuclear stockpile by providing an industrial hedge against geopolitical or technical problems.

The fiscal year 2010 budget request for NNSA funds the following areas:

- Weapons Activities (\$6.4 billion)
- Defense Nuclear Nonproliferation (\$2.14 billion)
- Naval Reactors (\$1.0 billion): \$175 million increase from fiscal year 2009
- Office of the Administrator (\$420.8 million)

Environmental Management

The Federal Government has the dual responsibilities of addressing the nuclear weapons production legacy of our past and providing the necessary environmental infrastructure for today that will ensure a clean, safe and healthy environment for future generations. To deliver on the Department's obligations stemming from 50 years of nuclear research and weapons production during the cold war, the Office of Environmental Management (EM) continues to focus its resources on those activities that will yield the greatest risk reductions, with safety as the utmost priority. To achieve a balance of risk reduction and environmental cleanup, the fiscal year 2010 request of \$5.8 billion, a decrease of 3 percent from fiscal year 2009, builds upon the \$6 billion in Recovery Act funding. These investments are already having an impact. Fifty skilled new workers recently reported to work at the Savannah River Site.

This request supports the following activities, in priority order:

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

In developing the fiscal year 2010 budget for its environmental cleanup efforts, the Department will focus on achieving the greatest risk reduction, while also incorporating regulatory compliance commitments and best business practices, to maximize cleanup progress. In fiscal year 2010, EM is aggressively pursuing the consolidation and disposition of surplus plutonium and other special nuclear materials to enhance national security and to minimize the storage risks and costs associated with these materials. In addition, EM continues to make significant progress on the construction and operation of waste treatment and immobilization facilities across the complex. The budget continues shipments of remote-handled transuranic waste to the Waste Isolation Pilot Plant.

The fiscal year 2010 budget request for EM funds the following activities:

- Non-Defense Environmental Management (\$238 million)
- Defense Environmental Management (\$5.5 billion)
- UED&D Fund (\$559 million)

Yucca Mountain

The fiscal year 2010 budget request of \$197 million for OCRWM implements the administration's decision to terminate the Yucca Mountain program while developing nuclear waste disposal alternatives. All funding for development of the Yucca Mountain facility would be eliminated, such as further land acquisition, transportation access, and additional engineering. The budget request includes the minimal funding needed to explore alternatives for nuclear waste disposal through OCRWM and to continue participation in the Nuclear Regulatory Commission (NRC) license application process, consistent with the provisions of the Nuclear Waste Policy Act. The administration intends to convene a "blue-ribbon" panel of experts to evaluate alternative approaches for meeting the Federal responsibility to manage and ultimately dispose of spent nuclear fuel and high-level radioactive waste from both commercial and defense activities. The panel will provide the opportunity for a meaningful dialogue on how best to address this challenging issue and will provide recommendations for managing and disposing of spent nuclear fuel and high-level radioactive waste.

IMPROVING THE MANAGEMENT OF THE DEPARTMENT

As Secretary, I am making a concerted effort to improve management throughout the Department. The Department is committed to strengthening its management to implement the \$26.4 billion fiscal year 2010 request and \$38.7 billion of Recovery Act funds. The Department has developed strong oversight strategies for Recovery Act implementation, including upfront risk assessments and building specific risk management plans, upgrading process controls, establishing personal risk assurance accountabilities, and expanding outreach, training, and coordination between Headquarters and field offices. The Recovery Act, however, is only one aspect of a much larger effort to improve the Department's management.

As part of President Obama's commitment to fiscal discipline, DOE will focus on using its resources responsibly, transparently, and effectively by identifying potential savings throughout the agency. The fiscal year 2010 budget request of \$182.3 million for Departmental Administration, along with resources in individual program offices, will continue the improvement in key functional areas such as human, financial, project, and information technology management. These efforts will instill management excellence and encourage the most efficient use of the Department's resources.

The Office of the Chief Information Officer (CIO) will receive \$104.5 million, \$33.4 million of which will go to cybersecurity and secure communications, \$9.4 million to the corporate management information program, and \$23.6 million for energy information technology services.

The Office of the Chief Financial Officer will continue its effort in fiscal year 2010 to build and improve its integrated business management system, iMANAGE, with the deployment of budget execution and formulation modules such as iBUDGET. To accomplish this and other goals, the CFO's office will receive \$66 million in the fis-

cal year 2010 budget. A significant portion of the increase is to assume costs previously carried by the CIO for accounting systems operations.

The Office of Management (\$88.4 million) and the Office of Human Capital Management (\$29.5 million) will help ensure effective and efficient management principles permeate from top to bottom at the Department of Energy. The Department has been making steady progress in improving project management and developed an action plan with concrete steps and scheduled milestones to successfully address the root causes of the major challenges to planning and managing Department projects. The action plan identifies eight measures that, when fulfilled, will result in significant, measurable, and sustainable improvements in the Department's contract and project management performance and culture. Primary actions include: strengthened front-end planning, optimized staffing, improved risk management, better alignment of funding profiles and cost baselines, strengthened cost estimating capability, improved acquisition strategies and plans, improved oversight, and stricter adherence to project management requirements.

The Department's human capital management efforts are focused on an integrated approach that ensures human capital programs and policies are linked to the Department's missions, strategies, and strategic goals, while providing for continuous improvement in efficiency and effectiveness. The Department is revising its human capital management strategic plan to address future organizational needs, workforce size, skill gaps, performance management systems and diversity. To accomplish this goal, the Department will continue to implement strategies to attract, motivate and retain a highly skilled and diverse workforce to meet the future needs of the Nation in such vital areas as scientific discovery and innovation.

CONCLUSION

It is my firm belief that the short-term impact of the Recovery Act combined with the new approaches and long-term vision in President Obama's fiscal year 2010 budget, will lay the groundwork necessary for creating the new green economy. Both President Obama and I look forward to working with the 111th Congress to make this vision a reality.

I appreciate the opportunity to appear before you to present the fiscal year 2010 budget proposal for the Department of Energy. I will be happy to take any questions that the chairman and members of the subcommittee may have at this time.

FUNDING ALLOCATIONS

Senator DORGAN. Mr. Secretary, thank you very much for your testimony. I have a good many questions, so I will begin with the first few questions, and then my colleagues will ask questions, and I will be able to stay and ask remaining questions.

Let me ask you about coal. I asked during, I believe it was your confirmation hearing, about the statement, "Coal is my worst nightmare," that you made, and you described the context of that statement, and I understand it.

This budget essentially flat funds coal research and development. The fact is, coal is our most abundant resource by far, not even close. If it's our most abundant resource—and I and many others believe and I would hope you believe that we can continue to use coal, because we can use science, research, and technology to decarbonize coal—then how do we get there if we flat fund research and development with respect to coal?

So can you give me a little bit of the philosophy that led to a flat funding for that account? Given what the President said about the substantial front-end investments for these kinds of things, I would have expected a very substantial recommended increase, in order for us to use coal in our future, because it's our most abundant resource.

Secretary CHU. Well, Mr. Chairman, I agree with you, and I have to say that this budget reflects that because it has folded in the fact that we have received \$3.4 billion, substantial funds, in the

American Recovery and Reinvestment Act. Many of the pilot programs for that money, \$3.4 billion that might have been funded in this section now have gone over to that.

So in a certain sense, that incredibly large amount of funding for these pilot programs and the investigations are then, say, "well, we will continue this current budget", certainly if it were not for the Recovery Act funds, you would have seen a different budget.

So even though I know the philosophy of the Recovery Act was to be seen as strictly supplemental, in the context of that addition, I think it's reasonable.

Senator DORGAN. Well, that was the philosophy, actually. But I think most of the stimulus funding is considered to be demonstration projects rather than R&D. In the area of solar, which I support, and some other areas, even though there was substantial money in the stimulus, there's also substantial money in R&D, but coal is flat funded.

Quickly, do you believe that we will have to continue to use coal in our future and need to find ways to decarbonize coal?

Secretary CHU. Yes.

HYDROGEN

Senator DORGAN. Okay. Well, we'll talk more about that. Let me ask you about hydrogen. You have essentially zeroed out the hydrogen program. You've moved a portion of it into a different direction, but there are about 190 ongoing hydrogen projects that are unfunded.

We've got about 500 jobs, 140 at universities, 150 at national laboratories, 235 in industry, that have been working on hydrogen. And I agree that hydrogen is not near term. But I also agree if someone is going to look at things that are not near term, but are essential in the longer term, who but the Department of Energy should do that?

I'm stunned that the budget essentially just moves away from hydrogen fuel cell research and stops projects in the middle of these projects. I don't understand just deciding to take projects that are half completed and say, "You know what? We've decided that we're not going to do those projects anymore." I'm a big fan of hydrogen in fuel cells, and I believe that they are going to be part of our future. I agree it's not near term, but I agree also that the Energy Department has a significant role in continuing this research, your response?

Secretary CHU. Well, this was a tough call. I think it was centered mostly on saying that hydrogen for vehicles is not near term, and that we wanted to prioritize to be investing more in things like advanced batteries, something that I could see in the next 10, 15 years could actually be adopted on a significant mass-deployment scale.

Hydrogen stationary fuel cells I think we will continue funding. There are real issues that I have with transportation vehicles. The most problematic, in my opinion, is we still have not figured out how to store hydrogen in a compact form. So while we can be funding more basic research and looking for ways to do that, that is something of real significance.

The other is the infrastructure. We would have to create a totally new infrastructure in order to have the hydrogen vehicles be fueled. Not insignificant is the fact that the hydrogen, if we were to deploy this within the next 10 years, would come out of reforming natural gas, and it's a questionable call as to whether we want to be using the reforming of natural gas.

And so there are many issues. At a more basic research level, I think there have been advances in fuel cells, and we want to push on more radical approaches to these things. But I think stationary hydrogen is going to be, in my opinion, the first application.

Senator DORGAN. Well, in North Dakota, we're actually using wind power to produce hydrogen from water, separating hydrogen from—well, at any rate, my point is that I think the Department's made a significant mistake here. And I, for one, am not interested in shutting down these research projects, and I'm going to do everything we can to continue them.

We're only looking at near term, the next 5 to 15 years, but when you come around talking about cap and trade and climate change, you're going to talk about 2040 and 2060, 2070. So I really think this is an important area of research.

President Bush, Senator Bennett, myself, so many others have been very involved in this, and to see these contracts shut down in the middle of the contract on very important research, I think is not a smart thing to do. So we'll have more to discuss about that.

BLUE RIBBON COMMISSION

Quickly, what is the status of the development of the Nuclear Waste Blue Ribbon Commission? You recommend shutting down Yucca Mountain as a storage site. So the question is what's the development of the Commission, the status? What's your evaluation of what the Energy Committee is doing? In the energy authorizing committee, we have proposed something of that sort. Are you considering recycling spent nuclear fuel to reduce the volume? So give us your thoughts about what is behind shutting down Yucca Mountain.

Secretary CHU. There's a first draft of names that are beginning to be circulated among the White House personnel people. We will be circulating them among Congress also for comment. The authorization committees, Chairman Bingaman and his committee, is I think—we're essentially in sync, in terms of trying to develop a very measured, intelligent, deep group of people that can actually step back and say that there are options available to us today, and looking down in our crystal ball and tea leaves 50 years from now, 20, 50 years from now, we can see other options.

So now is a good opportunity to say—to charge the committee. There are options. I personally feel that if we do it right, we can develop ways of processing nuclear fuel to recover much more of the inherent energy value of that stuff, perhaps—through recycling, but we need to develop processes that are economically viable and proliferation resistant.

So if that's true, and I think there's a reasonably good chance we can do this in the coming decades, then we would want to have two different types of storage—an interim type of storage, where you can then either get back the access, reprocess the fuel. We also

want to be investing in types of reactors that can help burn down this fuel, and especially the—waste, so we can greatly reduce the waste.

Now, having—after you’ve done all that, then there comes a point where you say you might not want to have access to, after you’ve burned down a considerable amount of the energy value. So then a permanent disposition might be called for. But these are things that the Blue Ribbon Panel should be discussing. And it’s the hope that with their advice to both the administration and the Congress, we can formulate a path forward that I think could be much better than the one we’re currently on.

Senator DORGAN. I’m going to reserve the remainder of my questions until the end. Senator Bennett?

NUCLEAR POWER

Senator BENNETT. Thank you, Mr. Chairman. Mr. Secretary, let’s continue this conversation about nuclear power. You’ve testified several times, and again today, in your support of nuclear power. And I’m delighted with that, because I’m a strong proponent myself. The budget fails to demonstrate any urgency, in my view, particularly deploying state-of-the-art reactor technology. And the rest of the world is investing in new reactors. Russia, France, India, all beginning to line up countries to sell their reactor technologies.

Now, the United States is clearly the leader in terms of safety. There have never been lives lost. There’s never been a problem with the American reactors. So that raises the question of why we are not the export leader in this business, but these other countries are.

So would you be willing to support additional funding for the NP2010 program if it improved U.S. export competitiveness and accelerated the deployment of new reactors domestically? That would, I believe, create thousands of new jobs in the United States. Is that something that you could be supportive of, if this subcommittee moved in that direction?

Secretary CHU. Well, in terms of NP2010, there were two reactors that we initially were supporting, the AP1000, the Westinghouse reactor, and the GE reactor. It is my understanding that the orders for the GE reactor have shifted, and it’s not clear. And so while that reactor is still going forward in a much different pace—and so a decision was made until we get strong signs from General Electric that they were going to go ahead and push this because of the recession, because of a shifting of orders, for example, from the GE reactor to the Westinghouse reactor, the support of the licensing of that reactor didn’t seem to be as high a priority.

So I do want very much to restart the nuclear industry. We’re in a final review of a number of proposals for the loan guarantees. And so that’s something that has a very high priority with me. This specific reactor, the GE reactor, and the extension of 2010 will really depend, in large part, on what General Electric—how aggressively they want to move forward on it as well.

LOAN GUARANTEES

Senator BENNETT. I see. Let’s talk about the loan guarantees for a minute. In the bill that left the Senate, there was a very hefty

increase in loan guarantees. It did not survive with the conversations in the conference. Those of us—well, I won't say those—I was subjected to some fairly heavy criticism on the part of people who said, "Well, the loan guarantees should not include nuclear. The loan guarantees should be entirely for wind and solar and that sort of thing, and you shouldn't include nuclear in there."

The Department's issued five solicitations under the Loan Guarantee Program, and in four of the five, demand vastly exceeded the available supply. Now, would you be open to having the Congress change the law so that you could shift from one pattern to the other, if there's one that's undersubscribed, and make that money available to others? And do you still support the idea that under the loan guarantees, nuclear has to be included as renewable, in the sense that we are defining as renewable something that is not emitting carbon?

Secretary CHU. I absolutely support the idea that within the loan guarantees, restarting the nuclear industry should be supported. Right now, the \$18.5 billion can probably help start three of their four applications. We're looking as to whether there can be some cost-sharing with non-Federal loan guarantees from abroad in order to fund four. I think that's a start. I personally would like to see a bigger start.

Senator BENNETT. Well, the request for \$93 billion for the \$18.5, so there's obviously a great deal of interest in it. And my concern is that if you have other areas under loan guarantees where the requests are below the amount available, that you be given the authority to shift money from that and make it available to nuclear. Is that something you would be supportive of?

Secretary CHU. I think in general, philosophically, absolutely yes. But I think to balance that, there is a fear, because the cost of nuclear is so high, that there is a fear that if you were allowed to shift the money, that it could easily gobble up a lot of the things of the lower cost renewable energy projects. So there should be a balance there, but having the flexibility to make those decisions, I would welcome.

Senator BENNETT. Okay, one last question. We've talked about the stimulus package and the amount of money that's available. Can you give us a path as to how quickly some of this money can be moved out? It has not moved as rapidly as many people thought that it should. And are those people just—their expectations are too high, and you're moving the best you can? Or have you run into problems? Or is there a holdup where we can be helpful? Can you give us the timeline? Just give us an overall view of what's happening with all of the money that got appropriated to—

Secretary CHU. I think the progress in the loan guarantees has been actually very good since when the new administration took over. When I took over initially, I was told that the first loan, which was authorized by—

Senator BENNETT. Not just loan guarantees, but generally, the President—you have \$38.7 billion appropriated, and you spent 1 percent of that.

Secretary CHU. Okay. That's right. So in many of the programs we're doing, we're on target. We have a schedule that we want to have allocated 70 percent of that Recovery Act money by Labor

Day. There's an issue here because in many of the things that we do, we request for proposals. We have to review the proposals, and then we have to make decisions.

So in order to do this, there's going to be a massive review this summer of many of those programs. So we've gotten clearance from OMB, apportionment of many of these things. And so the allocations, we hope a lot of them can be made by this Labor Day. So, so far, there has been \$4 billion obligated to date, about 10 percent.

Senator BENNETT. About 10 percent. Okay. So, Labor Day is an updated timeline when you will have, what, 70 percent of it spent?

Secretary CHU. Well, by spent, what we're saying—

Senator BENNETT. Or obligated?

Secretary CHU. Yes, we're trying to get to that obligation period by that time. That's correct.

Senator BENNETT. By Labor Day. And are there any accounts that you see that might, in fact, lower the amount you'll have to spend in fiscal year 2010 as a result of the normal appropriations?

Secretary CHU. Sorry, I didn't quite get the question.

Senator BENNETT. If you have the backup of stimulus funds that you've been unable to spend and then those get spent during fiscal year 2010, does that mean there is any fiscal year 2010 money that can, in fact, be delayed until fiscal year 2011 because you simply can't physically spend it?

Secretary CHU. Right. Well, we're going to be trying to do our best to satisfy the statutes of that Economic Recovery, which is really to have it essentially obligated—100 percent of it obligated by 2010, and a large fraction of it spent. But as you know, there—in some of these things that we're doing, in order to lay the foundation for a new energy economy, it's not as though it's money instantly into supplemental check—

RECOVERY FUNDS

Senator BENNETT. Oh, I understand that. But you understand the angst that is out there among our constituents about the amount of money in total the Federal Government is spending and the concern that it may not be spent wisely. And if, as you move forward in your pattern to say, "Okay, this is the proper timetable and the proper method of spending stimulus funds," and you discover that in doing that, it means that you do not need as much of the 2010, in terms of—speaking in business terms now—actual cash flow. I'm not talking about changing your plans or changing your research programs or your targets or something.

But there becomes a physical question of pushing the money out the door. And in terms of actual cash flow in 2010, you can't prudently do it—

Secretary CHU. Right.

Senator BENNETT. Would you share with the subcommittee those funds that might be pushed onto 2011?

Secretary CHU. Yes, I could share those concerns. But we are looking at novel ways of addressing this. It is a—you're quite right to say that this is a Herculean task. It more than effectively doubles our budget. And so, for example, I have sent a letter out to all the presidents of the major research universities, the relevant deans, the presidents, and the executive chairs of all the relevant

professional societies, to say that we're going to have essentially a review-fest over a period of one week in Washington, asking them to nominate for this summer their best people to help us review these proposals. We cannot do this alone with our current staff. And so we're looking at things like that in order to get this moving.

Senator BENNETT. Okay. Thank you very much.

Senator DORGAN. Senator Bennett, thank you very much. I have just been called by Senator Reed, the majority leader, to go to the floor to negotiate an amendment that they're trying to clear before they do final on this, in the bill that's now pending. So I've asked Senator Murray to chair while I'm gone. And let me call on Senator Alexander. We're recognizing Senators in order of appearance at the hearing.

INNOVATION HUBS

Senator ALEXANDER. Thank you very much, Mr. Chairman. Mr. Secretary, welcome. On May 9, 2008, I made an address at Oak Ridge Laboratory about a new Manhattan project for clean energy independence, seven grand challenges for the next 5 years: plug-in cars and trucks, carbon capture, solar power, nuclear waste, advanced biofuels, green buildings, and fusion. So I like your hubs. I think that's exactly the way to go about these grand challenges.

I have a question about a relatively small item. In the America Competes Act, which you had a role in developing the recommendations for, there is a provision for distinguished scientists who would have one foot at a university and one foot at a national laboratory. It's worked well at Oak Ridge, for example, with the University of Tennessee over the last 20 years.

There's authorization for up to 100, was the idea, to be phased in over a period of time, and there's the authorization for \$30 million of spending, none of which is funded yet in this budget. I just want to call that to your attention in case it does get funded to suggest that moving ahead with those at the rate of four or five a year might be one way to advance these hubs, as you're looking to attract very talented people to focus their attention on those. Have you noticed this?

Secretary CHU. Actually, first, let me just say I support the idea. I think having intimate collaborations from universities and national labs is something I'm very supportive of. I would be encouraging—although one doesn't see it specifically in a line item of a budget, one is beginning to see this in the national labs, and I would be encouraging the national labs to grow much stronger relationships with surrounding universities. It serves both the university and the national labs very well. It brings in a lot of young blood. It creates a churn and intellectual excitement.

So while it doesn't have to necessarily show up in a line item, I will be encouraging all the national labs to do just that within their programs.

Senator ALEXANDER. And this authority isn't earmarked to a particular university; it's for the Secretary to compete and do it in whatever way is right. I would like to explore the questions that Senator Dorgan and Senator Bennett raised about nuclear power.

The President, in his inaugural address, talked about power from the earth, the wind, and the sun, and that's captured the imagina-

tion of a lot of people. But it's less than 1½ percent of our electricity today, and if we double it or triple it, we still don't have much. And even if we reach the 15 or 20 percent that some people think we might of renewable power, that's probably it, and that still leaves a need for 80 or 85 baseload power.

I thought the President's rumored proposal today of capping greenhouse gases from tailpipes by a low-carbon fuel standard was a good idea. I think that it makes sense because that will encourage switching to an existing technology, such as electric cars. We have enough—we could plug in, Brookings says, half our cars and trucks, without building one new power plant, if we do it at night, we have so much unused capacity.

If we look back at the beginning of the cap-and-trade program in 1990 and 1991, we had an existing technology then for dealing with the acid rain. We had scrubbers that would take care of that. Where I'm going is, as we move along in the greenhouse gas discussion, we probably get next to coal plants, which are 40 percent of the carbon. And we don't have an existing technology to deal with that, except nuclear power, and with a limited amount of experience with burying carbon underground.

So why wouldn't we be as aggressive about expanding nuclear power and doubling or tripling research in Manhattan project to find a way to get rid of the carbon in existing coal plants as we are with wind and solar and other so-called renewable powers? They're not baseload powers. And isn't it true we have to have some new source of clean baseload power? Why not just put a plan in to build 100 new nuclear powerplants in the next 20 years as a start toward that and double or triple research to take carbon from existing coal plants?

Secretary CHU. Well, as enthusiastic as I am about nuclear power, that number, 100, would be a lot. It would be a huge challenge to our nuclear industry. I think I've repeatedly gone on record as saying, as you well know, that this administration, this Department, the hopefully soon-to-be confirmed members of my team are all enthusiastic about it. They say it is a necessary part of our baseload power.

I agree with you, if you're going to go above 15, 20, 25 percent renewables, there are real issues having to do with the transmission and distribution system, having to do with storage. The storage problem is especially an unsolved problem, but there are options, and so we'll be looking at, for example, pumped hydro, where it's appropriate in certain regions.

But I reiterate the fact that we're blessed with a lot of coal, and although we do not have today the technologies that would make capture and sequestration of coal economically competitive, I think there's a good chance that we can get there. And so I'd prefer to take a different stand and say let's push all of these things as hard as we can.

The nuclear industry, if you look at the capacity of their ability to build reactors, it's not there today, and so while we want to move aggressively ahead on that, I think we still have to try to move aggressively as we can on developing the technologies for capture and sequestration.

Senator MURRAY [presiding]. Thank you, Senator Alexander.

Senator ALEXANDER. Thank you, Madam Chairman.
 Senator MURRAY. We'll move to Senator Tester.

LOAN GUARANTEE PROGRAM

Senator TESTER. Yes, thank you, Madam Chair, and thank you for being here, Secretary Chu. A couple of things, going back to some previous questions, I certainly appreciate the situation you're in and that there is a sizable sum of money available to you to send out. But I also appreciate the fact that you're taking the time to make sure we get the results from this. It's just not money spent for the sake of spending money. And I think there's a real urgency in generation and transmission in this country, as the questions before me have pointed out.

I want to go back a little bit to the Loan Guarantee Program. You talked about a massive review—I don't know if it was of that program or not. But just can you tell me where we are as far as the decisionmaking process of that Loan Guarantee Program, and what is the timeframe for getting some of the loan guarantees out the door?

Secretary CHU. Okay, so we've made a provisional grant to one company. That means that they have to find funding for the current statute for the 20 percent. This is middle May. I think by the end of this month, we'll be announcing a number of others. We've greatly accelerated all the review processes and how we do it, and we're doing many things in parallel now, something that the Department is not used to.

And so the loan guarantees essentially are being accelerated by about a factor of 5, maybe closer to 10. So this is a very significant focus on making sure that these things are reviewed, reviewed adequately, but very quickly.

Senator TESTER. Okay. So you're anticipating some announcements—because we are in the middle of May——

Secretary CHU. Right.

Senator TESTER [continuing]. Any day?

Secretary CHU. Certainly within the next couple weeks to a month, yes.

WIND ENERGY

Senator TESTER. Okay, all right. We have great wind resources, particularly in the eastern part of Montana. And what has traditionally happened over the last 4 or 5 years is they've built a lot of towers in a fairly small area for purposes of maintenance and construction, cranes, all that stuff. It looks to me like the best benefit you can get out of wind is if you decentralize it, if you move it around for intermittency purposes. The wind's blowing somewhere in eastern Montana every day, all the time, and the issue is the grid.

Do you ever put forth policies or put forth direction to electrical generation companies to encourage them, or is there anything we can do to encourage that, or is that even a good idea? I'm talking about decentralization of wind to reduce intermittency and reduce the need for—go ahead.

Secretary CHU. No, that is a very good idea. In fact, a number of Cabinet-level people have been meeting on an every-other-week

basis. The principals—meet—this is Interior, Ag, Energy, CEQ, a number of stakeholders—to try to develop a coherent plan where the energy resources, both solar and wind, where are the places where it would not be—we have to be very sensitive to environmental concern and danger species, things like that, and trying to now develop this—FERC is also, of course, part of this. And we’re trying to then develop this and start to work with the private sector.

Senator TESTER. So you have the ability to give some direction?

Secretary CHU. Well, we’re—

Senator TESTER. Or we need to do it at this level?

Secretary CHU. Well, we are trying to develop some plan that gets buy-in from the private sector.

Senator TESTER. Okay. That’s the best.

Secretary CHU. The meetings have been going on for several months.

CO₂ SEQUESTRATION

Senator TESTER. A few weeks ago, this subcommittee had a hearing on beneficial use of CO₂. We heard some pretty encouraging things about algae. One that was particularly encouraging to me was cement, making cement, not having to separate the flue gas. It sounded to me like it was tricked out and ready to go.

Two questions, No. 1, is that kind of specialty use of CO₂ something that you see as viable and is it something that can happen? And then the follow-up question is, is the beneficial reuse of CO₂, is it being limited by our study of carbon sequestration and storage?

Secretary CHU. We are certainly looking into those things—the algae converted CO₂ into lipids that can be used for transportation fuel and cement. The verdict is not in whether these processes work but if they could go to a scale necessary to be significant, and so we’re looking very hard into this. I do know other countries also are looking into—for example, I just had a discussion with some representatives of China. They’re keen on seeing whether this can actually work.

But again, we’re in the process of trying to study whether it can really go to scale or whether it will be a small, more boutique type of thing. Cement especially is something that goes in several stages. There are various grades of cement and long before you can actually get into a structural cement there are many issues having to do with structural integrity. The economic viability is something—it’s—but these are fairly new ideas, and so we are very interested in looking and seeing if they can really work.

Senator TESTER. Do you think the budget’s adequate enough to deal with the CO₂ issue, generally speaking, both as beneficial use and as storage? Is this an adequate budget to deal with that?

Secretary CHU. I believe it is. I think we’re upping, actually, the funding in algae, and cement, there are a couple of companies looking at this, in terms of supporting that with loan guarantees.

Senator MURRAY. Thank you, Senator Tester. Senator Feinstein.

DESERT PROTECTION

Senator FEINSTEIN. Thank you very much, Madam Chairman. Good morning, Secretary. It's good to see you here. I've tried to obtain an appointment with you. So far, I've not been able, so I'm going to take this opportunity to express a concern publicly that I would have expressed privately, had I had the opportunity.

You may not know this, but I authored the Desert Protection Act in southern California. We created two new national parks, Joshua Tree and Death Valley, and the Mojave Preserve. Since that time, for about the past 7 years, we've been trying to buy railroad inholdings to put them into conservation and have in effect bought about 700,000 acres in a very unique public-private partnership. The private sectors contributed \$40 million, and we, about \$17 million, to be able to do that.

So it was much to my consternation that I was suddenly told that a lot of large solar facilities were going on the land that we had just purchased with a lot of private money to conserve. So I went down to the desert and brought the companies involved and took a look.

And here's what I found, that I saw seven projects. They totaled nearly 60 square miles, 60 square miles. One was 9.3 square miles. One was 7.03 square miles. One, 15 miles square, that's BrightSource, Iberdrola, 3.09, the second Iberdrola, another 3.09, PG&E, 6.56, and Solal, 6.25, and many of them in this land that is due for conservation and that had been purchased for the purpose of conservation.

Then I began to look, and I talked to Southern California Edison, "What's your largest solar project?" 50 megawatts. And I see here, we've got 914, 815 megawatts, 500, 500, 500, 800, 600, huge projects. And I asked how was this done? Well, the national topography of the land is leveled out. The sand is removed. A gravel surface is put in. The solar troughs are centered. You need a large steam plant, and you need very large transmission lines.

The question comes, for me, having tried very hard over 16 years to protect this area of the desert, now to see it all in the main going for a huge number—now, I'm only talking about 7 out of 65 projects for the area. Those were the only ones I saw. But the ones I saw were 60 square miles' worth of solar troughs, huge steam plants and fences that will go around it. Right in the middle of a desert where the desert tortoise has some habitat, where there are other problems—bighorn sheep, Indian petroglyphs, and so on—and we've been able to clean up this desert over time.

The question I have is should we not cap the size of these things? The largest that I know of is in Kramer Junction. Two projects, one 160 megawatts and one 150. Each one is about 2 square miles. Those are the largest I know of anywhere in the United States. And now we're talking about one of 15 square miles. Should we not cap the size of these?

Secretary CHU. Well, I certainly would be willing to—first, I'm a little bit surprised if you asked to see me and my staff said no.

Senator FEINSTEIN. Well, we just haven't gotten a response. That's sort of the way it's done. You just don't hear.

Secretary CHU. Oh.

Senator FEINSTEIN. But anyway.

Secretary CHU. I'm still surprised. You actually have my private number.

Senator FEINSTEIN. Well, I should call you at home, then.

Secretary CHU. But I'd certainly be willing to talk to you about this. These are sensitive issues and we have to think hard about them. I don't know—I was actually just informed only a few days ago about this concern and I'd certainly be willing to look into it.

I think this is one of those very delicate issues, as I was saying to Senator Tester, as we are developing a plan moving forward in conjunction with the other Secretaries, one of the issues is the sensitivity to habitats of endangered species that we're looking at, and we're trying to make sure that we fold all those concerns into where there would be good sites for solar and wind.

Senator FEINSTEIN. My time is up. Let me say one more thing. In my State, I have 47,000 abandoned mines. People came in, they mined, they took the stuff they wanted and they walked away from the mines. Solar technology is going to change. In Daggett, I've looked at some photovoltaics and solar troughs. They walked away from them. They left the steam engine there, steam plant there. This has to be considered as well.

Everything right now is how you can do it the cheapest possible way you can. Huge is better. But I've got to tell you, I'm going to fight for this land to be protected. And I think that size is a factor, and you just can't come in and build 15 miles square facilities with huge steam plants. We're willing to do our share. I am. I understand the desert is a good place for it. But the sky's not the limit, Mr. Secretary, and that's what I want to say. Thank you, Madam Chairman.

WASTE CLEANUP

Senator MURRAY. Thank you, Senator Feinstein. Mr. Secretary, thank you. You and I have spoken on several occasions about the legal and moral obligation for the Federal Government to clean up the waste that was left behind from World War II and the cold war. We've talked about it prior to your confirmation, at the Budget Committee hearing, and again after the release of the 2010 budget proposal.

My position is really clear, and the administration is going to have to expect it to remain consistent, because that's what I want for these budgets. I want budgets that clearly meet the obligations we have to the Nation and the States and the communities that are home to those cleanup sites. And I want budgets that consistently make progress toward the goal of cleaning up that waste.

The funding highs and lows that we see just don't get us there, and unfortunately, that's what I see in the EM budget we've been presented with. Let me talk about the highs. In the Office of River Protection, it's good to see an increase for the work at the tank farm. We have seen years and years of pushing off those infrastructure needs, and there's a lot of work that needs to be done there. You're putting your focus back on that work, and I do appreciate that. I expect that we can remain consistent, and we'll look forward to that as the new base level of funding for those tanks. That's really important.

However, the same effort isn't evident with Richland Operations, where there's a reduction in funding below the fiscal year 2009 and fiscal year 2008 appropriated amounts. That reduction does not represent a consistent effort for stable and compliant budgets. We all have to remember that the economic recovery funds were meant to make up for lost time and to create good-paying jobs, not to make amends for this year.

The River Corridor Closure Project is up; however, the Central Plateau is down. Reducing the active cleanup footprint at the site is a really large task that requires consistent budgets to fund the effort. So I encourage you to keep that in mind when you're planning for next year's budget so we don't get ourselves back into this position again.

As you know, Hanford is not going to be cleaned up in 5 or 10 years. It's a large project, massive in size, and we need to manage it thoughtfully and consistently with that long-term mission in mind. And that's why I am always saying we need stable and consistent budget, so we can get the job done safely, No. 1, and successfully.

I also wanted to just quickly mention to you the Hammer Facility that is on site at Hanford. The Hammer Facility offers incredibly wonderful training for people who take on the very, very dangerous work of cleanup. And I'm hopeful that when you do come out to visit the Hanford site, that you'll get the opportunity to stop by and see Hammer, see what they're doing, to help promote a safe working environment at a very, very challenging place.

I'm still looking forward to your visit at some point in the near future, where you can see progress on the site, but also, some of the worker safety training going on at Hammer and at PNNL and how everything works together towards cleanup.

I do have a number of detailed questions for you on support for Hammer and the B reactor. I'll submit those for the record. But I do have a question for you while you're here, Mr. Secretary. I do want to say that I'm pleased at the overall increase for energy efficiency and renewable energy. We've got to move forward on a clean energy economy. And I think that does help us keep on the path.

Now that you have spent some time at the Department, I'm looking forward to hearing an update on the Water Power Program. As you know, that program got \$40 million in 2009, and the President is now requesting a 25 percent reduction, which I am very concerned about. I think we have to have a very strong continued investment in existing hydro facilities that will allow us to use those to supplement the more unpredictable sources, like wind or solar. And I think we have to increase our work to develop new marine and hydrokinetic technologies, as well, that you and I have talked about before.

WATER POWER

So with my less than a minute left could you talk to me a little bit about your vision for the Water Power Program.

Secretary CHU. I think, first, very briefly, I am very committed to continuing the cleanup as aggressively as we can and looking for better ways of doing that. It's not only the money, but it's also the way it's invested and funded. And so a lot of time is now being

spent in reviewing how we deal with the contractors, making sure that they do the job in a timely manner.

In terms of the water projects, it's too late to start this in 2010, but in the 2011 budget, I'm a big advocate for looking at ways of being, let me just say friendly to the fish, but allow us to continue hydropower, but also to look at the possibility of actually having some pumped hydro, small amounts of sources, so that we can actually couple the renewable energy better. And so we're going to be looking very hard at that.

Senator MURRAY. Okay. I look forward to working with you on that. I think it's extremely important. And I appreciate your response. Senator Cochran.

STRATEGIC PETROLEUM RESERVE

Senator COCHRAN. Mr. Secretary, welcome to the subcommittee. We thank you for your cooperation and your service as Secretary, a very important position. In the budget request for the Strategic Petroleum Reserve, roughly \$50 million is included and proposed for the purchase of a new cavern to replace an existing storage cavern that was said to pose an extreme environmental risk. And this is for storage of strategic petroleum reserve.

There are salt domes in my State of Mississippi which some think are ideal sites for the storage of the petroleum reserve. Your Assistant Secretary recently testified about legislation to increase storage capacity, specifically for the strategic petroleum reserve.

I'm curious to know what your thoughts are about choosing caverns that some say are not environmentally appropriate for storage, rather than looking into the possibility of salt domes that are coincidentally located in southern Mississippi. I'm just curious to know if this has reached your level for attention and consideration.

Secretary CHU. Well, my understanding is that one cavern, which I believe is the salt cavern—it wasn't understood that the thickness of the salt was, in one section of it, thin enough that it could open up the possibility of a breach and can actually—the petroleum could leak into the environment.

And so that was discovered, in my understanding, last year, year and a half. And so once it was discovered, it was decided that that posed an environmental risk and we should go out and purchase some property to put it in a place where the envelope, if you will, would be less likely to be breached. And so that's what we're in the process of doing, but salt caverns are actually used for that, as you well know.

Senator COCHRAN. Right. Well, I was just curious to know whether that reached your level for your personal attention. I don't have any fixed views about which caverns are the best or not the best, but we certainly want to be sure that they are safe in terms of environmental consequences, and certainly in respect to possible damage to people who live in the area.

Funding, incidentally for the strategic petroleum reserve included \$35 million for a site near Richton, Mississippi, contingent on a report issued by the Department within 45 days. My staff has contacted the Department about the report, and we're just curious to know what the status of that report is, if you know.

Secretary CHU. I don't know. I could get back to you on that and give you the details.

Senator COCHRAN. We would appreciate that, and we would like to be kept in the loop, as long as you have active consideration of Mississippi sites. Or I know in Louisiana, they have some salt caverns there as well. But it's of importance. We want to be a positive contributor to the solving of our energy problems, and we think that there are some caverns that possibly could be suitable, and we'd like to know—there was a report, I think, contemplated at one time to describe and define this, so the general public would have some better ideas of what's going on. Rumors get started, and I would like to know what the facts are so I can pass that on to my constituents. If you could look into that, I would appreciate it very much.

Secretary CHU. Sure, I'd be delighted to.

Senator COCHRAN. Thank you. Thank you, Madam Chairman. Sorry, Mr. Chairman.

GEOHERMAL

Senator TESTER. Oh, that's entirely all right. I'll ask a few questions here, waiting for Senator Reed to go here. Real quick, do you think that there's any future as far as geothermal goes in relation to baseload power, or is it economically not going to happen?

Secretary CHU. I think there is a real potential, especially enhanced geothermal. But we're looking—geothermal right now is on .3 percent of our electricity generation capacity in the United States.

Senator TESTER. But we have incredible resource.

Secretary CHU. We have incredible resource. It's mostly—my understanding, it's mostly in the ability to do enhanced geothermal, meaning that you pump in water or carbon dioxide that uses the heat transfer fluid. We know how to fracture rock much better than we did before, and so this is a possibility.

We are going to be investing in research to see whether enhanced geothermal can actually be viable. If it is viable, there is a very large resource.

Senator TESTER. How many years out do you think it is, before the first viability?

Secretary CHU. I'm trying to think of the briefing, but these things are issues where you're going to—it's, again, there's—it takes time to drill. It takes time to test it. Ten years. I don't know.

Senator TESTER. Okay. Senator Reed.

WIND AND GRID INVESTMENTS

Senator REED. Thank you very much. Mr. Secretary, thank you for joining us today. I know you are aware that my State of Rhode Island is aggressively trying to deploy wind-powered facilities off its coast in State waters near Block Island and in Federal waters further out. This is not only going to provide us with, we hope, renewable energy resources, but also provide a stimulus to our manufacturing sector, producing the blades to turbines and other equipment.

One of the concerns we have is that the investments that you are leading in terms of the grid might focus the attention away from

these projects along the east coast and more toward the center of the country. And I would just ask you to sort of ask us how these grid improvements can help and not hinder the development of these wind projects. And it's not just Rhode Island. It's Delaware. It's all up and down the—Virginia, all up and down the coast, this sector.

Secretary CHU. Well, you're raising a very important point. The Atlantic Coast has a lot of wind resources, very close to population centers. And we are—certainly this is part of us, as we get out feet wet, so to speak, in finding out how to develop the wind resources.

I think it's important to actually develop them in both places. The more diverse the set of wind resources, not only in Montana, but all over the United States, the better we have of actually becoming more base load. So to have wind resources off the shallow Atlantic Coast and having it in the Northern Midwest, they're very important.

So in talking to power distribution companies, utility companies, it's not clear to them what the best economic investment is either. So we're trying to work through this. The issue with offshore is that for shallow offshore, it's about a factor of two more expensive initial investment. Even more so—perhaps a factor of three or more—in the maintenance, and so far, the maintenance is higher than expected in the European experience. And so we are trying to work through all of these things. Hopefully within several years, we can get the wind turbines so that the gear boxes, the blades, are much more robust.

But so these are all issues. Going offshore actually complicates that.

Senator REED. Yes, indeed. I think, though, that—and I don't want to suggest a response, but it seems that there should be a very explicit recognition of these offshore efforts and coordination as you invest in the grid. It would help either inadvertently or directly see huge investments, which make it even more difficult to bring this power—

Secretary CHU. No, I agree with you. I think it should be a balanced view, and how to develop the renewable resources at large in the United States in the most balanced way. And in our little group of secretaries and other administrators, this is very much on the table, the balance between Atlantic offshore and Midwest, for example.

Senator REED. And principally FERC and the Department of the Interior will have the principal roles of the siting, et cetera. But I presume the Department of Energy will be an active participant, from your comments.

Secretary CHU. Yes. But you said it correctly FERC and Interior will have the major roles in deciding.

WEATHERIZATION

Senator REED. Let me—I have at this time, one final topic. And that is thanks to the efforts of Chairman Dorgan particularly, there's been an unprecedented investment in weatherization in the Recovery Act. And then the 2009 appropriations bill has \$450 million to complement the roughly \$5 billion in the Recovery Act. But the 2010 budget has only \$220 million for weatherization. Now, I

understand some of that is because of a big spike up, and you're coming down. But there is a concern that we're ramping up this capacity of weatherization. We're getting people out there, particularly in the context of recovery, those are good jobs, and then we're going to see the funding streams diminish rapidly, leaving us with capacity and people, but—and still with demand.

So I wonder if you could just give us the notion of what's your long-term strategy for weatherization, Dr. Chu.

Secretary CHU. Yes, Senator, you were actually raising a very good point. Because in the weatherization, roughly \$10 billion is, in the Recovery Act, spread around several agencies. Part of that is actually building a workforce that can weatherize, and after 2 years or 2½ years, what do you do with this workforce?

So I think what we are very concerned about, in trying to design self-sustained programs beyond that. Let me give you one example. Secretary Donovan and I are looking for ways in which, when properties change hands, when you buy a home, that you can have financing, additional financing, say an extra \$10,000, \$15,000 that's part of your mortgage that, if done right, that financing could actually decrease the cost of running your house, because the money you save in lower utility bills will be more than compensative for the additional little bit of mortgage.

Now, when you sell your property, it's—okay, the investments are there. And so that helps overcome the initial hurdle of capital that is very important. This weatherization could cost \$10,000, \$15,000 for middle-class homes. It also gets the middle class into this.

We're also looking at programs where banks could be encouraged to again for the affordability of the house, ask that, in addition to a termite inspection, they ask for the utility bills from the gas and heat. And in that section of the country, this is the spread of utility bills per square foot for average house. So just like a refrigerator label, this is the spread—the home you're thinking of buying is here or here.

This does—first, no taxpayer money. Very little transaction cost, but it motivates several things. You get a more informed consumer. You actually give incentive to the current homeowner to weatherize, to increase the resale value of the home. And you actually—then there's an incentive. It also helps the new home builders who are reluctant to put in energy efficiency. One can predict the energy efficiency of those new homes, and they look much better. And so you stimulate in many ways, just by the simple transaction that seems to me logical, in the sense that what a bank really cares about is the affordability of the home. It includes the taxes. It includes the mortgage rate. It includes the utility bills.

So there are things like that we're looking to do—and revolving funds yet another one, so that we actually get this, 1 million or 2 million homes is just the beginning. We need to get this self sustaining in a very deep way. So these are some of the programs we're thinking of piloting and testing.

Senator REED. Thanks very much, Mr. Secretary. Thank you, Mr. Chairman.

Senator TESTER. Thank you.

HYDROGEN FUEL CELLS

Senator DORGAN [presiding]. Senator Reed, thank you very much. Mr. Secretary, again, I regret that I was called over to the Capitol, but I appreciate your answering the questions of my colleagues. Let me go back to the issue of hydrogen. I want to ask a number of questions then we will let you be on your way.

The hydrogen fuel cell issue has been a part of the Department of Energy's portfolio for well over a decade now. In 2006, the Department of Energy developed and released the hydrogen posture plan. It laid out a 15-year strategy for hydrogen and fuel cell research, development, demonstration, and deployment.

Since about 2001, roughly \$1.5 billion has been invested by the Federal Government in hydrogen and fuel cells, and industry and the States are estimated to have spent somewhere in excess of \$4 billion. My understanding, from the experts who know, is that these programs have met their cost and their technical goals. Research has kept pace with key milestones established in the hydrogen posture plan.

So, again, I don't understand. Let me be more specific. Do you come to us saying you want to shut down these research projects in the middle of the research? Is that what the budget is asking us to do?

Secretary CHU. Well, it is a shifting of priorities. I would be very happy to talk to you about this and discuss this. But certainly it was more the intent of the 2000—the concern in the 2010 budget was focused more on the transportation sector and whether hydrogen cars could become a reality in let's say 20 years, and whether—or do we see it further out, and whether we should be investing these resources in, for example, much more efficient internal combustion engines, especially, from my point of view, diesels, since the new advances in diesels allow diesels to now meet California EPA standards. They're very clean diesels, and also the plug-in vehicles.

And so in terms of offsetting our imports of foreign oils, getting some more oil independence, really getting these things in the marketplace, I see those as more likely solutions in the next 20 to 30 years.

Senator DORGAN. I don't disagree with that at all, but do you think 50 years from now, that your hope is more efficient internal combustion engines, more diesel engines on the road? Or is it your hope that perhaps we do things that are transformative? For example, continuing to work on hydrogen fuel cells that are longer term? And if not the Department of Energy to work on this, who?

And then finally, you didn't quite answer the question. Do you really want us to shut down about I think 190 research projects that are in the middle of the project? And we just say, "You know what? That was yesterday's money, yesterday's Secretary, yesterday's idea. Shut them all down." And you really want us to do that?

Secretary CHU. Well, I'd be happy to work with you and look at the details of where the programs are and things of that nature. And we can work out—

Senator DORGAN. I'm hoping to help you with the funding for these projects, by the way, because I think—well, we may not be

around in the long term, in the long term, we're all dead. But the fact is the near term is not the only thing that's important to us. If we're going to be transformative, I think you look out beyond 5, 10, and 20 years.

WIND DYNAMOMETER

Let me ask you, Mr. Secretary, about an issue, wind dynamometer that is at NREL. My understanding is that we've spent a lot of money to test commercial wind turbines at NREL. I've been there. I've seen this, big investment in hardware. I'm told that the DOE is now pursuing competitive solicitation in the private sector for a dynamometer, rather than capitalizing on the investment made at NREL. Are we moving away from NREL as a center of expertise in this area, and if so, why?

Secretary CHU. Well, actually, I'll confess I don't know that part of it. I do know that we have this wind test facility at NREL and there's a dynamometer. Getting the private sector involved is something I think the Department of Energy is very interested in. So I don't know the exact details of that.

Senator DORGAN. Would you look at that?

Secretary CHU. Sure.

Senator DORGAN. And my understanding is, there's some interest in the Department of Energy to duplicate that investment in the private sector up in the Northeast, and I'd be very concerned about that. I mean, I would hope that we would continue having NREL as the center of that research.

Secretary CHU. Oh, well, there's something else—maybe it's this, but we are making investments in Boston, but that's a wind test facility. That's not—

PENSIONS

Senator DORGAN. That's not what I'm thinking of. And also—I'm going to say really nice things about you in a moment, but I do want to ask these questions. It appears to me there's about a \$500 million to \$1 billion shortfall on the pension side.

Secretary CHU. Yes.

Senator DORGAN. And I think my colleague from Utah mentioned that, and I didn't hear, but maybe you've answered it since I—

Secretary CHU. No, I actually didn't get to that. This is of great concern to us. We did scramble around for a lot of the money. This is a serious concern. We have a lot of employees and former employees, and we have an obligation to them. And so there was some last-minute scrambling to find some emergency funds. It's not completely covered yet. In the long term, this is an obligation the Department of Energy has in the sense that we have a liability. I don't think any other agency has this liability. We have to figure out a way, for example, of having our contractors move toward defined contributions rather than defined benefits. Of course, we grandfather in all the people that we've had obligation to. We're not talking about that. But this overhanging liability is something serious, and because of the stock market decrease and because of the new act that says it has 80 percent funded, we all of the sudden got these shortfalls.

We're aware of the problem. The long-term fix will probably have to be something like evolving toward—as we get in new contracts, toward defined contributions.

Senator DORGAN. Right. So we might have some unfinished business on the budget side. I mean, it appears to us it's a \$500 million to \$1 billion that's a shortfall. We'll have to continue to work with you on that.

RECYCLING SPENT FUEL

Let me ask if you could just describe again, so that I understand, in shorthand under what conditions would you consider recycling spent nuclear fuel?

Secretary CHU. If we could develop proliferation resistance, something that would be unlikely that terrorists, if they got hold of this material, could actually work with it as an example, if it has some soft protection, so it doesn't create a stream of separate plutonium or something that's easily shielded.

There's also the economic viability of the processes in general. We want to see industry saying there's a path forward which that we can really invest in these recycling plans. And finally, we need to develop generation IV reactors, high-energy neutron spectrum reactors that can burn down this waste.

I think actually all these things are solvable. It could take decades, but I'm certainly interested in looking at it, looking at the work. There's—if we extract a lot of the worth of the nuclear fuel, this is a clean source of energy, baseload energy, and I think the waste problem is solvable, and I think there's a likelihood if we do it right and get a bunch of very smart people on it, that we can develop these recycling methods.

Senator DORGAN. And I would say, as you look out there, decades out on the horizon exist not just this issue, but hydrogen as well, in the longer term. You come from a science laboratory, are a Nobel Prize winner, a very distinguished person and I feel very strongly that the administration has solicited the service of someone who's extraordinary. So I'm very pleased you're there.

But I also know where you are. You're in the Department of Energy, and that's a great place. You've got some great people there. But it's also an area filled with superglue in some areas. You just slow everything down then get it all stopped. On the issue of loan guarantees and the things that you've come to in this agency, an agency that in some areas, it just is almost impossible to move. You can observe more movement in a glacier than in the Department of Energy on some issues.

ACCELERATING LOAN GUARANTEES

So tell me about what you have discovered and what your experience is with respect to getting some of these Loan Guarantee Programs moving that were just dead stopped.

Secretary CHU. Well, we discovered first, that they could be increased by a factor of 5, maybe even 10. The only way we discovered this is actually, for example, we hired Matt Rogers, an outstanding person from McKinsey, and by literally first looking at other agencies in the Government, seeing how they do their loan programs, and then looking at how we do it, but then looking step

by step at everything and how you actually go about the business in terms of little horror stories here and there. They said that the amount of paper required was such that they were concerned of any loans below several hundred million dollars. They couldn't know how people could afford to do this because of the paperwork required, the amount of paperwork, 500 to 1,000 pages. We're working very hard to reduce that. The target is 50 pages. If you can't get your idea out in 50 pages, there's something wrong with it.

In terms of vetting, many of the times, if you have a dual vetting process, if there's a substantial financial investment and a bank does some of the things, we can then cooperate and do that. The idea that in helping the customers, the potential customers, there was a strong sense that you couldn't help any particular customer because it would be unfair, it was giving a particular advantage to that particular applicant. And so we're turning that around and saying there's another way to be fair—help everyone. It's a novel thought, but we're moving ahead on that.

And so what it really took after the first couple weeks to say, okay. The people there need a little help in seeing that you can actually move this considerably faster. The idea that you go in serially and then you get to the next point and you go again, it's like a long relay race. Every time you pass the baton, the baton's dropped.

In actual fact, in industrial project management, in good project managements in the Federal Government, that's not done that way. You can start many things nearly in parallel. So we essentially are looking at every nook and cranny and finding that we can actually increase this considerably. And so, again, we went from getting the first loan out in 1½ years to getting the first loan out in 58 days from the time I took office. And so we are very anxious to see this continue.

You made a reference to the fact that it is—the friction in the Department of Energy is considerable. Our committee is more that Newton was right—the body set in motion tends to stop the next day, unless you continue to apply pressure.

But I think the good news is as we work through this and actually give people the tools and the ideas of how to do this, there is now beginning to be genuine excitement in the career people.

Senator DORGAN. Senator Tester, did you have other questions?

Senator TESTER. Yes, I just had one, if I might.

Senator DORGAN. Let me just—if you might, let me finish with my one question, then I'll recognize you for whatever you wish.

DECARBONIZING COAL

People are coming to my office with really interesting ideas. I had a person in some while ago who has a couple hundred scientists working on developing synthetic microbes to chew the coal. That's a scientific term, chew the coal, I guess. Actually, the synthetic microbes would consume the coal, and through the consumption of coal by these microbes, you would produce methane, and probably even be able to do that in situ, underground.

I have no idea whether that's just harebrained or unbelievably interesting in the next 5 years, 25, or 50 years. Someone comes to

me with a patent that says, "I have the silver bullet with respect to decarbonizing coal." In fact, we had a hearing on it, and the guy that comes to the hearing is the recognized expert in the country from Stanford on cement and concrete. And he takes all of the flue gas from a coal plant, and through mineralization, or whatever, produces a product that is, he says, harder than concrete and more valuable and contains all of the CO₂.

A company comes to me and says, "We have a process by which we separate CO₂ with the flue gas, and we get nitrogen, hydrogen, and baking soda, and baking soda contains all the CO₂." Those are just three, but there are lots of them, lots of people out there doing interesting things.

Give me your assessment. And the reason I'm asking this is because I believe, again, we're going to continue to use coal in the future. The question is, how effectively and at what cost do we decarbonize coal?

Give me your assessment of those kinds of things and ideas, and are you running into them, and do you believe they represent great promise for the future?

Secretary CHU. I'm running into them. I think many of them are very interesting, and we are looking at them very hard. I think one of the things that you're seeing and the things I'm also seeing is there's an unleashing of incredible ingenuity and imagination. Not all these things will work. Most of them will probably not work, but yet out of that, I think there's a great possibility that there would be some really very good ideas.

I'm a big fan of, at least in these early stages, where it costs very little to explore these ideas, to explore as many of them as possible. Now, this is actually one of the joys of being in the job I have. We can look at these wonderful new ideas and say, "Is there going to be merit in this 5, 10, even 15 years out," of all those things, the concrete, the conversion of coal, so most of the pollutants and the really bad stuff is just left deep underground, and you just sip out the natural gas.

These are potentially very good ideas. What's especially nice about some of these ideas, especially the one on the bio part, is that's occurring in an area where the science is advancing very rapidly. And so the chance of a dramatic breakthrough—because we now know how to reprogram these microbes in completely new ways, offer real hope.

Whenever you see the science advancing most rapidly, there's more likelihood of getting really big breakthroughs.

Senator DORGAN. Senator Tester?

RENEWABLE PORTFOLIO STANDARD

Senator TESTER. Thank you, Mr. Chairman. I just—there are two policies that we're wrestling with right now. One of them is putting a value on carbon, and the other one is a renewable portfolio standard. Assuming we put a value on carbon, is there really a need for a renewable portfolio standard?

Secretary CHU. I think there is. Because of the way you are going to be capping and bringing down the cap in a gradual way, that it—and the type of legislation that is being discussed actually has

to allow the United States to make this transition over a period of time. I mean, that's realistic. We just have to do that.

And what our renewable portfolio standard does is it gives you a guaranteed market, and so it can tell investors, we need to get to let's say 15 or 20 percent. The price signal, if you will, from the cap and trade and the decrease in the carbon emissions is one way, but that has to be, by its very nature, in order for the country to make a transition, a slow gradual process, and a renewable electricity or renewable clean energy standard, you say, now I've created a market, and so it's a draw, so that the investment community can say, "Yes, I can put in my wind turbines or my photovoltaics." So they actually complemented each other.

Senator TESTER. Okay. Thank you very much.

ADDITIONAL COMMITTEE QUESTIONS

Senator DORGAN. Well, Mr. Secretary, you are the first Cabinet Secretary to use the term joy in describing your work in all the years I have served here, but I expect that joy reflects your background as someone who ran a science lab, and having access to all of the interesting things that are going on in these laboratories.

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

[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 BYRON L. DORGAN

Question. The DOE currently has approximately 190 multi-year contracts for hydrogen related research that would be terminated under the fiscal year 2010 DOE budget request. How many of these contracts go through fiscal year 2010? What is the amount of funding that would be required in fiscal year 2010 to honor these existing contracts?

Answer. The refocused Fuel Cell Technologies program allows the Department to prioritize technologies that will have a more immediate energy impact and bring consumers advanced transportation choices sooner. Certain projects in the areas of hydrogen production and delivery, hydrogen storage, technology validation, systems analysis, manufacturing, safety and codes and standards, education, and market transformation would not be funded at the 2010 request level. If the Department continued on the previous schedule, the 190 projects would require approximately \$105 million in fiscal year 2010. However, project performers know that funding is subject to annual appropriation and changing priorities.

Question. Congress set up the Hydrogen Technical Advisory Committee (HTAC) to provide detailed analysis of the hydrogen and fuel cell vehicle program to the Secretary. Did you consult with the HTAC before making the decision to terminate the hydrogen and fuel cell vehicle programs?

Answer. The Secretary considered all available information before making the decision to re-focus research, development and demonstration activities on fuel cell system technologies. While the HTAC periodically submits reports, letters and other information to the Secretary for consideration, the HTAC primarily provides valuable technical progress information, which is only one of multiple entities supporting DOE funding allocation decisions.

Question. The 2006 Hydrogen Posture Plan established key technical milestones and timelines. Would you agree that the hydrogen program has been meeting and exceeding these milestones? If this is the case, how would the fiscal year 2010 budget request not be short-circuiting the progress being made by this program?

Answer. The Department agrees that the program has been meeting a number of the milestones. However, given the Nation's economic climate and the urgency in addressing climate change and petroleum reduction, the Department is balancing the advanced transportation technology portfolio to fast-track lower-risk energy technologies and to bring consumers near-term, advanced transportation choices.

Technologies such as biofuels and plug-in electric drive vehicles will achieve benefits sooner, at less cost, and with less technology risk than hydrogen fuel cells.

In addition, the Recovery Act provides approximately \$41.9 million for near-term benefits such as commercialization and deployment of fuel cells and job creation in fuel cell manufacturing, installation, maintenance, and support services that will help develop a supply base that could eventually support automotive applications. The Department also plans to spend up to approximately \$50 million in fiscal year 2010 through the Office of Science for relevant cross-cutting basic research (e.g. catalysis, membranes and biological/photoelectrochemical approaches) to enable breakthroughs in hydrogen technologies and \$16.4 million through the Office of Fossil Energy to continue work on hydrogen production from coal, with carbon sequestration, due to the importance of zero carbon approaches.

QUESTIONS SUBMITTED BY SENATOR PATTY MURRAY

Question. Secretary Chu, I am pleased to see an overall increase for Energy Efficiency and Renewable Energy. We've got to move forward toward a clean energy economy and this will help keep us on that path.

And now that you have spent some time at the Department, I'm looking forward to hearing an update on the Water Power Program. As you know, the Program received \$40 million in fiscal year 2009 and the President is requesting a 25 percent reduction in funding, which I am very concerned about. We must continue investment in our existing hydro facilities to allow us to use those flexible resources to firm up intermittent renewable resources like wind and solar. And we must also increase our work to develop new marine and hydrokinetic technologies that may also be able to act as base load resources in the future.

What are your priorities for the Water Power program, specifically with regard to both marine and hydrokinetic technologies and also with regard to conventional hydropower?

Answer. DOE is excited about the potential to develop both emerging marine and hydrokinetic technologies as well as untapped hydropower resources, including efficiency or capacity upgrades at existing facilities, the construction of hydropower plants at existing non-powered dams, and the possible construction off small or "low-impact" hydropower and pumped storage facilities.

The \$40 million appropriated for water power in fiscal year 2009 allowed DOE to initiate aggressive action to address both marine and hydrokinetics and conventional hydropower, and the Department is working diligently to ensure this new increased level of funding is spent carefully and wisely. The Department's current priorities for marine and hydrokinetic technologies (i.e. wave, tidal, in-stream, ocean current, and ocean thermal) are to evaluate the cost and performance of the various technology types, to determine how much energy is available and extractable from each resource, to support the industry in designing and testing innovative energy conversion devices, and to predict and evaluate the possible environmental impacts of water power technologies. As the size of these resources and the ability of emerging technologies to capture those resources becomes clearer, the Department will be better able to determine if higher funding levels are necessary.

DOE also recognizes that incremental conventional hydropower generation requires a careful second look, and is particularly enthusiastic about its potential to provide on-demand, dispatchable power to support grid stability and further integrate variable generation. The Department's priorities for hydropower are to address barriers to the development of incremental hydropower generation (including efficiency and capacity upgrades at existing facilities and the construction of facilities at existing non-powered dams) and to address the development of pumped storage. DOE is undertaking a comprehensive effort to understand existing hydropower assets and resources, to identify undeveloped incremental hydro resources and costs, to quantify and maximize the value of the existing hydro fleet to support the grid, and to improve the environmental performance of hydropower generation in the United States.

Question. Mr. Secretary, I've already reiterated my invite for you to come out to Washington and see the DOE footprint in my State. And I also want to encourage you—again—to visit the Marine Sciences Laboratory in Sequim, Washington. Not only is it located on the beautiful Olympic Peninsula, it is also the Department's only marine sciences lab. I encourage you to use the Water Power Program to expand the work at the lab, and utilize the expertise and knowledge there.

I am not reassured that this administration sees the value of this potential clean energy source. Can you tell me how you plan to integrate the Marine Sciences Laboratory into the Water Power Program?

Answer. The Department is funding a number of activities in the Pacific Northwest, including PNNL's Marine Sciences Lab. Researchers at the Marine Sciences Laboratory work closely with the DOE-funded Northwest National Marine Renewable Energy Center, a partnership among DOE, the University of Washington, and Oregon State University. The Lab also supports environmental assessments at two tidal energy projects in the Puget Sound led by 2008 DOE grant recipients, Verdant Power and Snohomish County Public Utility District, so that it can thoroughly test and develop marine energy technology designs and launch demonstration projects. In addition, two DOE solicitations (FOAs No. DEFOA0000069 and 0000070) for water power projects closed on June 4, which included environmental studies for marine energy, and for which PNNL was eligible to apply.

Question. Secretary Chu, hydropower is an important clean energy resource in the Pacific Northwest. Work is needed to assess potential resources and environmental impacts, technical upgrades, integration with renewable, and the potential of pumped storage. How do you plan to support these conventional hydropower needs within the Water Power program?

Answer. The Department recognizes the strong role that conventional hydropower plays in our Nation's renewable energy portfolio and is enthusiastic about exploring further the untapped potential of incremental conventional hydropower. We are addressing its needs in our Water Power Program through four strategic objectives: understanding assets and resources, increasing incremental power generation, improving environmental performance, and maximizing hydropower values to the grid. A key first step is a project the Department is calling the National Hydropower Asset Assessment. This effort will build and analyze a unique and comprehensive database of existing Federal and non-Federal projects, their generation outputs, and water availability at the projects. This assessment will also provide a basis for evaluating current technology needs and opportunities that will help hydropower maintain its important position among renewable energy in the United States.

The Department is also soliciting new, industry-led projects to assess undeveloped hydropower resources at existing dams in the United States. This opportunity is encompassed within the Advanced Water Power Funding Opportunity Announcement (DE-FOA-0000069), which will be announced this summer. DOE laboratories are also engaged in providing new engineering and environmental R&D to support the hydropower industry.

Question. Mr. Secretary, what incentives can we put in place to facilitate the development of new pumped storage resources and the continued investment in our existing hydro facilities, to allow us to use those flexible resources to firm up intermittent renewable resources like wind and solar?

Answer. Development of new pumped storage projects in the United States faces major challenges in two areas: financing very large capital construction costs, and surviving a long, costly, and uncertain regulatory process that is as complex as that associated with nuclear power. If new pumped storage projects used renewable energy in their pump cycle, these projects could also get consideration for inclusion in renewable energy standards, which would provide an additional financial incentive for development. Other policy initiatives that would help this type of development include streamlining the regulatory process and designing energy markets that return more reliable, long-term benefits to developers of generation units that provide valuable services to the Nation's electricity grid.

DOE recently issued a Notice of Intent on the \$3.3 billion Smart Grid Investment Grant Program and a draft Funding Opportunity Announcement (FOA) for an additional \$615 million for Smart Grid Demonstrations funded by the Recovery Act. Energy storage technology and specifically smart grid applications, including integration of pumped hydro storage with renewable resources like wind and solar, are within the scope of these two Recovery Act projects. The Department is in the process of reviewing all comments received during the public commenting period for incorporation into the final FOAs, both of which are expected to be released in June 2009 through the FedConnect portal at www.fedconnect.net.

Question. As DOE builds toward President Obama's clean energy economy, how will DOE evaluate a resource's contribution to and potential to meet these important, ambitious energy and environmental goals? What role does DOE anticipate for hydropower in helping to meet these objectives, especially as Congress moves to address global warming?

Answer. DOE is actively investigating the potential role of water power technologies, including both emerging marine and hydrokinetic technologies as well as conventional hydropower, in meeting the President's clean energy goals.

The Department is working to better understand the role for the full suite of marine and hydrokinetic technologies, including wave, tidal, ocean current, river in-stream, and ocean thermal energy, by evaluating the cost and performance of the

various technology types, determining how much energy is available and extractable from each resource, supporting the industry in designing and testing innovative energy conversion devices, and predicting and evaluating the possible environmental impacts of water power technologies. As the size of these resources and the ability of emerging technologies to capture them becomes clearer, the Department will better be able to assess their true potential in contributing substantially to the national electricity generation portfolio.

In addition, DOE is enthusiastic about the potential development of certain untapped hydropower resources, including efficiency or capacity upgrades at existing facilities, the construction of hydropower plants at existing non-powered dams, and possibly the construction of small or "low-impact" hydropower and pumped storage facilities. As a large-scale, and quickly dispatchable generation source, incremental hydropower may be able not only to provide a clean and renewable source of electricity but also facilitate the further integration of intermittent renewable resources.

Question. As you know, transportation emissions are a significant source of greenhouse gas emissions. This administration is investing considerably in alternative fuels for energy security and environmental reasons; however, most of those are focused on personal vehicles. As you know, air transportation is solely dependent on jet fuels at this time. What thought has DOE given to advancing jet biofuels, including research and development, feedstock development, technology and infrastructure?

Answer. Traditionally, DOE has focused on ground transportation fuels, while most air transportation work has been conducted by the Department of Defense, the Department of Transportation and the National Aeronautics and Space Administration. However, DOE has begun to focus on the production of heavy duty fuels including, "green" and renewable diesels, and aviation fuels.

For example, the Joint BioEnergy Institute led by Lawrence Berkeley National Laboratory is re-engineering microbes to produce hydrocarbon fuels like green gasoline, diesel, and jet fuel. A subset of recently selected DOE Energy Frontiers Research Centers will focus on fundamental research related to producing advanced biofuels, such as bio-oils from microalgae, which are promising intermediates for the production of advanced biofuels, including green jet fuel. The National Renewable Energy Laboratory, Sandia National Laboratory, and other laboratories are also launching research into algal biofuels for the Defense Advanced Research Projects Agency and Air Force Office of Scientific Research. Algae-based fuels will also be eligible for both Advanced Research Projects Agency-Energy and DOE Loan Guarantee funding opportunities.

Additionally, DOE will use Recovery Act funding to support a competitive solicitation for two research consortia aimed at accelerating the development of cost competitive advanced fungible biofuels, which include hydrocarbon fuels, diesel and jet fuel, and algae based biofuels which also include jet fuel. The solicitation is expected to be released in the summer of 2009. In order to capture relevant technologies that are ready for deployment, a current competitive solicitation closing on June 30, 2009 allows for pilot- and demonstration-scale biorefineries that include jet fuel from biomass. DOE's Office of Fossil Energy announced \$70.6 million of Recovery Act funding will be spent to facilitate the existing algae-based carbon mitigation project at Cholla Power Plant in Holbrook, Arizona to expand testing with a coal-based gasification system. The goal is to produce fuels from domestic resources while reducing atmospheric CO₂ emissions. DOE's Office of Fossil Energy and the National Energy Technology Laboratory issued a Recovery Act funding opportunity on June 8 that allows conversion of to CO₂ biomass (algae, for example) and subsequent biofuels production as a mechanism of CO₂ sequestration and use.

Question. Secretary Chu, I want to ask about a section of the hydrogen fuel cell budget, the Market Transformation program. This subcommittee has in the past supported the Market Transformation, which helps support fuel cell deployment in early commercial applications, because we share your view that we ought to do now what we can do now on fuel cells. I understand that you allocated a small part of the stimulus dollars to fuel cell deployment this year. Can you tell me why the President's budget proposes no funding for Market Transportation program?

Answer. The President's budget proposes no additional funds for market transformation activities in fiscal year 2010 because the \$41.9 million of Recovery Act funding dedicated to fuel cell market transformation activities will support 13 projects over fiscal year 2009 and fiscal year 2010. These projects will deploy more than 1,000 fuel cells and will help create jobs in fuel cell manufacturing, installation, maintenance and support service sectors. Together with \$72.4 million of industry cost-share, the total 2-year funding for these projects is \$114.3 million.

QUESTIONS SUBMITTED BY SENATOR ROBERT F. BENNETT

LOAN GUARANTEES—LOAN PROGRAM—3.5 YEARS AND NO REWARDS

Question. Mr. Secretary, the Department has taken over 3.5 years to establish the loan guarantee program and it still has not granted a single loan guarantee. I believe this program has tremendous potential, but worry that it is not being implemented in a timely and effective manner. For example:

GAO recently notified the subcommittee staff that the current subsidy model used to establish the risk premiums paid by applicants was suspended in February by OMB.

Finally, I understand you have also proposed several changes to the operations of the loan guarantee program, but many of these reforms have yet to be implemented.

How soon, will you be implementing your reforms and will any of these changes require legislation?

Answer. The Department is continuously implementing changes in its procedures that facilitate the loan guarantee process. The Department of Energy has not identified any needed legislative changes.

Question. When do you expect to make final awards in light of OMB suspending the use of the credit subsidy model?

Answer. To clarify, OMB did not suspend the credit subsidy model. In implementing the model, the Department identified a technical issue related to certain types of projects and OMB and DOE have resolved the issue. The Department issued a conditional commitment for its first loan guarantee in March and issued two additional conditional commitments in July.

Question. Is there anything Congress can do to help?

Answer. The Department appreciates Congress's support for this important program.

INDUSTRY LETTER

Question. I have attached a copy of the letter sent to the President regarding specific reforms to the Loan Guarantee program.

Can you please review each of the specific recommendations and provide a written response to the subcommittee as to your position of each of the policy recommendations and possible impact to the program.

Answer. The Department is currently reviewing the letter.

NOT ALL SCIENCE FUNDING IS EQUAL—ESPECIALLY AT THE WEAPONS LABS

Question. Mr. Secretary, I am troubled by the disparity in funding for applied and fundamental scientific research provided to DOE labs verses the NNSA labs. Clearly, the cancellation of the Los Alamos Neutron Science Center (LANSCE) Refurbishment is the most glaring example of the selectiveness of the research funding in this budget. The LANSCE facility is the scientific corner stone of Los Alamos, serving both classified and unclassified work and with over 500 users annually.

How do you explain the failure in the budget to link the DOE and NNSA science?

Answer. Budgeting is, in the end, an exercise in priorities and choices with limited resources. While there is certainly good science that could be done with a refurbished LANSCE, other investments in both NNSA and Science facilities will yield a greater and more immediate benefit. A refurbishment could be considered in the next budget cycle.

Question. The OMB Web site lists LANSCE refurbishment as a terminated program and specifically states one reason being that Nuclear Energy Office doesn't support isotope production any longer. Last year the isotope program was shifted to the Office of Science program. Will LANSCE continue to have a roll [sic] in the Science program?

Answer. The Isotope Production Facility (IPF) at LANSCE uses a portion of the H^+ beam extracted at 100 MeV from the accelerator; this facility produces a variety of radioisotopes used in medical diagnosis and treatment and for scientific research. Together with DOE's Brookhaven and Oak Ridge National Laboratories, the IPF provides the national supply of radioisotopes not available commercially for both research and applications. In addition to regular fiscal year 2009 appropriations and an fiscal year 2010 request within the Office of Science, the IPF is currently receiving Recovery Act funds from the Office of Science for enhanced isotope production capabilities and R&D. The LANSCE accelerator also supplies protons to the Lujan Center, a pulsed spallation neutron source that is used by researchers supported by the Office of Science, NNSA, and other agencies.

THE NEED FOR SCIENTIFIC LEADERSHIP WITHIN THE NNSA

Question. Mr. Secretary, in light of your budget, which fails to adequately invest in building the science missions at the NNSA labs, I believe we need to establish a new position within the NNSA to steward and cultivate scientific research using the existing NNSA facilities. I believe this position should report to Secretary, Deputy Secretary and the NNSA Administrator. This might help raise awareness of both the weapons science, and non-weapons science that goes on at our NNSA labs. Certainly the grand challenge of energy security and climate change science are of such complexity that this work can and should be shared with all the labs.

I am considering a modification to the NNSA Act to create a new position within the NNSA reporting directly to you to lead the NNSA science program and to work with the rest of the Department to integrate the national security capabilities with those in basic and applied programs within DOE. What do you think about that?

Answer. I share your concern about sustaining science and engineering vitality at the NNSA's laboratories at Los Alamos, Livermore and Sandia. We are considering how to best broaden and sustain our science underpinning of nuclear security and how to do that appropriately for the related interests of other agencies that use these laboratory capabilities for science and national security missions. It is possible that a new position as you describe could be appropriate and useful in sustaining and advancing the science and engineering the Nation needs. At present we are focusing on basis and needs for our nuclear security science and engineering considering both the Department's missions and the related interests such as those in the intelligence community, the Department of Defense and the Department of Homeland Security. Within a few months, when I have a clearer picture of the basis and needs for these science and engineering skills, we will be in a better position to discuss the change you propose.

FOSSIL ENERGY—FUTUREGEN

Question. The FutureGen project was halted due to cost escalations, but it is my understanding that the administration is considering resuming this project, using \$1 billion in Recovery Act Funds to do so.

Can you share with us your thoughts on resuming this project?

Answer. DOE officials have been meeting with officials of the FutureGen Industrial Alliance, Inc., and on June 12, Secretary Chu announced that an agreement was established with the Alliance to move forward with the FutureGen project pending a joint decision based on a detailed cost estimate and fundraising activities, thereby limiting the risk of cost increases while accomplishing the goals of the program.

Question. There is roughly \$1.5 billion available for the Clean Coal Power Initiative (CCPI) round three solicitation. This far exceeds the initial requested amount for this solicitation, and in large part is due to project defaults from previous rounds. This research also mirrors the demonstration goals of building a zero-emission coal plant as proposed by FutureGen.

Will you please explain to us why you are considering restarting the FutureGen project, when that same type of research is available for the CCPI round three solicitation?

Answer. The FutureGen project has already completed conceptual design, project siting, approximately 1 year of preliminary design activities, an extensive Environmental Impact Statement (EIS), and an associated risk assessment. With those activities already completed, if the project was reinstated in the near future, the FutureGen Alliance conceptually could complete preliminary and detailed design and, if a decision were made to proceed, potentially could start the construction phase in 2010. Conversely, commercial demonstration projects resulting from the CCPI round three solicitation are at the proposal or project definition stage of development. Accordingly, it may take those projects considerable time to commence construction, compared to FutureGen. Given the time-sensitive nature of both climate change and economic recovery, the FutureGen project (if it is restarted) could provide a demonstration of technology that could accelerate follow-on activities such as CCPI projects (where relevant.) Also, CCPI demonstration projects may involve different technologies and site locations than FutureGen. We believe it is prudent to develop a portfolio of power plant and carbon capture technologies, as well as to compile operational experience on different regional sequestration geologies throughout the United States.

The FutureGen Project will provide for the design, construction and operation of a coal-fueled, integrated gasification combined cycle (IGCC) with pre-combustion subsystems for the capture of carbon dioxide and geologic sequestration into a saline formation. In comparison, CCPI-3 will provide commercial demonstration projects

that may include post-combustion capture systems or an oxy-fueled combustion process. CCPI-3 will provide one or more sequestration options, including beneficial reuse in enhanced oil recovery or enhanced coal bed methane recovery options as well as the possibility of basalt formations or stacked storage. The different approaches provided by these programs will support an expanded portfolio providing the DOE the ability to make progress toward capture and sequestration goals.

SCIENCE

Question. This budget includes over \$300 million in new Secretarial priority initiatives, while funding for Nuclear Energy, Fossil Energy and NNSA Science have all been reduced.

How do you reconcile this investment?

Answer. Under the Secretary's proposed initiatives the Department's overall investment in Nuclear Energy, Fossil Energy, and NNSA will actually increase, with new funding going into areas with the biggest potential pay-off for the Nation. In Nuclear Energy, the Secretary is proposing two new Energy Innovation Hubs, one to support "Extreme Materials" with the goal of achieving higher reactor efficiencies and one to support advanced computer modeling and simulations of nuclear processes and systems. For Fossil Energy, a Hub is envisioned to advance Carbon Capture and Sequestration technology. And, within the NNSA, funding shifts from construction to the transition of the National Ignition Facility to a fully capable experimental facility in pursuit of the first ignition campaign.

In addition, the RE-ENERGYSE program (Regaining our ENERGY Science and Engineering Edge) is a \$115 million new initiative designed to attract and train the next generation workforce for the 21st century energy economy. RE-ENERGYSE will support education and R&D initiatives in all energy programs.

ARPA-E

Question. In light of the new Energy Hubs, large untapped potential in the loan guarantee program, and substantial funding increases for EERE and Science, I am trying to figure out the role ARPA-E at the Department of Energy, except as another layer of bureaucracy.

Can you please provide a specific example or technology that will benefit from ARPA-E and how is it different from the loan guarantee program, office of science or renewable energy efforts?

Answer. ARPA-E is a highly entrepreneurial program that will fund "creative, out-of-the-box, transformational" energy research not currently funded by other programs. ARPA-E seeks to accelerate transformational advances in areas which address national energy priorities and are too risky for industry to invest in without public support. Transformational R&D is about creating new ways of doing things and leading to the next generation of technology that will allow the United States to be competitive in the global market.

ARPA-E will seek out the best ideas and move quickly to bring selected immature energy technologies with exceptional potential beyond the risk barriers that prevent their translation from the laboratory bench to the marketplace. Essential aspects of this nimble and flexible approach include:

—*Technology Focus Flexibility.*—ARPA-E will look for the best opportunities to improve energy security and curb climate change by making significant programmatic investments lasting 2 to 5 years. ARPA-E will fund transformational, high risk technologies with the potential for 2–3 × improvements in technology performance and/or cost when compared to current technologies. ARPA-E will then move on to the next big ideas, shifting into and out of areas depending on the most promising opportunities for transformational change.

—*Programmatic Flexibility.*—ARPA-E will have the flexibility to forge and nurture optimized partnerships that combine unique talents and insight from different fields. The programs can use DOE's "Other Transactions" authority (Technology Investment Agreements) to help attract organizations that traditionally do not participate in Government RD&D programs. Also, ARPA-E will promote results-oriented programs through the use of challenging program milestones and the discipline to end programs that fail to perform.

—*Organizational Flexibility.*—ARPA-E is a lean, flat organization that reports directly to the Secretary of Energy. ARPA-E has very broad hiring authority to attract program managers from universities, industry, the venture capital community and elsewhere. Program managers will be part of the organization for 3 year terms—not for their entire career. After having made a successful technology impact, they will move on to other opportunities in industry, academia, and elsewhere. ARPA-E's structure will promote technical and programmatic

agility by ensuring that the organization has the right resources to address the goal of enhancing the United State's economic and energy security.

These essential aspects of ARPA-E's approach will allow scientists and technologists to rapidly bring transformational ideas to a level of maturity sufficient for industry to take over development and bring the resultant technologies to market. ARPA-E's mission is to enhance the economic and energy security of the United States by developing new energy technologies that offer the potential for making significant progress toward reducing imported energy; reducing energy-related emissions, including greenhouse gases; and improving energy efficiency.

Each of the other existing DOE organizations has a unique role that ARPA-E complements.

- The Office of Science (SC) is charged with discovery and knowledge generation. SC is focused on the fundamentals of energy-related science, generating new discoveries and a base of knowledge which are used to create future energy technologies and improve existing ones.
- The Office of Energy Efficiency and Renewable Energy (EERE) and the other Applied Programs at DOE are focused on applied R&D as well as demonstration and deployment activities in specific, targeted, program areas which address national energy priorities and in collaboration with industry. Both EERE and ARPA-E focus on high pay-off technology development. However, EERE supports a more focused suite of technologies through a longer gestation period. Such longer-term support may include commercial viability demonstration projects which are often necessary before market acceptance of capital-intensive energy technologies as well as activities which address other information, market, and regulatory barriers to technology adoption. The commercial demonstration projects involve large scale engineering and process integration work and require specialized management and oversight.
- The Energy Innovation Hubs, modeled on the Department's successful Bio-energy Research Centers, will focus significant R&D resources within SC, EERE and other Applied Programs on a sustained development approach to basic and applied R&D on our most critical energy science and technology challenges. This is to be contrasted with the opportunistic style of ARPA-E, which is designed to push an area rapidly forward and then move on to another priority. Each Hub will be comprised of a highly collaborative team spanning many disciplines and drawn from the full spectrum of R&D practitioners—including universities, private industry, non-profits, and national laboratories—and each Hub is expected to become a world leader for R&D in its topical area. The Hubs will support cross-disciplinary R&D focused on the barriers to transforming energy technologies into commercially deployable materials, devices, and systems. Each Hub has proposed funding at \$25 million per year, for a 5-year term, with additional start-up funding of \$10 million in the first year for renovation (but not "bricks and mortar"), equipment, and instrumentation.
- The Loan Guarantee Program is for a later stage of technology development, guaranteeing loans to support early commercial use of advanced technologies (and for a limited time commercial technologies under the Recovery Act). The Loan Guarantee Program is targeted at early commercial use, not energy research, development, and demonstration programs.

Each of the organizations has a unique contribution for creating, developing, and deploying the energy technologies this Nation needs. ARPA-E was formed this spring and has released its first solicitation, but has not yet selected nor funded any projects. ARPA-E is organized to manage high risk R&D projects proactively. Many years of experience in scientific research and technology development have shown that different stages of the science and technology enterprise need different management styles and organization. ARPA-E complements the existing DOE organizations by adding one specifically organized and focused on high-risk transformational technologies.

NUCLEAR ENERGY

Question. Will the United States continue to play a role in the Global Nuclear Energy Partnership international discussions and contribute actively to these meetings and support international research and best practices regarding nuclear safety, security and nonproliferation? Will the Department of Energy continue to send staff to participate in these meetings?

Answer. Yes, the United States continues to support the objectives of the international component of GNEP and the use of civil nuclear energy in ways that advance safety, security and nonproliferation. The Department continues to participate in the GNEP international meetings while the subject of how best to achieve GNEP-

international objectives is undergoing an interagency review. We believe that proliferation issues should be a top priority in any discussions about the expanded use of civil nuclear energy and, in particular, in discussions that relate to development, deployment and operation of fuel cycle technologies. Thus, it is important for the Department to remain engaged in international meetings and activities that are developing strategies to ensure reliable nuclear fuel services and to provide management options for spent fuel in a manner that minimizes proliferation concerns.

YUCCA MOUNTAIN

Question. Nuclear power will be critical to reaching our energy independence and reducing our reliance on fossil fuels. Yet, with the termination of Yucca Mountain in this budget, we still have no clear strategy on how to deal with nuclear waste.

Exactly what is the Department's strategy to deal with spent fuel?

Answer. The administration intends to convene a "blue-ribbon" panel of experts to evaluate alternative approaches for meeting the Federal responsibility to manage and ultimately dispose of spent nuclear fuel and high-level radioactive waste from both commercial and defense activities.

Question. Why should the ratepayers, who have paid \$20 billion in fees, be forced to continue to store on site and not be entitled to a refund of these fees?

Answer. We remain committed to meeting our obligations for managing and ultimately disposing of spent nuclear fuel and high-level radioactive waste. The administration intends to convene a "blue-ribbon" panel of experts to evaluate alternative approaches for meeting the Federal responsibility to manage and ultimately dispose of spent nuclear fuel and high-level radioactive waste from both commercial and defense activities. The administration looks forward to ongoing dialogue with members of Congress, interested stakeholders, and others as we review these alternative approaches in the months ahead.

Question. You have announced that you intend to appoint a Blue Ribbon Commission to consider all the options for addressing our spent fuel needs.

When do you intend to appoint this commission and what will they specifically be asked to consider?

Answer. The "blue-ribbon" panel will provide the opportunity for a full public dialogue on how best to address this challenging issue and will provide recommendations that may form the basis for working with Congress to revise the statutory framework for managing and disposing of spent nuclear fuel and high-level radioactive waste. As we go forward with convening the panel, I will keep Congress informed of our progress.

IDAHO NATIONAL LAB—NEXT GENERATION NUCLEAR PLANT (NGNP)

Question. Mr. Secretary, the Idaho laboratory has aggressively pursued the Next Generation Nuclear Plant (NGNP) project. The Energy Policy Act of 2005 authorized the construction of this reactor at the Idaho National Lab.

The fiscal year 2010 budget documents make no mention of this plant. In fact, rather than prioritizing research on two advanced technology reactors which were down selected last year, this budget proposes to expand research back to 6 types of advanced reactors.

Can you please explain the justification for expanding the Department's research priorities? Where is this program headed and what does it mean for the NGNP reactor at Idaho?

Answer. The fiscal year 2010 budget request of \$191 million represents a firm commitment to move forward with needed long term research and development on underlying technologies supporting Generation IV reactor concepts, including high temperature gas reactors under consideration for the Next Generation Nuclear Plant (NGNP). The request also includes \$35 million for a modeling and simulation Energy Innovation Hub. The Department is currently evaluating its long-term plans for the NGNP project, which would rely on the private sector entering into a cost-sharing partnership with the Department. This budget request reflects the Department's commitment to be a strong partner in support of gas reactor technology.

PENSIONS

Question. Understanding that the pension funding shortfalls continue to shift on a daily basis; will the Department please provide written quarterly updates regarding the estimated pension shortfalls and programmatic impacts?

I think every member of this subcommittee would classify Environmental Cleanup as a priority, and you can see this in the funding provided in the Recovery Act. However, your request decreases the funding from fiscal year 2009 based on funding

in the Recovery Act. EERE and Science also received large sums of money in the Recovery Act, but both of those programs are increased in your budget request.

How can you justify cutting cleanup because of Recovery Act funds, when you have a \$400 million pension shortfall in this program?

Answer. The Department closely monitors the funding obligations associated with DOE contractor sponsored defined-benefit (DB) pension plans. Each contractor that sponsors a DB pension plan collects information to determine a plan's funded status as of the end of each pension plan year (that for most plans is December 31) that is then certified by a plan's actuary as of April 1. This funded status is the basis for determining what level of funding the contractor must contribute to a DB pension plan to ensure that as of the end of a plan year the plan is funded in accordance with applicable law (e.g., the Employee Retirement Income Security Act) and Departmental direction. Evaluations of a plan's funded status at interim points during the pension plan year would not change the level of funding required for that pension plan year or provide any certainty about what level of funding will be needed for the next pension plan year. Therefore, quarterly updates on the funded status of a plan would not provide information that would be useful in determining the amount of funds that will be needed to meet annual funding requirements. However, the Department is prepared to brief your staff on this issue at any time.

The fiscal year 2010 budget request for the Environmental Management program supports the Department's mission and allows contractors to make all required pension payments to their DB pension plans.

Question. Do you foresee any layoffs at any of the cleanup sites as a result of unfunded pension obligations?

Answer. The Department closely monitors the funding obligations associated with DOE contractor sponsored defined-benefit (DB) pension plans. Each contractor that sponsors a DB pension plan collects information to determine a plan's funded status as of the end of each pension plan year (that for most plans is December 31) that is then certified by a plan's actuary as of April 1. This funded status is the basis for determining what level of funding the contractor must contribute to a DB pension plan to ensure that as of the end of a plan year the plan is funded in accordance with applicable law (e.g., the Employee Retirement Income Security Act) and Departmental direction. Evaluations of a plan's funded status at interim points during the pension plan year would not change the level of funding required for that pension plan year or provide any certainty about what level of funding will be needed for the next pension plan year. Therefore, quarterly updates on the funded status of a plan would not provide information that would be useful in determining the amount of funds that will be needed to meet annual funding requirements. However, the Department is prepared to brief your staff on this issue at any time.

The Department does not anticipate impacts to the EM contractor workforce during fiscal year 2010 due to contractor funding of DB pension plans.

ENERGY INNOVATION HUBS

Question. Mr. Secretary, this budget provides \$280 million to establish eight energy hubs, a personal priority of yours. These eight centers of excellence will attack energy related problems in a collaborative manner.

Why did the budget recommend establishing a hub for extreme materials research within the Office of Nuclear Energy and at the same time cancel the refurbishment of the Los Alamos Neutron Science Center, which supports a similar mission and also has computing capabilities?

Answer. The Energy Innovation Hub for Extreme Materials will be competitively chosen. Its mission will be to support cross-disciplinary research and development focused on the barriers to transforming energy technologies into commercially deployable materials, devices and systems. Since the location and specific work scope of the Energy Innovation Hub for Extreme Materials will be decided through a competitive procurement process, it must be independent of the refurbishment of the Los Alamos Neutron Science Center.

While there is certainly good science that could be done with a refurbished LANSCE, DOE believes that other investments in other facilities will yield a greater and more immediate benefit.

The eight Energy Innovation Hubs will advance highly promising areas of energy science and technology from their early research concept stage to the point where the risk level is low enough for industry to deploy them into the marketplace. The work of the Hubs will encompass the full span from basic research to engineering development to commercialization and hand-off to industry.

Question. Did the Department give any thought to establishing a hub to focus on environmental cleanup? What about a hub to defeat the cyber security threat?

Answer. The Department deliberated at length on the optimum number and topics for the Energy Innovation Hubs. The goal for the Hubs is to make significant progress in overcoming current barriers to the United States' becoming a global leader in new energy technologies. The focus of the Hubs is on development and commercialization of clean, economic, sustainable energy technologies.

Neither the Environmental Management program nor Cyber Security efforts in the Department fall within this "energy technologies" focus of the Hubs. And, in fact, each of these efforts is already well defined and supported. That said, the concept of establishing a Hub for either Environmental Management or Cyber Security could be considered in the future if such an idea seemed advisable.

WEATHERIZATION

Question. The weatherization assistance program has over \$5 billion available from the ARRA, Continuing Resolution, and fiscal year 2009. I am told that the Department will be spending that money over the next 3 years.

How can you justify another \$220 million request when you cannot spend it this fiscal year?

Answer. To achieve the increases in the numbers of homes weatherized, State and local agencies are in the process of hiring and training thousands of workers. In addition to increased hiring, State and local agencies will be making a substantial capital investment in procuring vehicles and equipment to outfit these new weatherization crews. However, the "ramp-up" in the number of weatherized homes per month enabled by Recovery Act funds will not be fully realized until the hiring, training, and acquisition process is completed. DOE expects that the weatherization network should be close to its target rate of 22,000 homes weatherized per month by the end of the year. As a result, DOE expects that weatherization activities enabled by the Recovery Act should continue into 2011.

Additional funds in fiscal year 2010 are required to maintain the pace of hiring, training and expansion enabled by the Recovery Act in order to build the capacity needed to realize the President's goal of weatherizing 1 million homes annually. Without this continued investment, new hires could be lost at the end of 3 years and local agencies could be saddled with excess vehicles, equipment, and costs associated with lay-offs of their work forces.

CYBER SECURITY

Question. Mr. Secretary, the largest increase in the budget of the Office of Electricity Delivery and Reliability is for cyber security. No doubt, this is in response to the press reports that foreign hackers can gain access to our electrical grid.

However, NNSA cyber security staff has briefed the subcommittee regarding a large and sustained increase in cyber attacks against Department systems this year. Unfortunately, the budget for NNSA cyber security fails to provide any increase to combat these cyber attacks on our national security infrastructure.

How do you rationalize an increase in the Office of Electricity, but no increase for the NNSA?

Answer. NNSA's cyber security budget was not increased because NNSA has sufficient resources to address the threats.

Question. Do you believe you have the threats to the NNSA classified and national security information contained?

Answer. The threats to the national security information and classified system within the NNSA computing environment are constantly changing and represent risks to our operations. However, with the technology enhancement (i.e. EnCase Enterprise) and process improvements (NNSA Policy (NAP)) NNSA has invested in over the past 2 years, I believe that we have minimized the threats to the classified environment and national security information and are operating at an acceptable level of risk. The Department and NNSA senior leadership will continue to monitor the threats to our classified information technology assets along with the accompanying risks in order to make necessary changes and provide an appropriate level of protection.

URANIUM TAXES

Question. Mr. Secretary, your budget proposes a \$200 million/year tax on nuclear power utilities to be applied to the Uranium Enrichment Decommission and Decontamination Fund. This account currently enjoys a surplus of \$4.7 billion and can sustain the ongoing cleanup for 7 years at current spending rates. Since these funds are not needed immediately and haven't been reauthorized by Congress I have to assume this is nothing more than a gimmick used to offset deficit spending or meet budget shortfalls.

Mr. Secretary, the GAO did a study last year and found that the Department had a very valuable amount of unrecovered uranium sitting in storage at the very sites you want to cleanup. The value of these depleted uranium tails easily exceed the revenue raised by the tax and cleanup an existing liability on the Department's books.

Will you consider the sale of the depleted uranium tails stored in Kentucky and Ohio as an alternative to raising taxes on utilities who use nuclear power and have already paid \$1.5 billion in taxes already?

Answer. The Department continues to monitor the uranium market as it manages various inventories of uranium declared excess to the Nation's national security needs. Any proceeds from any sale of the Department's uranium inventory will be deposited in the U.S. Treasury as required by the Miscellaneous Receipts Act (31 U.S.C. § 3302); therefore, the proceeds cannot be applied toward cleanup of the gaseous diffusion plants.

CLEAN UP FUNDING

Question. Mr. Secretary, your budget tells two distinctly different stories regarding the stimulus funds. When it comes to environmental cleanup, you justify a reduction in the fiscal year 2010 budget request due available stimulus funds. [sic] However, when it comes to renewable energy projects you have provided additional increases despite that program enjoying \$17 billion in additional Stimulus funding.

Can you please explain why this budget tells two completely different stories regarding the impact of stimulus funding on the budget?

Answer. The total funding requests provided in the fiscal year 2010 budget, in conjunction with Recovery Act funds, were carefully considered so as to make the biggest impact, given the status of the science and technology in each area.

The fiscal year 2010 budget was formulated in light of the significant funding provided in the Recovery Act. Recovery funding enabled the Department to accelerate a number of important commitments in the areas of renewable energy, environmental management, grid modernization, carbon capture and sequestration (CCS) and basic science research.

In building the fiscal year 2010 request, the administration adopted a thoughtful approach that considered not only whether a program had received Recovery Act funding, but also how those funds fit within our overall policy goals and priorities.

In some cases, the Recovery Act investments are so significant that they amount to several years of base funding. This allowed the Department to make prudent use of our resources to address other high priorities. In other instances, like Environmental Management, the Recovery funding is being used on projects that meet the objectives of economic stimulus, but which may not ordinarily compete well against projects aimed at addressing the clean up of higher-risk sites. Our fiscal year 2010 request for EM continues to focus on high risk sites.

QUESTIONS SUBMITTED BY SENATOR THAD COCHRAN

Question. Mr. Secretary, in your budget for the Strategic Petroleum Reserve, you propose roughly \$50 million for the purchase of a new cavern to replace an existing storage cavern that was said to pose "an extreme environmental risk." My staff was informed that the Department purchased this cavern instead of taking advantage of salt domes already owned by the Department of Energy for Strategic Petroleum Reserve Expansion. Why?

Answer. The Department has not purchased any new caverns for the Strategic Petroleum Reserve. The cavern that has been identified for decommissioning, Cavern 20, is located at the Bayou Choctaw site and is in very close proximity to the edge of the salt dome. After use during Hurricane Katrina in 2005, Cavern 20 experienced preferential leaching towards the edge of the salt dome. Continued use of the cavern presents a risk of major environmental danger. The fiscal year 2010 request proposes funding for the purchase of an existing commercial storage cavern that is located adjacent to the Bayou Choctaw site to replace the unsound cavern. It is vital for the Department to maintain its current inventory level and drawdown response capabilities at the Bayou Choctaw site because this site is the only Strategic Petroleum Reserve site that directly serves the refiners on the lower Mississippi River and refiners in the Midwest served by the Capline Distribution System. Crude oil releases from this site were instrumental in keeping the Capline system refiners supplied after the hurricanes in 2005 and 2008.

Question. Your acting assistant Secretary for the Strategic Petroleum Reserve testified before the Environment and Public Works Committee recently about legislation sponsored by Senator Bingaman to create new storage for refined oil in the

Strategic Petroleum Reserve. As you know, salt domes in my State of Mississippi were identified by the last administration as a possible location for the expansion of the Strategic Petroleum Reserve. Although funds were not included for expansion activities in your budget, your staff expressed interest in the idea of new refined oil storage capacity. The Department of Energy owns salt caverns in Mississippi, which could hold both refined and crude oil. Will Mississippi be considered as the site for this plan, likely to be included in the Energy package Senator Bingaman is planning to move through the Senate this summer?

Answer. Although the Department has identified land for site development for 1 billion barrel expansion of the SPR at Richton, Mississippi, the Department has not acquired the land. Rather, DOE has completed prerequisite activities to include salt dome seismic analyses, site environmental surveys, and title work in preparation for the site acquisition. DOE has recently concluded studies for preparation of a Supplemental Environmental Impact Statement (SEIS) to find more environmentally suitable locations for the water intake system, the offshore brine disposal and the marine terminal in Pascagoula.

The Department is currently evaluating the situation involving the land acquisition and the additional \$31.5 million appropriated in fiscal year 2009 for new site expansion activities, beyond land acquisition.

Question. Funding for fiscal year 2009 for the Strategic Petroleum Reserve included \$35 million for the Richton, Mississippi site, contingent on a report issued by the Department within 45 days. My staff has contacted yours about the report. What is the status of this report?

Answer. Pursuant to the fiscal year 2009 Omnibus Appropriations Act (Public Law 111-8), a draft report assessing the effects of expansion of the Reserve on the domestic petroleum market is undergoing internal review. We will publish and submit the final report to Congress as soon as the review process has been completed.

QUESTIONS SUBMITTED BY SENATOR GEORGE V. VOINOVICH

Question. Over the last several years, the Department of Energy has greatly increased its oversight of the contractors responsible for managing and operating (M&O) the national laboratories under M&O contracts through prescriptive directives and requirements administered by overlapping and often redundant oversight organizations. Currently, the DOE's oversight organizations employ thousands of Federal staff with annual budgets of \$500 million. Given that no other agency expends this amount of resources to oversee contractors who were supposedly engaged to apply best private-sector practices to operations, do you think the level of regulatory oversight at the Department's national laboratories has gotten out of control and hampers their ability to provide solutions to our Nation's pressing energy needs?

Answer. As Secretary of Energy, I am firmly committed to improving efficiency at our Laboratories. There is much that the Department can and will do to enhance our laboratories' ability to deliver on the DOE missions. Significant improvement can be made with a concerted effort. Further, we will also review the use of independent certifications (ISO 9000 and 14000, DOE Voluntary Protection Programs, etc.) as part of our expectations and our strategy for overseeing our contractors' business and operations systems and processes. Finally, we will consider the circumstances under which external regulation may be appropriate.

Question. The Government-owned, contractor-operated (GOCO) model for laboratory management was originally designed to bring the best possible scientific and management talent to the laboratories and to allow them to apply the best private-sector business practices, thus maximizing their flexibility and efficiency. However, as laboratory resources are increasingly being redirected from performing R&D to demonstrating compliance with extremely prescriptive DOE work requirements, the argument for rethinking DOE's GOCO model is strengthened. What is your vision of the GOCO management relationship between DOE and its contractors?

Answer. In my view, the proper relationship between the Department and its M&O contractors is one that focuses on clear definitions of performance expectations and outcomes and on holding our contractors accountable for achieving those outcomes.

The success of the relationship between DOE and its M&O contractors depends on a clear and consistently-applied understanding of the roles and responsibilities of each party. The Department should specify what goals and requirements the contractors must meet and then hold the contractors accountable for meeting these goals. The contractors should determine how to meet those contract goals and requirements and apply best business practices.

Question. How do you explain the current role of the local DOE site/field offices, and do you see this role changing over time?

Answer. The current role of the local DOE site/field offices is to provide contractual support and oversight of the Department's national laboratories and other facilities that are Government-owned and contractor operated (GOCO). As you know, I am committed to improving the overall management of the Department, to make it more efficient, responsive, and economic in meeting our missions and better serving the American people. Toward this end I have already begun the process of reviewing the Department's current management structures, processes, and procedures, and would expect this to continue for some time.

Question. In terms of execution of civilian R&D programs, how would you categorize the differences between the DOE Office of Science, National Science Foundation, and National Institute of Health?

Answer. DOE is a mission agency with responsibilities in energy, environment, national security, and discovery science. The DOE Office of Science supports scientific research within this mission at over 300 universities and the national laboratories. The Office of Science also plans, builds, and operates scientific user facilities for the scientific community. These facilities are a significant pillar of the U.S. scientific enterprise. The DOE Office of Science is the steward for 10 national laboratories, and it is the primary Federal supporter of basic research in service of the energy mission. The programs of the Office of Science are carefully planned and focused in areas of importance to advance the DOE mission.

NIH is the primary Federal agency for conducting and supporting medical research. It is part of the Department of Health and Human Services, the principal agency for protecting the health of all Americans and providing essential human services. NIH employs intramural researchers and also funds extramural researchers. The DOE Office of Science generally does not directly fund medical science and does not have Federal intramural researchers.

The National Science Foundation (NSF) aims "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense. . . ." The NSF supports all fields of fundamental science and engineering, except for medical sciences, and also supports the social sciences.

NSF is proposal-driven and funds science independent of the field or application of that science; in contrast the DOE Office of Science is mission-driven, supporting science serving the DOE missions of energy, environment, and national security.

A cornerstone of Office of Science funding is a rigorous peer review process, much like NIH and NSF.

Question. Although our national laboratory system includes what may be the largest and most impressive collection of scientific facilities and talent in the world, the American tax payer does not receive the maximum benefit from these investments because current DOE policy prevents labs from partnering with private companies on research proposals from Federal agencies. Would you support a change in current DOE policy to authorize national laboratories, on a non-exclusive basis, to partner with private industry on research request for proposals (RFPs)?

Answer. Senator Voinovich, you raise an interesting issue as to how to best utilize our national laboratories, which for the most part are Government-owned contractor-operated and are Federally Funded Research and Development Centers (FFRDCs). Our national laboratories partner extensively with private industry through, for example, the Work for Others program, Cooperative Research and Development Agreements, licensing arrangements and user agreements. With respect to responding to RFPs, however, the Federal Acquisition Regulation, which applies on a Government-wide basis, requires that agencies sponsoring FFRDCs include in the sponsoring agreement a prohibition against the FFRDC's competing with any non-FFRDC concern in response to a Federal agency RFP. DOE's implementation of that requirement is set out in DOE Order 481.1C stating that FFRDCs may not respond to RFPs that involve head-to-head competition. This preclusion is based partly on the sanctioned special access to Government information that FFRDCs have that could put commercial competitors at a disadvantage. The Order goes on to permit, under certain circumstances, FFRDCs to respond to Broad Agency Announcements, financial assistance solicitations, Program Research and Development Announcements, and similar solicitations which do not result in head-to-head competition. I believe that the DOE should look carefully at improving opportunities for private industry to partner with DOE national laboratories.

Question. Has the Department of Energy determined which energy sources will provide the most electricity with the lowest carbon-emissions and smallest lifecycle footprint on the environment as a whole, including raw materials and land usage? Has the DOE done a comprehensive study to determine the effectiveness of U.S. energy subsidies, and if not, has the DOE determined which energy subsidies, if any,

would result in the best return on investment for tax payers while meeting the President's GHG emissions targets?

Answer. No, but the Department of Energy is continuing to develop and evaluate a portfolio of technologies with the lowest life-cycle costs and carbon footprint to meet the Nation's growing electricity demand.

Numerous Federal programs operate today to help accelerate the deployment of greenhouse gas intensity-reducing technologies by providing various financial incentives, including direct subsidies. While these financial incentives are expected to reduce GHG emissions, they also incur costs to the U.S. Government. DOE is evaluating the economic and environmental effectiveness of energy subsidies. The Energy Information Administration did recently complete a study, "Federal Financial Interventions and Subsidies in Energy Markets," but this study does not calculate the return on investment in terms of GHG emissions reduction. The executive summary is available at: <http://www.eia.doe.gov/oiaf/servicerpt/subsidy2/pdf/execsum.pdf>.

Question. What is the Department of Energy doing to help expand the number of nuclear power plants we have in the United States and reduce our dependence on foreign energy sources? Will additional loan guarantee authority be given to allow industry to move forward?

Answer. The Nuclear Power 2010 (NP2010) program was established to address the issues limiting deployment of new nuclear plants in the United States. The primary goal of the NP2010 program was to demonstrate the streamlined Federal regulatory processes governing the siting and construction of new, standardized nuclear plant designs. The NP2010 program has successfully met its objectives, and we await industry decisions to build the first new nuclear plants in more than 30 years. The NP2010 program is requesting \$20.0 million in fiscal year 2010 to complete support of the NuStart New Nuclear Plant Licensing Demonstration project. This industry cost-shared project includes interactions with the Nuclear Regulatory Commission (NRC) to obtain the NuStart Construction and Operating License for the AP1000 advanced light water reactor design including meetings with the Advisory Committee on Reactor Safety, issuance of Final Safety Evaluation Reports and Final Environmental Impact Statements and initiation of hearings by the Advisory Committee on Reactor Safeguards.

Taken together, the NP2010 program and loan guarantees for nuclear power projects are designed to address the technical, regulatory and financial risks associated with deploying new nuclear plants. DOE is not seeking additional loan guarantee authority or additional appropriations for credit subsidy costs in fiscal year 2010.

Question. What initiatives and programs is the Department of Energy planning to ensure we have the technical workforce required to maintain, build and service our Nation's nuclear power plants in a safe and efficient manner?

Answer. The Office of Nuclear Energy will provide \$2.9 million in undergraduate scholarships and graduate fellowships to high-quality undergraduate and graduate students going into nuclear science and engineering disciplines at universities and colleges located in the United States. The Office of Nuclear Energy also has recommended that 29 universities and colleges receive a total of \$6 million in grants for new equipment and instrumentation for their existing research reactors, for other specialized nuclear science and engineering facilities, and to establish classrooms and laboratories. These grants are designed to enhance the universities' and colleges' nuclear energy research and development capabilities to educate the next generation of nuclear engineers and scientists.

Working with industry, the Office of Nuclear Energy will soon begin activities to more thoroughly analyze total workforce needs to support continued safe and reliable operation of the existing nuclear fleet and construction and operation of the next generation of nuclear power plants in the United States. Finally, the Department will continue to look for partnership opportunities with industry groups, academia, and other Government agencies to ensure an adequate, highly skilled workforce is available to ensure continued safe and reliable nuclear power operations.

SUBCOMMITTEE RECESS

Senator DORGAN. Thank you for being with us this morning. Our subcommittee will want to work closely with you and with your staff in the Department of Energy as we work through the markup of an appropriations bill going forward in the coming fiscal year. This hearing is recessed.

[Whereupon, at 11:54 a.m., Tuesday, May 19, the subcommittee was recessed, to reconvene subject to the call of the Chair.]