AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2010

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

PETER J. VISCLOSKY, Indiana, *Chairman*

CHET EDWARDS, Texas
ED PASTOR, Arizona
MARION BERRY, Arkansas
CHAKA FATTAH, Pennsylvania
STEVE ISRAEL, New York
TIM RYAN, Ohio
JOHN W. OLVER, Massachusetts
LINCOLN DAVIS, Tennessee
JOHN T. SALAZAR, Colorado
RODNEY P. FRELINGHUYSEN, New Jersey
ZACH WAMP, Tennessee
MICHAEL K. SIMPSON, Idaho
DENNIS R. REHBERG, Montana
KEN CALVERT, California
RODNEY ALEXANDER, Louisiana

NOTE: Under Committee Rules, Mr. Obey, as Chairman of the Full Committee, and Mr. Lewis, as Ranking Minority Member of the Full Committee, are authorized to sit as Members of all Subcommittees.

TAUNJA BERQUAM, ROBERT SHERMAN, JOSEPH LEVIN, JAMES WINDLE, and CASEY PEARCE, *Staff Assistants*

PART 7

DEPARTMENT OF ENERGY BUDGET HEARING

Printed for the use of the Committee on Appropriations

PART 7—ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2010

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2010

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

PETER J. VISCLOSKY, Indiana, *Chairman*

CHET EDWARDS, Texas
ED PASTOR, Arizona
MARION BERRY, Arkansas
CHAKA FATTAH, Pennsylvania
STEVE ISRAEL, New York
TIM RYAN, Ohio
JOHN W. OLVER, Massachusetts
LINCOLN DAVIS, Tennessee
JOHN T. SALAZAR, Colorado
RODNEY P. FRELINGHUYSEN, New Jersey
ZACH WAMP, Tennessee
MICHAEL K. SIMPSON, Idaho
DENNIS R. REHBERG, Montana
KEN CALVERT, California
RODNEY ALEXANDER, Louisiana

NOTE: Under Committee Rules, Mr. Obey, as Chairman of the Full Committee, and Mr. Lewis, as Ranking Minority Member of the Full Committee, are authorized to sit as Members of all Subcommittees.

TAUNJA BERQUAM, ROBERT SHERMAN, JOSEPH LEVIN, JAMES WINDLE, and CASEY PEARCE, *Staff Assistants*

PART 7

DEPARTMENT OF ENERGY

BUDGET HEARING

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE

52–676 WASHINGTON : 2009

COMMITTEE ON APPROPRIATIONS

DAVID R. OBEY, Wisconsin, *Chairman*

JOHN P. MURTHA, Pennsylvania
NORMAN D. DICKS, Washington
ALAN B. MOLLOHAN, West Virginia
MARCY KAPTUR, Ohio
PETER J. VISCLOSKY, Indiana
NITA M. LOWEY, New York
JOSÉ E. SERRANO, New York
ROSA L. DeLAURO, Connecticut
JAMES P. MORAN, Virginia
JOHN W. OLVER, Massachusetts
ED PASTOR, Arizona
DAVID E. PRICE, North Carolina
CHET EDWARDS, Texas
PATRICK J. KENNEDY, Rhode Island
MAURICE D. HINCHEY, New York
LUCILLE ROYBAL-ALLARD, California
SAM FARR, California
JESSE L. JACKSON, JR., Illinois
CAROLYN C. KILPATRICK, Michigan
ALLEN BOYD, Florida
CHAKA FATTAH, Pennsylvania
STEVEN R. ROTHMAN, New Jersey
SANFORD D. BISHOP, JR., Georgia
MARION BERRY, Arkansas
BARBARA LEE, California
ADAM SCHIFF, California
MICHAEL HONDA, California
BETTY McCOLLUM, Minnesota
STEVE ISRAEL, New York
TIM RYAN, Ohio
C.A. "DUTCH" RUPPERSBERGER, Maryland
BEN CHANDLER, Kentucky
DEBBIE WASSERMAN SCHULTZ, Florida
CIRO RODRIGUEZ, Texas
LINCOLN DAVIS, Tennessee
JOHN T. SALAZAR, Colorado

JERRY LEWIS, California
C. W. BILL YOUNG, Florida
HAROLD ROGERS, Kentucky
FRANK R. WOLF, Virginia
JACK KINGSTON, Georgia
RODNEY P. FRELINGHUYSEN, New Jersey
TODD TIAHRT, Kansas
ZACH WAMP, Tennessee
TOM LATHAM, Iowa
ROBERT B. ADERHOLT, Alabama
JO ANN EMERSON, Missouri
KAY GRANGER, Texas
MICHAEL K. SIMPSON, Idaho
JOHN ABNEY CULBERSON, Texas
MARK STEVEN KIRK, Illinois
ANDER CRENSHAW, Florida
DENNIS R. REHBERG, Montana
JOHN R. CARTER, Texas
RODNEY ALEXANDER, Louisiana
KEN CALVERT, California
JO BONNER, Alabama
STEVEN C. LaTOURETTE, Ohio
TOM COLE, Oklahoma

BEVERLY PHETO, *Clerk and Staff Director*

ENERGY AND WATER DEVELOPMENT, AND RELATED AGENCIES APPROPRIATIONS FOR 2010

WEDNESDAY, JUNE 3, 2009.

DEPARTMENT OF ENERGY

WITNESS

HON. STEVEN CHU, SECRETARY, U.S. DEPARTMENT OF ENERGY

Mr. PASTOR. The hearing will come to order.

Good morning. We have before us today the Secretary of Energy, Dr. Steven Chu. He is here to present the administration's budget request for the Department of Energy.

I am pleased that President Obama has clearly engaged the energy challenges facing this Nation and has made energy policy a top priority of his agenda. I view the President's decision to ask Secretary Chu to lead the Department of Energy also as a reflection of this commitment. Unfortunately, too often Secretary positions have been a consolation prize for appointees who preferred other positions, but we are very encouraged that we have before us today a Cabinet Secretary who is truly enthusiastic about embracing the DOE portfolio in this era of energy challenges.

The Secretary of Energy features a broad portfolio of research and development efforts. Given the substantial short-, medium- and long-range energy challenges facing the Nation, we need a strong but balanced approach to energy R&D, which includes both fundamental energy research and development, as well as significant technology demonstration, deployment and commercialization efforts.

Mr. Secretary, we look forward to hearing from you today as to how the fiscal year 2010 budget request will help address the energy and national security challenges we face, and the management plans to ensure efficient planning and execution. We look forward to cooperating with you on the challenges ahead of us. But I do want to remind you that the cooperation and respect are two-way streets. While we admire your background and expertise, that in no way means that we will rubber-stamp the DOE budget request for fiscal year 2010.

There is also relevant background, knowledge, experience and expertise on this committee. I don't expect that we will always agree on everything regarding the DOE budget, but I sincerely hope we can work through those differences together in a cooperative and bipartisan manner.

Mr. Secretary, I would also ask that you ensure that the hearing record, responses to the questions for the record and any supporting information requested by the subcommittee are cleared through the Department, your office, the Office of Management and Budget, and delivered in final form to the subcommittee no later than 4 weeks from the time you receive them.

[The Opening Statement of Hon. Ed Pastor follows:]

OPENING STATEMENT
The Honorable Ed Pastor
Chairman, Energy and Water Development Subcommittee
House Committee on Appropriations

Hearing on the Department of Energy FY 2010 Budget
June 3, 2009

Good morning. We have before us today the Secretary of Energy, Dr. Steven Chu. He is here to present the Administration's budget request for the Department of Energy.

I am pleased that President Obama has clearly engaged the energy challenges facing this nation and has made energy policy a top priority of his agenda. I view the President's decision to ask Secretary Chu to lead the Department of Energy also as a reflection of his commitment. Unfortunately, too often the Secretary's position has been a consolation prize for appointees who preferred another position. I am encouraged that we have before us today a Cabinet Secretary who is truly enthusiastic about embracing the DOE portfolio in this era of energy challenges.

The Department of Energy features a broad portfolio of research and development efforts. Given the substantial short-, medium-, and long-term energy challenges facing the nation, we need a strong but balanced approach to energy R&D which includes both fundamental energy research and development as well as significant technology demonstration, deployment and commercialization efforts.

The nation also needs to have a comprehensive energy policy for the 21st century. Our current carbon-based economy and our energy ad-hoc policy imperil our economy, our national security, and our environment. The energy crisis is not just about insecure oil supplies from the Middle East, but about the cost it inflicts on hardworking Americans, the national security threat it poses, and the havoc it wreaks on the environment. We need to change the entire energy mix to introduce competition into the system and ensure that we are not captive to any one source of energy. In addition, we need to be more conscientious about our energy consumption and further advance our conservation efforts.

I don't believe we can wait for market forces to produce solutions on their own. I don't know of any other global power that has taken such a "hands-off" approach to energy as the United States has in recent years. Sitting around waiting until our oil and coal run out is just not an option. We have to lead and we have to do it now. There is simply too much at stake.

I also reject the notion that changing the way we use energy has to be a painful experience. But it will take focus, discipline, and a willingness to change. I firmly support the principle that innovation, technology, and research and development should be at the very core of our national efforts to secure our energy future. I believe we can invent and invest our way out of this problem and that government should help lead the way. There will be a lot of players with a stake in our energy future, but Mr. Secretary, this Committee will look to you to lead the way.

The government will drive the policies and incentives for a more robust energy mix and smarter energy consumption. However, no matter the policy set forth, if strong leadership and fundamental management reform are not forthcoming at the Department of Energy, it will significantly inhibit the chance of a successful energy policy.

I also note that over sixty percent of the Department's funding is associated with maintaining and securing the nuclear stockpile and the clean-up associated with the legacy of radioactive waste. I understand that the budget before us holds off on many major initiatives at the NNSA until there is there is more clarity from the next Nuclear Posture Review. For the past several years, this Committee has refused to invest in new weapons initiatives until the Administration provides a solid policy foundation for our nuclear arsenal. Only until those questions are answered can we determine what projects and activities the NNSA really needs to do. I am hopeful that this approach, free of obsolete Cold War assumptions, will allow for thoughtful planning about the future of nuclear weapons and the DOE weapons complex, before asking taxpayers to make billion dollar investments.

Despite the pressures from the current economy, the weapons program and the cleanup program are not jobs program. These programs are meant to accomplish specific activities in the national interest, and to do in a cost-effective manner. I would note that this Committee has concerns about the President's decision regarding Yucca Mountain, as the absence of a repository will affect not only our energy portfolio for the future, but also the cleanup of radioactive waste and defense spent fuel from a number of DOE sites. Several of those sites are represented by Members on this subcommittee, so rest assured

that we intend to be involved in decisions affecting the disposal of spent nuclear fuel and defense waste.

Mr. Secretary, I look forward to hearing from you today about how the FY 2010 budget request will help address the energy and national security challenges we face and the management plans to ensure efficient planning and execution. We look forward to cooperating with you on the challenges ahead of us, but I do want to remind you that cooperation and respect are a two-way street. While we admire your background and expertise, that in no way means that we will "rubber stamp" the DOE budget request for fiscal year 2010. There is also relevant background knowledge and expertise here on this committee. I don't expect that we will always agree on everything regarding the DOE budget, but I do sincerely hope that we can work through those differences in a cooperative, bipartisan manner.

Mr. Secretary, I also would ask that you ensure that the hearing record, responses to the questions for the record, and any supporting information requested by the Subcommittee are cleared through the Department, your office, and the Office of Management and Budget and delivered in final form to the Subcommittee no later than four weeks from time you receive them.

With those opening comments, I would like to yield to our ranking member, Mr. Frelinghuysen, for any opening comments that he would like to make.

Mr. PASTOR. With those opening remarks, I would like to yield to our Ranking Member Mr. Frelinghuysen.

Mr. FRELINGHUYSEN. Thank you, Mr. Vice Chairman. Let me associate myself with your remarks as well as Mr. Edwards'. I look forward to working with you.

Secretary Chu, good morning. Welcome to your first appearance before this committee. You bring to this administration a history of impressive accomplishments, and, may I add, a New Jersey connection through your previous employment at AT&T Bell Labs. How good it was in those old days.

I should say to your credit that I am sensing an undercurrent of enthusiasm about the new leadership at the Department of Energy. I hope you can capitalize on this and it will lead to more focused and more accountable management across your Department.

Your portfolio is daunting, with roughly 14,000 full-time employees, overseeing 93,000 contractors, not to mention the number of employees at the Federal and State level needed to meet the requirements of the Recovery Act, aka the stimulus, legislation, which, I may add, our subcommittee never reviewed, and which more than doubled the size of your budget with an infusion of about $38.7 billion.

It will come as no surprise that there are clear philosophical differences emerging between the developing priorities of this administration and those long supported in a bipartisan way, I may add, by this committee and Congress. Let me outline a few.

Basic and applied research is indeed the core of our Nation's ability to remain innovative and cutting edge, but we must maintain our focus on technology development and ultimately the commercialization of revolutionary technologies to keep our Nation safe and competitive. Unfortunately, this budget appears to subordinate commercial efforts and recasts our partnerships with private industry in disturbing ways.

Last year, the volatility of gas prices jolted our country into an energy awakening, leaving the American public thirsting for cheaper, domestically generated and environmentally clean energy supplies. I believe to get there we must have diversity of energy supplies, period, and that nuclear power must be part of that mix. Nuclear power has wide acceptance these days among most of our fellow citizens, yet this budget makes me question whether nuclear power is a priority in this administration.

Your request underfunds the Department's commitment to the nuclear industry included in the NP2010 program. It appears to back off our commitment to our international partners by stalling the development of the next-generation nuclear power plant. Both of these were at one time good-news stories for the Department, Mr. Secretary.

This budget neglects our commitments to a tested and proven private industry, and, to my mind, to our international partners and allies, and puts our Nation at risk of ultimately ceding our leadership role in the clean energy revolution, a role that I personally strongly support.

I will be frank with you, Mr. Secretary: The only point of real clarity and deliberate resolve I can glean from this request is the

proposal to shutter Yucca Mountain, a decision that to this Member is an irresponsible about face with no clear way forward.

You propose $5 million for a blue ribbon panel whose charter would include a review of alternative locations for a geological repository, and, I may add, covering old and familiar investigative territory. There is a sad and very costly irony with this proposal. Taxpayers have spent over $10 billion, and countless scientific studies have been conducted over 26 years. The question of what we do with our nuclear waste had been answered quite honestly until this budget was submitted.

The termination of Yucca Mountain appears to have had some confluence with a larger energy supply portfolio as well. Quite frankly, the budget reads more like an attempt to pit—and it is unfortunate—renewable and nuclear power against each other, a false choice, in my book.

No one can dispute the potential benefit and growing need for renewable energy sources. Indeed, renewable sources will become a larger contributor, though they currently account for just 7 percent of the overall energy mix.

As I have already mentioned, there is, I believe, a growing public consensus that nuclear power must be a major component of any energy portfolio that reduces our environmental footprint. Economically, the nuclear power boom will continue across the globe, with or without the United States. China, for example, has 125 nuclear plants in the pipeline. The United States has just 26 in the licensing process.

Nuclear and renewable energy should be partners in the push for environmentally clean power and economic development, not combatants or rivals. Unfortunately, your Department's budget does not seem to support that approach, and I quite honestly feel there is a similar bias in this budget against oil and natural gas production.

Finally, the weapons activities requests a mere $4 million above last year's level, significantly below the rate of inflation. I do not see how the President's vision, and I agree with his vision, of a world without nuclear weapons, not to mention NNSA's nuclear obligation to our Nation's security, can be met with this request.

While the budget requests an increase for dismantlement, it cuts or flatlines funding for scientific and industrial expertise that we will need in the long run. Meanwhile, the Russians and Chinese are continuing their aggressive nuclear development programs, and the North Koreans have demonstrated a degree of sophistication that should worry all of us. As I told your Administrator 2 weeks ago, national security does not deserve a placeholder budget, yet this is precisely what we have before us, to my mind.

Mr. Secretary, as I close, I want you to know that we know how this budget was drafted. The needs of your Department are much greater than the ceiling that OMB has forced on you. Action now rests with this committee. We will be rational and prudent and nonpartisan in our recommendations so as not to compromise any element of national security.

So I look forward, as I am sure all members of the committee do, to your remarks, and to our discussion during this hearing.

Again, thank you, Mr. Vice Chairman.

Mr. PASTOR. Thank you, Rodney.

Mr. PASTOR. I want to inform the subcommittee and the Secretary that we plan to call the hearing at 12 o'clock. So we will have as many questions as possible. I think that at 12 o'clock we will adjourn.

Mr. Secretary, good morning. Welcome. It is a great pleasure to have you with us.

Secretary CHU. Thank you, Vice Chair Pastor, Ranking Member Frelinghuysen, members of the committee. I am pleased to be before you today to present President Obama's fiscal year 2010 budget request for the Department of Energy. Before I start, I would like to say, yes, I did not prefer any other position, and I am looking forward to working with all of you, and we will be responsive to all the requests.

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 long-term growth and prosperity.

President Obama's fiscal year 2010 budget invests in clean and 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. The fiscal year 2010 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. The 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 would like to use this time to briefly highlight a few of the top-line numbers in areas of particular importance.

To promote nuclear security and the President's ambitious nonproliferation 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 to foster a revolution in energy supply and demand while positioning the United States to lead on 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 has increased by 69 percent to $238 million.

Another significant increase is the Office of Electricity, Delivery and Energy Reliability, which will receive $208 million, 50 percent more than fiscal year 2009, as it works to develop a new smart grid. This 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 highest 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 the spectrum of a 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 ARPA–E were launched last month. Let me explain briefly the differences among these initiatives and why I believe launching these hubs is so important.

The 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 multidisciplinary, highly collaborative teams, ideally working under one roof to solve priority technology challenges such as artificial photosynthesis, the creation of 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 these issues, 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 am convinced that launching Energy Innovation Hubs is a critical next step in this effort. Bringing together the best scientists from different disciplines and 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 dramatically use 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 9 years at Bell Laboratories. I believe 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. They will essentially be little Bell Lablets. These investments will pay for themselves many times over and enhance America's competitiveness on 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 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.

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. I ask that my full written statement be included for the record and will be happy to take questions at this time.

Mr. PASTOR. Without objection, your statement will be included for the record.

[The information follows:]

Statement of Steven Chu
Secretary, U.S. Department of Energy
Before the
House Committee on Appropriations
Subcommittee on Energy and Water Development, and Related Agencies

FY 2010 Appropriations Hearing
June 3, 2009

Chairman Visclosky, Ranking Member Frelinghuysen, members of the Committee, 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 FY 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 FY 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 electric 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 FY 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 ten 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 FY 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. They will essentially be little "Bell Lablets."

The scientific collaboration the Hubs will foster will be unique and indispensible, 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 FY 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 FY 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 FY 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 three 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 FY 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 FY 2010 budget requests $4.9 billion for the **Office of Science**, a $184 million increase over FY 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 FY 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 FY 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 U.S. a leader on climate change.

Two of the Department's eight Energy Innovation Hubs are requested in the Office of Science in FY 2010. 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 an energy security challenge. Furthermore, the United States has a responsibility to curb carbon emissions to mitigate the effects of global climate change. The FY 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 FY 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 emissions. 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 U.S. 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, 70s and 80s 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 FY 2010 **Office of Electricity Delivery and Energy Reliability** budget provides $208 million, an increase of 52 percent over FY 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 FY 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 FY 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 FY 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 CO_2 capture.

The FY 2010 budget request for FE funds the following areas:

- Fossil energy research and development ($617.6 million),including $403.9 million for coal power research, $179.9 million of which is dedicated to carbon sequestration
- 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 FY 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 FY 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 FY 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 FY 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 FY 2010 President's budget request is $9.9 billion, which is $815 million more than the FY 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 FY 2004-directed reductions to the U.S. nuclear weapons stockpile were completed in 2007, five 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 FY 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 FY 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 FY 2010 request of $5.8 billion, a decrease of 3 percent from FY 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 FY 2010 budget for its environmental cleanup efforts, the Department focused on achieving the greatest risk reduction, while also incorporating regulatory compliance commitments and best business practices, to maximize cleanup progress. In FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 2010 budget proposal for the Department of Energy. I will be happy to take any questions that the Chairman and members of the Committee may have at this time.

Mr. PASTOR. You finished talking about the hubs by saying mini Bell Labs. At the time it was basically a private commercial venture, as I understand the Bell Labs. In your vision of the hubs, is it a private-only venture, is it a public-private venture? Could you expand a little bit more on how you see a hub looking like?

I have a great interest in battery development. We have kind of lost that technology here as Korea and Japan and other countries, I think, are at the forefront, and there is a great need for developing greater storage capacity and being able to use it whenever we need it. So that is one of my interests. Battery research and development is something that I think is very important. How would you create and develop a hub that was in that particular area? How do you visualize that?

Secretary CHU. Thank you for that question, Vice Chair. The idea of a hub or a Bell Lablet was not whether it was public or private, but the way Bell Laboratories actually managed the science.

When I was at Bell Laboratories for 9 years, and actually for about 75 years, the very best scientists were the managers. That is somewhat unusual, because in many instances you might have been a good scientist at one time, seen better days, and then you become a manager. That was not true at Bell Laboratories. So the technical decisions of how things were made, how you are going to invest your money, were made by these contributing scientists.

Now, what that did is it allowed people to make very clear, very timely decisions. Decisions on what to fund were not made by peer review, they were made by very intelligent people and back and forth between the people proposing and the people who had to bless the projects, and, I mean, really in an intimate sort of way.

When I was a department head, a person would come to me and they would say, I have a great idea, here it is. So let's go to work. We would talk about it. I would say, what about this, what about that, I don't think it is going to work because of this, and we would answer back and forth.

That is a process that allows you to go very much more quickly. When I read the history of the way Lincoln Labs were designed during World War II, the way Los Alamos, the way the metallurgical lab was done on the Manhattan Project, it was a similar thing. The very best scientists were actually in the fray discussing back and forth.

The other thing is in these innovation hubs, they could span many different areas. For example, in batteries, it is a materials issue, there are measurement issues, there are structural issues, there many things that can cut across many disciplines. There could be some basic science issues. But in the end you want to deliver the goods. In the end, Lincoln Labs had to develop radar. So it spans this gambit in a seamless way, and then you have these top leaders making these decisions.

If we did it the old-fashioned way, which is you give us a proposal, we decide whether it is good, you go away for 3 years, you come back and tell us what you have done, and we will think about giving you another 3 years' worth of money, that actually delays things quite a bit. You can abandon things very quickly. Management says, here is a much better idea. Now we know enough in the first 3 months, this doesn't look like it is going to pan out, you can

drop it. You can't drop it if you have got a proposal. You have to show some results, because golden rule number two of any scientist is get refunded.

So if you can get on-the-ground, intimate, top manager looking at what is going on, I think you can go much faster. That is the basic idea.

Mr. PASTOR. Rodney.

Mr. FRELINGHUYSEN. Thank you, Mr. Vice Chairman.

Secretary, The New York Times reported, as you may have seen on the front page this morning, what would be, I think, regarded as a rather important security lapse. Could you tell us a little bit about what you have been able to find out? Obviously some of that basic information is out there. But certainly there appears to be, I guess, in 266 pages quite a lot of information that might be considered to be sensitive.

Can you tell us and maybe give us a level of assurance or reassurance as to what is going to happen?

Secretary CHU. Okay. I know what I know from reading that New York Times article, so let me start with that.

My understanding is that someone made a mistake, probably at the Government Printing Office, and released sensitive information. That information includes where nuclear spent fuel is in civilian sites. But as far as the Department of Energy is concerned, it also includes some information on where some high-level uranium, for example, is in our sites, in particular in Oak Ridge and Y–12, and where on the sites it identified actually some tunnels, is my understanding, where this material is kept. So that is of great concern. We will be looking hard and making sure that physical security of those lab sites is sufficient to prevent people, terrorists, others from getting hold of that material.

That is all I can say at the moment. It is of some concern, especially in Oak Ridge and Y–12.

Mr. FRELINGHUYSEN. You are dealing with it. That is reassuring.

Secretary CHU. Well, I am here with you, but as soon as I go back, I will be dealing with it.

Mr. FRELINGHUYSEN. That is why you are leaving at noon.

When we passed the stimulus bill, aka the Recovery Act, and I mentioned it in my opening remarks, the Department of Energy was a huge beneficiary of a lot of money. Of course, I have some concerns that a lot of that money was borrowed and has to be paid back.

Can you tell us—and maybe you weren't there during this creative period—how you formulated the decision to spend those dollars, to what extent money has gone out the door, in other words, how much of it has been obligated, and who you have in a position of responsibility to make sure as that close to $39 billion goes out the door, what person is in charge of oversight and accountability?

Secretary CHU. Our goal is by Labor Day to obligate roughly 50 percent of the $38.7 billion. If you look at the various things, I am thinking, for example, on weatherization, there is a concern all throughout the whole program that we want to make sure the money is spent well. So the weatherization, for example, $5 billion in the Department of Energy, is split in the following ways.

Already, all the States have 10 percent of that money to stand up organizations to make sure as the States and the local areas begin to weatherize, that there is a trained core of people that can do this in a proper way. After that we will release another 40 percent and see how they are doing.

So we won't give the remaining money. We will give 40 percent and say, okay, let's see what you have done. Is this money being well spent? It is one thing to stimulate jobs, but overall we have to not only stimulate jobs, but it has to actually save energy, because it is the saving of the energy that will actually put money back into their pockets that will begin to stimulate the economy in a second way. So it is very important that you actually say it in the energy bills. So it is going to be released in tranches.

On the energy loan parts, the loan guarantee parts, we have announced one loan so far. From when I took over the Department, it took us about 58 days. That is a little bit ahead of the schedule I was originally told, which was a year and a half. We are hopeful in the next several weeks we will be announcing another set of loans.

Always there are little glitches in things. There are negotiations between companies, things of that nature. These are announcements of conditional loans in the sense we will obligate. If those companies do their part in getting the additional 20 percent of financing, it is good. I just want to make it clear.

There are a number of other things. In fact, at the very beginning, I think the first week of my time at the Department of Energy, I appointed a person who reports directly to me that oversees all of the economic stimulus material. He has meetings now, I believe, on a daily basis with all of the various people, and we chat.

Mr. FRELINGHUYSEN. You and I have chatted about that.

Secretary CHU. Right.

Mr. FRELINGHUYSEN. You are going to make sure that that person is cracking the whip in terms of oversight as this money goes out the door for weatherization to the various States.

Secretary CHU. We talk probably almost every day. When I am in town we talk, and otherwise it is e-mails. And that person, although he is a very kind person, he does crack the whip. So, yes.

Mr. FRELINGHUYSEN. The money is going to weatherization assistance, which is a huge boost from, what, $220 million last year to over $5 billion. You are confident that through the mechanisms you have set up, that the States are prepared to hire people that are competent to make sure this money gets out the door?

Secretary CHU. Well, let's just say—I don't know about confident. Let's just say we are trying to do a lot of preventive things, as much as possible, to make sure that it has gone out the door in a sensible way, that you try to minimize fraud. I will confess this is an area of some vulnerability, and because it is, and because we know it, we are looking as closely as we can at what States' programs are doing.

Mr. FRELINGHUYSEN. In many cases, the programs that exist in some of our States, and individual legislators can put the oar in the water here, the amount of money they are getting is a huge amount compared to whatever they have traditionally gotten from

the Department of Energy. So there is a potential there for trouble if we don't set pretty high standards to begin with.

Secretary CHU. I agree with you absolutely. You mentioned also the stimulus money, the $38.7 billion, our budget is $26 billion a year, and the 38—most of that will be obligated; it will essentially be obligated in 2 years. Even that, and the strains on our Department are such that we can't do things as business as usual.

For example, we are now scouring the country looking at the best universities, letters being sent out to the presidents, to the deans, to the heads of professional societies, give us some of your best people to help us review these problems. We can't rely on the staff of the Department of Energy. Then we will be bringing them in for a week in Washington this summer to get the very best experts to help us review.

Mr. FRELINGHUYSEN. You are going to bring them to Washington to be inculcated on how to get——

Secretary CHU. This is true government service.

Mr. FRELINGHUYSEN. It is unbelievable. We know you are the "grantsman in chief" now. You have got a huge portfolio. We wish you luck in that regard. We will be obviously closely monitoring what you are doing.

Thank you, Mr. Vice Chairman.

Mr. PASTOR. You may want them to go to Phoenix in August. That will show real dedication, and there is great rates.

Chet.

Mr. EDWARDS. Thank you, Mr. Vice Chairman.

Secretary Chu, congratulations on your appointment, and thank you for your leadership in the energy field for many years. We look forward to working with you.

I salute the administration for saying we need a balanced, multipronged approach towards changing our dependency upon foreign energy sources. "Drill, baby, drill" is a good slogan, but I think we all understand it requires more than that. It is going to be conservation, alternative energy research and reliable dependence upon some traditional sources of energy. I want to ask you about that particular point.

Nuclear power provides, am I correct, about 20 percent of our present electricity needs in the United States? Is that approximately correct?

Secretary CHU. That is approximately correct.

Mr. EDWARDS. So with our population and economy growing, we will have to have new nuclear power plants just to maintain 20 percent of our electricity coming from nuclear plants; is that correct?

Secretary CHU. That is correct.

Mr. EDWARDS. What is the administration's position on the role nuclear power should play in providing energy for our homes and businesses?

Secretary CHU. I would actually like to see that fraction increase.

Mr. EDWARDS. Okay. Will our policies in the administration encourage that?

Secretary CHU. Yes, and some actions in Congress. I think nuclear power does provide base load energy. It is clean. As we re-

start the nuclear industry, I would like the United States to recapture the technological lead.

There is some good news. Westinghouse, which even though it is partly owned by the Japanese, the designers of the AP1000 are in the United States, and it is getting a lot of contracts worldwide.

Mr. EDWARDS. Okay. Let me ask about another source of energy. In your bio it says you are charged with helping implement President Obama's ambitious agenda to invest in alternative and renewable energy, end our addiction to foreign oil, address global climate change and create millions of new jobs. Let me talk about ending our addiction to foreign oil.

Presently, as I understand it, natural gas and oil provide 65 percent of America's energy, and independent natural gas and oil producers develop 90 percent of U.S. wells, produce 82 percent of U.S. natural gas, and produce 68 percent of U.S. oil. I know you are not Secretary of Treasury, and you are not overseeing tax policy, but you are a key voice, if not the key voice, in the administration on energy issues.

Can you explain to me how the administration thinks it will reduce our dependence upon either foreign oil or even natural gas, and how it will not discourage drilling of natural gas wells in the country, if we were to add billions of tax dollars for intangible drilling costs, percentage depletion issues and other tax issues that were included in the President's budget?

It seems to me counterproductive, particularly with natural gas, since that price is set on a regional or national basis based on supply and demand, not on a world basis, to propose taxes that would discourage independent gas producers that generally take every dollar in profit they make and put back into production here in the U.S. It seems awfully counterproductive for encouraging less dependence upon foreign sources of energy to be adding a massive new tax onto independent producers of natural gas as well as independent producers of oil in the United States.

Any thoughts on that as Secretary of Energy?

Secretary CHU. Yes. Actually, I would go with the first sentence when you started that, which is that is a question for the Secretary of the Treasury. But let me add to what things are under my control.

As I said before with Ranking Member Frelinghuysen, the best way we can end our dependence on foreign oil are two things. Part of that comprehensive plan would be increasing the domestic supplies. But the other part is conservation, that we use especially less in our personal vehicles, and a diversity of supply.

So diversity of supply means to me several things. It means that we develop as quickly as possible fourth-generation biofuels based on cellulose that make environmental sense, that would be cost competitive with natural oil.

The appealing part about that is that it uses a lot of agricultural waste that is now put into landfill or we simply burn up and pollutes the air. So this is wheat, straw; corn is plowed into the ground, but we can extract half of it; what rice we produce, the lumber waste materials, urban waste. So that is one thing.

The other thing is electrification of personal vehicles. If we can get that, we can offload a lot of our gasoline supplies with plug-in hybrids. So we want to develop those aggressively.

Mr. EDWARDS. I salute the administration for those efforts. I will finish by saying I respect the fact that you aren't the Secretary of the Treasury, you are not Director of OMB, but you are Secretary of Energy, and I would like someone in the administration to explain to me how it encourages natural gas production in the United States, a relatively clean fuel, by taxing it to the tune of billions of dollars of additional taxes. I hope your voice will be heard.

I hope the Secretary of Treasury doesn't come up with tax policies without input from the Secretary of Energy when it comes to his tax proposals impacting energy production and supply in this country.

Thank you.

Mr. PASTOR. Zack.

Mr. WAMP. Thank you, Mr. Vice Chairman.

Mr. Secretary, I, too, applaud you for your intellect, for your willingness to serve, encourage you greatly on renewables and energy conservation, having helped lead those efforts through the years here. Nuclear, though, a big question, both nuclear energy and nuclear weapons. That is kind of my two-pronged approach here this morning.

Talk to me, please, about the commitment to closing the fuel cycle. Since we are moving away from Yucca, what we are doing in your budget request to advance the research to demonstrate that that can be done, which we believe at the Oak Ridge National Laboratory can be done pretty quickly? I think that has great potential.

Then you talk about your desire to increase the 20 percent. Where is the loan guarantee commitment, both in bills we have already seen and in the upcoming bill, to show that the administration wants to see more than a handful of reactors built in order to increase that 20 percent electricity from nuclear?

Secretary CHU. Okay. Let me take them in reverse order. The loan guarantee, there are discussions ongoing, active discussions, with four of the applicants. We have $18.5 billion. We are proceeding as fast as possible. Hopefully sometime this summer we can make announcements. That $18.5 billion can cover three or four and no more. There are other applicants, so in order to proceed ahead with more, we would essentially need more money for authorizing and appropriating.

Mr. WAMP. You will be pursuing that in future years, future bills, future options?

Secretary CHU. Yes, I think that makes sense.

There are a few other things we are doing. This is the final year, it was mentioned before, NP2010. There were two reactors in NP2010, the AP1000 and a new GE reactor. We are going to be completing helping Westinghouse finalize, and hopefully it is an NRC decision, but we will be hoping that NRC will be looking favorably on licensing that reactor in the U.S.

The GE reactor is a slightly different matter. A lot of orders for that reactor have been shifted. So while it is in this state, we didn't

think it was prudent to be going ahead. So we are on hold on that one. If they want to go forward, we will try to help them.

In terms of closing the fuel cycle, that is something which I personally think has great opportunity. If nuclear energy is going to be a viable form of carbon-free energy not only in this century, but next century, we have to look towards recycling of fuel. We have to be looking towards developing a new generation of reactors, in particular a generation of reactors that have a high-energy neutron flux that can burn down the long-lived actinides components, that we could actually harness much more of the energy in the nuclear fuel. We are using less than 10 percent today, and that is it. So I think that the possibility is very real.

Now, having said that, I would have to say that the current technology that is being used today, for example, in France and in Japan, creates a stream of plutonium, and that is not good. Plutonium or a plutonium oxide getting into the wrong hands could be bomb material.

So what we want to do, there are three prongs. We want to spend research in developing a proliferation-resistant method of recycling the fuel. If we get that method, and it looks economically viable, then it is time to pilot. Not before. So that is one thing. So we are going to be researching proliferation-resistant type of ways of recycling fuel.

As I said before, we are investing in advanced reactors and advanced reactor designs that go beyond things like the Westinghouse reactor. So that is something that we feel very positive about.

Now, the good news is that for the next couple of decades, we have enough reactor fuel, so we need not rush in to starting to pilot something prematurely. There was a National Academy of Sciences report on this issue, in fact, the whole GNP issue. It came out very positively on everything except piloting a fuel-recycling plant at this time. Certainly the international cooperation in trying to make sure that the resurgence of civilian nuclear power in the world is done correctly and the international cooperation, all these things came up very positively. But with that one thing, they said, wait, let's do some more work on it.

Mr. WAMP. Let's remember that the first 100 reactors were built in 20 years in this country. We know a whole lot more about it now than we did then. And we can build another 100 reactors, as Senator Alexander said last week, a whole lot easier than we built the first 10 reactors. There has never been a death associated with nuclear energy in this country. So I think time is of the essence.

I hope that the research you are talking about doesn't slow the process of bringing new electricity on line if we are going to be competitive. The renewable frontier is great, but we are not where we need to be right now, and we all know that. So I just want to encourage you to push.

A second thing on this New York Times story, the DBT, design basis threat, moved since September 11. NNSA is part of DOE, but it is separate, and I frankly think it has worked pretty well. So you are going to have to, maybe following this story, I hope, move a little bit into that national security piece of your responsibility to get to the bottom of this.

I hope you come to Oak Ridge. I hope you will go to 9212, which is a building there at Y–12 that you won't like. You will say this is not adequate. It would be replaced by the uranium-processing facility which is on the drawing board, so to speak, but the budget request is not sufficient to maintain the level of talent that we have designing the UPF. But this may cause you to take a harder look at this, even this story. So I am always looking for the silver lining. The DBT, the design basis threat, could even be modified just on the basis of this story, on what kind of security precautions you need to protect our stockpiled highly enriched uranium.

So I would encourage you to come and take a second look. I understand the administration has underfunded the UPF design. We have made a pretty strong case with this committee that it needs to be funded. When 15 Members show up today, though, it speaks volumes about their interest in what you are doing and the energy piece of this, and I know that you definitely have got a signature issue on the energy side, but the weapons side here is going to need your attention, obviously, from this story and more.

Finally, on pensions, I read where you are looking at trying to supplement some of the loss of pension revenue, I think, for the people that work for the Department of Energy, and I want to ask on behalf of the whole slew of retirees that are out there that haven't had any update in their pension benefits in a long, long time, will you consider looking at that while you are looking at the pension funds of existing workers?

Secretary CHU. Yes. I think it is actually part and parcel of the whole package. It is the current workers and the former workers, with regard to the pension exposures when the market crashed.

Mr. WAMP. Thank you, Mr. Chairman.

Mr. PASTOR. Mr. Berry.

Mr. BERRY. Thank you for being here this morning, Mr. Secretary, and thank you for being willing to take on this job. Looking at your résumé, you enjoy challenges. You have sure got you one now.

Where I grew up, they had a saying, don't feed the bulldog, and we are trying to figure out what to feed the bulldog here, because if we don't have the energy to grow this economy, regardless of what form it takes, it won't make any difference, we can't grow it. You know that. You don't need me to tell you about it. But we are all very concerned about it.

I have one question. The Energy Innovation Hubs, have they already been selected?

Secretary CHU. No.

Mr. BERRY. How will that be done?

Secretary CHU. Well, we will be putting out a call for proposals. There are topics that have been announced, and we would then review those with both—I hope to assemble, again going back to what I said before, some of the very best people that we have to look at those proposals.

A critical part of that would be the leadership of those hubs, because this is a critical part of that. I don't just want people to cluster together in some virtual thing. It has to be a really coherent thing, ideally under one roof.

Mr. BERRY. I believe it was in 2007, but the Department of Energy designated three centers of research for biomass, one at Oak Ridge, one at the University of Wisconsin, and one at the University of California at Berkeley.

Can you tell me anything? Or you might want to take it for the record. What has happened to that?

Secretary CHU. That is actually a precursor to these other innovation hubs. Those three effective hubs have done very well. There are many, many patents that have come out of all of those. They are largely highly coordinated research efforts that do go across the gamut between solving some basic research needs, but really focused on delivering some goods, of actually developing technologies that will be picked up by the private sector. So, in fact, those energy biology centers were the precursor for expanding into other areas, further hubs.

Mr. BERRY. Okay. That is focused on biomass?

Secretary CHU. Those are focused on bioenergy and biomass, that is correct.

Mr. BERRY. I would share some of the concern that has been mentioned. I know you have got I guess it is $18.5 billion in the Loan Guarantee Program at present. You have already said I think you intend to ask for more if it is needed. It seems to me that is just not big enough to do the job, and we need to be moving forward pretty quickly on it. I hope you all would look at that carefully.

I suffer from concern. I live way out in the country, and I don't want to wake up some night and not be able to turn the lights on, and we will be the first ones cut off when we don't have enough. There are those that don't think that would be a bad deal.

And I would also share with you my concern that we are going to go back and reinvent the wheel with Yucca Mountain. We got a mighty expensive dinosaur out there if we don't figure it out. I share your interest in salvaging this used fuel and making it so we can use it again, but it seems an awful shame to me to have spent that money, and then we still haven't got anything, and we are kind of going back and starting over.

Mr. BERRY. I know the folks in Nevada do not like it, but sometimes things happen in Arkansas I do not like either. But thank you.

Every time one of you guys appears before this committee, it is well established that I am not a nuclear physicist, and my colleagues enjoy that fact a great deal.

Thank you for being here, Mr. Secretary.

Secretary CHU. You are welcome.

Mr. PASTOR. Mike.

Mr. SIMPSON. Thank you, Mr. Vice Chairman.

I was just thrilled to learn that Mr. Berry's district has electricity now.

Thank you, Mr. Secretary, for being here today.

I knew I should not have said that.

Thank you for being here today and congratulations on your appointment. We look forward to working with you on these challenging times in the future.

I have whole pages of things that I would like to go through, but let me talk first about something, Yucca Mountain. I am not going to criticize your decision on that. It is what it is. And I have learned, in politics, it does not do a lot of good to howl at the moon very long. But let's talk about where we are going forward on that. You said apparently that Yucca Mountain is not a viable option. Is that in the Department and the administration's view, is Yucca Mountain, as a permanent geological repository, dead?

Secretary CHU. Yes.

Mr. SIMPSON. You are going to establish a Blue Ribbon panel. How will that be different from the Nuclear Waste Policy Technical Review Committee or whatever they call it now?

Secretary CHU. Yeah, thank you for that question.

We do know a lot more than we did 25, 30 years ago, when this first started. In fact, what I just said about the potential for recycling would mean that it would make sense—I do not want to prejudge what this Blue Ribbon panel is going to do. But given where we are, given the very good hope that we could get a different set of reactors, Generation IV reactors that could burn down the actinides; given the hope that—remember, before that, the national policy was once-through fuel use.

So if there is a real technological and economic possibility that we could be recycling the fuel, that you would want to then have storage for a couple hundred years, because this would be storage that would say, as you get better and better at fuel recycling, you withdraw it, you recycle it, and you continue to use those assets.

Then there will become a time when you do not want to do it anymore; it is not going to be viable. Once the fuel is vitrified, as an example, or largely depleted, there is no call for it. And so then the requirements of storage would be, you do not need to have access to it any more.

So just given those two things would suggest that you could step back, take another look at it, and have classes of storage. It probably might have to be distributed for a lot of reasons, including transportation. So it could not be just one site.

So these are some of the things that I would hope the Blue Ribbon panel would look at, again stepping back and then coming back to us, coming back to Congress and saying, you might need a revision of the Nuclear Waste Act, and based on what we know today relative to what we knew 25 years ago.

Mr. SIMPSON. Will your instructions to this Blue Ribbon panel be to also look at the alternatives of a permanent geological repository?

Secretary CHU. Yes. It is going to be pretty wide open. How do you go beyond, you know, as you said, it is what it is, so how do you go beyond this situation and give us a better future based on what we know today and also based on what we think will be happening in the next 50 years?

Mr. SIMPSON. If a permanent geological repository will be part of what they look at, the most studied piece of earth in the world is Yucca Mountain. Will they have the option to make a recommendation on Yucca Mountain, or will that be off the table as far as this panel is concerned?

Secretary CHU. I think Yucca Mountain as a long-term repository is definitely off the table. I should say that based on what we know today, there are geological sites, if you do not want to have access to the material anymore, going hundreds of years in the future, there are actually better geological sites.

Mr. SIMPSON. So this potentially opens up all of the sites that were looked at before, before Yucca Mountain was chosen, as well as many others as potential permanent repositories for nuclear waste.

Secretary CHU. Right. But the requirement, you know, again, I do not want to prejudge what the Blue Ribbon panel finds, but if they say there is going to be a certain class of material that you do not want to have access to, it is okay to put it in there, seal it up, close the door, then other sites become actually more desirable, sites that have been there for hundreds of millions of years, that we know it is going nowhere, that changes in rainfall patterns and things like that have not, won't disturb these things. So it becomes a different question.

Mr. SIMPSON. It becomes a different question, but it is interesting that we would say this one piece of earth we are not going to look at; everything else we will look at, when this one piece of earth is the most studied piece of earth in the world. You might as well take Disneyland off the potential sites, also. There are certain places we could take off.

And I find it amazing that we would say, we are not going to—the committee, Blue Ribbon committee is going to look at geological repositories, but the one geological repository we are not going to look at that has had 55 National Science Academy studies done on it, as well as multiple other things, the one we are not going to look at is Yucca Mountain, which indicates to me that that is more politics than it is science, quite frankly, which disappoints me. But it is, as I said, what it is.

And probably before we find a permanent repository, there will be a new administration, and we will find something else that we decide to do. And that has been one of my concerns with the Department of Energy, as well as other areas of government, all along is that we keep changing directions all, you know, every time we have a new Secretary, a new President, a new NE Secretary or whatever, they all have a different vision.

We all come to our positions with our histories and our prejudices and our biases and everything else. You mention that you would like to see an increase in the percentage of nuclear power. You come from a science background. Much of your budget, you said in your testimony, your emphasis is science, discovery, and innovation. The one word you seem to have left out to me is deployment, because ultimately, all of this only means anything if it is used by the private sector in producing electricity or other things that we are doing.

What is your vision of how we get these things? You talked about the mini-Bell Labs and all that type of thing. We have to get this stuff out into the field to be working. When I look at your NE budget, the NP 2010 enacted in 2009, $177 million requested, this year $20 million. Gen IV research and development, no mention of NGNP in your budget. The NE portfolio backs out $70 million for

two of your energy hubs. So the NE budget is actually a decrease of $100 million. That does not really even take into account the fact that much of or some of the budget is used to address the pension shortfalls. So we are going to have a substantial decrease in actually getting and deploying the technologies out into the field. What is your reaction to that?

Secretary CHU. Well, as I said before, the NP 2010 budget is worked out; it is essentially being finished by the AP1000.

Okay, so that is why you see the budget decrease that you see. The work is going to be done on NP 2010, and the authorization is for NP 2010 anyway. I agree with you, deployment is the key. Picking up in the private sector is absolutely the key. And so we are changing the way things are being done in the Department of Energy.

There has been, in the past, and I think all the members of this committee know about this, is that there is an Office of Science that does superb support of basic science. And then we have technologies. And there is a big gap between those. And there is a gap between some of the things that the technologies support and actually getting out into the private sector.

So many of the programs we are doing are designed to bridge that gap, number one. The ARPA-E is designed primarily to sponsor that research that will be before industry, before venture capital picks it up. So it is a very short-term, 3-year, maybe renewable to 5 years; after that, it is zeroed out. That project will have to find private-sector support. So it is the seed money for pre-venture capital, pre-commercial.

Many of the other things, the two under secretaries, one for the technologies and the other for the science, have agreed before they were signed on that they would work very, very closely together; they are going to be helping and reviewing everybody's programs. They were part of building up the team under them in a very intimate way. Again, we are trying to break the stovepiping, and knowing full well that, at the end of the day, you want to use our intellectual horsepower to get something out into the private sector. That is the goal. Just as it was, as I said before, with Los Alamos and Lincoln Lab. You are actually trying to get somebody to produce something, deliver the goods.

Mr. SIMPSON. Sure.

Secretary CHU. So I think if I had looked at the Department of Energy's history before, there were these so-called valleys of death. There was not just one, there were a few.

Mr. SIMPSON. They still exist.

Secretary CHU. They do. And so you will have to come and——

Mr. SIMPSON. You have created some of them.

Secretary CHU. I——

Mr. SIMPSON. NGNP was——

Mr. PASTOR. Mike, I am going to have to, we have still other members, so I will give you a minute, Mr. Secretary, to finish your statement so I can go to Mr. Israel.

Secretary CHU. I think there is no agreement in philosophically where we both want to go. Let me just say that. And I would be glad to talk to you about some details and find out your opinions

if you think we are doing something incorrectly. But I think the end goal is exactly the same.

Mr. SIMPSON. I will follow this up on the second round.

Mr. PASTOR. Mr. Israel.

Mr. ISRAEL. Thank you, Mr. Vice Chairman.

Welcome, Mr. Secretary. I have enjoyed our several conversations and do look forward to work with you in a partnership.

I do want to, in the spirit of friendship, share with you a very deep concern I have with the budget, and that is on hydrogen fuel cells: $140 million cut from last year; 66 percent reduction in EERE for hydrogen fuel cells.

I remember seeing the President visit the Jay Leno Show when Jay Leno had a show late in the evening and talked about his affinity for hydrogen fuel cells. And I am concerned that the budget numbers do not match that affinity at all.

I recently visited a GM facility in Honeoye Falls in Upstate New York with one of our colleagues, Congressman Eric Massa. They are doing extraordinary work on research and development of hydrogen fuel cells. I drove in a car that they had deployed.

I understand in your testimony to the Senate, you said that this is a very tough call and explained that you need a refueling capability, and we do not have that right now. It seems to me that, as a matter of logic, that this is a chicken-and-egg issue, that you are not going to have a fueling capability if you do not have hydrogen fuel cells. And you are not going to have hydrogen fuel cells if you are cutting the budget by $140 million. Your Hydrogen Technical and Fuel Cell Advisory Committee, I understand, did not recommend these cuts.

And so I would like to give you an opportunity to explain why those cuts were made and appeal to you to work with the members of this subcommittee, Congressman Massa, and other interested parties to see if we can develop a different approach that reaffirms this Nation's commitment to next generation hydrogen fuel cell research, development, and deployment.

Secretary CHU. Okay. Thank you.

So let me first start saying that it is not only the refueling stations that are an issue. I think the fuel cells themselves have come a long way. They have made great progress. There are still some issues about the longevity and cost of the hydrogen fuel cells. If I were to plot the best course for developing this so that there would be significant deployment, I would probably go with hydrogen fuel cells; there is a centralized place where you—also the source of hydrogen, currently the predominant way is to reform natural gas.

It is not a matter of an infrastructure being built; it is an infrastructure that has to be as extensive as the infrastructure for gasoline and diesel. And so that is hundreds of billions of dollars of—you know, so that does not come overnight. So one could imagine starting this in a warehouse for forklifts, especially indoor forklifts, where because there are air pollution problems, and so hydrogen fuel cells emit water. It makes perfect sense. They are centrally located. You can are have a reforming station in one place and refuel.

There is also an energy storage problem. Right now the best storage we currently have today is high pressure storage, 5,000, 10,000

pounds per square inch. Pretty dangerous stuff. Very high pressure tank, and not that much range unless it is a huge tank. So we have a storage problem. We have an infrastructure problem. You start by looking at local areas like forklifts or Postal Service trucks or things like that to get it going to prove the technology.

In the meantime, we will be investing money in energy storage of hydrogen so that we can for example develop better methods that the hydrogen can be absorbed on surfaces. That would allow the energy source to go up considerably. We will be designing better methods, looking at other types of things. Hydrogen fuel cells, stationary hydrogen fuel cell also, since they do not have, you know, these four concurrent technologies, the storage, the infrastructure, the generation of hydrogen and the fuel cells and the cost of the fuel cells themselves. And once you work on a stationary one, the lighter weighting does not matter, the temperature does not matter as much. So I think we will be continuing on stationary storage. The Office of Science will be continuing to invest in solving these other problems. And we will be looking at trying to develop it in a graduated way so that you prove the technology in a more local setting, where the infrastructure does make sense. But we will be glad to work with you, this committee, and the Senate committee on this issue.

Mr. ISRAEL. Well, I appreciate that. And I intend to work very closely with you. I recognize that there are all sorts of problems with the technology. But I do not believe we are going to solve those problems by slashing budgets $140 million. Not to be too pedestrian, but there were plenty of people who said there were all sorts of reasons not to do the Mercury project, not to do the Apollo program, all sorts of technical hurdles. We did not take no for an answer. We accelerated budgets. We made those investments. And we solved those problems.

Again, in the spirit of friendship and cooperation, I look forward to working very closely with you on what is an absolute priority for me and I know other members of the this committee and the colleagues we have in the House.

Thank you, Mr. Vice Chair.

Mr. PASTOR. Mr. Rehberg.

Mr. REHBERG. Thank you, Mr. Vice Chair.

And again, welcome, and congratulations. It is always hard for me to zero in, because of any congressional district, I literally have any form that you can think of other than nuclear. Wind, solar, geothermal, biomass, oil, gas, coal.

But it is interesting to hear you say that about Yucca Mountain, because where I want to go is an area I want to thank you for being open-minded, and that is Future Gen. Could you tell me a little bit about sequestration? Where have the changes occurred within the Department of Energy between, you know, Mr. Bodman and yourself and the thought process that goes into revisiting the issue? Because I sat in this committee last year and was told by your predecessor, Future Gen is dead, dead, dead, dead. It will never be seen again, and we moved off into the regional partnerships, the seven projects.

But could you talk a little bit about sequestration, its opportunities, the technology available? Is Mattoon still a viable site? Is it

going to be the place that the demonstration plant is going to be? And a little bit about the partners. I spent a lot of time dealing with those governments from India, or companies within India, China, South Korea, to try and get them to be a partner.

And when the rug was pulled out from under us, it not only is embarrassing; it is very costly. It is time-consuming, and it sets the project back a ways. So if you could just talk a little bit about the thought process within Department of Energy on sequestration.

Secretary CHU. Okay, so the thought process is pretty linear. What I was thinking is that roughly 50 percent of our electricity is generated by coal. The United States has the biggest coal reserves in the world. China and India and Russia and Australia have enormous coal reserves.

No matter what happens in the United States, India and China will not, and Australia probably, would not turn their back on coal, and actually neither will Russia. I have been talking with some Russian representatives. So it is very important that we develop the technology that captures and also that safely sequesters carbon from coal plants because of this huge asset. So we need to develop these technologies.

These technologies do not exist today ready to go. There are all sorts of issues that span the gamut in sequestration from legal issues to the longevity of the storage and things like that. The people I have spoken to over the years, not just since coming to this job, but over the last couple of years tell me that these are surmountable issues. There is no show stopper inherent in any of this.

Mr. REHBERG. There would be no doubt that the decisions that were made over the last 3 years delayed the project or projects. Does your budget reflect trying to catch up? Will it accomplish what we hope to accomplish, and that is to solve this issue as quickly as possible so we can get on with building coal-fired generating plants?

Secretary CHU. If seen in the light of also the Economic Recovery and Reinvestment Act, absolutely. I mean, there is a considerable amount of money. There is $3.4 billion set aside for carbon capture and sequestration.

Mr. REHBERG. So what would the timeline be then?

Secretary CHU. Well, we are in discussions, as you pointed out, we reopened discussions with the Future Gen Alliance. And I am hopeful we can come to some agreement, but we are in the process of negotiations. It is open. It is going forward. I am optimistic.

Mr. REHBERG. I look forward to working with you on it if you need some help in trying to push that forward with the alliance or with the appropriations. We are kind of at a stalemate in Montana. It is always interesting when somebody says I am all for coal-fired generating plants, however not until we have sequestration. What they are really saying is they are not for coal-fired generating plants. We are kind of at an environmental stalemate.

I appreciate Mr. Edwards' comments, because I was going to talk a little bit about oil, and Mr. Simpson's as well, because you can see that we need you to be stronger than some of the other Secretaries in other Departments. Our problem is it is great to talk in theory about things like biomass, but if we can't have access to our forests because people are standing in the way at the Department

of Interior, it serves no purpose. So I guess my charge to you or my plea is, be tougher than them and convince them that you cannot move to alternatives until they are in place.

And my fear is much of what happened to Montana's economy, we gave up on natural resource development because we were all sucked into believing the next generation was fiber and telecommunications. We forgot to build the bridge between the two economies. And it has taken us a while to overcome.

And I fear that nobody is paying attention to the global perspective of, if we jump right in and only focus on alternatives, without a recognition that we are not there yet technologically, we as a country are going to be real sorry when the lights do go out in Arkansas or in California because we have not done what is necessary to build the bridge to the next technology by taking advantage of the resources we have got in place now.

So look forward to working with you and thank you.

Mr. PASTOR. John Olver.

Mr. OLVER. Thank you very much, Mr. Vice Chairman.

I thought there were at least two other people in here between.

Mr. PASTOR. I am just following orders. They give me the list.

Mr. OLVER. The order people came in or something like that?

Mr. PASTOR. Yes, sir.

Mr. OLVER. Okay. I thank you very much.

Thank you very much, Mr. Secretary, for being here, for taking this job.

I hope in this process you will have some patience with those of us who have to show results and take our exams every 2 years. In most of what you are doing in your science area, it looks like it is pretty long-range stuff. And at some point here, I would like to ask a couple questions about how you give exams for what it is that is being done, how you do the oversight and the evaluation and so forth for that.

I would like to comment to my friend Mr. Simpson, I was wondering exactly where he was going on the Yucca Mountain. And it seems to me that one of your orders to your Blue Ribbon Commission should be that the site needs to be offshore or off planet, else each one of us might begin to worry about where it was going to be in our district, and it might of course be in the lava flows of Oregon or Idaho or something as opposed to Yucca Mountain, coming out somewhere farther down the road.

You do not need to answer to that at all. I want to explore with you your science programs. I had gotten up to ask a question about where in the budget were the various hubs. And I understand that they are pretty well spread around. A couple of them must be in EERE. A couple of them must be in nuclear, somewhere in the nuclear energy program. Which ones would be in EERE? Can you tell me? I see a list of eight topics. I think that is where the hubs are going to be, one in each of those topics I take it is the intent.

Secretary CHU. Right. That is the intent.

Mr. OLVER. Okay. Which ones are going to be in EERE and which ones are going to be in nuclear energy?

Secretary CHU. Well, there are two that relate to nuclear energy. One is materials in extreme conditions.

Mr. OLVER. Extreme materials.

Secretary CHU. Yes. And the other is in the design of new processes, new plants, new reactors.

Mr. OLVER. I do not see which one of the phrases that would be covered by, the design——

Secretary CHU. Hold on just a second. They are looking.

Mr. OLVER. Which ones would be in EERE?

Secretary CHU. In EERE?

Mr. OLVER. In EERE.

Secretary CHU. EERE, oh, sorry. Let's see, solar electricity.

Mr. OLVER. Solar electricity.

Secretary CHU. New generation of photovoltaics, and also building systems design.

Mr. OLVER. Ah, I guessed those correctly. There must be some others. But I am very curious what would be, and I am still not sure which ones are in nuclear energy. I will find them.

Secretary CHU. No, I have it here, extreme materials and modeling and simulation.

Mr. OLVER. Modeling and simulation. That is in nuclear.

Secretary CHU. Modeling and simulation has to do with using those techniques, high performance computing, to design new reactors.

Mr. OLVER. Okay. You say these are modeled after the bioenergy centers. The bioenergy centers, there is a group of seven of them that were authorized in the legislation in 2007 relating to the previous authorizations in 2005, the genome-to-life program in 2005. And the bioenergy centers had three major purposes. They were for facilitating bioenergy production, for environmental remediation, and for CCS, carbon capture and sequestration. Now, only three of those were ever started. And I do not know, are those three to be continued in the new legislation?

Secretary CHU. Yes.

Mr. OLVER. But their authorization ends. Their authorization terminates at the end of 2009. Are you proposing legislation to authorize those?

Secretary CHU. I did not know that the authorization was ending in 2009. In that case, yes.

Mr. OLVER. I believe that was the case.

Secretary CHU. I do not know.

Mr. OLVER. I think that authorization terminates.

Secretary CHU. Okay. I hope not.

Mr. OLVER. Well, do you intend to do others of the seven? Seven were—if you are going to do that, do you think that that is worth doing? You are doing three bioenergy production centers already.

Secretary CHU. Well, actually one of them there is going to be a Bell Lablet or energy hub on carbon capture and sequestration.

Mr. OLVER. Yes, carbon capture finally is being done under your hub idea. The hub idea is a bit different.

Secretary CHU. No, actually, they are not that much different.

Mr. OLVER. But you have got them laid out in a much longer term. In essence, the three that are there are sort of mini hubs of a series of universities doing university research. You are thinking in through your hubs of bringing in a whole bunch of other entities into the hub, not just universities I take it.

Secretary CHU. No, so let me try and explain. There are those three that exist today. The central one is—actually, the lead is not UC-Berkeley, but Lawrence Berkeley National Laboratory.

Mr. OLVER. Lawrence Livermore.

Secretary CHU. Lawrence Berkeley.

Mr. OLVER. Lawrence Berkeley.

Secretary CHU. Livermore is a partner, but a minor partner. Sandia is a partner, UC-Berkeley is a partner, Carnegie Institute for Plant Biology is a partner. But it is all under one roof.

Mr. OLVER. When I first served on this subcommittee, there was some question about how we were going to decide what each of the national labs was doing. And so there was some question about whether we were doing the things that were most appropriately to be done or what should be done in the future at Sandia and Los Alamos, Lawrence Livermore, Argonne, Stony Brook, and Oak Ridge, and so forth. Are the hubs, is it possible that those science labs will be a part of one or another of these hubs? Or are you intending to create hubs that will be—you say in one building. You have talked about it being in one building, which is more the mini Bell Labs, but that was not a single building by any means.

Secretary CHU. Okay. So let me—it actually, in Murray Hill, it was one single big, big, big building.

Mr. OLVER. Maybe I am looking at——

Secretary CHU. There were many Bell Labs. But that is not important. What is important is that these hubs, the template of the hub is actually very, very close to those bioenergy institutes. Two of the bioenergy institutes are led by national labs, Oak Ridge and Lawrence Berkeley National Lab. The other one is led by the University of Wisconsin. And so we are throwing this out open to both national labs and universities. The ideally under one roof still applies, meaning that ideally you get these people together. And so what these three institutes have done is they have said, where are the assets in the country? The one I know best is the one I helped start, which is Lawrence Berkeley National Lab. If we looked regional, where are the assets in the country——

Mr. OLVER. Excuse me, Mr. Secretary.

I do not have enough time for you to explain this in this venue. In fact, my Chairman is going to pull the hook on me very shortly here.

But the hubs look as if they are pretty long-range. There is a 5–year. You are contemplating the possibility that if they do good work, they are going to go on for another 5 years. The EFRCs are one university usually; although they could be more. In fact, a hub could be made out of three universities that were otherwise doing work in that area and might end up answering your RFPs when they go out. It is a collaboration of some group of people who think they are working in those areas and have something big to offer. The RFPs are going to be available——

Secretary CHU. Right.

Mr. OLVER [continuing]. To groups that wish to collaborate in an area that they think that they have something to offer.

Secretary CHU. Right. But the EFRCs and the hubs are very different in the sense that the EFRCs are considerably smaller.

Mr. OLVER. They are only one university, aren't they? The EFRCs?

Secretary CHU. No, many of the EFRCs, they are collaborating with other groups as well. They take collaborations.

Mr. OLVER. All right. Are you likely to do the bioremediation kind of a—that was one of those original centers. One of the goals in the original centers was there. There seems to me to be lots of waste being produced and potentially to be produced by either bioenergy or nuclear or the use of coal that could take bioenergy or bioremediation as part of the cleanup. Do you intend to RFP something like that if they become—if they are reauthorized?

Secretary CHU. Well, bioremediation we would certainly fund, but we made a decision not to make that a major hub. There are only eight of these hubs. And so, again, in our judgment, there are many more things that we think are ripe for rapid research that could lead to rapid deployment. And if you look at the areas in these hubs, that is the decision we made. Bioremediation will still be supported in, for example, Office of Science, the ER programs, other things like that. So it is not that it is off the table; it is just that, with regard to hubs, we made a decision based on what we think was rapid.

Mr. OLVER. Well, let me ask one just last very quick one, and I have a whole other line of questioning that I will take up privately. But are you funding—does your budget include funding for the 2010 for the three that are presently——

Secretary CHU. Yes.

Mr. OLVER [continuing]. The three bioenergy research centers?

Secretary CHU. Yes.

Mr. OLVER. So they are there.

Secretary CHU. They are there.

Mr. OLVER. Do you intend to ask for authorization for the 10 hubs that you are proposing?

Secretary CHU. Yes. The three biocenters were started on a 5–year, with the possibility of renewal for 5 years. The new hubs are along the same.

Mr. OLVER. And the funding pattern is essentially the same for the——

Secretary CHU. Correct.

Mr. OLVER. That is the basic similarity of the model.

Secretary CHU. Correct.

Mr. OLVER. Okay. So you do expect to ask for authorization legislation. It is not in the big energy bill that is moving around at the moment, is it?

Secretary CHU. No, but it——

Mr. OLVER. It is a huge expenditure and a huge commitment not to be authorized in some kind of a way.

Secretary CHU. Okay.

Mr. OLVER. It is hanging out there.

Secretary CHU. Okay. Got it.

Mr. PASTOR. We have about 30 minutes left, and Ryan just left, so we have I think three members who have not asked questions. We are going to allow them to ask the questions, and then whatever remainder either myself or other people will finish it off, and then we will have a few minutes for closing remarks.

So Rodney, you are next.

Mr. ALEXANDER. Thank you, Mr. Chairman.

Mr. Secretary, good morning. It is still morning. In your budget request, the R&D for solar power energy has almost doubled. In fact, it grew a lot more than the others. What justifies that? Do you have that much confidence in that form of energy?

Secretary CHU. What justifies it is actually, again, looking forward, first, there is a tremendous potential. Right now, if you look in the short term, this year, next year, if you look at the price-cost competitiveness of photovoltaics as an example relative to other renewables, relative to fossil, it is not there. It requires great subsidies in order to get installments. But the potential for it is huge; 5 percent of the world's deserts can supply all the electricity if we could transport it, if we could store it. And that is not that much of the world's deserts if it is, let's say, 20 percent.

So what I see is I see some rapid developments in nanotechnologies that could create a new generation of photovoltaics that can go beyond silicon, either polycrystalline or single crystal silicon. There are already some thin-film technologies, like the one Cylindra is developing, that show promise. But in the research labs, there are many other things that are being looked at that can even have greater promise. So it is this huge thing out there. It is like why we fund fusion, which that is not going to be viable, commercially viable let's say for the next 50 years, it is a huge potential. Photovoltaics one hopes could be there sooner.

Mr. ALEXANDER. In your research for biofuels from biomass, there is no mention of algae. And we know that we have wetlands all across the United States and some marginal lands that serve very little purpose except to hold the world together. Do you not believe that there is a potential there for——

Secretary CHU. No, there is potential for algae. And we will be funding, are funding algae projects. So that is part of our biofuels portfolio.

Mr. ALEXANDER. Okay. The companies out there today that exist that are using some natural products to fuel their energy needs and maybe are creating some materials internally that might have been waste at one time, and they are now using that to fuel their generators, and they enjoy a tax credit, do you think those tax credits might be in jeopardy, which would lead to an increase in cost for these companies?

Secretary CHU. Well, actually—well, the honest answer is, I do not know, but I am a big fan of using waste, and using that waste and using it to create energy. I think it makes a much more efficient economy.

Mr. ALEXANDER. Well, there are some companies enjoying those tax credits now that are afraid that, for instance, if there are natural products that they are using to fire their boilers, and the government creates a program over here that would encourage another individual to take those raw products and convert them to an energy and then sell them back to the plant for fuel sources when the plant has been using those raw materials as a supply of fuel, and if we take that credit away from them, then that indeed is going to lead to a tax increase for them.

Secretary CHU. Well, I do not know the details, but from just listening to you, if there are—for example, I am surmising this is some sort of biowaste that they would put into the boiler and burn it. And you know, burning biomass and using it as a supplement for generating power is something that works. It is very effective. And so on the face of it, I would have to look more into it, but it seems to me that that is certainly a suitable way of using waste products.

Mr. ALEXANDER. Thank you.

Mr. PASTOR. Lincoln.

Mr. DAVIS. Mr. Chairman, thank you.

Mr. Secretary, I appreciate you being here, and I know that, as I look at your background, it is great to have a scientist that is our Secretary of Energy. I live in a rural area. And I sometimes speak just regular rural language when I talk. And I am not ashamed of that, as our gentleman from Arkansas is. And we have a terminology that we use that you never eat the seed corn; you always keep it for the next year and the next season, the next season. I think over the last several years we should have been applying that to our research and development when we talk about energy in this country, because back in the late 1970s, when Carter talked about an energy policy that would make us energy-independent or close to energy-independent and self-sustainable, we kind of forgot that. And so we started consuming the seed corn, so to say, in some other area. We stopped the research and development that I think we should have been doing the last 30 years. My hope is that we do not miss this opportunity.

So, in doing that, in saying this and kind of setting the mold of what I want to ask, I look at all of the proposed sources of energy that we will have in the future, nuclear, solar, windmills, biomass, coal, natural gas, hydro, all the different areas that we are talking about, and I find here that we are just talking about climate change instead of energy, becoming energy-independent. And in essence, I think that we should look at an energy policy based upon it being economic security and national security. And I think that has to be a part of any energy policy that we establish.

Certainly climate change, we need to realize that that is occurring, and that if we do not do something, we will not have to worry about national security or economic security because we will not exist any more. So I do believe that climate change is occurring. A couple questions I have always, if you mention nuclear energy, someone says, well, it is going to take a long time to do that. We produce, what, about, for an average reactor, about 1,500, today, megawatts?

Secretary CHU. Yeah, a gigawatt.

Mr. DAVIS. Roughly that?

Secretary CHU. Yeah.

Mr. DAVIS. Okay. How large of an area and how quick could we produce a solar farm that would produce that type of energy? How long would it take us to do that? And do we have the research available today to actually make that possible?

Secretary CHU. No, I would say that the solar farms that we are anticipating today where they are thermophotovoltaic are 1 quarter that size.

Mr. DAVIS. What?

Secretary CHU. 1 quarter. They are in the scale, of the ones that I have seen, are in a scale of a hundred, 200 megawatts instead of a thousand.

Mr. DAVIS. And how long would it take us to actually—do we have the technology today to actually put those in place? And how long will it take us to actually build that farm or that facility that would produce those hundred megawatts?

Secretary CHU. Well, there are a couple of projects that I know of, particularly solar thermal, that the time scale would be a couple of years. I am actually more concerned about the long licensing periods of the nuclear reactors than the solar thermal farms.

Mr. DAVIS. You see, I am concerned about whether or not we are going to be able to produce 20 percent or more or 15 percent or more of noncarbon-based produced electricity in this country. And for me, looking at doubling or tripling the number of nuclear facilities that we have, maybe we need to start the process, expedite the process. Your Department needs to actually expedite working with the Nuclear Regulatory Commission to see that we are able to expedite the licensing of nuclear facilities. I am not saying that that is the only answer. But it seems today the only thing we hear is biomass, windmills and solar panels are the only way that we are ever going to reach the level of producing the energy we need without carbon emissions. I am just asking you, is that plausible to assume that we can do that?

Secretary CHU. Well, I am agreeing with you. We are 20 percent nuclear today. If you look at the wind and solar thermophotovoltaic, it is less than 3 percent. We have hydro at 6 percent. It is going to take a while to grow that 2.8 percent. And these sources are variable. And so although there is, you know, I am a big believer in renewable energy, you also have to recognize where we are today, and it is going to take a while to make this transition. So——

Mr. DAVIS. As I look at the enriched uranium that we have in different labs, located certainly in Oak Ridge, I understand we have maybe hundreds of years possibly of—and maybe you cannot answer that question, maybe I should not have made the statement I made as far as security wise, but don't we have available energy today where we can convert it into nuclear energy for a long, long time for this country?

Secretary CHU. It depends on what we are going to do with the fuel cycle largely. The way we do it now, we are only using less than 10 percent of the energy content of the fuel. And so that is why we are putting money into research for closing the fuel cycle.

Mr. DAVIS. We are having some success at our labs, as well, especially in Oak Ridge, on finding ways, perhaps, where we can maybe reuse 85, 90 percent of the rods. Is that correct? Am I hearing that from some scientists, or is that just a hope and a dream?

Secretary CHU. Well, it is——

Mr. DAVIS. As we recycle.

Secretary CHU. 80 percent are numbers that I have been hearing. It is not only Oak Ridge; it is Argonne, and especially it is Idaho that are looking into these issues.

Mr. DAVIS. We have a lot of money today in the omnibus bill that was passed. And of course, some folks refer to it as the stimulus package. I refer to it as the American Economic Recovery and Reinvestment Act, because that is what we hoped will happen.

A lot of dollars there. Many of the labs today, about 17 of those, some of their contracts are coming up for renewal or for competition again. What I am finding is that, with all these dollars that we have that we are going to be spending, and then a competitive bidding process, in many cases, only one, which is basically the incumbent lab, are the contractors who will only bid on those bids. Would you consider looking at maybe extending those contracts for a year, 2 years, 5 years as we go through this process today of research and development that we are doing to try to refine the potential energy sources we have for our country?

Secretary CHU. Well, there are two parts to that. I certainly do not know what the statute of limitations are regarding the rebidding. I went through a process when I was director of Lawrence Berkeley Lab; we were the first lab that had to rebid. I started this one or 2 months in the beginning of my tenure. A lot of money was spent. A lot of time and energy was spent, and there was one bidder. So I share your sympathy. So I would look into it. But, again, I do not know what the statutes are. But I would certainly be willing to work with you.

Mr. DAVIS. Obviously, the law might have to be——

Mr. PASTOR. Lincoln, I am going to have to, we are running out of time.

Mr. DAVIS. Thank you.

Mr. PASTOR. I want to give Mr. Salazar a chance, and Ryan and Fattah.

Mr. SALAZAR. Well, I want to thank you, Mr. Vice Chairman.

Mr. PASTOR. I did not want to forget you, John.

Mr. SALAZAR. Well, I did get here early, but I know that you made a good selection in letting me ask a question that has already been asked.

Mr. Secretary, I want to follow up a little bit on what Mr. Rehberg said on clean coal-burning technology. How committed is this administration in moving carbon sequestration and issues like that forward? We have massive resources in coal in my district, and I think in probably every member's who is here. And are we really—you do not hear that coming from the administration.

Secretary CHU. Really? Hear it from me. Yes. I say that the world is not going to turn its back on coal. If we do not fix this problem, okay, no matter—so we are very committed. Every time I talk to my counterparts in foreign countries, I say, let's get serious, and also let's work very closely together, because this is a huge undertaking, and it has huge costs to pilot these things. And so, and this is something where, let's forget about competitive advantage, because most of the investments of a power plant will be made in that country. So let's develop together these methods. But we are very committed to doing this.

Mr. SALAZAR. But if we lead the world in technology development, we can actually help sell that technology, I mean, and recover some of our costs, I believe.

Let me just move forward. I will be brief. On the cyber security and the electricity power grid, could you give me your comments or your thoughts?

Secretary CHU. Yes, very important issue, because this is the power of the country. And as we go into a new distribution system that we will definitely need going forward in the future, because we are going to be anticipating there will be more renewables which have variable sources of power, which means you will have to be switching around power.

It has to be done in an automatic basis. You cannot use the old technology, which is, call up the next power station and say, send me some power. Because when a cloud rolls by, the wind stops blowing; it has got to be done automatically.

We are going to have to manage two-way flows, that more and more buildings will be generating their own energy that will be put back onto the grid. I do think in 5 or 10 years, we will have substantial introduction of plug-in hybrid vehicles, again two-way flows.

And so you need all these things, which means you need an automatic system. Also, by the way, it will help us deploy and use our energy resources better because you can reach in and you can, in those 1 or 2 percent of the days, you can actually throttle back the use so that you can, because there are a lot of energy assets that are sitting there only for that 1 or 2 percent of the days, and the rest of the time they are sitting idle. And when they are sitting idle, it means that you are getting no return on your investment. So the grid will allow all these things to happen much better.

Then having said that, you know, there are hackers all over the place that would just love to have incredible mischief in bringing down something. Except now this is different. This is our electricity. This is not your PC. And so it is a very, very big deal that we develop methods. The Secretary of Commerce and I, first we are pushing very hard on developing communications standards, which of course deeply embedded in them are the security issues as we go forward in the smart grid. How are the companies going to develop standards that they can do and security protocol standards?

So we have been pushing this. It was authorized 2 years ago. What we found since we took over, it has gone very little, essentially nowhere. I found this out personally because we organized a series of meetings. I sat in the second one where there were scenarios, and the people in these companies who were presented scenarios, okay, what do you have to think about in order to develop these standards? There will be more than a hundred new standards that would have to be developed. And listening to them talk about the scenarios, this is the first time they have thought about it after 2 years. So we are pushing it as hard as we can to get these things. It is of great concern.

Now, the good news is that because of—between the Department of Defense, NSA, and Department of Energy, there is a lot of expertise out there on security, cyber security. Because we have had to protect nuclear secrets for so long, there is a lot of expertise. And so that expertise will have to be tapped in. But this is pretty serious.

Mr. SALAZAR. Thank you, Secretary.

Thank you, Mr. Vice Chair.

Mr. PASTOR. Mr. Ryan.

Mr. RYAN. Thank you, Mr. Chairman.

I want to go back to—Mr. Secretary, thank you. I was glad to see your appointment, and I am glad you are here helping us. I have a couple of questions.

One, I want to go back to the hubs. You were starting to say that there was going to be a regional flavor, and the hubs were going to hopefully tap into regional assets. Can you just talk a little bit more about that?

Secretary CHU. The regional assets in the sense that I do not mean we are going to make a hub in this part of the country, that part of the country. Overall, the major selection and criteria will be how good a scientific team can be put together. And high on that list is, how good are the managers of that team going to be?

But regional in the sense that, ideally, under one roof. It has been my experience in my career that if you are under one roof and you eat lunch every day and all the people in that building are marching towards a goal, whether it be figuring out, inventing new building systems technology that industry can use to make our buildings 80 percent more energy efficient and economically pay for themselves in 10 years, if you have everybody in that building working towards that goal and they are eating lunch together every day, and it is well managed, the probability of remarkable progress will be higher than if it is just a onesie, twosie, here, there, separated. So that, in my experience and what I saw at Bell Laboratories when they got serious about something, like the invention of the transistor, you can go much faster.

Mr. RYAN. And you, in your remarks, in your written remarks, you talked about commercialization. And how do you, as you organize the hubs, what is the approach to commercialization? What is the role, I think the Vice Chair asked early on, about private sector engagement? So can you talk a little bit about commercialization?

Secretary CHU. Sure. We are expecting these hubs to have partners and strong connections with industry. The two that I know best on the biology hubs have embedded in their structure and in the start connections with companies. For example, the biofuels hub led by Berkeley Lab, they made a decision to just bypass ethanol. They have made, in their first 6 months, they have been able to reprogram yeast and bacteria to make diesel and gasoline and jet-like fuel from sugar. And because of the technology that they have developed, they are now talking with automobile manufacturers and saying, precisely, what type of fuel would be ideal for the engines and going forward?

So that is just one example of how we want these hubs to be talking to their customers as an integral part of what their research is. This is not academic stuff firing out there putting stuff between journals. It is really delivering some goods.

Mr. RYAN. That is the concern, obviously, and that is why you are changing it. So, for example, you are doing the batteries, the battery hub. Would General Motors be a partner? Just throwing General Motors out there. But would a General Motors or a car manufacturer put money into the lab as well, put resources into

the lab as well, or is it more the people working at the hub, calling them, saying, hey, what do you need?

Secretary CHU. You know, that is a very good question. I think in the energy-efficient buildings systems, there are companies out there that are building-control companies. When I was a director of Lawrence Berkeley Lab, last year-and-a-half I was a director, we were talking with the likes of, for example, United Technologies that makes building-control systems and makes air conditioners, Carrier air conditioners and all these things.

So what one would want ideally is, and they were willing to put in money, $3 million to $5 million a year, okay, and so, ideally, and you get real collaboration if you get companies willing to pony up and say, okay, in addition to the money the Department of Energy is funding, to make it serious, let's put some significant skin in the game. At the very least, it would be lovely if they would say, let's send their scientists over there and put them under that same roof.

Mr. RYAN. This is a part of——

Mr. PASTOR. Can we ask Mr. Fattah here for his questions?

Mr. RYAN. No. No, I am kidding.

Mr. FATTAH. Thank you, Mr. Chairman.

Mr. RYAN. We will pick this up later, Mr. Secretary.

Mr. PASTOR. You are going to have so many luncheon dates with all these members that you are going to have to clear your calendar for a few weeks.

Secretary CHU. As long as they do not mind, I do not have to eat, because I would be glad to watch them eat while I talk. I am trying to lose weight.

Mr. FATTAH. Let me first acknowledge our chairman and his extraordinary work, even in his absence. And I hope that at some point soon, he is returned to the committee.

But I want to thank the Vice Chairman for recognizing me.

Mr. Secretary, it is good to see you again.

The President has indicated his seriousness about this question of energy and energy independence for the country by his appointment of you. I think that has been well recognized by everyone who has commented. We are very happy that you are leading the Department. I am sure you are going to love science even more the closer you get to politics and this political environment.

But I have three issues that I wanted to raise. And to the degree that you cannot get to them today, you can supply them for the record. But I am very interested on one level about the energy efficiency block grant, and I am very pleased at what we have seen thus far in local communities across the country as the Department has moved very aggressively to get those dollars out the door. We want to continue to work with the Department on some of the efforts to make this program as successful as we want it to be in terms of having local governments at the city, at the county levels be able to work to have a more energy-efficient environment in their locales.

Secondly, I am interested in the loan guarantee program, both on the renewable side and on the nuclear side. I joined my colleagues who have spoken in favor of nuclear in the sense that I think it is the quickest way and the cleanest way to proceed. I come from

a State that has a number of nuclear facilities, and I think we need to be very aggressive.

I also think that, in many instances, the licensing process itself is more challenging than the financing. That it is not is so much just—you know, you might be able to do nuclear without a loan guarantee, but you cannot do it if you have such an uncertain environment in which the licensing process proceeds along. So I appreciate your earlier comment that you are interested in the challenges that lie there.

But I am also interested on the renewable side. And there were a number of entrepreneurs who are very concerned about the, and I have spoken to you about this before, about the passivity, if you would, of the Department over these number of years to get any of those dollars on the street.

And I am interested in how we can make that work even more efficiently and whether there could be even marriages with States like my own that have been aggressive in terms of creating their own programs and loan pools for small entrepreneurs in this regard.

The last thing, and the one priority that I would like to follow up with you, I see your senior staff around, and I do not have to have lunch with you, I just need to see whoever is actually in charge of this RE–ENERGYSE effort, this education effort, the $115 million. I am very interested in how that is going to be worked through, because I think that that is where the rubber really does meet the road, that we need to be training more people like yourself if the country actually is going to meet its scientific challenges going forward. And we have a dearth of Americans of any stripe proceeding and focusing on terminal education and any of the hard sciences. So I am very interested in that effort.

So those are my three issues, RE–ENERGYSE, which I would actually like to do some follow-up, the loan guarantee on both sides, the bifurcated both on the renewable and on nuclear, and the energy block grants. So I would rest my case there.

Thank you, Mr. Vice Chair.

Mr. PASTOR. Before I let our ranking member close with his statement——

Mr. FATTAH. You want to let the Secretary respond to my questions?

Mr. PASTOR. I thought you were going to meet with his staff and——

Mr. FATTAH. I would like to get an initial comment.

Secretary CHU. Very, very quickly. With regard to loans, I would stick to substance things; there is this 20 percent requirement that these companies come up with an additional 20 percent. Given today's tight credit markets, we would be willing to work with the States. Some States are already trying to finance the other 20 percent. And to the extent that it is permissible in the statute, we would be willing to work with the States.

And on RE–ENERGYSE, very, very important. You know, I was a member of that committee led by Norm Augustine that led to that report, "Rising Above the Gathering Storm." The path forward in how the United States is going to prosper in the 21st century, the answer was very simple, invest in the intellectual capital from

K through 12 all the way up. You know, put in tax credits that allow companies to invest in research so that they can properly use that intellectual capital that we trained all the way up and down the ladder. That is the simple answer.

So I am now glad that I am in a position to try to carry out some of that stuff. ARPA–E was part of that in that as well. And I went before I think two Congressional committees saying what a good thing ARPA–E was because it will help us get some of this intellectual capital out into the market and deployed.

So, again, it is ironic that, I do not know, that was in 2005, and in 2009, here I am having to deliver some of the goods. It is much easier to just talk about it. And, you know, the energy investments, yeah, it is a big deal to us. So I will be glad to meet with you.

Mr. FATTAH. Thank you, Mr. Secretary.

Mr. PASTOR. Rodney.

Mr. FRELINGHUYSEN. Thank you, Mr. Vice Chairman.

I want to thank you, along with Mr. Pastor, for your testimony this morning.

I am sorry that the hearing was limited to 2 hours, because I know there is a lot of excitement that you have gotten a great deal of money into the Recovery Act, and I am sure we will be watching to see how you spend that. But it is unfortunate we really did not have an opportunity to concentrate on your responsibility and our responsibility of issues that relate to the nuclear protection and reliability of our nuclear stockpile.

I know there is a lot of excitement on the renewable energy side of things, but to me, through this committee and through my work on the Defense Subcommittee on Appropriations, I am concerned, just I say for the record, whether you have the money and we are making substantial enough investments in those who are key movers and understanders of the reliability of the stockpile and our ability to deliver to our military customers, you know, on a reliable basis.

I do not need to have you respond to it, but I think it is unfortunate, since that is historically really the main responsibility of the Secretary of Energy, that we really have not had a chance to sort of discuss that and get the level of reassurance that I think we deserve.

Thank you, Mr. Chairman.

Mr. PASTOR. Thank you.

Going back to Fattah's question that dealt with regaining our energy science and engineering, it is interesting, because I read on page 5 of your testimony, you describe it, and it goes from K to 20-plus, and you talk about grants, masters degrees, higher, et cetera. But you end with, and I think even when you deal with the community colleges, you are talking at the higher levels, but since you start from K to—let's say K to eighth, it says, and increase public awareness, particularly among young people, about the role that science and technology can play in responsible environmental stewardship.

I would tell you that the problem is bigger than that. And my concern is that many of these young students still do not have the knowledge, working knowledge, comprehension in science and math. And so the awareness can be developed I think if they have

teachers that can teach science, if they have teachers that can teach math effectively.

And I would suggest to you that probably the National Science Foundation may not be the only Federal agency to work with, but I know that, in the Department of Education, they have a STEM program that is trying to encourage young men and women to look at math and science. And so I would encourage you to plug in wherever you can so that the young people can get that basic education of math and science. And with that, they will become more aware of that relationship to our environment. So I would strongly encourage you to get to the root problem that our kids are not getting enough math and science in their education.

And with that, you can close the hearing, Mr. Secretary. If you have a response, I would be happy to take it. If not, thank you for being here.

Secretary CHU. Sure. Very briefly, I agree with you. We are partnering with the NSF, and we should also, not actively yet, be partnering with HUD—not HUD, but Department of Education on K through 12, both the teaching of science and math teachers. We have a couple of programs that are being led in the Department of Energy and National Laboratories that actually train teachers, science teachers, high school, junior high school, even elementary school teachers during the summertime.

Those programs actually showed remarkable improvement, particularly in the math scores. You help the teachers, and the students show these improvements over a couple of years. So that is a very big deal. And so we are going to be doing things of that nature. This is our feed stock of tomorrow, and so it does begin in K through 12. So we will need tens of millions of dollars. And as we figure out better ways of putting the money, we would look towards increasing it.

Mr. PASTOR. I thank you for this morning.

And Mr. Secretary.

Secretary CHU. One last comment for Ranking Member Frelinghuysen. When the NNSA was first formed, there was an advisory committee. I was on that advisory committee. So actually the role in nuclear security goes way back in my history. And I do think, although we did not talk about this that much, it is a very important part of what I have to do and what I do do. And let me just say there is——

Mr. FRELINGHUYSEN. I am respectful of that. But as we have sharply reduced our nuclear stockpile, which a lot of people do not give us credit for, but as we continue to even cut it even more, it is important that we keep that institutional memory and expertise and technological advantage that is so essential.

Secretary CHU. I agree with you.

Mr. FRELINGHUYSEN. Thank you.

Mr. PASTOR. Thank you.

QUESTIONS FOR THE RECORD

ENERGY AND WATER DEVELOPMENT SUBCOMMITTEE
HOUSE COMMITTEE ON APPROPRIATIONS

DEPARTMENT OF ENERGY FISCAL YEAR 2010 BUDGET HEARING

JUNE 3, 2009

DEPARTMENTAL MANAGEMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the Department of Energy has historically struggled to effectively manage its programs. In your testimony, you have stated this is one of your top priorities. In a recent hearing before this Committee, the Department described a number of corrective actions it has taken. What specifically is in the FY 2010 budget request that will improve the Department's management?

Secretary Chu: One of my top priorities is to ensure that the Department's capital asset and environmental clean-up projects are completed and meet cost schedule and performance goals within a 10% variance. In accordance with the Department's Corrective Action Plan, the Department has included in its FY 2010 budget request funding to advance the following initiatives in order to improve contract and project management:

- Implementation of a staffing model (algorithm and guide) which will inform management of the approximate types and number of federal staff to provide appropriate oversight of a project during its planning and execution phases.
- Continue the Department's efforts to certify contractor's Earned Value Management Systems (EVMS) as compliant with national standards.
- Develop and deploy a user-friendly replacement Project Assessment and Rating System (PARS) that provides transparent, consistent and quality project performance data (including contractor EVMS data) to all levels of field and Headquarters' management.
- Continue implementing a corporate clearinghouse system (ProjNet) for contract and project management lessons learned to avoid or mitigate events that may lead to poor performance.
- Enhance our Project Management Career Development Program course offerings to provide our Federal Project Directors (FPDs) and Integrated Project Team (IPT) members with the knowledge and skills necessary to effectively manage contracts and projects.

DEPARTMENTAL MANAGEMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the Department of Energy has historically struggled to effectively manage its programs. In your testimony, you have stated this is one of your top priorities. In a recent hearing before this Committee, the Department described a number of corrective actions it has taken. I understand that the Department has developed an aggressive management approach to Recovery Act implementation. This includes designating a senior advisor, Matt Rogers, to lead efforts to track every Recovery dollar through a series of management "gateways" toward outlaying the dollars. Why are you not applying the same urgency to base program funding?

Secretary Chu: DOE is actively working to improve the management of its programs, and will use the Recovery Act management model as an example of how DOE can improve its management department-wide. This aggressive approach on Recovery Act implementation will lay the groundwork for improving management across the Department.

PLANNING, PROGRAMMING, BUDGETING AND EVALUATION

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the diverse set of missions at the Department and the national priority given to energy supports the implementation of robust Planning, Programming, Budgeting, and Evaluation process to assure that resources are aligned with policy priorities. Could you share your thoughts on improving the alignment of resources and strategic priorities? Are you currently planning to implement a PPBE process at the Department? What is the status of your strategic plan?

Secretary Chu: Yes, The integrated efforts of the office of Program Analysis and Evaluation, Office of Budget, and the Office of Cost Analysis are developing the plans and processes to implement a PPBE system in the Department. Working with the Department Executive Leadership, we plan on implementing the PPBE for the FY 2012 budget. We are exploring a limited PPBE process currently for the FY 2011 budget as well.

The current strategic plan for the Department is the FY 2006 plan. We are in the process of developing an update to the plan to be finalized in FY2010. We have begun working on the Secretarial Priorities for the Department which will be translated into the Strategic Themes and Goals for DOE.

FIVE-YEAR BUDGETING

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, five-year budgeting would provide an opportunity for in-depth program oversight, a tenet of the President's own budget reform, do you have an opinion on five-year budgeting? Do you plan to implement five-year budget planning across the Department?

Secretary Chu: I believe in five year budget planning and the Department is making significant strides in that direction.

Five year budget planning will offer the Department many advantages including enhancing transparency and improving long-term planning. We are currently establishing a Department-wide budget formulation and execution system that will be better able to build and track five year budget plans.

UNCOSTED BALANCES AND ACCOUNTING

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, according to the GAO, the Department continues to carry large uncosted balances from prior years. There are often explanations for this, such as research and development that spend funds over multiple years. Further, many of these uncosted balances are committed to contracts. A simple way to allay Congressional concerns with these uncosteds is to provide the unobligated, uncommitted funding balances for DOE programs. This would reveal the smaller subset of uncosteds that are not currently obligated and committed to contracts. In the interest of transparency, would you support providing these unobligated balances to the Committee?

Secretary Chu: The Committee is correct that there are many reasons a program might have apparently large uncosted balances. Those balances are not in and of themselves an indication of a program's performance and it would be unwarranted to assume that such funds are excess to program's legitimate needs.

Taking the analysis to the next level as the Committee suggests by looking at unobligated, uncommitted funding balances would winnow the field somewhat. By excluding obligated funds from the balances you properly account for money that is already committed to carry out programs, projects and activities as authorized by Congress. However, even the unobligated portion of the carryover balances does not translate into "excess" funding. For example, Nuclear Nonproliferation might have a large unobligated balance for a particular project pending the completion of international agreements required to implement the program. Similarly, CCPI projects funded by Fossil Energy might need three years worth of appropriations before they can make an award, giving the appearance of having hundreds of millions of dollars that are unobligated and uncosted, but they are not excess, and in fact follow Congressional direction to aggregate funds.

RECOVERY ACT AND THE FY 2010 REQUEST

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, in many cases, the $38.7 billion of Recovery funding supported existing activities and programs. How did the Recovery Act funding inform the FY 2010 budget formulation? The Recovery Act was intended to be a one-time infusion to these existing programs. But, the Committee is concerned that it will generate sustained increases in out-year funding requirements. Is this not a legitimate concern?

Secretary Chu: Mr. Chairman, I understand your concern. We looked at the FY 2009 budget, the FY 2010 budget, and the Recovery Act funding together to ensure that we were achieving our policy objectives in an integrated fashion. So, the FY 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 FY2010 request, the Administration adopted a thoughtful approach that considered not only whether a program had received Recovery Act funding, but how those funds fit in with our overall policy goals and priorities. The Department has built a Recovery Act portfolio that is focused on getting the job done with the funds provided and avoiding out-year tails.

In some cases the Recovery Act investments are so significant, such as in the case of CCS that they amount to several years of base funding. This allowed us 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 would not normally compete well against projects aimed at addressing the clean up of higher-risk sites. Our FY10 request for EM continues to focus on high risk sites.

Therefore, while Recovery Act funding will be spent over the next several years, it is not our intention that it builds a legacy requiring additional out-year appropriations.

RECOVERY ACT AND THE FY 2010 BUDGET

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the Recovery Act included over $8 billion to the Weatherization Activities and State Energy Program. Both of these are managed by state authorities, and the Department acts mostly as a pass-through for the funding. That said, we appropriated the money to your Department, and will hold you responsible for its proper expenditure. What specifically have you done to ensure that the states are appropriately spending this funding?

Secretary Chu: DOE is maximizing the appropriate use of Weatherization Assistance Program and State Energy Program Recovery Act appropriations through grant award requirements, milestone based funding, monitoring, and technical assistance. We are implementing a robust oversight and monitoring plan, which will include regular and frequent visits to the State Energy offices, community action agencies, and will include visits to an unprecedented number of weatherized homes. We are also launching numerous visits to states to assess their preparedness to execute Recovery Act funds appropriately and quickly.

As soon as the Recovery Act was passed, we conducted Department-wide risk assessments to identify existing or potential vulnerabilities within our programs that may hinder our efforts to deliver on the Recovery Act. From these identified risks, senior management officials have begun developing risk mitigation plans to increase internal controls and reduce opportunities for fraud, waste, and abuse of Recovery funds. For example, some programs have determined to use a phased approach in their distribution of funds. This will allow them to maintain better accountability by measuring performance against clear project milestones and disbursing new funds on the basis of successful performance. Several programs have also significantly expanded fraud training for their program managers and senior officials.

As part of our planning and monitoring efforts, the Chief Financial Officer's (CFO) Office of Program Analysis and Evaluation and the Office of Internal Review have taken steps to address internal controls guidance, documentation standards, external reporting requirements, outcome validation, and early issues identification.

Within the CFO's office, we are also aligning our financial systems to accept Recovery Act data, perform analysis, and track the execution of Recovery Act plans so that senior management can monitor progress. Separate Treasury account symbols have been established to comply with requirements for tracking and reporting Recovery Act funding separately from existing Department funding. Project codes are being established in our accounting system as Recovery projects are approved by the Secretary. These efforts will all allow the Department to better monitor and assess the progress of Recovery Act projects and will also facilitate the Department's reporting to Recovery.gov, which in turn will assure the accountability and transparency for the American people which the President has promised.

The Department has taken several steps to ensure that all procurement vehicles incorporate a selection process that is fair and advances the President's long-term policy agenda. To ensure that all solicitations, contracts, and financial assistance awards comply with OMB's Recovery Act requirements, we have issued standard language for all these procurement instruments. We are also directing our contracting professionals to pay special attention to the content quality of specific areas, including clear scope definition, adequate documentation to support decisions, compliance with transparency requirements, and small business considerations.

In our efforts to ensure accountability, we have required each Headquarters program element, field office managers, and Field Chief Financial Officers to sign an "Acknowledgement of Management Accountability of Internal Controls." This document will serve as a commitment from management to maintain a strong internal control environment. The signed acknowledgements are required prior to any distribution of Recovery funds. The Department will require an additional assurance letter at the end of the fiscal year to support financial statement reporting. These policies and procedures will help ensure that we achieve the outcomes envisioned by the President and the accountability expected by our fellow Americans.

During the grant award process grantees agree to comply with the following requirements:

- Submittal of a plan within 60 days of the release of the Funding Opportunity Announcement;
- Recipients have agreed to obligate funds within 18 months of receipt of initial funds, and an agreement has also been made to expend all funds within 36 months of receipt;
- Demonstration of compliance with prescribed milestones in order to receive full funding for Recovery Act plans;
- Quarterly reporting on job creation and energy savings as set forth in the DOE grant application; and
- Cooperation with on-site visits and reviews by DOE.

In addition, grant funds will be obligated and disbursed on a milestone basis including the following:

- 10 percent at time of initial award, to provide funding for plan development
- 40 percent when recipient's complete plan is approved by the Office of Energy Efficiency and Renewable Energy (EERE);
- 20 percent to 50 percent when recipients have demonstrated in progress reviews that they have obligated funds appropriately, complied with reporting requirements and jobs are being created; and
- Balance of unobligated funds when recipients demonstrate continued progress during EERE reviews.

A detailed monitoring plan is being prepared and will include periodic desk audits, field audits, and audits of agency financial and operational records by headquarters as well as the Project Management Center (PMC). The PMC will conduct on-site monitoring of

each State once each year, an increase from once every two years currently. In addition, EERE plans to add field project management staff to carry out monitoring and other roles.

To assist with compliance, DOE will provide training and technical assistance to State and local governments on grantee reporting requirements, DOE monitoring systems, and peer-to-peer exchange on related topics.

PENSION LIABILITY

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, does the FY 2010 budget request provide adequate resources for the Department to meet its pension commitments and not have severe consequences for base programs?

Secretary Chu: In general, the funded status of DB pension plans are calculated as the end of each pension plan year (that for most plans is December 31) that are then certified by a plan's actuary as of the following April 1. The FY 2010 budget request will support mission requirements and currently projected reimbursements for contractor employee defined-benefit (DB) pension plans.

PENSION LIABILITY

Chairman Visclosky and Ranking Member Frelinghuysen: We understand the January 2009 estimate for the FY 2010 pension requirement was $1.4 billion. You have made adjustments to indirect rates to confront this challenge in FY 2010. Now that sites have adjusted their indirect, overhead rates what is your current estimate of contributions available in FY 2010?

Secretary Chu: This figure may change. Each Department 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. The current DOE projection for contractor employee defined-benefit (DB) pension reimbursements in FY 2010 remains approximately $1.4 billion. Actual obligations for FY 2010 will be determined once the yearend funded status for each plan is known. The total obligation may be higher or lower than earlier estimates.

PENSION LIABILITIES

Chairman Visclosky and Ranking Member Frelinghuysen: Pensions are paid out of the overhead rates of your site contractors. The more program dollars they receive, the more they get for overhead. Did the billions of program dollars we appropriated in the Recovery Act help you meet your pension liabilities?

Secretary Chu: Yes. An overhead rate was charged against Recovery Funds in FY2009 to reimburse contractors for allowable contract costs. Because reimbursement of contractor employee defined benefit pension plans is an allowable cost, a portion of the Recovery Act funding ultimately has been used for this purpose. It is anticipated that Recovery Act funds also will be used in FY 2010 for this purpose through the upward adjustment of indirect (overhead) rates for site contractors.

CONGRESSIONAL DIRECTION

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, there are instances where the Department does not follow congressional direction. For example, the FY 2009 Omnibus conference report directed the Department to shift the Office of Cost Analysis within the Chief Financial Officer to the Office of Engineering and Construction Management. This move of personnel and funding, to our knowledge, has not taken place. What is the status of the move of this office? Can you share with the Committee more generally your thoughts on following Congressional direction?

Secretary Chu: I intend to work closely with the Congress and accept all suggested direction into my planning process. In doing so, I need to balance Congressional direction with Administration priorities to ultimately implement an energy program that best serves the interests of the Nation.

One of the tools at my disposal for accomplishing this very challenging and complex task is the effective organization and use of my staff. Implementing the American Recovery and Reinvestment Act is one of the most important tasks at hand, and the organization that plays and will continue to play a leading role in this effort is the Office of the Chief Financial Officer (CFO). For the CFO to be effective in this effort, it needs an independent capability for cost analysis that will be fully integrated with the Office of Program Analysis and Evaluation (PA&E) and the Office of Budget, and is Department wide in view. The Office of Cost Analysis (OCA) is linked closely to PA&E and Budget in the development and implementation of the DOE planning, programming, budgeting and execution system which will result in my ability to create a balanced multi-year budget plan that will achieve the goals of Department. OCA is also responsible for cost estimating policy, escalation rate guidance, cost analysis training, cost analyst professional development, development of a Department-wide cost database, and independent cost estimates -- an inherently governmental function accomplished by federal employees. Key outcomes from these analyses tie directly into the responsibilities of Budget, PA&E and the CFO's overall fiduciary responsibilities and provides information necessary to make informed decisions.

The Office of Engineering and Construction Management (OECM) has a more limited focus. As delineated in DOE Order 413, OECM is concerned with validating cost estimates and assessing project performance for capital asset projects (construction and environmental clean-up projects) which comprise roughly 30 % of the DOE budget. Moreover their focus is primarily from selection of a project alternative to the end of the project – they have a more limited role in the earliest phases of a project. As indicated, OECM is not involved with cost sharing programs, which are becoming more and more important to developing alternative energy production in the United States. The move would damage the synergy between cost, budget, and analysis being developed within the CFO's office. Based on the above rationale I have decided to keep OCA in the CFO's office as I further expand the analytical basis for decision making in the Department.

DOE HUMAN RESOURCES AND HIRING FAILURES

Chairman Visclosky and Ranking Member Frelinghuysen: Your budget proposal requests $29.5 million for the Office of the Chief Human Capital Officer, a continuation of funding levels in past several years. Despite such a large internal HR and hiring organization at DOE headquarters, the Office of Energy Efficiency and Renewable Energy has had approximately 100 unfilled vacancies appropriated by this Subcommittee for several years running. Does this signal a failure of leadership and execution by the Department's Office of the Chief Human Capital Officer? What are you doing to address DOE's chronic failure to hire unfilled vacancies?

Secretary Chu: During FY 2009, the number of open positions in the Office of Energy Efficiency and Renewable Energy (EE) at Headquarters started at 53 in October 2008, rose to 111 in March 2009, and currently, in September, stands at 89. The changes in the number of vacant positions over the months are the result of both EE management decisions and the filling of open positions.

Of the 89 positions currently open in the EE Program/Headquarters, the Office of the Chief Human Capital Officer (HC) has 49 in either the announcement or the selection certificate stage, and 40 have been filled. Of the total number, 69 actions have been jointly worked between HC and the Golden Field Office, which has hiring authority for EE field positions.

EE has recently established additional new position needs based on the American Recovery and Reinvestment Act (Recovery Act). EE managers have established a need to fill 44 positions at Headquarters, and additional positions in the field. Currently, three of these jobs are in development with EE, 30 are in the vacancy announcement stage, and 11 have been filled.

HC has completed 40 hires for EE Headquarters thus far in FY09; recently filled 28 Presidential Management Fellow positions in EE; and is currently working with the White House Liaison to fill 9 political positions (selections will not be completed until the new EE Assistant Secretary is confirmed).

Table 1. Current Hiring Status for Office of Energy Efficiency and Renewable Energy (EE) at Headquarters

As of September 2009	Vacant Positions	With EE for Development	Classification Stage	Announcement/ Selection Certificate Stage	Jointly Worked by HC-32 and Golden or WH Liaison	Filled Positions
EE Headquarters	89			49	69	40
EE Presidential Management Fellows						28
EE Recovery Act	44	3		30		11
EE Political Positions	9				9	1

The Headquarters Human Resources Operations Division, under HC, provides HR services for Headquarters Program and Staff Offices. The organization has taken several steps to improve resource flexibility and hiring processes to ensure that the HR needs of all Program Offices are met. For example the agreement noted above, which shares servicing of EE vacancies with the EE Golden Field Office, has been in place for more than one year. Additionally, HQ HR Operations continually assesses workload requirements and makes resource adjustments to meet changing Program needs. For example, HC has increased the staff dedicated to servicing EE's HR needs at HQ from one to four FTEs.

In addition to monitoring workload and resource demands, HC also tracks the time required to fill vacant positions. The table below provides data reflecting time-to-hire in FY09. The recruitment process involves a number of phases and variables that can impact time-to-hire, which HC is working to better control. For example, HC is currently looking at ways to shorten the position classification and public notice vacancy preparation phases. Despite the process challenges, the HQ HR Operations Office met the Office of Personnel Management (OPM) 45-day hiring model in FY08 and has exceeded it so far in FY09. In fact, HC makes a job offer in an average of just 37 workdays versus the 45 day standard from job closing to job offer.

Table 2. DOE HQ HR and Overall DOE HR Hiring Averages

HC-32 Hiring Phase (Calendar days, unless otherwise noted)	DOE HQ HR Average	DOE HQ HR Staffing of EE Vacancies	Overall DOE HR Average	DOE Goal	Difference (HQ to Goal)
Classification	33	106	23	21	+12 Days
Public Notice (Announce to Certificate)	52	NA	53	35	+17 Days
Merit Promotion (Announce to Certificate)	37	65	41	35	+2 Days
Public Notice (Cert to Job Offer)	22	NA	37	22	0 Days
Merit Promotion (Cert to Job Offer)	34	28	33	22	+12 Days
45-Work Day Hiring Model (*OPM goal)	37	36	43	45*	-8 Days

As of November 2008, HC has begun implementing a Headquarters Improvement Plan to improve the efficiency of all Headquarters hiring. The plan expands the use of automation in the hiring process through the use of fax imaging, category ratings, standardized position descriptions, and a standing register for select positions. HC is enhancing the use and analysis of the OPM Management Satisfaction Survey as well. The plan requires more face-to-face meetings with customers to address staffing needs and assign priorities. Training sessions are being conducted for customer organizations so that the recruitment packages they submit require less rework and better reflect their staffing needs.

THIRD-PARTY FINANCING

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, third-party financing of new facilities is a method for the Department to avoid near-term large outlays associated with capital construction costs while gaining capabilities by leasing the facilities from third-parties. But the third party financer clearly expects to recoup its investment, and more, from the lease payments, or it wouldn't be providing the financing. What is your view of the risk involved in these third-party financed projects? Are these situations where the Department is paying less now, but might have to pay more overall in the outyears?

Secretary Chu: The use of third-party financing of new facilities is a method of facility acquisition used by the Federal Government within the rules set forth by the executive and legislative branches in connection with the Budget Enforcement Act of 1990 (BEA), as revised pursuant to the Balanced Budget Act of 1997. Within the executive branch, the rules are codified in Office of Management and Budget (OMB) Circular A-11, Preparation, Submission and Execution of the Budget, Part 8, Appendix B, Budgetary Treatment of Lease-Purchases and Leases of Capital Assets, and in Part 7, Planning, Budgeting, Acquisition and Management of Capital Assets, , OMB's Capital Planning Guide. The Capital Planning Guide prescribes a decision process for capital assets that includes initial market research to ensure that as many alternative solutions as possible, including third-party financing if applicable and available, are identified for consideration and requires submission of proposals to OMB during the conceptual, developmental stage. The process evaluates, among other things, risk, cost, value, and available budget. The alternative selected at the end of that process, whether third-party financing or direct appropriation, is the alternative with the most beneficial balance of all of the factors. The process also employs a rigorous cost comparison methodology; based on current time-value-of-money assumptions. If the actual factors differ from the assumptions, DOE may have to pay more or less overall in the outyears.

BASIC VERSUS APPLIED RESEARCH

Chairman Visclosky: The Department of Energy engages in both basic and applied research and development, targeting a spectrum of short-term and long-term public benefits. The Department faces a constant tension between these two ends of the spectrum, between realizing near-term benefits and planning for the future. Mr. Secretary, what is the Department's plan to strategically prioritize its portfolio of basic and applied energy research, and how is this strategy reflected in the 2010 budget request?

Secretary Chu: Supporting strong basic research programs and applied energy research programs, and ensuring that there is effective coordination between these programs, is a top priority of mine. And it is essential as the Department leads the Nation in developing fundamentally new solutions to the way we produce, distribute, and use energy.

The FY 2010 request reflects several priorities in the Department's portfolio. The request supports key investments in energy research for clean, renewable energy generation, such as solar, wind, and geothermal; energy efficiency and conservation in homes, transportation, and industry; grid modernization to improve reliability, efficiency, and security in electricity transmission and distribution; and other low emission energy technologies, such as nuclear energy, clean coal, new vehicle technologies including batteries, and new fuel blends.

The FY 2010 Office of Science budget request supports the President's commitment to double the funding for physical sciences over ten years. This investment is essential for fostering the transformational research and discoveries that will provide new knowledge and game-changing solutions, supporting the training of the next generation of science leaders in the U.S., and providing the tools and research capabilities that enable the U.S. to maintain its leadership in science and innovation. $100 million is included in the request to continue the support for the Energy Frontier Research Centers that are initiated in FY 2009. These centers have enlisted the talents and skills of the best scientists and engineers in the U.S to address current scientific challenges to clean energy and energy security.

I strongly believe that if we are going to make a significant leap forward in overcoming barriers to transformational energy technologies and systems and making them deployable, then the Department needs to provide the opportunities for the experts to self-assemble in cross-disciplinary teams to lead those efforts. In FY 2010, the Department proposes to fund eight multi-disciplinary Energy Innovation Hubs. These hubs, modeled in part after the DOE Bioenergy Research Centers, would bring experts from multiple disciplines together at a central location to advance highly promising areas of energy science and technology from early stages of research to the point that the risk level will be low enough for industry to deploy into the market place. Hubs would be funded at approximately $25 million per year for 5 years, with an option to renew for another 5 years pending successful progress and external review. Up to an additional $10 million

per hub would be available for start-up funds in the first year; however construction of new buildings would not be part of the award.

As the Department's new senior leadership comes on board we will be working together to review programs' current portfolios, identify scientific and technical opportunities where strategic investments could make significant impacts, and develop a framework to bring the program experts together to collaborate across the basic and applied programs in new areas and build on existing successful collaborations.

Chairman Visclosky: Is the Department emphasizing technologies with near-term impact or long-term promise in its budget request?

Secretary Chu: The Department is emphasizing both. The FY 2010 request supports the development and deployment of energy technologies that can make a difference now, as well as investing in the basic and applied research that will result in improved and fundamentally new technologies.

Chairman Visclosky: What role does Science play in meeting the Department's long-term and mid-term energy goals?

Secretary Chu: Significant improvements in existing energy technologies are necessary. But, more importantly, developments of new energy technologies are essential. During the 20th century, we witnessed revolutionary advances, bringing us remarkable discoveries such as high temperature superconductors, which transmit electricity without resistance, and carbon nanotubes, which combine the strength of steel with the mass of a feather. Both discoveries, though, were partly serendipitous. In the 21st century, we must take charge of the complexity of materials—both biological and inorganic—and replace serendipity with intention. To accomplish this will require sustained investments in exploratory and high-risk research in traditional and emerging disciplines, including the development of new tools and facilities; focused investments in high-priority research areas; and investments that train new generations of scientists and engineers to be leaders in the 21st century. The FY 2010 Science budget request supports all three of these investment strategies, which will advance the Department's long-term and mid-term energy goals.

STRATEGY

Chairman Visclosky and Ranking Member Frelinghuysen: Dr. Chu, many Americans look to their government to provide leadership on the key issues of the day...health care, national defense, constitutional rights, and, of course, energy. As the head of the Department of Energy, you're in a position not only provide leadership on energy issues, but to decide how the government will lead. For instance, government incentives, or disincentives, can largely determine where and what kind of energy sources the American public will rely upon in the future. In your view, what is the proper role of the government in shaping the energy sector of the United States? Should the government play a strong hand in determining what kinds of energy sources will provide our power in the future, or let the market determine that? Thank you. What criteria should the government use in determining the types of energy sources that should be supported through government policy? Would you explain specifically how the budget under consideration today reflects the criteria that you've just explained? (For instance, given the climate change benefits of nuclear power, why does this budget request cut support for this energy source?)

Secretary Chu: The government's role should be to perform and promote the best science and engineering available to help solve our energy challenges. The challenges we face, reducing greenhouse gases, energy independence and creating jobs, should drive the solutions. In order to achieve these goals, DOE needs to take a cross disciplinary approach that brings various stakeholders together with the singular focus of addressing these problems. DOE is uniquely positioned to help bring together these stakeholders, including, industry, universities, and national laboratories to help solve our energy challenges. In so doing, DOE's role is to provide the expertise and resources to perform critical research and development that industry will not pursue alone. With these three challenges in mind, the best and most practical research, science and engineering should determine what energy sources power our future.

The budget under consideration reflects this criteria by investing in the type of science and engineering that will best achieve these goals, such as clean coal and renewable power through solar, wind, hydropower and geothermal. Nuclear power is and must be a part of the solution. Toward that end, the budget also provides for significant nuclear R&D into recycling of spent fuel and advanced modeling and simulation. These initiatives would be carried out via two proposed Energy Hubs.

YUCCA MOUNTAIN

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, what specifically will be gained by continuing the licensing process after announcing the termination of Yucca as the national repository? By all accounts, this request is far short of what is needed for a genuine licensing effort. 300 contentions have already been submitted to the NRC, and 500-600 more inquires are expected. The scientific, geologic, and other technical expertise rests with the Contractor, who, with this request, will be forced to downsize to 90 personnel from a peak of 1,350 in FY07, nearly a 94 percent reduction. Why not fully fund the licensing process, retain the expertise for a sound scientific evaluation, and really understand why Yucca Mountain failed? Is the Administration, as one report indicated, afraid of what the science might tell them?

Secretary Chu: The Administration does not view Yucca Mountain as a workable option. To that end, 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. This panel will provide the opportunity for a meaningful dialogue on how best to address this challenging issue and 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. The budget request is sufficient to support the work of this panel, as well as continued participation in the current licensing proceeding, including responding to any questions from Nuclear Regulatory Commission. The experience gained in the current licensing proceeding can inform the subsequent licensing of any future waste disposal alternative.

YUCCA MOUNTAIN

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, what specifically will be gained by continuing the licensing process after announcing the termination of Yucca as the national repository? Does the Administration anticipate the need for statutory relief from the 4-year license review period?

Secretary Chu: The experience gained in the current licensing proceeding can inform the subsequent licensing of any future waste disposal alternative. Thus far the licensing proceeding has moved forward in accordance with the schedule established by the Nuclear Regulatory Commission for making a decision within three years.

YUCCA MOUNTAIN

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, what specifically will be gained by continuing the licensing process after announcing the termination of Yucca as the national repository? Could you provide us any details on the Commission, such as when it will convene and where you are in terms of selecting officials? Can you explain why Yucca Mountain will not be included under their charter?

Secretary Chu: The experience gained in the current licensing proceeding can inform the subsequent licensing of any future waste disposal alternative. 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. No final decisions have yet been made as to the charter or the makeup of the panel. As we go forward with convening the panel, I will keep Congress informed of our progress.

YUCCA MOUNTAIN

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, what specifically will be gained by continuing the licensing process after announcing the termination of Yucca as the national repository? Yucca Mountain is the most studied terrain on earth with more than 3.5 million documents submitted to support NRC licensing and $10 billion taxpayer dollars have been spent. If a review based on science will decide the path forward on the geological repository how can we omit Yucca Mountain from consideration?

Secretary Chu: The experience gained in the current licensing proceeding can inform the subsequent licensing of any future waste disposal alternative. While the Administration does not view Yucca Mountain as a workable option, we recognize the Federal responsibility 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.

YUCCA MOUNTAIN

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, what specifically will be gained by continuing the licensing process after announcing the termination of Yucca as the national repository? What is your latest estimate of the total liabilities the Department could face with termination, including the return of funds to the States and potential lawsuits?

Secretary Chu: The experience gained in the current licensing proceeding can inform the subsequent licensing of any future waste disposal alternative.

The Department has estimated the liability resulting from the delay in beginning waste acceptance in 1998 could be $12.3 billion, assuming performance beginning in 2020. The amount of Government liability that might result from a termination of the proposed Yucca Mountain repository would be based on a number of variables that are not quantifiable at this time.

UED&D FUND

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, your budget request includes a proposal to collect additional resources from the utilities into the UED&D Fund, starting with $200 million in fiscal year 2010. As you know, for 15 years, until fiscal year 2007, this Fund collected contributions from the utilities and from federal appropriations. As I understand it, the utilities have paid their contributions, as required by law. Has the federal government? If not, how much more do we have to pay?

Secretary Chu: The utilities fulfilled their full legal monetary contributions (as required by the Energy Policy Act of 1992) to the UED&D fund in fiscal year (FY) 2007. The Federal Government monetary contributions were expected to be complete in FY 2011. However, with $390 million appropriated from the General Fund to pay for the UED&D Fund liabilities under the American Recovery and Reinvestment Act of 2009, all Federal Government contributions will be current, assuming appropriations to the UED&D Fund are provided as requested in the President's FY 2010 budget.

UED&D FUND

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, your budget request includes a proposal to collect additional resources from the utilities into the UED&D Fund, starting with $200 million in fiscal year 2010. As you know, for 15 years, until fiscal year 2007, this Fund collected contributions from the utilities and from federal appropriations. The Department is seen as an unreliable partner by many within the private sector. Your decision to terminate Yucca Mountain because of political pressure and without any scientific basis adds to this perception. If this proposal to require the utilities to pay once more into the UED&D Fund, after they have completely fulfilled their legal requirements, is adopted, do you worry that your relationship with the private sector may get even worse?

Secretary Chu: The Fifth Triennial Report to Congress indicated that the Fund will experience an estimated $11.9 billion shortfall. If the Federal Government were to pay for this liability without contributions from the utilities, the resulting balance of payments would be inherently unfair to the American taxpayers. I am certain that once all parties understand the costs and collections, the utilities will again be willing to bear their share of this cleanup liability.

NUCLEAR ENERGY RESEARCH AND DEVELOPMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the FY 2010 request did not provide a lot of detail regarding the overall direction of the Administration's nuclear energy policy. Is there a shift away from near-term deployment to longer-term research in advanced reactors and fuel cycle R&D? In light of this perceived shift, the question needs to be asked: What is your opinion on the future of nuclear power in this country?

Secretary Chu: Nuclear power currently supplies nearly 20 percent of the Nation's electricity and approximately 70 percent of its greenhouse gas-free electricity. Nuclear power will continue to be an important and necessary part of our energy mix and the Department is committed to supporting its use in a safe and secure manner that minimizes proliferation concerns.

Regarding near-term deployment, the Nuclear Power 2010 program has helped industry overcome regulatory uncertainties by demonstrating the Nuclear Regulatory Commission's (NRC's) new approach to commercial nuclear reactor licensing, including the new combined construction and operating license (COL) process.. The reactor vendors are well positioned to complete their activities as a fully private venture. DOE is confident that the program's goal of helping enable an industry decision to build will be achieved in 2010.

In light of this progress within the Nuclear Power 2010 program, the Department is shifting toward longer-term research on advanced reactors and fuel cycle research and development. The FY 2010 request supports innovative applications of nuclear technology to develop new nuclear generation technologies and advanced energy products, develop advanced proliferation-resistant nuclear fuel and waste management technologies and maintain and enhance national nuclear capabilities to meet future challenges. The multi-disciplinary Energy Innovation Hubs (Hubs) will accelerate innovation by providing an opportunity for additional focus on modeling and simulation and extreme materials R&D.

NUCLEAR ENERGY RESEARCH AND DEVELOPMENT

Mr. Secretary, the FY 2010 request did not provide a lot of detail regarding the overall direction of the Administration's nuclear energy policy. Is there a shift away from near-term deployment to longer-term research in advanced reactors and fuel cycle R&D? The Department forged a committed to industry, as well as its international partners through the Gen IV International Forum, for its part in the development of the Next Generation Nuclear Power plant (NGNP). Yet, this budget makes absolutely no reference to NGNP. Does the Department still envision the deployment of a pilot plant by 2021, as prescribed by EPACT? Given its technical advancements, what would be gained by delaying construction of next generation technologies in favor of longer-term research? If this shift has taken place, there is a risk that the taxpayer investment into nearer-term deployment, like with NGNP, will be lost if we do not proceed. Does this concern you?

Secretary Chu: As we indicated in the FY 2010 budget request, the Department is shifting toward longer-term research in advanced reactors and fuel cycle research and development. The FY 2010 budget request of $191 million for the Gen IV program represents a significant commitment to move forward with 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 Department is currently evaluating its plans for the NGNP project, which would rely on the private sector entering into a cost-sharing partnership with the Department.

EXPEDITING THE LOAN GUARANTEE PROCESS

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, on February 19th, you issued a press release announcing a series of measures to expedite issuing loan guarantees. You have said this is one of your highest priorities. Yet, we still haven't made any significant progress in getting loans out the door. What is the status of the program?

Secretary Chu: The Department of Energy's Credit Programs continue to be one of my highest priorities. I am personally reviewing the programs, and have committed to giving the programs the attention, departmental resources and oversight they need to succeed while ensuring that taxpayer interests are protected. Delivering on this opportunity to help drive economic recovery and make a down payment on the Nation's energy and environmental future represents an essential leadership role for the Department. The Loan Guarantee Program is moving forward aggressively to make loans to companies that have applied for credit assistance for a variety of innovative technologies. Our plan is to deliver loan guarantees by the end of this year. As required by the 2009 Omnibus Appropriations Act we have sent an implementation plan to the Appropriations Committees in anticipation of issuance of new solicitations.

EXPEDITING THE LOAN GUARANTEE PROCESS

Chairman Visclosky and Ranking Member Frelinghuysen: Please describe DOE's actions or plans for streamlining the loan guarantee process to increase the rate at which applications are reviewed and loan guarantees are issued. What monitoring and oversight processes will DOE use to mitigate risk and ensure accountability under a streamlined loan guarantee process?

Secretary Chu: The Department has accelerated the loan guarantee process significantly while maintaining appropriate evaluation and due diligence to protect taxpayer interests. We are shortening the cycle time from application to loan guarantee to ensure good projects get funded quickly. The changes include shorter review periods for applications, streamlining paperwork requirements and providing additional resources to process applications and working with industry to attract good projects while helping them navigate the process. Mitigating financial risk to taxpayers remains of utmost importance to the Department of Energy A number of measures are being taken to ensure risks are properly mitigated for each project prior to approval for closing of a loan guarantee, including using a sophisticated financial model for calculating project risk that is based on well-tested financial principles and utilizes input from independent sources, such as credit rating agencies, to test and validate the assumptions input to the model. In addition, experienced Loan Guarantee Program Office staff will perform rigorous due diligence and underwriting of loan guarantee applications to ascertain key risks, develop appropriate mitigants, and ensure that those risk factors that cannot be fully mitigated are incorporated as factors utilized in the credit subsidy model.

EXPEDITING THE LOAN GUARANTEE PROCESS

Chairman Visclosky and Ranking Member Frelinghuysen: We understand that DOE may consider offering loan guarantees for pre-construction activities at nuclear power facilities. What decisions has DOE made on this subject? What, if any, additional financial risks would be posed by this step and what revisions to the loan guarantee process would be required?

Secretary Chu: The Department is currently reviewing the needs for pre-COL financing of the parties sponsoring the 4 nuclear power projects selected for further due diligence and negotiation leading to a term sheet. The DOE recognizes the significant level of capital expenditures required for these plants even before the Construction and Operating License is issued and the financial strain this places on even the most credit worthy sponsors. Based on the needs assessment, the type of expenditures for which the projects are seeking some financing support, the compliance of these expenditures with NEPA and EPAct considerations and similar factors, as well as the ability to maintain acceptable credit standards and comply with Title XVII statutory requirements, the LGPO will determine whether pre-COL financing is desirable, necessary and achievable within the constraints of the program.

EXPEDITING THE LOAN GUARANTEE PROCESS

Chairman Visclosky and Ranking Member Frelinghuysen: What performance metrics or other measures has DOE developed to gauge the success of the loan guarantee program, particularly in the areas of (1) avoiding, reducing, or sequestering air pollutants or anthropogenic greenhouse gas emissions; (2) employing new or significantly improved technologies as compared to commercial technologies currently in place in the United States; and (3) preserving or creating jobs, and promoting economic recovery?

Secretary Chu: The DOE has developed the following performance measures, which were included in the FY 2010 Congressional Budget Request, to gauge the success of the loan guarantee program:

- Percentage of projects receiving DOE loan guarantees that have achieved and maintained commercial operations.
- Contain the loss rate of guaranteed loans to less than 4%.
- Newly installed generation capacity from power generation projects receiving DOE loan guarantees.
- Average cost per MWh for projects receiving DOE loan guarantees.
- Forecasted greenhouse gas emissions reductions from projects receiving loan guarantees compared to 'business as usual' energy generation.
- Forecasted air pollutant emissions (NOx, SOx, and particulates) reductions from projects receiving loan guarantees compared to 'business as usual' energy generation.

In addition to the performance measures above, the DOE will require that project sponsors report the number of jobs created or retained from projects receiving DOE loan guarantees from the Section 1705 Temporary Loan Guarantee Program under the American Recovery and Reinvestment Act of 2009.

EXPEDITING THE LOAN GUARANTEE PROCESS

Chairman Visclosky and Ranking Member Frelinghuysen: How many dollars in loan guarantees does the Department expect to be able to provide using the $6 billion appropriated for the program under the American Recovery and Reinvestment Act of 2009? The volume of loans guaranteed will be contingent upon the estimated subsidy costs. Has DOE established a process to estimate the subsidy costs, and what procedures will be performed to ensure that those estimates are reliable and reasonable? Does DOE expect the loans to be disbursed through third-party lenders or the Federal Financing Bank?

Secretary Chu: The $6 billion appropriated for Section 1705 subsidy costs is currently estimated to support $48.6 billion in eligible projects under Section 1705 of the Recovery Act. Subsidy cost is determined using a sophisticated financial model for calculating project risk that is based on well-tested financial principles and utilizes input from independent sources, such as credit rating agencies, to test and validate the assumptions input to the model. In addition, experienced Loan Guarantee Program Office staff will perform rigorous due diligence and underwriting of loan guarantee applications to ascertain key risks, develop appropriate mitigants, and ensure that those risk factors that cannot be fully mitigated are incorporated as factors utilized in the credit subsidy model. When DOE guarantees 100 percent of the Guaranteed Obligation, the loan will be funded by the Federal Finance Bank; guarantees provided for less than 100 percent will be provided by an eligible lender other than the Federal Finance Bank.

FUEL CELLS TECHNOLOGY PROGRAM

Chairman Visclosky and Ranking Member Frelinghuysen: The budget request proposes to eliminate funding for the hydrogen transportation activities within the office of Energy Efficiency and Renewable Energy. Mr. Secretary, does the budget request's elimination of hydrogen fuel transportation research and development in the Office of Energy Efficiency and Renewable Energy signal a shift away from high-risk research and development?

Secretary Chu: The Department is balancing near-term early market alternative energy applications while continuing to fund high-risk research and development projects with longer-term potential for reducing our Nation's dependence on foreign oil. In the area of fuel cells and their fuels, the Department plans to spend up to approximately $50 million in FY 2010 through the Office of Science for relevant cross-cutting basic research such as catalysis, membranes and biological / photoelectrochemical hydrogen production approaches to enable the success of hydrogen technologies. The Office of Fossil Energy requested $16.4 million to continue work on hydrogen production from coal, with carbon sequestration, due to the importance of zero carbon approaches. The Office of Energy Efficiency and Renewable Energy proposed a new applied research and development key activity, Fuel Cell Systems R&D that will be technology neutral for multiple applications and will include over $68 million for research projects addressing issues such as catalyst cost reduction and durability improvements that are relevant to both near-term and long-term applications.

FUEL CELLS TECHNOLOGY PROGRAM

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, even if significant technological or infrastructure barriers exist to hydrogen fueled vehicles, doesn't the potential long-term promise for reducing our nation's dependence on foreign oil warrant some level of public funding and a signal of support by the Department of Energy? Doesn't some level of investment ring consistent with the Department's policy of investment in a portfolio of investments in technologies with a broad range of risk profiles and payback periods?

Secretary Chu: The Department is continuing to invest in a portfolio of advanced energy technologies, including hydrogen and fuel cells, over a range of risk and payback timeframes through various offices and program areas. The Office of Science is planning to spend approximately $50 million in FY 2010 for relevant cross-cutting basic research such as catalysis, membranes and biological / photoelectrochemical hydrogen production approaches to enable the success of hydrogen technologies. The Office of Fossil Energy requested $16.4 million to continue work on hydrogen production from coal, with carbon sequestration, due to the importance of zero carbon approaches. The Office of Energy Efficiency and Renewable Energy proposed a new applied research and development key activity, Fuel Cell Systems R&D that will be technology neutral for multiple applications and will include over $68 million for research projects addressing issues such as catalyst cost reduction and durability improvements that are relevant to both automotive and nearer term applications.

In addition, the Recovery Act provides approximately $41.9 million for projects producing near-term benefits such as commercialization and deployment of fuel cells and job creation in fuel cell manufacturing, installation, maintenance, and support services, and will help develop a supply base that could eventually support automotive applications.

FUEL CELLS TECHNOLOGY PROGRAM

Chairman Visclosky and Ranking Member Frelinghuysen: Germany, the EU at large, and several other nations have committed funding and governmental support for hydrogen transportation. Do we risk losing our nation's competitive advantage by terminating public support for hydrogen transportation?

Secretary Chu: The U.S. government investment of approximately $1.5 billion for hydrogen and fuel cell technology research, development and demonstration activities over six years during Fiscal Years 2004 to 2009 compares to the investment for similar activities by Japan, the European Commission, and Germany of approximately $370 million in 2009, $625 million over the next five years, and $744 million over the next eight years, respectively.

Given the Nation's economic climate, and the urgency in addressing climate change and petroleum reduction, the Department is re-focusing the advanced transportation technology portfolio toward near-term energy technologies to bring consumers advanced transportation choices and to maintain the U.S. competitive advantage in alternative transportation technologies. The Recovery Act provides approximately $41.9 million for projects producing near-term benefits such as commercialization and deployment of fuel cells and job creation in fuel cell manufacturing, installation, maintenance, and support services. Other benefits include development of a supply base necessary for near-term commercialization and that will support automotive applications in the longer-term.

SOLAR ENERGY RESEARCH AND DEVELOPMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Solar energy sees the largest funding increase of any program within the Department's energy efficiency and renewable energy portfolio. How do you justify such a large increase of investment in solar energy technologies over other technologies?

Secretary Chu: The large proposed increase in investment in solar energy technologies is justified because of the huge potential of solar energy to reduce carbon emissions in the power sector and to create large numbers of green jobs. The Department proposes increased funding for two promising solar technologies: photovoltaics (PV), which convert the sun's energy directly into electricity, and concentrating solar power (CSP) technologies, which concentrate the sun's rays and produce electricity from the resulting thermal energy. PV technologies provide power for both residential and commercial applications, while CSP technologies with thermal storage enables utility-scale systems providing grid stability and power when it is most needed. Research and development activities will focus on the cost reductions necessary to make solar energy cost-competitive with conventional sources of electricity. Increased investment is needed to enable the Department to achieve its goal of grid parity for solar electricity by 2015. Analysis suggests that by 2030, the efforts of the EERE Solar Program can lead to more than 70 GW of electric power to the grid, reducing carbon emissions by roughly 500 million metric tons.

SOLAR ENERGY RESEARCH AND DEVELOPMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Solar energy sees the largest funding increase of any program within the Department's energy efficiency and renewable energy portfolio. What's the proposed balance between concentrating solar power and photovoltaics? Why?

Secretary Chu: The proposed funding in Fiscal Year 2010 is $150 million for photovoltaics (PV) and $78 million for concentrating solar power (CSP). This proposed balance reflects the potential of each technology to provide solar power within the United States. Photovoltaic systems can operate throughout the country, and are therefore capable of generating a larger portion of the Nation's electricity, whereas CSP systems are geographically constrained to the Southwestern area of the country where the sun is most intense. In addition, there is a large diversity of promising PV technologies, justifying a significant investment in PV research and development.

SOLAR ENERGY RESEARCH AND DEVELOPMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Solar energy sees the largest funding increase of any program within the Department's energy efficiency and renewable energy portfolio. Do you believe the Department's stated goal of "making electricity generated from solar competitive with conventional grid electricity by 2015" is realistic?

Secretary Chu: Yes. The Department's stated goal is aggressive, but realistic. The cost of solar electricity has decreased dramatically over the past 20 years, due in part to the Department's research and development efforts. However, it is important to understand that the Department does not expect solar to be competitive with conventional grid electricity everywhere in the U.S. by 2015. In particular, CSP technology will initially become competitive with new peaking gas generation in the Southwestern U.S., and PV will initially become competitive with retail residential and commercial electricity prices in locations with good sun and relatively high electricity prices. Beyond 2015, the Department expects investments in solar technology development to enable CSP technology to become competitive in intermediate- and eventually base-load generation (with increased levels of low-cost thermal storage). DOE expects PV to become competitive in a wider range of locations (with lower solar insolation or lower electricity prices) throughout the U.S.

SOLAR ENERGY RESEARCH AND DEVELOPMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Solar energy sees the largest funding increase of any program within the Department's energy efficiency and renewable energy portfolio. What are the primary barriers to scaling solar power in the United States? Is the technology still too costly, or are other non-economic factors critical?

Secretary Chu: The primary barrier to scaling solar power in the U.S. is cost. Solar electricity from utility-scale installations is roughly 2 to 4 times as costly today as conventional wholesale electricity on a nationwide basis. Solar electricity from distributed installations is currently competitive in locations with good solar resources and high retail electricity rates; however, to be widely competitive across the U.S. the cost of distributed solar also needs to decline considerably (50-70 percent from current prices). Other key barriers that restrict the scaling of solar power in the U.S. include a lack of understanding of solar technology characteristics among consumers and key stakeholders; a shortage of trained installers and technicians; zoning, permitting and other regulatory barriers; ineffective interconnection and net metering provisions; and a lack of mature financing and insurance instruments. DOE's Solar Energy Technologies Program is taking action to help address each of these barriers.

For utility-scale solar, there are added barriers of environmental concerns and lack of appropriate transmission capacity. DOE is working with BLM to analyze and mitigate environmental impacts of large scale solar and supporting the Western Governors' Association to better understand transmission issues and constraints.

BIOMASS AND BIOFUELS REFINERY FOCUS

Chairman Visclosky and Ranking Member Frelinghuysen: The budget request focuses on demonstration projects for cellulosic biofuels, but does not include research, development, and demonstration of other advanced biofuels sources such as algae. While cellulosic biofuels have the potential to produce domestic, cost-effective, sustainable, transportation fuel supplies, sources such as algae may have substantial benefits, including opening marginal land to biofuels production. Why has the Department chosen to omit advanced biofuels sources such as algae research from its fiscal year 2010 request? Does the Department's request signal a deliberate focus on activities with near-term benefits in lieu of investment in higher-risk technologies such as biofuels from algae? Do you expect to ramp up algae-derived biofuels research activities in future budget requests?

Secretary Chu: The FY 2010 budget request focuses on the near term goal of making cellulosic ethanol cost competitive while expanding activities for the development of advanced biofuels, specifically from thermochemical conversion processes. Additionally, the FY 2010 budget request includes funding to conduct life cycle assessments of algal biofuels technologies. DOE views algae as a potential biofuel feedstock and it is increasingly an important part of the Biomass Program's R&D efforts.

In May 2009, DOE announced a Notice of Intent to use up to $50 million of Recovery Act funding to create an Algal Biofuels Consortium. The consortium will consist of a multidisciplinary team selected via a competitive peer-reviewed solicitation process. The consortium is part of a larger DOE effort to accelerate the development of advanced infrastructure-compatible (non-ethanol) biofuels. Algae companies are welcome to compete in the DOE solicitations for pilot and demonstration-scale integrated biorefineries.

As part of its overall biomass R&D portfolio, the Department includes all feedstocks, including algae. The Department recently held the National Algal Biofuels Technology Roadmap Workshop to solicit input from leading experts. It is the intent of the Biomass Program to use the Roadmap to identify priority areas for the Algal Biofuels Consortium and inform future R&D efforts on algal biofuels. A draft version of the National Algal Biofuels Technology Roadmap is currently available through a request for information (RFI) listing on www.grants.gov, under the funding number DE-PS36-09GO39010-RFI. DOE is accepting comments and feedback on this draft of the Roadmap.

STOVEPIPED PROGRAMS AND CENTRALIZED ANALYSIS AT DOE

Chairman Visclosky and Ranking Member Frelinghuysen: Programs within the Office of Energy Efficiency and Renewable Energy are often referred to as "stovepipes" which communicate poorly and vie for funding. Critics further point to analysis and reports within individual programs that produce optimistic analyses that support their own programs. What are you doing to ensure that the programs perform in the service of the nation and less like advocacy groups representing their particular technologies?

Secretary Chu: The Office of Energy Efficiency and Renewable Energy (EERE) will avoid stovepiping through continued centralized analysis. EERE views the path to national goals as reachable through a roadmap of articulated objectives and an action plan outlining how to achieve them through EERE's portfolio of technologies. Strong analysis at several levels ensures that potentially competing technologies within the office are weighed and presented in an unbiased fashion. Two subprograms within EERE directly address these questions at the Assistant Secretary level with a global perspective for collaboration and cross-disciplinary efforts: Planning Analysis, and Evaluation; and Strategic Priorities and Impact Analysis.

The Planning, Analysis, and Evaluation subprogram (PAE) supports science and discovery by providing credible, reliable and independent insight and feedback necessary to develop, direct, defend, and manage EERE's budget portfolio at all decision making levels. The PAE subprogram provides direct expertise and management, and funds activities that provide technical, economic, and policy analyses and support for strategic and multi-year planning, performance and budget integration, benefit estimation, and scenario analysis for all Energy Efficiency and Renewable Energy programs. These efforts provide the means for selecting the most cost-effective technology portfolio and policy options both domestically and globally, and allow all programs to be evaluated on common ground.

The efforts of PAE will be complemented by the proposed Strategic Priorities and Impact Analysis (SPIA) subprogram. The establishment of SPIA will formalize and continue the development and review of strategy and analysis across programs without a direct view to budgetary implications. Its analysis activities will continue to provide senior EERE management with credible, reliable, and independent results that are essential for making short- and long-term decisions affecting the broad set of technology programs. Activities focus on climate change mitigation, market, policy, and energy-systems. These questions cut across technology stovepipes in that they necessitate solutions from many sources. SPIA seeks out the best science and analysis to allow EERE to develop, refine, and implement a technology roadmap with on-ramps, off-ramps, targets, and milestones.

The analysis of these subprograms coupled together through close collaboration allows EERE to work in an integrative manner between the programs, developing optimal whole-portfolio solutions to national challenges within the mission of DOE. Each activity also informs decisions on the optimal allocation of resources among EERE programs and

provides key information that enables senior management and the technology programs to select portfolios and pathways that will most effectively and productively advance DOE's economic, environmental, energy security, and management excellence goals.

STOVEPIPED PROGRAMS AND CENTRALIZED ANALYSIS AT DOE

Chairman Visclosky and Ranking Member Frelinghuysen: Programs within the Office of Energy Efficiency and Renewable Energy are often referred to as "stovepipes" which communicate poorly and vie for funding. Critics further point to analysis and reports within individual programs that produce optimistic analyses that support their own programs. The Department requests $43 million for a corporate-level Strategic Priorities and Impact Analysis subprogram. How would the requested funding address "stovepiping" and lead to program and funding prioritizations that serves the American people rather than individual programs? How would this analysis subprogram complement, rather than duplicate, other Department-wide and subprogram analysis groups?

Secretary Chu: Establishment of the Strategic Priorities and Impact Analysis (SPIA) subprogram will formalize and continue the development and review of strategy and analysis across programs and addresses exactly the sort of issues raised by the question. These analyses had previously been funded through the technology subprograms as appropriate, but are being requested separately in order to improve transparency. SPIA will continue to provide senior EERE management with credible, reliable, and independent analysis that is essential for making decisions across the broad set of technology programs. Activities focus on climate change mitigation, market, policy, and energy-systems whose impacts depend upon successful EERE clean energy technologies. These questions cut across technology stovepipes in that they necessitate solutions from many sources. This also ensures that work will be non-duplicative since all activities relate to multiple technologies.

Example activities of SPIA that mitigate stovepiping within EERE:

- Assess the challenges and opportunities associated with achieving a low carbon, carbon free, or carbon neutral energy system, including analysis of the potential carbon supply curve for a suite of energy technologies;
- Determine which efficiency and renewable technologies will face supply chain and lifecycle issues, estimate the magnitude and key steps associated with those issues, and aggressively pursue proactive solutions to avoid or minimize those bottlenecks;
- Understand and assess integrated options for the transformation of energy consumption in the transportation sector from liquid biofuels and efficient light duty vehicles to greatly increased system energy efficiency, electrification, and additional renewable fuels;
- Investigate how to best integrate renewable technologies with a stronger and smarter electric grid by connecting generation resources to distant loads, actively managing the use of energy through demand response and efficiency, and integrating new electric transportation technologies into the operation of the electric power system; and

- Develop analysis that informs the strategic vision of EERE and the broad methods by which the programs and crosscutting efforts can guide their efforts to meet national goals.

The crosscutting nature of the energy challenges facing the U.S. requires that SPIA activities include collaborative efforts with programs across the Federal Government. This effort includes successful integration of EERE work with other elements of DOE, other agencies, state and local governments, and partner countries. The same foundation of unbiased, quality information created and used by EERE to make decisions is also made available to external stakeholders to inform policy decisions at all levels of government and private investment. Communication and coordination through these partnerships prevents stovepiping and ensures that EERE analysis is credible, useful and deeply grounded.

WEATHERIZATION PROGRAM

Chairman Visclosky and Ranking Member Frelinghuysen: The Department's Weatherization program creates local jobs while saving energy and money for low-income families. As the President sets weatherization targets, there are concerns that the Department and the local entities receiving the grants are struggling to keep pace. The Department of Energy recently signed a Memorandum of Understanding with the Department of Housing and Urban Development to streamline the process for residents in HUD-supported buildings. Does the budget request contain any funding required to implement this partnership? What other steps are included in the budget request to increase the program's effectiveness and efficiency?

Secretary Chu: The FY 2010 Budget Request for the Weatherization Assistance Program does not identify specific funding for joint Department of Energy (DOE) and Department of Housing and Urban Development (HUD) public housing efforts. All DOE technical commitments for the Memorandum of Understanding will be funded from the Training and Technical Assistance budget of the Weatherization Assistance Program.

DOE is in the process of issuing a final rule intended to simplify the low-income client eligibility determination for residents in HUD subsidized housing. This rule, if made final, would use HUD data to reduce the review and eligibility verification burden under the Weatherization Assistance Program.

WEATHERIZATION PROGRAM

Chairman Visclosky and Ranking Member Frelinghuysen: Dr. Chu, your budget request includes $200 million for Weatherization Activities. We just appropriated $5 billion for this account, which must be spent before the end of fiscal year 2011. How much of that $5 billion has been spent out by the states? How long will it take to be fully spent? Is it likely that you'll be able to spend the $200 million you're asking for in this budget before the end of fiscal year 2010?

Secretary Chu: The $5 billion for the Weatherization Assistance Program included in the Recovery Act is being disbursed in stages as milestones are met. On March 12, funding allocations by State were announced and the initial 10 percent of total funding was available to support planning and ramp-up activities.

As of July 28, 2009: 44 States had received the 40 percent allocation that followed the approval of their comprehensive State plans and total weatherization obligations exceeded $2.1 billion. States have expended over $77 million through June 30, 2009.

Using Recovery Act funds, the Department expects to weatherize over 525,000 homes. To achieve this increase, State and local agencies are in the process of hiring and training thousands of workers. The increase in the number of homes weatherized per month will not be fully realized until the hiring and training process is completed. By the end of 2009, it is expected that the weatherization network will be close to or at full production capacity to achieve the target for number of homes weatherized. Funds are expected to be spent over a three year period. 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. The FY 2010 budget request for Weatherization will allow States to weatherize additional homes and also demonstrate DOE's continuing commitment to expanding the program.

NEW FEDERAL EMPLOYEES IN EERE

Chairman Visclosky and Ranking Member Frelinghuysen: Funding levels for Energy Efficiency and Renewable Energy have increased substantially in the past several years, and the Department's 2010 request further increases the budget by $390 million to 2.3 billion dollars. The resulting increase in programs, contracts, grants, and other activities presents a significant implementation and oversight challenge for the Department. Your request provides an additional $110 million to hire and support 253 new Federal employees in the Office of Energy Efficiency, above the 431 current employees and approximately 140 vacancies currently being filled.

Mr. Secretary, does the new staffing level in the request provide sufficient Federal employees to execute the offices programs at the requested funding levels? What criteria did the Department use to arrive at its 2010 request for an additional 253 Federal Employees in this office? What is the Department doing to actively manage such a rapid proposed scaling of Federal personnel in the Office of Energy Efficiency and Renewable Energy?

Secretary Chu: The staffing level in the request would provide the sufficient number of Federal employees to execute the programs at the level funding in the FY 2010 request. EERE recognizes the need to significantly ramp up human capital resources and support services to effectively administer its expanded programs, accelerate the pace at which activities are implemented, and respond to demands for technical assistance, oversight, transparency, and accountability.

From FY 2001 to FY 2006, EERE Appropriations averaged $1.2 billion with a workforce of 526 full-time equivalents (FTEs) per year. From FY 2007 to FY 2009, Congress nearly doubled its appropriation for EERE, thereby also substantially increasing the workload requirements. EERE's FY 2009 Omnibus Appropriation is approximately $2.2 billion, with a projected workforce of 489 FTEs, a size inadequate to provide proper management and oversight of the expanded portfolio of contracts, grants, and agreements enabled by the increase in funding.

Fiscal Year	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
EERE Budget	1,205,500	1,279,153	1,201,941	1,220,262	1,234,313	1,162,747	1,474,285	1,704,112	2,178,540	2,318,602
Program Direction	92,642	100,115	82,556	93,979	98,215	101,868	99,264	104,057	127,620	238,117
Staffing (FTE)	553	547	537	509	498	514	468	478	489	840

The EERE FY 2010 request for an additional 253 Federal employees is based on a workload assessment. EERE currently manages over 2,800 active contracts, grants, and agreements. In FY 2010, this number is expected to increase to over 4,900, and EERE could have more than 600 Congressionally Directed Projects in various stages of the procurement process. In addition, staffing and support levels in recent years have not kept pace with the increased program requirements, funding growth, and greater complexity of EERE's rapidly evolving efficiency and renewable energy portfolio.

EERE has over 880 approved positions in various stages of the hiring process. This number exceeds the FY 2010 Budget Request of 840 total FTEs by 40 positions (4.5 percent) to account for attrition. To actively manage such a rapid scaling of Federal personnel, the Department established a pilot program which decentralized part of EERE's staffing functions to its Golden Field Office to accelerate the hiring process. EERE is aggressively hiring Presidential Management Fellows and employees through the DOE Career Intern Program to expedite hiring. In addition, EERE is using single vacancy announcements to fill multiple positions.

CYBER SECURITY IN THE ELECTRICITY POWER GRID

Chairman Visclosky and Ranking Member Frelinghuysen: At a time when cyber attacks are becoming an increasing concern worldwide for both economic and security reasons, the nation's electricity transmission and distribution system is on the cusp of becoming connected to the network and exposed to such attacks. What are the most pressing cyber security risks to the current and future power grid? How does the Department's request for cyber security funding within the Office of Electricity Delivery and Energy Reliability address these risks?

Secretary Chu: Although specific cyber security risks arise as new vulnerabilities and threats are discovered, the most serious concern is the increasing sophistication of cyber attacks and the rapidly advancing capabilities of cyber adversaries. According to unclassified intelligence reports, cyber attacks against the nation's infrastructure are also becoming more targeted. As many utilities begin to implement smart grid technologies, the required increase in information and communications technologies exponentially increases digital access points through smart meters and automated control equipment, thereby increasing the opportunities for cyber attack. For nearly a decade, the Department has been working with the electric sector to reduce the risk of disruptions from cyber attack and has made considerable progress. Yet, the capabilities of our adversaries also continue to advance.

To address this threat, the Department has requested a substantial increase in the FY 2010 budget for cyber security for energy delivery systems. These new funds will allow us to add new capabilities to help keep pace with and anticipate the rapidly advancing cyber threat environment. Since 2005, the Department has been working with the electric sector to implement the Roadmap to Secure Control Systems in the Energy Sector. Our FY 2010 request continues this vital work and includes such efforts as: the development of advanced technologies to better secure against high-risk attacks; the development of modeling and simulation tools to better understand the risk associated with the escalating capabilities of the threat; and the initiation of a university-industry collaboration to develop control system networks that can survive an intentional cyber assault without loss of critical services, regardless of the threat capabilities.

CYBER SECURITY IN THE ELECTRICITY POWER GRID

Chairman Visclosky and Ranking Member Frelinghuysen: At a time when cyber attacks are becoming an increasing concern worldwide for both economic and security reasons, the nation's electricity transmission and distribution system is on the cusp of becoming connected to the network and exposed to such attacks. How does or will the Department's research and development efforts coordinate and collaborate with more operational activities relating to cyber Security across the Federal government?

Secretary Chu: The Department employs several mechanisms to coordinate its research and development efforts with operational activities throughout the intelligence community and with other federal agencies that conduct monitoring of cyber threats to energy systems. First, the Department routinely shares information on various types of incidents and threats with the Department of Homeland Security (DHS) through the U.S. Computer Emergency Readiness Team, which receives reports from the private sector on cyber intrusions and malicious attacks on their systems. The Department also receives direct reports of cyber activities and attacks on electric power system operations through mandatory reporting via the Electric Emergency Incident and Disturbance Report. The Department also coordinates with the DHS Control Systems Security Program within the National Cyber Security Division to share information on potential vulnerabilities and threats as well as options for mitigating them.

Internally, the Department's Office of Electricity Delivery and Energy Reliability shares cyber threat information with the Department's Office of Intelligence and the Office of Counterintelligence. In addition, the Department coordinates with the North American Electric Reliability Corporation's Information Sharing and Analysis Center on cyber threats and intrusions to electric utilities and performs analysis as requested on the impact of potential threats and vulnerabilities.

The Department also participates in several interagency groups focused on cyber security issues. The Secretary of Energy is a member of both the National Security Council (NSC) and the Homeland Security Council (HSC) which each provide policy advice and oversight on cyber security issues. The Department also participates on the Deputies Committee of the NSC/HCS and the NSC/HSC Interagency Policy Committee. The Department also participates on an interagency cyber security task force that is working to plan and implement portions of the Comprehensive National Cyber Security Initiative.

Under Homeland Security Presidential Directive 7 and the National Infrastructure Protection Plan, the Department has the primary federal responsibility for coordinating all critical infrastructure activities with the energy sector. DOE also leads the Government Coordinating Council for Energy, which is responsible for implementing the public-private partnership for critical infrastructure protection in the energy sector—including electricity, oil, and natural gas operations. Through this Council, the Department works with other agencies, such as the DHS and the Federal Energy Regulatory Commission, to help the private sector create more resilient physical and cyber systems within their

energy infrastructures. And, finally, the Department also draws on its recognized capabilities, expertise, and long-standing relationships to work on cyber security issues with private sector representatives on the Electric Sector Coordinating Council.

BARRIERS TO RENEWABLE ENERGY

Chairman Visclosky and Ranking Member Frelinghuysen: A significant expansion of renewable energy sources would introduce intermittency and power quality issues not yet seen in large quantities on our nation's grid. Mr. Secretary, do you see a level of deployment at which renewable energy sources pose a significant problem for the reliability of our transmission and distribution grid? What is the Department doing to address these issues?

Secretary Chu: I do not see a specific level at which deployment of renewable sources would create reliability problems. In any given area, much will depend on the particular characteristics of the renewable sources, and also on the characteristics of the existing non-renewable capacity in that area. These characteristics will determine the extent to which variable-output generation can be integrated readily into the system without eroding reliability.

The Department is doing a number of things to facilitate the integration of renewables. First, we are supporting renewable integration studies at the regional level in many parts of the country to get a better understanding of the problems that would arise, given various levels of renewables penetration, how those problems might be addressed, and what the costs would be. Second, we are supporting broad and inclusive regional and interconnection-level electricity supply planning; the renewables integration studies will provide essential input to this effort. The planning initiative will address questions such as when and where it would be economical to develop flexible new gas-fired capacity to balance the variability of renewables, and when and where it would be economical to develop energy storage capacity.

Overall, we have a lot to learn before we can know with any certainty the limits of renewables integration.

ELECTRICITY TRANSMISSION SYSTEM EXPANSION

Chairman Visclosky and Ranking Member Frelinghuysen: Our nation's electricity transmission system suffers from congestion across the country, and will further struggle as we increase power generation to meet growing demand. Siting new transmission lines has been a contentious and challenge barrier to moving power from areas with generation resources to areas connecting timely expansion of the grid to connect generation resources to and high-load areas. Do you believe that there are significant barriers to expanding the transmission grid? How is the Department proposing to facilitate grid expansion?

Secretary Chu: There are several barriers to expanding and strengthening our transmission networks. One is the need to justify building any particular new transmission facility in terms of engineering, economic, environmental, and public policy issues. Another is the need to decide how the costs of such facilities should be allocated. A third is the need for an inclusive public process that will determine specifically where such facilities should be sited.

Of these, I think the first is the most important. Under the American Recovery and Reinvestment Act, the Department will make funds available for major efforts to develop improved regional and interconnection-level transmission plans. Once we have a clear public sense of what needs to be built, where, and why, it will be easier to deal with the cost-allocation and siting problems.

ELECTRICITY TRANSMISSION SYSTEM EXPANSION

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, we all have the highest hopes that renewable energy will provide a larger percentage of our power in the future than it does today. Unfortunately, the areas with the highest potential for solar and wind power are often far away from the areas of highest demand. What's your best estimate of the amount we as a nation will have to invest in transmission lines in order to get this power to where it's needed?

Secretary Chu: Using Recovery Act funds, the Department will support major efforts to improve regional and interconnection-level transmission planning. We wish to see the development of a portfolio of alternative electricity supply futures, to know their associated transmission requirements, and to know what the delivered cost of electricity would be under various scenarios. Once these analyses have been done, we will have a better basis on which to estimate the costs of modernizing and expanding the nation's transmission networks.

We do know today, however, that the transmission component of the cost of a delivered kilowatt-hour ranges regionally between about 5 and 10 percent. This suggests that we could add substantially to the transmission networks without major impacts on the delivered cost of electricity, particularly if those transmission improvements give local utilities improved access to lower-cost but more distant generation sources.

ELECTRICITY TRANSMISSION SYSTEM EXPANSION

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, we all have the highest hopes that renewable energy will provide a larger percentage of our power in the future than it does today. Unfortunately, the areas with the highest potential for solar and wind power are often far away from the areas of highest demand. What's the average line loss today? In other words, if we wanted to take wind electricity generated in Nebraska and move it to Chicago, how much as a percentage would actually get there?

Secretary Chu: For extra high voltage transmission lines that move power over long distances, the average amount of power lost is 3 percent. After the power reaches the high-demand load center, approximately another 6 percent is lost in the distribution delivery system that connects the transmission system to the end-use customer. Therefore, on average 97 percent of the power delivered into the transmission system from remotely-located renewable wind or solar energy generation would be delivered to the load center, and approximately 91 percent would reach the end-use customer.

ELECTRICITY TRANSMISSION SYSTEM EXPANSION

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, we all have the highest hopes that renewable energy will provide a larger percentage of our power in the future than it does today. Unfortunately, the areas with the highest potential for solar and wind power are often far away from the areas of highest demand. Often the most efficient route for these lines is through private property. What's the Administration's position on the use of eminent domain for transmission lines?

Secretary Chu: In most parts of the United States, the states have long had primary responsibility for determining whether a new transmission line is needed to serve the public interest and, if it is needed, where it should be sited. In most cases, once a state has approved the siting for a new transmission line, the state issues a "certificate of public convenience and necessity" (or a document with some similar title) to the utility seeking to build the line. Such a certificate typically includes a limited grant of eminent domain to the utility. This enables the utility, should negotiations with a private property owner fail, to secure access to that property through court order. Somewhat similarly, the Bonneville Power Administration, the Western Area Power Administration, and the Southwestern Power Administration, which are parts of DOE, have transmission siting responsibilities and limited eminent domain authority under their enabling statutes. In general, the Department's perspective on the use of eminent domain is that it is essential to ensuring that the public need can be met, but that eminent domain should be exercised only as a last resort.

MODERNIZED POWER GRID ("SMART GRID")

Chairman Visclosky and Ranking Member Frelinghuysen: A modernized power grid, including the breadth of so-called "Smart Grid" technologies, has the potential to substantially increase the efficiency of our electricity transmission and distribution system and to decrease the demand for electricity. The opportunities, however, span a broad set of technologies and some of the realized benefits, such as consumer behavioral response to real-time pricing, are largely unproven. Where are the largest opportunities and barriers to modernizing our nation's transmission and distribution system, and how does your budget request reflect these priorities? What is the Department doing to increase efficiency and reduce transmission losses, which could effectively increase power supplied across the country without adding a single kilowatt of new generation?

Secretary Chu: Modernizing our century-old electric power grid presents a significant challenge. Over the last 25 years, growth in peak demand for electricity has significantly outpaced transmission growth, which has led to increased stresses on the country's electrical grid, leading to decreased efficiency and increased numbers of blackouts.

Developing a "smarter" grid is one way to meet this challenge. The Department is requesting substantial funds in its FY 2010 budget to support research and development of the Smart Grid. This funding will support research in advanced control methods for increased integration of renewables and distributed resources, improved decision support tools for operators to enhance reliability, advanced components for high voltage energy conversion and flow control, and integrated communications. The research to be conducted under FY 2010 funding will complement the nearly $4 billion of American Recovery and Reinvestment Act funding for smart grid implementation grants and smart grid regional demonstrations.

Within the smart grid, we believe the key to success lies in integrating communication and information infrastructure with the power delivery infrastructure. The biggest challenges to achieving this include the need to develop industry-accepted standards and specifications for interoperability of smart grid devices and systems and the need for costly upgrades of massive electric infrastructure that has been estimated, in the Electricity Advisory Committee report, to cost $500 billion over the next 20 years. Commerce Secretary Locke and I have been directly involved in engaging industry executives to work to expedite the adoption of interoperability standards, and the Department has provided $10 million in Recovery Act funds to the National Institute of Standards and Technology to support the needed standards development through public workshops.

Other FY 2010 activities address efficiency increases and transmission loss reduction. Through advanced monitoring and controls, power flow can be managed to minimize losses in delivery, and condition-based monitoring can further maximize asset utilization to provide needed equipment maintenance, improve performance, and prevent failures. Efficiency can also be improved through advanced materials research and development

for power system components (transformers, breakers, switches, and conductors, etc.). The FY 2010 budget includes a new research initiative, the Grid Materials, Devices and Systems Hub, that will focus on the development of such "smart" materials. The request also supports work on advanced cables and conductors using high temperature superconducting material, a clear example of an enabling technology to greatly increase power transfer capacity (3 to 5 times the capacity of conventional alternating current (AC) cables) in existing rights-of-way with minimum energy loss.

As you noted, the success of some "smart" technologies relies on the consumer. While data on long-term customer response to real-time pricing are still lacking, the beneficial impacts found in short-term pilot programs (less than 3 years in duration) are striking. A recent industry survey study concluded that time-of-use rates induce a decrease of 3 to 6 percent in peak demand, and critical-peak pricing tariffs induce a decrease of 13 to 20 percent in peak demand without enabling technologies (such as AC switches, smart thermostats, etc.), and that those decreases in peak demand double with enabling technologies. Such reductions translate into significant reductions in US demand, with significant economic benefits.

Lastly, we need to recognize the crucial role our state and regional partners play in efforts to modernize the grid. As the primary regulators of electricity investment for the utilities, new technologies and upgrades to the grid cannot move forward without their involvement and expertise. Building on efforts undertaken through the Recovery Act funding, our FY 2010 budget continues technical and financial assistance to states and regional entities for development of state policies and programs which support a more efficient and reliable grid.

ENVIRONMENTAL MANAGEMENT - MANAGEMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, while improvements have been made, the Environmental Management program continues to suffer from inadequate management. GAO report on EM baselines in May 2008 found that

"DOE established scope, cost and schedule baselines using optimistic and accelerated schedule assumptions, key policies for baseline management and cost estimating are spread across guidance documents, and are unclear; management protocols are constantly changing; performance reporting systems are inadequate and inaccurate; and baseline validations provide questionable assurance that project baseline commitments can be met."

What strategy do you envision, for future management of the Office of Environmental Management's portfolio of major operating projects, for correcting past cost and schedule estimating problems?

Secretary Chu: The Office of Environmental Management (EM) manages a large portfolio consisting of cleanup projects (e.g., deactivation and decommissioning of facilities, soil and groundwater remediation, and waste stabilization and disposition) and construction projects. For EM construction projects, the design and construction of facilities for treatment and disposal of nuclear wastes are often first-of-a-kind, requiring new technologies. The solutions we apply must serve cradle-to-grave operations and must comply with all safety and regulatory requirements that are often unique to EM cleanup missions. These challenges are not typically met through off-the-shelf commercial industry approaches.

While recognizing the inherent challenges of EM's nuclear cleanup mission, we have, nevertheless, committed to improving overall project management. To achieve this EM has formulated an Acquisition and Project Management Corrective Action Plan (CAP) which is consistent with and supportive of the overarching Departmental Root Cause Analysis Corrective Action Plan for contract and project management. The Acquisition and Project Management CAP incorporates recommendations from the Government Accountability Office, the National Academy of Public Administration, and EM's Best-in-Class Initiative in partnership with the Army Corps of Engineers. All of these recommendations are designed to strengthen EM project management. For example, EM is now instituting comprehensive periodic reviews of line-item construction projects based on the successful model used by the Office of Science to identify problems early and take corrective action. EM is also working to standardize its acquisition and project management policies and procedures for consistent implementation, to support more intensive and ongoing professional training and certification for project managers, and to strengthen its project assessment and oversight capability.

ENVIRONMENTAL MANAGEMENT – HANFORD SITE CLEAN-UP

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the only two EM sites not in compliance are at Hanford due to technological challenges that need to be overcome. The contract price for design, construction, and commissioning the new facilities needed to clean-up the tank waste has increased from $4.3 billion in 2000 to $12.3 billion in 2006, according to the GAO. With $2 billion in Recovery funds and a $2 billion FY 2010 request for Hanford, what progress do you expect to be made?

Secretary Chu: The funding provided by Congress in the Recovery Act for the Office of Environmental Management (EM) is to maintain and create jobs quickly, while accelerating the cleanup mission. To meet the goals of the Recovery Act, EM selected projects that could be readily accelerated to reduce the EM Program footprint and to put Americans to work in productive, beneficial jobs. EM's Recovery Act funding is targeted toward such well-understood efforts as soil and ground water remediation, radioactive solid waste disposition, and facility decontamination and decommissioning. These activities represent already planned, "shovel-ready" work for which EM has cost and schedule estimates, an established regulatory framework, proven technology, proven past performance, and existing contract vehicles.

The Recovery Act work at the Richland Operations Office ($1.635 billion) includes the demolition of nuclear facilities and support facilities, the remediation of waste sites and contaminated groundwater, and the retrieval of solid waste from burial grounds to support shrinking the active cleanup area of the 586-square-mile Hanford Site to 75 square miles or less by 2015.

The Recovery Act work at the Office of River Protection ($326 million) includes the acceleration of the design and construction of infrastructure and systems to transfer radioactive liquid waste from aging underground tanks to a waste treatment facility for immobilization and disposal.

The 2010 Budget work at the Richland Operations Office ($911 million) includes completion of the de-inventory of the special nuclear materials in the Plutonium Finishing Plant , continuation of treatment design of sludge from the K-Basins, and deactivation, decommissioning, and demolition of facilities and structures in the 100 and 300 Areas within the River Corridor Closure Project.

The 2010 Budget work at the Office of River Protection ($1.098 billion) will primarily focus on design and construction activities needed to continue resolution of the remaining challenges facing the Waste Treatment Plant. These activities will focus on technology verification associated with the Pretreatment Engineering Platform, Pulse Jet Mixing and remote sampling required to advance the design at a pace to support an aggressive construction schedule.

ENVIRONMENTAL MANAGEMENT – HANFORD SITE CLEAN-UP

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the only two EM sites not in compliance are at Hanford due to technological challenges that need to be overcome. The contract price for design, construction, and commissioning the new facilities needed to clean-up the tank waste has increased from $4.3 billion in 2000 to $12.3 billion in 2006, according to the GAO. How much of the $55 million increase in EM's Technology Development and deployment effort will be applied to solving the technology challenges associated with the Hanford tanks?

Secretary Chu: In Fiscal Year 2010, the funding for Technology Development and Deployment is $55 million for problems impacting the EM program as a whole, and $50 million at the Office of River Protection for technology needs targeted to its unique problems. The $50 million within ORP's budget will be used for applied research and technology development for the Hanford tanks. This research will be targeted to advance solutions for the treatment of radioactive waste, including pre-treatment processes, tank structural integrity, and advanced retrieval technologies.

FUTUREGEN

Chairman Visclosky and Ranking Member Frelinghuysen: $1 billion of ARRA funding is allocated to FutureGen or its successor. Could you provide the Committee an update on the decision regarding this effort? If a decision has been made, have you decided how many projects and where geographically the demonstration(s) will take place?

Secretary Chu: A decision has been made to pursue the FutureGen project in Mattoon, Illinois, in partnership with the FutureGen Industrial Alliance. DOE issued a NEPA Record of Decision on July 14, 2009 to move forward toward the first commercial scale, fully integrated, carbon capture and sequestration project in the country. The following activities will be pursued from the end of July 2009 through early 2010:

- Rapid restart of preliminary design activities;
- Completion of a site-specific preliminary design and updated cost estimate;
- Expansion of the Alliance sponsorship group;
- Development of a complete funding plan, and;
- Potential additional subsurface characterization.

Following the completion of the detailed cost estimate and fundraising activities, DOE and the FutureGen Industrial Alliance will make a decision to move forward or discontinue the project early in 2010. Both parties acknowledge that a decision to move forward is the preferred outcome and plan to reach a revised cooperative agreement that will include a funding plan for the full project should there be a decision to continue the project early in 2010.

The Department's maximum anticipated financial contribution should the project move forward is $1.073 billion, $1 billion of which would come from Recovery Act funds for carbon capture and storage research.

NUCLEAR NONPROLIFERATION BUDGET

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the nuclear nonproliferation budget is flat when the MOX-related work is subtracted. The programs working overseas to prevent the spread of nuclear weapons would seem to be a top priority. We also understand that additional nuclear security work could be done if additional resources were provided. How did you arrive at the flat-funding level given the high priority nature of this work?

Secretary Chu: Nuclear nonproliferation is a major priority of this administration and you will be able to see over the next couple of years a clear emphasis in nonproliferation work. The first year of this administration's budgets includes a major increase to fissile materials disposition, which is an important activity because it ensures that significant quantities of plutonium and highly enriched uranium are not available to potential proliferators. This budget also reflects the completion of two major pieces of work scope within DNN. The first is the completion of the BN-350 work under the GTRI program which was funded in FY2009 at ~$51M. The second is the completion of funding for the EWGPP work which was funded at ~$141M in FY2009 and is funded in FY2010 at ~$24M. Even though the budget appears to be flat the funding saved from these two efforts allowed for a substantial increase in funds budgeted for the MPC&A effort in Russia.

It will take some time to put in place all of the programs we are working to build up. However, the 2010 budget represents the best balance of efforts that we could put together in the context of the entire NNSA plan, which includes many "competing" efforts to ensure the safety, reliability and [surety] of our own weapons, provide for future naval capabilities and strengthen non-proliferation capabilities.

NUCLEAR NONPROLIFERATION BUDGET

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the nuclear nonproliferation budget is flat when the MOX-related work is subtracted. The programs working overseas to prevent the spread of nuclear weapons would seem to be a top priority. We also understand that additional nuclear security work could be done if additional resources were provided. We understand that the upcoming U.S.-Russia meeting in July will likely result in increased program scope for nonproliferation programs in FY 2010. How do you propose supporting these in FY 2010?

Secretary Chu: Yes, preventing the spread of nuclear weapons and weapons-usable nuclear materials is a top priority of this administration. President Obama hopes to reach agreement with Russia to expand cooperation on nuclear nonproliferation in several key areas, including Material Consolidation and Conversion and Plutonium Management and Disposition. While cooperation with Russia is important, it is a part of a larger effort that President Obama outlined in his April 5, 2009, speech in Prague. The President specifically called for *"...a new international effort to secure all vulnerable nuclear material around the world within four years....expand our cooperation with Russia, and pursue new partnerships to lock down these sensitive materials... We must also build on our efforts to break up black markets, detect and intercept materials in transit, and use financial tools to disrupt this dangerous trade."* Thus, these new efforts, as well as the upcoming U.S.-Russia Summit meeting in July, will result in increased and accelerated work scope for nonproliferation programs in FY 2010 and beyond, and not just in Russia, but elsewhere around the world as well.

In support of U.S. nonproliferation policy, NNSA would require additional funds and will need to request supplemental funding. Specifically, NNSA's Global Threat Reduction Initiative estimates an additional $126.5 million would be required to secure or remove vulnerable nuclear material in Mexico, Ukraine, Kazakhstan, Vietnam, and South Africa. In addition, NNSA's International Nuclear Material Protection and Cooperation Program (INMPC) estimates an additional $15 million would be needed to support the consolidation and conversion of non-weapons HEU in Russia, and an additional $30 million to secure vulnerable nuclear material in South Asia. The INMPC also estimates that additional funds would be needed to accelerate Second Line of Defense Program efforts, which will detect and intercept nuclear and other radioactive materials in transit across international borders: $70 million for the Megaports Initiative and $80 million for the Core Program.

NUCLEAR NONPROLIFERATION BUDGET

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, the nuclear nonproliferation budget is flat when the MOX-related work is subtracted. The programs working overseas to prevent the spread of nuclear weapons would seem to be a top priority. We also understand that additional nuclear security work could be done if additional resources were provided. In FY 2010, one of the major programs is working to secure nuclear material in the United Kingdom and Switzerland while border security work along Russia's long border will wait until FY 2011? Are you confident in the prioritization of these programs in terms of taking care of highest risk threats first?

Secretary Chu: Yes, I believe NNSA has prioritized its many requirements based on a reasonable mix of risk estimates and cost-benefit analyses. The highest priority is first line of defense activities, such as securing nuclear weapons and weapons-usable nuclear material at their source, and on permanently removing vulnerable nuclear material from sites that do not have adequate security. This is achieved through such activities as NNSA's International Nuclear Material Protection and Cooperation Program and the Global Threat Reduction Initiative. Within our first line of defense programs, activities are further prioritized based on the proliferation-attractiveness of the material involved and many different threat factors such as site security, country level threat environment, and proximity to strategic assets. With respect to the material in the U.K. and Switzerland, this material is part of our global effort to remove nuclear materials that could pose a proliferation threat. However, it is important to note that high income economy countries such as the U.K. and Switzerland would pay the costs for shipment of this material, thus not requiring the use of congressionally-appropriated funding.

As part of our layered strategy to combat nuclear terrorism, we also have a robust program focused on illicit trafficking of nuclear materials. The Second Line of Defense Program installs radiation detection equipment at vulnerable borders, airports, and seaports around the world. We are installing radiation detection equipment at all 370 of Russia's border crossings, with a commitment to complete this work by the end of 2011. This work has been ongoing since 1998 on a 50/50 cost-share basis with the Russian Federal Customs Service (FCS). To date, the Department of Energy has installed radiation detection equipment at approximately 160 border crossings and the FCS has equipped approximately the same number. Additional funds would allow us to accelerate installations in Russia, although the work would still extend into 2011.

STATUS OF MOX

Chairman Visclosky: Mr. Secretary, the FY 2010 request includes over $500 million for the MOX construction. As recently as January 2009, GAO noted in its update that January 2009 the MOX earned valued management system cannot be validated for effectively reflecting the $5 billion on schedule and at cost. How confident are you that the project is on the right track?

Secretary Chu: I believe the MOX project is on the right track. Since beginning facility construction nearly two years ago, the MOX project has remained within its cost and schedule baseline. With regard to the MOX earned value management system (EVMS), this system was independently certified as compliant with the industry standard on EVMS, American National Standards Institute/Electronics Industrial Alliance (ANSI/EIRA)-748 (current version), by the DOE Office of Engineering and Construction Management in May 2008 after an extensive review. DOE is continuing to work with GAO to address the specific concerns they have regarding the MOX project schedule.

MOX CONSTRUCTION

Chairman Visclosky: The MOX construction work, as well as the related-Waste Solidification Building, was requested in the NNSA in FY 2010. The Committee remains concerned that any cost-overruns of this beleaguered program will erode the priority nuclear nonproliferation work overseas. Could you explain to the Committee your rationale for moving MOX back into nuclear nonproliferation?

Secretary Chu: The MOX project is part of an important nonproliferation program to dispose of no less than 34 metric tons of surplus U.S. weapons-grade plutonium, as set forth in the Plutonium Management and Disposition Agreement between the United States of America and the Russian Federation. I returned the MOX project to the nonproliferation appropriation budget line for FY 2010, so that the funding would be aligned with the nonproliferation office actually managing the work. Since construction began nearly two years ago, the MOX project has remained within its cost and schedule baseline.

ENERGY INNOVATION HUBS

Chairman Visclosky and Ranking Member Frelinghuysen: The Department of Energy proposes $280 million for eight "Energy Innovation Hubs" in the fiscal year 2010. The Hubs would represent a significant investment of up to $2.6 billion over ten years. Mr. Secretary, the budget request does not detail an implementation plan for the Hubs. Because the Hubs are located in various subprograms within disparate Department offices and programs, how will each of these offices carry out site selection, physical facility build-out, and personnel management for each of the proposed Hubs?

Secretary Chu: The Hubs will be awarded to the best proposal submitted through the FOA process. The quality of the proposals submitted will determine where the site is located as, however the Hubs will use existing facilities. The Department of Energy's primary objective in selecting the Hubs is to award the proposals that have the best chance to deliver transformative energy breakthroughs. The Hubs will therefore be selected on the basis of a competitive merit review; there are no preconceived goals for specific locations or geographical distribution of the Hubs.

The Department recognizes that effective management of scientific facilities, programs, and projects is critical to the success of research. The Hub must have well-designed management plans for the establishment of the Hub, as well as for Hub operations. Plans should include provisions for coordination with other basic and applied research and development activities supported by the Department. Management of the Hub's initial establishment, research, technology development, resources (both personnel and physical resources), and scientific data is critical to the success of the Hub, to its overall contribution to the Energy Innovation Hubs initiative and Department's missions. In addition, each Hub must have an advisory board that includes industry participation.

ENERGY INNOVATION HUBS

Chairman Visclosky and Ranking Member Frelinghuysen: The Department of Energy proposes $280 million for eight "Energy Innovation Hubs" in the fiscal year 2010. The Hubs would represent a significant investment of up to $2.6 billion over ten years. Mr. Secretary, how will the Department provide oversight and track the progress of each research Hub? What milestones have you identified for the Hubs to measure their research and operational success compared to other existing Department programs?

Secretary Chu: The Hub will be subject to regular and rigorous peer review of its scientific program and its management structure, policies, and practices. Within DOE, there will be an Energy Innovation Hubs Oversight Board that will periodically review the progress of the Hubs. Each Hub will be managed by a particular department program office, which will be responsible for holding the Hub accountable and conducting annual site visit reviews of the Hub. After five years, the Hubs can apply for a five year renewal, subject to satisfying their goals and objectives and contributions to the overall mission of the Energy Innovation Hubs. Renewals after ten years are not strictly precluded, but will be subject to a significantly higher standard. The Hub Oversight Board will consist of the Secretary and/or his designate, the Under Secretaries for Energy and Science, and their senior scientific/technical advisors.

ENERGY INNOVATION HUBS

Chairman Visclosky and Ranking Member Frelinghuysen: The Department of Energy proposes $280 million for eight "Energy Innovation Hubs" in the fiscal year 2010. The Hubs would represent a significant investment of up to $2.6 billion over ten years. In the case of Nuclear Energy, the budget request includes two Hubs. Excluding those, the request actually decreases by $100 million from FY09. Can you comment on the perceived benefits of these Hubs versus continuing with investments already made in reactor and fuel cycle technologies?

Secretary Chu: Unlike the investments already being made in fuel cycle technologies, the Hubs bring a cross-disciplinary approach, bringing together a critical mass of stakeholders with the singular mission of solving a problem. This Manhattan Project style has in the past proven to be most successful in bringing about viable, practical solutions at the quickest pace. This model has been proven, from the creation of radar to the repeated successes at Bell Labs. The investments of the past have not brought about the advances required to restart this country's civilian nuclear power industry. The Hubs, however, using a proven model of R&D, bring the promise of closing the scientific and engineering gap that will allow us to invest in and deploy civilian nuclear power for the 21st century.

RE-ENERGYSE EDUCATION INITIATIVE

Chairman Visclosky and Ranking Member Frelinghuysen: The budget request proposes $115 million in the fiscal year 2010 for RE-ENERGYSE ("re-energize"), an educational initiative seeking to "educate the future leaders in energy science and technology." What baseline of funding is the Energy Department requesting to continue existing fiscal year 2009 education and workforce training activities already underway across Department offices, programs, and labs?

Secretary Chu: The Department is requesting $33 million in the Office of Science for various education and workforce training activities. In addition, there is $9.5 million for Weatherization training and technical assistance in the Office of Energy Efficiency and Renewable Energy. Also, up to 20 percent of the Office of Nuclear Energy's R&D budget will support University research and training programs for workforce training.

RE-ENERGYSE EDUCATION INITIATIVE

Chairman Visclosky and Ranking Member Frelinghuysen: The budget request proposes $115 million in the fiscal year 2010 for RE-ENERGYSE ("re-energize"), an educational initiative seeking to "educate the future leaders in energy science and technology." How does RE-ENERGYSE complement the education and workforce training programs already underway in the Department?

Secretary Chu: RE-ENERGYSE is a science and engineering initiative to educate thousands of students per year in the fields contributing to fundamental understanding of energy science and engineering systems. The RE-ENERGYSE program complements workforce training programs by providing longer term educational activities such as certificate, degree or advanced degree programs. This new initiative has two programs representing the different phases of the education pipe line:

1. Higher Education ($80M): Supports fellowships, internships, post-doctoral opportunities and the development of four interdisciplinary masters programs in the area of clean energy. This program will offer up to 200, three-year fellowships for graduate students in engineering and other relevant fields and will also fund up to 200 post-doctoral opportunities that will allow exceptional students to apply their skills in a laboratory setting devoted to clean energy topics. In addition, up to 1,000 assistantships for undergraduate students to support a summer research project will be available.

2. Technical Training and K-12 Education ($35M): Support the development of effective training programs at community colleges and other training centers to develop up-to-date, technically accurate, curricula as well as faculty training that will focus on solving the Nation's energy challenges. Training and educational programs will be designed to meet current and near-term local market needs for a green workforce. This program will also include activities designed to engage and empower K-12 students and educators to help meet the Nation's energy and environment challenges.

ACCURACY OF EIA REPORTS

Chairman Visclosky and Ranking Member Frelinghuysen: In 2008, gasoline prices ranged from below two dollars to more than four dollars per gallon. It is critical to accurately forecast energy market when our economy depends so heavily on energy commodities prices that have shown increasing volatility in recent years. The budget request increases funding for the Energy Information Administration by $22 million, nearly a 20 percent increase over 2009 funding levels. How is the Energy Information Administration proposing to use the addition funding to enhance the accuracy of its existing forecasting capabilities? How does the Department propose to use the additional funding to enhance the Energy Information Administration's offerings?

Secretary Chu: $17.2 million of the $22.5 million increase requested for the Energy Information Administration (EIA) in the Administration's FY 2010 budget would fund three new initiatives designed to improve EIA's ability to understand and forecast near- and longer-term energy markets, while also providing data that can be used for benchmarking and performance measurement of weatherization and other energy efficiency programs, which received nearly $15 billion in the American Recovery and Reinvestment Act (ARRA)..

The *Energy and Financial Markets* initiative would create a strong interdisciplinary team that would focus on understanding the roles of futures markets' trading behavior and oil market fundamentals in short-term oil price formation. The team would include current and new employees, with experienced academics and private-sector market analysts as technical advisors. The team would undertake analysis to examine the role of financial and futures markets and to develop an approach to short-term forecasting that considers both physical market fundamentals and financial market activity. The benefits of the effort would include: 1) an improved capacity to understand and explain the relationships of trader behavior and fundamentals to price formation, 2) stronger theories and analytic techniques to explain market behavior, and 3) a fuller understanding of price formation to improve EIA's short-term price forecast. Even if new theories prove difficult to develop, a stronger focus on price formation processes would improve EIA's work and allow for increased public understanding of price formation.

The *End Use and Efficiency Data* initiative supports a significant expansion of the sample sizes for EIA's Residential and Commercial Buildings Energy Consumption Surveys for 2010 and beyond. This funding would improve the scope and quality of end-use consumption data, which examines the characteristics of residential and commercial buildings and the presence and use of equipment within them and relates these observations to the amount of energy consumed and the size of energy bills at the sampled locations. These data, which are expensive to gather due to the need for contractor personnel to make a site visit to each of the buildings in the survey sample, are used extensively by DOE programs and outside researchers,. They are also used in EIA's short- and longer-term models to adequately project future demand and energy efficiency gains. With larger sample sizes, EIA could develop data that are more statistically

reliable for more States, which would permit more complex analysis of key indicators of energy use and energy efficiency. The end-use consumption surveys provide baseline information critical to understanding energy use and are the basis for benchmarking and performance measurement for energy efficiency programs, in which ARRA has made a large investment. This initiative also includes a comprehensive study by the National Academy of Sciences of EIA's consumption data program, which will provide recommendations that will assure that the program is carried out in the most efficient possible way.

The *Data Scope and Quality Improvements* initiative continues and extends efforts begun in FY 2009 and would be directed at, among other activities, collecting weekly renewable fuels data, enhancing reporting on refinery outages, addressing gasoline import and diesel export data gaps, and continuing to improve state-level and international data timeliness – all of which would help support short- and longer-term forecasting and projections models. Monthly ethanol and biodiesel data, as well as collection of data for all petroleum fuels at the individual terminal level, rather than as an aggregate for each owner across 5 large regions, have recently begun under the earlier phase of this effort.

Most of the remaining $5.3 million of the $22.5 million increase requested for EIA in the Administration's FY 2010 budget go towards funding previously planned increments to multi-year initiatives that were initially funded in FY 2009. One such initiative is the *National Energy Model Replacement Project*, begun in FY 2009, which will focus on updating EIA's long-run energy modeling capabilities. This multi-year effort will keep EIA's modeling tools relevant in areas where the energy sector has undergone significant structural change since NEMS was originally launched. For example, we need to move to regional rather than national modeling of transportation fuels markets to reflect regional differences in fuel specifications and the region-specific penetration of alternative fuels such as E85 ethanol blends. About $2 million is proposed to cover the increase in costs for Federal and contractor personnel, after netting out planned efficiencies in the delivery of the base program.

WEAPONS RECUSAL

Chairman Visclosky and Ranking Member Frelinghuysen: Dr. Chu, as you know, you have an unusually extensive list of issues on which you have set a policy of recusing yourself. How are you implementing this? Are all major decisions brought to your attention as if you were not recusing yourself, and do you then send the recused issues back down the line for decision? Or have you given blanket authority to your subordinates to decide which issues should never be brought to your attention because of the recusal policy?

Secretary Chu: Because of my prior employment with the University of California, I have restrictions on my participation on certain matters involving the University of California, Los Alamos National Security, LLC (LANS), and Lawrence Livermore National Security, LLC (LLNS). Most of these restrictions, and virtually all of them concerning the weapons program, will end one year after I severed my employment with the University, on January 20, 2009. My recusal as to these entities is not complete. I have been authorized by the Department's Designated Agency Ethics Official (DAEO), pursuant to 5 C.F.R. § 2635.502(d), to participate in particular matters involving specific parties in which the University of California, LANS, or LLNS is a party or represents a party with the following limitations: (1) any evaluation of the work performed; (2) any award fee process; (3) any extension of a grant, contract or cooperative agreement; (4) any recompetition of a grant, contract or cooperative agreement; (5) any competition for a new grant, contract or cooperative agreement; (6) any approval of technology transfer transactions (e.g., licenses); (7) any approval of real property transactions with the Department of Energy; (8) any approval of other specific agreements with the Department of Energy; or (9) direct negotiations with any of these entities related to financial arrangements between that entity and the Department of Energy.

Further, because of my former service on the Board of Directors of the University of Rochester, a participant in the development of the National Ignition Facility, for a period of two years from the date of my appointment (January 21, 2009) I may not participate in any particular matter involving specific parties that is directly and substantially related to the University of Rochester, including regulations and contracts.

My recusal has a screening mechanism in place. My immediate staff works with the Department's DAEO to determine if a particular matter is something from which I am recused. The process is established to route matters from which I am recused to the Deputy Secretary or other appropriate Department officials without my involvement. Of course, I am also vigilant to make sure that I do not participate in a matter from which I am recused.

RRW 2008 MAJOR REPORTING REQUIREMENT

Chairman Visclosky and Ranking Member Frelinghuysen: Secretary Chu, the Obama Administration has terminated RRW, which is consistent with the Subcommittee's position. But keep in mind that in FY2008 the Committee directed the Secretary of Energy, in consultation with the Department of Defense and Intelligence Community, to submit to the House and Senate Committees on Appropriations

a. A comprehensive nuclear defense and nonproliferation strategy,
b. A detailed description that translates that strategy into a specific nuclear stockpile,
c. A comprehensive long-term expenditure plan defining the nuclear weapons complex to support that stockpile

Each of these three requirements included several subsidiary requirements. In FY2009 we re-iterated that they must be submitted in the sequence I just summarized This sequencing was independently supported by a GAO report issued last July, which stated that "NNSA and DOD have not established clear, long-term requirements for the nuclear weapons stockpile. It is GAO's view that NNSA will not be able to develop accurate cost estimates or plans for Complex Transformation until stockpile requirements are known." Now may I have your commitment that you will make it your personal responsibility to get these three sequenced plans to us at the earliest possible date, whether that be as part of the Nuclear Posture Review or by some other vehicle?

Secretary Chu: The Departments of Defense, State, and Energy are working together to define nuclear defense and nonproliferation goals. All three Departments are actively contributing to the Nuclear Posture Review (NPR) currently underway. This NPR will define a comprehensive nuclear defense policy, the force structure required to implement that policy, the numbers and types of nuclear weapons in the stockpile needed to meet policy and force structure objectives, and the DOE infrastructure required to support that stockpile.

W76

Chairman Visclosky and Ranking Member Frelinghuysen: Dr. Chu, a story last weekend in the LA Times seemed to question the Department's ability to fulfill its mission to support its military customers. At issue was the W76 warhead, and the Department's claims that its life extension program was a success. Now, I'm well aware of the unexpected problems that the Department has faced in maintaining this weapon. But as far as I'm concerned, until the government decides we no longer need this weapon, it's the responsibility of NNSA to meet the military's needs and schedule. You have requested $209 million for the W76 life extension program for fiscal year 2010. Is this enough to keep the military on schedule? How much more will you need? What is the Department's rationale for purposefully under-budgeting for such an important purpose?

Secretary Chu: The LA Times article about the W76 Life Extension Program is incorrect. The program is certainly facing challenges; however, the National Nuclear Security Administration (NNSA) completed the W76 First Production Unit in September 2008, the Navy accepted the design as a stockpile item in February 2009. We have fully assembled units in storage and we anticipate delivery of the first shipment this fall. NNSA resolved the Fogbank issue over a year ago. The ramp-up to production at the Kansas City Plant is slower than desired due to a technical issue with a mechanical subsystem. NNSA is actively working that issue with Sandia National Laboratories and the Kansas City Plant, and we do not anticipate this issue will affect the W76 delivery schedule.

Chairman Visclosky and Ranking Member Frelinghuysen: Is this enough to keep the military on schedule?

Secretary Chu: In FY 2010, the NNSA will not be able to meet the schedule NNSA and the Navy agreed to for delivery and deployment at the end of FY 2008. We are constrained by personnel and tooling ramp-up rates at Pantex. In FY 2010, we will continue a lower rate of production constant with the original FY 2009 plan.

Chairman Visclosky and Ranking Member Frelinghuysen: How much more will you need?

Secretary Chu: The NNSA and the Navy are coordinating to determine the minimum FY 2010 production rate need to support Navy requirements. NNSA requires a two-year ramp up to full-rate production. In addition to the program line, significant investment in Production Support under Stockpile Service would be required to increase the base production capacity at Pantex beyond that planned for FY 2010. Even with an aggressive hiring program, it will take time to recruit qualified individuals who will then need to be cleared and trained. Additionally, the increase in base production capacity would require sustainment in the out-years. Achieving a higher W76 production rate quickly would not be possible without adversely impacting other completing production missions such as

surveillance and dismantlements. For instance, we would need to retrain personnel currently scheduled to support dismantlements and update and qualify facility bays and cells for a new mission area. DOE is committed to balancing its requirements and retaining the expertise of its personnel across all of its program areas.

Chairman Visclosky and Ranking Member Frelinghuysen: What is the Department's rationale for purposefully under-budgeting for such an important purpose?

Secretary Chu: We are balancing limited resources across the entire budget request to meet all our requirements for stockpile stewardship. The FY 2010 budget supports the rate of production constant with the original FY 2009 plan. The FY 2009 Budget Request budgeted $196,216,000 for the W76 LEP in FY 2010. The FY 2010 Request is an increase of $13M over that amount and is constant with the amount requested in FY 2009.

DISTRIBUTION OF DOE SCIENCE RESOURCES

Chairman Visclosky and Ranking Member Frelinghuysen: Mr. Secretary, as you know, Basic Energy Sciences is the largest account in your Office of Science. Its budget is nearly twice that of the second largest account. In no sense do I mean this as a criticism. Basic Science is outstanding people doing outstanding work. But I'd like to hear your vision of where this is going for the long term. Do you expect the emphasis on basic science to continue indefinitely, or do you foresee an eventual shift more toward the applied side?

Secretary Chu: I believe the Department of Energy must continue to emphasize basic science. The delivery of scientific discoveries and major scientific tools are essential to transforming our understanding of nature and advancing the energy, economic, and national security of the United States and I believe that will continue to be true for the foreseeable future.

The Department's investments over the past several decades in studying such things as the smallest constituents of matter; subatomic, atomic, molecular, and chemical transitions; and the atomic structure-function relationships of biological and inorganic materials that make up our observable world, have helped spur the worldwide scientific revolutions in nanotechnology, biotechnology, and high-performance computing. With the discoveries and the tools developed in the 20th century we are moving from an era of science that was centered on observation and discovery to one that includes the ability to direct and control matter all the way down to molecular, atomic, and electronic levels. This ability creates tremendous opportunities for energy technologies as well as other technology areas that impact the Department's environmental and national security missions. Our Nation's ability to continue to innovate and develop revolutionary technologies will continue to come from new discoveries in basic science using tools to continue to push the frontier of knowledge across all scientific disciplines.

JOINT DARK ENERGY MISSION

Chairman Visclosky and Ranking Member Frelinghuysen: This Committee has a long history of supporting the Joint Dark Energy Mission. Unfortunately, despite this support, the program has been delayed for many years. Is this project still a priority for the Department as indicated in the Office of Science's 20 Year Facilities Plan? If so, what steps are you and the Department taking to ensure that the mission moves forward and that it fully embraces the scientific and technical needs and expertise of the Department and its scientists?

Secretary Chu: One of my priorities for the Department of Energy is to encourage departmental, interagency, and global coordination of activities and partnerships that will achieve transformational discoveries. The Joint Dark Energy Mission has been identified as scientifically compelling and an excellent opportunity for such a partnership. Despite the delays in this project, the Department is still committed to pursuing this opportunity and implementing a successful mission. The Department has initiated discussions with the Office of Science and Technology Policy (OSTP) and National Aeronautics and Space Administration (NASA) to clarify any remaining issues regarding our partnership in the mission and develop a path forward. In this partnership, input will be solicited from the scientific community and utilized to ensure that the mission concept, plan for the science investigations, and our contributions are optimized to deliver the best science within available resources.

Chairman Visclosky and Ranking Member Frelinghuysen: Does the Administration plan any project oversight that ensures that both DOE's and NASA's needs are addressed?

Secretary Chu: OSTP has been involved in the agency discussions. The Department is working with NASA and OSTP to put in place oversight mechanisms that will ensure that the needs of the agencies are heard and addressed.

ADVANCEMENT IN EERE TECHNOLOGIES

Mr. Wamp: Secretary Chu, given our deep interest in energy, this Congress and the President have invested significant sums in energy efficiency, and renewable energy. Much of this investment is focused initially on the states and the deployment of current technologies. However, tremendous advancements in energy efficiency and renewable energy technologies are required if our nation is to truly address climate change and our over reliance on foreign oil, which has major national security implications. Do you intend to capitalize on the federal investment in expertise, skills, facilities and tools at the DOE's many national laboratories, such as Oak Ridge National Laboratory, to address these technological challenges? Do you intend to develop integrated, cross-laboratory teams with a specific focus on critical technical issues associated with improving solar photovoltaic, energy storage, zero energy buildings, and other energy efficiency and renewable energy technologies? What processes will you use to ensure that the best scientific and engineering talent is tapped to solve these critical energy challenges in the shortest time frame? Will the processes involve independent peer review so that the government can be assured that the public's money is being appropriately spent?

Secretary Chu: The Department of Energy makes extensive use of the National Laboratories at Oak Ridge and elsewhere. They play a critical role in DOE's efforts to respond to the challenges of climate change, energy security, and economic vitality. In FY 2008, the Office of Energy Efficiency and Renewable Energy (EERE) invested $591 million in National Laboratories, or 35 percent of its annual appropriations. Oak Ridge National Laboratory received $83 million, the second highest amount among all National Laboratories.

Furthermore, DOE is investing approximately $206 million in its labs through the Recovery Act to improve their R&D capabilities in critical areas, as well as to improve facilities and infrastructure. For example, up to $105 million will fund a lab call dedicated to improving building science materials and control systems, equipment for appliance standards and ENERGY STAR test procedures, batteries and carbon fiber.

DOE works extensively with integrated cross-laboratory teams focused on specific issues and expects to continue to do so. For example, the National Center for Photovoltaics includes researchers from both National Renewable Energy Laboratory (NREL) and Sandia National Laboratory, as well as others, in an integrated team. Similarly, SunLab focuses on concentrating solar thermal power systems involving both NREL and Sandia. Oak Ridge and NREL are involved into the Bioenergy Science Center, a consortium which focuses on developing advanced cellulosic feedstocks and enzymes for ethanol production. Much of the work by the Department is conducted through cost-shared competitive solicitations with industry, often supported by work at the National Laboratories. The competition ensures that the best scientific and engineering talent is tapped and the best innovations are identified; the cost-share ensures that the taxpayer dollar is leveraged to get the best possible return for the public. All of the competitive solicitations undergo merit review by independent peers for their selection. In addition,

EERE and other offices conduct regular in-progress peer reviews to ensure that the selected work is done effectively.

MATCHING REQUIREMENTS IN THE RECOVERY ACT

Mr. Wamp: On a separate issue, the ARRA required industry and non-profits to come up with 20-50 percent in matching funds if they wanted to work with the Department on clean energy projects. Has anyone in industry or in the non-profit world expressed concern about these matching requirements? Do you think the matching requirements included in the ARRA have affected the number and quality of energy project proposals submitted to the Department? Are you concerned that you're not getting the best proposals because of the matching fund requirements included in the ARRA?

Secretary Chu: The Department responded to industry and Congressional concerns over cost-share requirements by seeking a waiver to better leverage public private partnerships. For example, the Office of Energy Efficiency and Renewable Energy (EERE) received a Cost Share Reduction Determination from the Secretary that allows the office to reduce cost share requirements set forth in EPAct 2005 for demonstration and commercial application activities to a level of not less than 25 percent for private industry recipients and not less than 10 percent for academic institutions, non-profit organizations, Indian tribes or Tribal Energy Resource Development Organizations, and state and local governments (under EPAct 2005, this is 50 percent). For applied research and development projects, the Secretarial Determination reduced recipient cost share to as low as 10 percent of the total project costs, except for Indian Tribes or Tribal Energy Resource Groups, for whom the cost share requirement is waived (under EPAct 2005, this is 20 percent).

To ensure EERE continues to maximize its leverage, cost share was added as a program policy factor during merit reviews, as requested by OMB, which enables the selection official to pick the best mix of projects for the dollars available.

CARBON, CAPTURE AND STORAGE

Mr. Wamp: Mr. Secretary, you stated during your confirmation hearing that a carbon emission solution for coal is essential. Coal provides half of our fuel for domestic generation of electricity and China and India will certainly continue to depend on that fuel as you have noted. China, in particular, is turning to coal gasification to make chemical feedstocks. The US has several potential flagship projects of this same technology under development, including a major one by TX Energy in Beaumont, Texas. As a gasification-to-chemicals plant, the TX Energy project would inherently capture CO2 as part of the process of converting synthesis gas to durable products. So, the capture costs are already built into the product price and are not additive to the CCS equation. That is to say: industrial gasification plants such as this project are the cheapest option for demonstrating CCS technology. TX Energy plans to capture and sequester at least 75 percent of its annual CO2 emissions in a nearby enhanced oil recovery field. Given that front end engineering and design (FEED) has been completed and construction could begin as early as next year, the TX Energy project would be one of the earliest and largest such endeavors in the world. Is this the kind of commercial demonstration of CCS that you had in mind, Mr. Secretary?

Secretary Chu: Early adopters of carbon capture and storage (CCS) will take advantage of unique combinations of low cost capture and separation along with value added uses of the CO2, such as in enhanced oil recovery or enhanced coal bed methane recovery, whereby a valuable commodity can be produced to offset the costs associated with CCS. Commercial demonstrations of systems utilizing these value-added combinations are required to demonstration CCS viability along with those that store CO2 in saline formations and other non-commodity producing formations. Capture from concentrated and nearly pure streams of CO2, as can be found from natural gas processing plants, ethanol plants, refineries and some chemical operations, will permit the storage of CO2 in geologic formations easier than that capturing from more dilute sources such as power plants due to the economics of capture. However, commercial demonstrations of power plants with CCS are required given their significant contribution to CO2 emissions.

CARBON, CAPTURE AND STORAGE

Mr. Wamp: Mr. Secretary, early adoption" incentives that might be included in some future climate change legislation won't be available until 2015, or later. So, U.S. companies like TX Energy would lose 5 years if they wait for these incentives to materialize. In the interim, projects like this that attempt large-scale CCS would experience enormous deadweight CCS costs for which there is no present financial return to the company and no requirement for the company to undertake. Even if carbon credits were awarded later, their "present value" would be minimal, and provide no benefit toward financial closing decisions.

Secretary Chu: The Department of Energy has established several programs that provide industry with opportunities to finance carbon capture and storage (CCS) projects. These include a loan guarantee program, the Clean Coal Power Initiative, the Regional Carbon Sequestration Partnership Program and $3.4 billion from the American Reinvestment Recovery Act. These initiatives focus on research, development and deployment of CCS technologies.

Companies willing to take early risks to participate in these programs may be in a favorable position when CCS becomes widely deployed.

CARBON, CAPTURE AND STORAGE

Mr. Wamp: Mr. Secretary, you stated during your confirmation hearing that a carbon emission solution for coal is essential. Coal provides half of our fuel for domestic generation of electricity and China and India will certainly continue to depend on that fuel as you have noted. China, in particular, is turning to coal gasification to make chemical feedstocks. The US has several potential flagship projects of this same technology under development, including a major one by TX Energy in Beaumont, Texas. As a gasification-to-chemicals plant, the TX Energy project would inherently capture CO2 as part of the process of converting synthesis gas to durable products. So, the capture costs are already built into the product price and are not additive to the CCS equation. That is to say: industrial gasification plants such as this project are the cheapest option for demonstrating CCS technology. TX Energy plans to capture and sequester at least 75 percent of its annual CO2 emissions in a nearby enhanced oil recovery field. Given that front end engineering and design (FEED) has been completed and construction could begin as early as next year, the TX Energy project would be one of the earliest and largest such endeavors in the world. Would you agree that the government needs to do more now to stimulate early commercial-scale deployment of CCS technology?

Secretary Chu: Commercial demonstrations and deployments of carbon capture and storage (CCS) systems utilizing fairly pure CO2 streams coupled with value added storage could be an optimal way to deploy CCS. These value added combinations are required along with those that store CO2 in saline formations and other non-commodity producing formations. Stimulating early commercial-scale deployment of CCS is required so that knowledge can be gained to reduce costs and risks, especially in cases where no value added products are produced to help offset costs. The Department has established several programs that provide industry with opportunities for financial support that benefit the ability to prove technology and finance projects. These include a loan guarantee program, the Regional Carbon Sequestration Partnership Program the Clean Coal Power Initiative, and $3.4 billion from the American Reinvestment Recovery Act. These initiatives will focus on research, development and deployment of technologies to use coal more cleanly and efficiently and for the capture and storage of CO2.

FUEL CYCLE LOAN GUARANTEES

Mr. Wamp: The Administration is working with the bankruptcy court to reorganize General Motors in 60-90 days, and the U.S. Government will commit at least another $30 billion during that time. Yet, your loan guarantee program continues to flounder. It's been over a year and relatively small programs of $1-2 billion languish. At your confirmation hearing you said that this would be a priority and you planned to make some announcements in several months. That time has long passed. When can I expect an announcement about the front end fuel cycle loan guarantees?

Secretary Chu: As of the Part II submission deadline of December 2, 2008 for applications supporting Front-End Nuclear Facility projects, the LGP received two Part II applications to support two different Front-End Nuclear Facility Projects. The LGP is in advanced stages of due diligence on both projects and expects to reach a final determination later this summer.

YUCCA MOUNTAIN

Mr. Wamp: Mr. Secretary, was the Administration's decision to declare Yucca Mountain "no longer an option" based more on political reasons than technical reasons? Has the Nuclear Waste Technical Review Board, the independent review committee chartered by Congress to review DOE's nuclear waste program, found any technical or scientific reasons why Yucca is no longer suitable as a repository site? Mr. Secretary, will you please inform the Subcommittee in writing as to why from a technical and scientific perspective, Yucca Should "no longer" be consider an option? What scientific evidence do you have that would indicate that the science supporting the license application is not sound?

Secretary Chu: The Administration has made it clear that Yucca Mountain is not a workable option. This decision is not based on a determination that a repository at the Yucca Mountain site could not meet regulatory requirements but rather reflects the Administration's belief that we can find a better solution that achieves a broader national consensus. To that end, 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. This panel will provide the opportunity for a meaningful dialogue on how best to address this challenging issue and 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.

YUCCA MOUNTAIN

Mr. Wamp: Mr. Secretary, do you intend on the Yucca project to comply with the Obama Administration's Executive Order on Scientific Integrity? In regards, to the Yucca project, will you assure this committee that you be transparent in all decision-making both past, present and in the future??

Secretary Chu: Yes, we will comply with the Administration's Executive Order on Scientific Integrity. I believe 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 as we move forward to address this important national issue.

FUNDING FOR HYDROGEN VEHICLE PROGRAM

Mr. Calvert: Mr. Secretary, like many people, I was surprised and disappointed by the Administration's decision to cut funding for the hydrogen vehicle program within the Office of Energy Efficiency and Renewable Energy. I understand from your public statements that you based this decision on your belief that hydrogen vehicle technology is too far down the road. As you may know, Congress established the Hydrogen and Fuel Cell Technical Advisory Committee (HTAC) in the Energy Policy Act of 2005 to provide technical and programmatic advice to the DOE Secretary on your department's hydrogen research, development, and demonstration efforts. Mr. Secretary, in making the decision to cut funding for the hydrogen vehicle program, did you consult with the HTAC? If so, did the HTAC's technical and programmatic advice concur with your assessment of the advances made in the hydrogen vehicle program? Did you meet with the industry and hydrogen stakeholders before this decision was made? As you may know, my home state of California is one of the more aggressive states in terms of pursuing hydrogen vehicle technology projects. In fact near my district, the University of California Irvine houses the National Fuel Cell Research Center. Did you consult with any of these California-based hydrogen stakeholders?

Secretary Chu: The Department considered all available information before making the decision to re-focus research, development, and demonstration activities on fuel cell system technologies. The Department engages and communicates with industry and other stakeholders, including those based in California, through mechanisms such as technical collaborations and correspondence exchange. Also, the HTAC periodically submits reports, letters, and other information to the Secretary of Energy for consideration. Every two years, the Secretary reports to Congress on how this advice from HTAC was incorporated into the policy and budget decisions of the Department. The last report to Congress was submitted in 2008.

FUNDING FOR HYDROGEN VEHICLE PROGRAM

Mr. Calvert: Mr. Secretary, like many people, I was surprised and disappointed by the Administration's decision to cut funding for the hydrogen vehicle program within the Office of Energy Efficiency and Renewable Energy. I understand from your public statements that you based this decision on your belief that hydrogen vehicle technology is too far down the road. As you may know, Congress established the Hydrogen and Fuel Cell Technical Advisory Committee (HTAC) in the Energy Policy Act of 2005 to provide technical and programmatic advice to the DOE Secretary on your department's hydrogen research, development, and demonstration efforts. What analytical standards did you use in assessing the hydrogen vehicle program? Were the same standards applied to other alternative energy vehicle technologies? Does the budget request's elimination of hydrogen vehicle program in the Office of Energy Efficiency and Renewable Energy signal a shift away from high-risk research and development of technologies that have potential long-term promise for reducing our nation's dependence on foreign oil?

Secretary Chu: The Department has conducted studies that analyze cost and greenhouse gas reduction potential for a wide spectrum of alternative energy technologies, including hydrogen and fuel cells. These studies agree on the longer-term horizon for significant market penetration for hydrogen fuel cell vehicles. External studies, such as the National Academy of Sciences 2008 analysis of market entry issues for alternative transportation technologies and the 2008 Oak Ridge National Laboratory report that analyzed market penetration scenarios for hydrogen fuel cell vehicles, also reach the same conclusion. Given the Nation's economic climate and the urgency in addressing climate change and petroleum reduction, the Department is re-focusing the advanced transportation technology portfolio toward near-term energy technologies. Technologies such as biofuels and plug-in hybrids can achieve benefits sooner, at less cost, and with less technology risk.

The Department is continuing to fund high-risk research and development projects with longer-term potential for reducing our nation's dependence on foreign oil. In the area of fuel cells and their fuels, the Department plans to spend up to approximately $50 million in FY 2010 through the Office of Science for relevant cross-cutting basic research such as catalysis, membranes and biological/photoelectrochemical hydrogen production approaches to enable the success of hydrogen technologies. The Office of Fossil Energy requested $16.4 million to continue work on hydrogen production from coal, with carbon sequestration, due to the importance of zero carbon approaches. The Office of Energy Efficiency and Renewable Energy proposes a new applied research and development key activity, Fuel Cell Systems R&D, that will be technology neutral for multiple applications and will include over $68 million for research projects addressing issues such as catalyst cost reduction and durability improvements that are relevant to both automotive and nearer term applications.

FUNDING FOR HYDROGEN VEHICLE PROGRAM

Mr. Calvert: In an appearance on the Tonight Show this past March, President Obama responded to the fact that Jay Leno owns a GM hydrogen car by stating that "That's a whole new level of technology. That's what's going to create the auto industry of the future. That's where we're going to win back manufacturing. But right now we're behind." Won't America continue to be "behind" by cutting the funding to the hydrogen vehicle program? Won't America continue to be "behind" by cutting the funding to the hydrogen vehicle program?

Secretary Chu: Given the Nation's economic climate, and the urgency in addressing climate change and petroleum reduction, the Department is balancing its advanced transportation technology portfolio to fast-track near-term energy technologies and to bring consumers advanced transportation choices. Technologies such as biofuels and plug-in hybrids can achieve benefits sooner, at less cost, and with less technology risk. In addition, the Recovery Act provides approximately $41.9 million for projects producing near-term benefits such as commercialization and deployment of fuel cells and job creation in fuel cell manufacturing, installation, maintenance, and support services. Other benefits include development of a supply base necessary for near-term commercialization and that will support automotive applications in the longer-term. This approach will ensure the U.S. maintains its lead in the development of near-term alternative energy technologies which will also create the necessary foundation for longer-term transportation alternatives.

ARPA-E

Mr. Calvert: Mr. Secretary, I understand that some research universities and institutions have concerns with the announced ARPA-E Funding Opportunity. Specifically, the research entities are concerned by the requirement for at least 20 percent cost sharing. As stated in the announcement, ARPA-E will accomplish its mission by funding scientists to perform high risk, high payoff R &D efforts with the purpose of enabling major technological advances to overcome the problems of energy security and climate change. Such expertise exists at universities and other research institutions that are home to some of the nation's best researchers, however, DOE's requirement for at least 20 percent cost sharing in these difficult economic times may have a chilling effect on our investigators and a subsequent loss to the nation of their ideas. Do you share any of these concerns that have been raised regarding the 20 percent cost share requirement?

Secretary Chu: During the next year, ARPA-E will be issuing additional solicitations for specific technical programs. ARPA-E will look at many factors to determine the appropriate level of cost sharing. As rules of thumb, when the project risk is very high, the cost sharing should be lower. When the technology is closer to market or the future market is large and potentially very profitable, the cost share should be higher. ARPA-E will be flexible, working with the performer to determine the appropriate level and appropriate type of cost-sharing arrangements, which may include monetary contributions and/or other (in-kind) contributions.

As part of the Department of Energy, ARPA-E does fall under the Energy Policy Act of 2005 in which the Department of Energy is to ask for a minimum of 20 percent cost share for R&D of an applied nature and 50 percent cost share for a demonstration or commercial activity, unless reduced or eliminated by me as the Secretary. I will work with the Director of ARPA-E to determine under what circumstances it is appropriate to issue such waivers.

JOINT DARK ENERGY MISSIONS

Mr. Calvert: About six years ago, under the leadership of the Office of Science and Technology Policy, NASA and the Department of Energy began a process to merge their spaced-based dark energy research programs. The result was the Joint Dark Energy Mission (JDEM). Since that time, in spite of the explicit support of this committee, JDEM has been stuck in bureaucratic limbo and appears now to be a program in jeopardy of losing its initial scientific focus—at least in regards to the scientific objectives of the Department of Energy. Mr. Secretary, what is the status of this research program? Can it get back on track, and if so, how will this be done?

Secretary Chu: For a number of reasons the proposed DOE/NASA JDEM has been delayed. Despite this, DOE is still committed to pursuing this opportunity and implementing a successful mission that achieves the scientific goals of both NASA and DOE. We have also worked together with NASA in the presentation of the Dark Energy Mission to the National Academies Decadal Survey that is underway. DOE has initiated discussions with OSTP and NASA to clarify any remaining issues regarding our partnership in the mission and develop a path forward. In this partnership, input will be solicited from the scientific community and utilized to ensure that the mission concept, plan for the science investigations, and DOE's contributions are optimized to deliver the best science within available resources.

HUBS

Mr. Calvert: Mr. Secretary, you have said that the success of the Department's BioEenrgy Research Centers, specifically the Joint BioEnergy Institute (JBEI) which is led by Lawrence Berkeley National Laboratory, stems largely from a clear and focused mission and from the co-location of scientists from diverse fields and institutions. Specifically, during your discussion of the proposed Energy Innovation Hubs at the FY2010 budget roll out, you cited JBEI as an example of how these new "institutes" should work. I'm particularly interested to learn how these Hubs will bridge the silos that exist between the basic and applied programs at DOE. However, with these Hubs located throughout different DOE offices, how can the Department ensure that the institutes are well-coordinated, have targeted missions and contain the elements for success that you have articulated? Who will have the direct-line responsibility to make sure these new institutes live up to their good intentions? Although you have stated that researchers and equipment at these Hubs should be co-located, is there a need to develop geographically focused components or "sub" Hubs that will be better able to focus on specific climate, economic and geologic characteristics of a region? If this is a need, has the Department requested enough money for the establishment of these Hubs?

Secretary Chu: The Hubs begin from the premise of solving real world problems. The scientific and technological hurdles to solving these problems have largely been identified, for example, Grid modeling and simulation, nuclear recycling, the high cost of solar power, and the short battery life for hybrid vehicles. But what is lacking is the basic and applied research to overcome these hurdles. The Hubs will ask what research is necessary in order to solve these problems, all the way from basic science to applied technologies. By focusing basic and applied research on jointly solving a particular problem, the gap is inherently bridged as each type of research must work hand in hand in solving these problems.

The Hubs themselves, however, are a not a panacea for breaking down the silos that exist at DOE. As I have made clear, siloed thinking at the Department will not be tolerated. The Hubs, however, provide an example of how we can cut across silos and will set up a framework and culture that can, in the future, be replicated across the Department.

The Hubs will all be accountable to the Secretary and will exist only to the extent to which they produce results. The Hub will be subject to regular and rigorous peer review of its scientific program and its management structure, policies, and practices. Within DOE, there will be an Energy Innovation Hubs Oversight Board that will periodically review the progress of the Hubs. The Hub Oversight Board will consist of the Secretary and/or his designate, the Under Secretaries for Energy and Science, and their senior scientific/technical advisors. Each Hub will be managed by a particular department program office, which will be responsible for holding the Hub accountable and conducting annual site visit reviews of the Hub.

While the Hubs must be organized in order to achieve the desired results, visiting fellows will be encouraged. If there is particular research that can only be conducted in another location, then the interest in results would require that such research be performed elsewhere. But there must always be a direct link back to the Hub in which the experts can work closely together as a critical mass toward solving problems.

DEEP UNDERGROUND SCIENCE AND ENGINEERING LAB

Mr. Calvert: Under the leadership of the University of California, Berkeley, planning for Deep Underground Science and Engineering Laboratory (DUSEL) is well underway. I understand that the Department of Energy anticipates conducting key physics experiments at the DUSEL. What is the status of planning for this within the Department?

Secretary Chu: A Long Baseline Neutrino Experiment (LBNE) has been identified by the High Energy Physics community as a scientific opportunity that the U.S. should pursue. This experiment requires an intense neutrino beam pointed at a large underground detector that is located at some large distance (over 1,000 kilometers) from the neutrino source. A rigorous analysis of mission alternatives, as required by the DOE project management process, has not yet been performed, however, a new beamline using the Fermilab proton source and a large detector at the Homestake Mine (the proposed location of DUSEL) appear to fit the criteria for a LBNE. The first step in the DOE project management process is called Critical Decision-0 or Approval of Mission Need. DOE will make a determination of Mission Need for the LBNE soon. Our High Energy Physics program has allocated funding in the FY 2009 Appropriations and Recovery acts, as well as in the FY 2010 Request, to support R&D and activities to achieve the Critical Decision-1 (alternatives analysis) milestone during calendar year 2010.

Mr. Calvert: Is DUSEL a high priority for the Department of Energy? If so, how much do you anticipate that DOE's experiments at DUSEL will cost?

Secretary Chu: The long baseline neutrino experiment (LBNE) is a DOE priority. The cost of the project depends upon whether it can be done in collaboration with NSF or other partners, and in particular as part of the proposed DUSEL. DOE has not completed the CD-0 (Approval of Mission Need) milestone for LBNE, and the project is therefore at an extremely early stage. At this point, with these qualifications, the cost for LBNE is roughly estimated to be up to $1 billion over the period FY 2011-2019, assuming no contribution from NSF. By the time of Critical Decision-1 review in calendar year 2010, the estimated cost will be much better known.

OFFICE OF ADVANCED SCIENTIFIC COMPUTING RESEARCH

Mr. Calvert: Mr. Secretary, considering the number of users and support for DOE's missions, could you please explain the rationale of the Office of Advanced Scientific Computing Research for the FY2010 funding levels for the Department's leadership class computing facilities compared to the funding of its production computing facility?

Secretary Chu: The budgets for the Office of Science's production and leadership computing facilities are developed to support the differing missions of the two types of facilities within the available resources. The production facility at the National Energy Research Scientific Computing Center (NERSC) is focused on meeting the production computing needs of the Department's science mission. NERSC supports thousands of users with small to large allocations that range from 1,000 to 12 million processor hours on a variety of computing systems. To keep up with demand, the Department plans and budgets for regular upgrades to the NERSC facility. In FY 2009, the largest machine at NERSC, a Cray XT-4, was upgraded to roughly double its capacity. The FY 2010 budget request supports another upgrade of the NERSC facility by adding a new computing system, which is anticipated to again double the capacity at NERSC.

Leadership computing serves a very different purpose and is characterized by a small number of very large allocations currently ranging from 10 million to over 100 million processor hours. These facilities were called for in P.L 108–423, the Department of Energy High-End Computing Revitalization Act of 2004, and were explicitly assigned a mission beyond the Department. These facilities have an open policy for access, in much the same way that DOE light sources and neutron sources serve the national scientific community. Many DOE mission-related projects, however, do successfully compete for resources at the Leadership Computing Facilities. For example, in FY 2009 a team of researchers at the Oak Ridge Leadership Computing Facility used the Cray XT-5 to achieve the first petascale simulation—at 1.352 quadrillion calculations a second—of superconductors, which are materials that conduct electricity without resistance, and which has helped to resolve a long term scientific controversy about the mechanism that underlies this phenomenon. Another team of researchers recently used the entire 500 teraflop IBM Blue Gene/P at Argonne National Laboratory to conduct the first ever full scale simulation of the neutronics of a liquid-metal-cooled fast nuclear reactor core, which is a key technology for the development of next generation, safe, clean, nuclear energy. These full scale simulations are a critical part of the design of this type of reactor. An example of important Leadership Computing Facility results not related to DOE missions is a 2008 calculation that uncovered the underlying mechanism for Parkinson's disease and has led to research in next generations of pharmaceutical treatments.

Mr. Calvert: The Office of Advanced Scientific Computing Research has indicated that it will make computing capabilities available to the Department's applied research programs. How will this work? What resources will be made available and how will they be managed efficiently?

Secretary Chu: At DOE, we are committed to a competitive, peer reviewed process for determining the allocation of time on all of our scientific user facilities. There are two such processes open to researchers supported by the applied programs of the Department, and these processes are also open to researchers supported by other agencies, states, and industry. The Innovative and Novel Computational Impact on Theory and Experiment, or INCITE, process was established in 2004 to provide large allocations on the leadership computing facilities. The ASCR Leadership Computing Challenge program is a new allocation option established in FY 2009 for the ASCR scientific computing facilities. This program is open year-round to scientists from the research community and allocates between 5 and 30 percent of the computational resources at NERSC and the Leadership Facilities at Argonne and Oak Ridge for special situations of interest to the Department, with an emphasis on high-risk, high-payoff simulations in areas directly related to the Department's energy mission, for national emergencies, and for broadening the community of researchers capable of using leadership computing resources.

ADVANCED TURBINE PROGRAM

Mr. Calvert: Mr. Secretary, within your FY 2010 budget request, the Office of Fossil Energy requests an increase of $3,000,000 over FY 2009 enacted levels for the Advanced Turbines program account, however the supporting budget justification documents the Office of Fossil Energy presented to Congress appears to fund only the hydrogen turbine program within Advanced Turbines. Are there any other types of research efforts underway within the Advanced Turbine program not affiliated with hydrogen turbines? If so, please provide a list of each research effort, its associated goals and timelines for completion, and the research benefit each effort is to provide. Has the Department of Energy awarded any contracts within the last five years under the Advanced Turbine program not associated with Hydrogen Turbines? If so, please provide a list of each award, the recipient, the award amount, and the status of completion to date. The budget justification document for the Advanced Turbines program, states "Turbine and combustor development work with Siemens Power Generation (SPG), and Clean Energy Systems, Inc., for oxy fuel based systems that capture 100 percent of the CO2 emitted from coal based plants, will be concluded." Has the Department completely funded the work outlined and awarded to Siemens Power Generation and Clean Energy Systems, Inc. for oxy fuel based systems? Please provide an accounting of funding provided, by fiscal year.

Secretary Chu: There are two projects under the Turbines Program that are not focused on hydrogen turbine development. Both of these projects involve the development of oxy-syngas turbine technology.

The development of an oxy-syngas turbine combustor is being performed by Clean Energy Systems, Incorporated. The goal is the development of a pre-commercial oxy-syngas turbine combustor, and the project began in October of 2005 and is scheduled to run through March of 2010. The research benefit is a combustor system that can be used with an oxy-syngas turbine.

The second project is the development of oxy-syngas turbomachinery, and is being carried out by Siemens Power Generation. The goal is conceptual design, with attendant cost and feasibility studies, of components for an oxy-syngas turbine. The project began in October, 2005 and is scheduled to run through September, 2011. The research benefit is the design of key components for the oxy-syngas turbine.

These two projects constitute the two awards under the Turbines program in the last five years that are not related to hydrogen turbine development. Other specifics on these projects are as follows:

The Clean Energy Systems Project- the Cooperative Agreement number is DE-FC26-05NT42645. The award amount is $4,707,837. The status of completion to date is that this project has completed design work for an oxy-syngas turbine combustor.

The Siemens Power Generation Project- the Cooperative Agreement number is DE-FC26-05NT42646, and the recipient is Siemens Power Generation. The award amount is $15,701,507. The status of completion to date is that the project has completed conceptual designs for key components, as well as economic analyses.

The funding profile for the CES and Siemens projects are as follows:

The Clean Energy Systems project received $600,000 in Fiscal Year 2005, $1.2 million in Fiscal Year 2006, no funds in Fiscal Year 2007, $300,000 in Fiscal Year 2008, and is receiving $1.5 million this fiscal year.

The Siemens Power Generation project received $490,000 in Fiscal Year 2005, $900,000 in Fiscal Year 2006, $1.1 million in Fiscal Year 2007, $300,000 in Fiscal Year 2008, and is receiving $590,000 this Fiscal Year.

Hydrogen turbine development activities have highest priority within the Turbines program. A study by the University of California at Irvine was commissioned under the Turbines Program to compare the projected efficiency of a coal-based power cycle using oxy-syngas turbine technology with a coal-based integrated gasification combined cycle (IGCC) system using carbon sequestration and hydrogen turbine technology. The finding was that the efficiency of the oxy-syngas power cycle was lower than the IGCC system using the hydrogen turbine.

CARBON, CAPTURE AND STORAGE

Mr. Calvert: What is the Department's goal regarding carbon capture and storage as it pertains to percent of carbon captured from fossil based power plants? Does the Department have a difference in the percent of carbon captured from fossil fuel power plants based on fuel type?

Secretary Chu: The Department of Energy's goal regarding carbon capture and storage comprises two pathways—existing fossil energy power plants and new advanced gasification-based power plants. The carbon capture goal for existing fossil energy power plants is to develop post- and oxy-combustion CO2 capture technologies that achieve 90 percent CO2 capture at less than a 35 percent increase in cost of electricity (COE), when compared to no-capture, and they are expected to be demonstrated and available for commercial deployment beginning in 2020.

The carbon capture goal for new advanced gasification-based fossil energy power plants is to develop pre-combustion CO2 capture technologies that achieve 90 percent CO2 capture at less than a 10 percent increase in COE (when compared to non-capture) and they are also expected to be demonstrated and available for commercial deployment beginning in 2020.

The 90 percent carbon capture (or capture efficiency) goal from fossil fuel power plants is independent of fuel type (e.g., bituminous, sub-bituminous). The aim the Sequestration Program is to validate the technology necessary for large volume sequestration by 2012.

CARBON, CAPTURE AND STORAGE

Mr. Calvert: Does the Department believe oxy fuel based power systems are useful within the next five years? Why or why not? Please provide a detailed response. Why does the Department propose to conclude all work on oxy fuel based systems that provide for 100 percent capture of CO2 emitted from coal based plants? Is 100 percent capture not the goal of the Department regarding carbon emissions from power plants? Why or why not?

Secretary Chu: Whether or not oxy-combustion power plants are useful –i.e., could be available for commercial deployment in five years - remains to be determined pending successful completion of on-going scale-up testing being conducted by DOE's National Energy Technology Laboratory (NETL) and others. It should be noted that the characteristics of oxy-combustion have not yet been fully developed. Oxy-combustion flame characteristics, burner and coal-feed design, and analyses of the interaction of oxy-combustion products with boiler materials are all areas in need of more research. As a result, researchers are conducting laboratory- through pilot-scale testing into oxy-combustion boiler characteristics and innovative oxy-burner design. Although oxy-combustion would produce a flue gas that has a high CO2 concentration, the flue gas will also include H2O, excess O2, N2, SO2, NOX, Hg, and other contaminants. Therefore, other research focuses on the development of flue gas purification technologies.

It should also be noted that this first generation of oxy-combustion technology may not be considered cost-effective based on DOE/NETL estimates that it would increase the cost of electricity (COE) by approximately 80 percent and reduce the net plant efficiency by over 11 percentage points, as compared to a conventional air-fired, supercritical, pulverized coal power plant without CO2 capture. As a result, the cost effectiveness of first generation oxy-combustion is similar to commercially-available post-combustion technologies such as amine-based monoethanolamine (MEA) scrubbing technology.

For oxy-combustion to be a cost-effective power generation option, a low-cost supply of pure oxygen (O2) is required. Today's commercially-available method for O2 production – known as a cryogenic air separation unit (ASU) – is both capital and energy intensive. In response, DOE/NETL is funding the development of novel technologies that have the potential to provide step-change reductions in the cost of O2 production. However, these technologies are in the early stage of development and would likely not be available for commercial deployment until 2020.

DOE is not planning to discontinue work on the development of oxy-combustion technologies. As stated above, additional R&D is required to develop cost-effective oxygen production. DOE would also like to clarify that oxy-combustion, or any post-combustion technology should not be considered capable of achieving 100 percent CO2 capture. Oxy-combustion systems for CO2 capture rely on combusting coal with relatively pure oxygen diluted with recycled CO2 or CO2/steam mixtures. Under these conditions, the primary products of combustion are water and CO2, with the CO2

separated by condensing the water through cooling and compression. Theoretically, oxy-combustion could approach near 100 percent CO2 capture. However, near 100 percent capture is not practical due primarily to air infiltration at various stages of the coal combustion and flue gas handling processes. As a result, DOE's goal is to develop both oxy-combustion and post-combustion technologies that can cost-effectively achieve 90 percent CO2 capture.

NUCLEAR ENERGY LOAN GUARANTEE

Mr. Calvert: Financing which keeps pace with the development of new nuclear plants is dependent upon financing support from the federal government. I understand that the Department is negotiating terms and conditions and conducting due diligence with several projects for civil nuclear projects. What action has the Department specifically taken to ensure that the $18.5 billion in loan volume currently authorized for nuclear power projects supports existing projects? What actions are being taken to support the four to eight additional nuclear power projects that will be ready to start construction over the next several years? What steps have been taken or are planned to ensure the new licensing process will be sound and support confidence in private investment in new power plant projects?

Secretary Chu: The Department has selected four nuclear power projects for further due diligence based upon superior financial fitness as well as "readiness to proceed" once the COL license is obtained from the NRC from the 14 projects that originally responded to the nuclear power solicitation. Those 4 projects and their sponsors have been informed and the DOE is actively pursuing the selection of necessary support services to assist it in completing the necessary underwriting and due diligence that will lead to conditional commitments for some or all projects. With respect to the last question, the licensing process is entirely under the purview of the NRC, and it is inappropriate for me to comment on that process.

DEFENSE NUCLEAR NONPROLIFERATION

Mr. Calvert: Nonproliferation and Verification Research and Development programs and activities develop new technologies to improve U.S. capabilities to detect and monitor nuclear weapons production and proliferation and nuclear explosions worldwide. The FY 2010 budget request of $297.3 million represents a decrease of $66.5 million below the FY 2009 appropriated level. What are the Department and NNSA's nonproliferation priorities? What are the primary areas of progress, and the main challenges facing NNSA nonproliferation efforts?

Secretary Chu: Our highest priorities in the nonproliferation research and development arena are in the areas of developing new radiation detection capabilities for uranium and plutonium, especially at standoff distances, and of continuing our longstanding efforts to improve the Nation's ability to detect nuclear detonations. These priorities are supported by progress in the proliferation detection arena through advances in remote sensing, advanced materials, simulation, modeling and algorithm development. In the area of nuclear detonation detection, our biggest advances have come in our ability to bring vast computing capability to the task of evaluating ambiguous seismic data and resolving signal-to-noise ratio problems.

We are also trying to pursue research and development projects that will provide benefits to our other nonproliferation programs, for example, by providing support to the development of new safeguards technologies; in developing new detection capabilities that would be useful to the Second Line of Defense program; or in providing assistance to export control authorities and customs officials. The biggest challenges we face lie in the inherent difficulty of demonstrating progress in basic scientific exploration and in determining research goals that can be used both to sustain our programmatic progress and to explain the importance of our work to our stakeholders. Other challenges we face are common to our colleagues in Defense Programs: maintaining a highly skilled workforce at the national laboratories, and ensuring a laboratory infrastructure with cutting edge tools and capabilities, even as we reduce the Nation's reliance on nuclear weapons.

DEFENSE NUCLEAR NONPROLIFERATION

Mr. Calvert: Nonproliferation and Verification Research and Development programs and activities develop new technologies to improve U.S. capabilities to detect and monitor nuclear weapons production and proliferation and nuclear explosions worldwide. The FY 2010 budget request of $297.3 million represents a decrease of $66.5 million below the FY 2009 appropriated level. Are there any areas where NNSA could do more to accelerate and strengthen its nonproliferation programs if it had more funding, or does the FY2010 budget request reflect all current needs and capabilities?

Secretary Chu: The FY 2010 budget submitted by the President provides relatively steady funding for this program, after taking into account the completion of NNSA's funding commitment for the expansion of the 300 Area at Pacific Northwest National Laboratory. The nature of basic research and development is such that it is rarely possible to predict which project will yield a major technological breakthrough. We therefore fund a wide range of scientific research efforts that cover several different areas, any of which might produce a promising result; maintaining a stable level of effort is most important for supporting this kind of work. The President's budget request supports research and capability needed in advanced materials, remote sensing, simulation, modeling, algorithm development, radiochemistry, seismology, and forensics.

DEFENSE NUCLEAR NONPROLIFERATION

Mr. Calvert: The Nonproliferation and Verification Research and Development (R&D) program is the sole remaining U.S. government capability for long-term nuclear nonproliferation research and development and other critical work that helps keep the U.S. on the cutting edge of technology. The program has also been thinly staffed in recent years and supports many U.S. government entities outside of NNSA. What efforts are being made to expand and strengthen this program, with a particular focus on increasing the qualified scientific workforce in this area and developing the capacity to detect nuclear material origin and uranium enrichment and plutonium reprocessing?

Secretary Chu: This program's mission areas include development of technologies and methods to detect Uranium-235 production activities, plutonium production activities, special nuclear material movement, and advanced technology for global nuclear safeguards. Additionally, this R&D office improves the Nation's ability to detect nuclear detonations, builds the Nation's operational treaty monitoring space sensors, develops regional geophysical capabilities to enable the Nation's ground-based treaty monitoring networks, and advances technology in post-detonation nuclear forensics. In the last year, we strengthened this program by making the following staffing additions: we created new programs for addressing emerging requirements for global nuclear safeguards and radiological source replacement, and designated a full-time federal program manager for these tasks; we created a new forensics program and hired a full-time federal program manager and a full-time federal supervisor for integrating proliferation detection programs; we took advantage of using fellows from the Nonproliferation Graduate Program; and we created a Chief Scientist position for better integration of efforts across the program. Our cutting-edge, fundamental research at the national laboratories attracts both experienced and new researchers, thus enhancing the qualified scientific workforce in this area.

GLOBAL NUCLEAR ENERGY PARTNERSHIP

Mr. Calvert: What is the current status of Global Nuclear Energy Partnership?

Secretary Chu: DOE is no longer pursuing a domestic GNEP program that includes consideration of near-term demonstrations and GNEP facility construction. We have restructured all fuel cycle-related research and development (R&D) work into a long-term, science-based R&D program titled Fuel Cycle R&D.

We believe that proliferation issues should be a priority in any discussions about the use of civil nuclear energy and, in particular, in discussions that relate to development, deployment and operation of advanced fuel cycle and waste management technologies. Thus, the Department remains engaged in international meetings. However, the Department is considering how best to adapt to the existing international GNEP structure to be more reflective of current priorities.

YUCCA MOUNTAIN

Mr. Calvert: President Obama has indicated that he does not intend to pursue Yucca Mountain as a long-term repository for high-level waste. Yucca Mountain remains designated, by law, as a repository for high level radioactive waste. According to current plans, the Yucca Mountain repository would not open until 2017. Nonetheless, having this plan in place has significant implications for Environmental Management (EM). What are the implications of the President's stated intent to not pursue Yucca Mountain on EM's ability to manage and consolidate waste from both defense and non-defense sources today? In particular, what does this mean for EM's ability to ship surplus (or non-MOXable) plutonium from Hanford, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and other sites to the Savannah River Site?

Secretary Chu: For the near term, the Department will continue its current activities for the management and safe storage of high-level waste (HLW) and spent nuclear fuel (SNF). With adequate maintenance and surveillance we believe these materials could continue to be stored at our sites for decades, and still be safely retrieved. Thus, we intend to continue our planned efforts to consolidate plutonium at the Savannah River Site.

As I have testified, I am in the process of convening a "blue ribbon" panel of experts to evaluate alternative approaches to meet the Department's obligations for managing and ultimately disposing of SNF and HLW.

YUCCA MOUNTAIN

Mr. Calvert: President Obama has indicated that he does not intend to pursue Yucca Mountain as a long-term repository for high-level waste. Yucca Mountain remains designated, by law, as a repository for high level radioactive waste Given the unclear future of the Yucca Mountain projects, and the difficult economic reality many Americans and businesses are now facing, what efforts are being made by the Department to terminate fees paid by consumers, which has been used to cover only licensing costs incurred by the Department, NRC, and local Nevada government units that provide oversight of the program?

Secretary Chu: As indicated in our FY2010 budget request, the Administration intends to terminate Yucca Mountain activities while developing nuclear waste disposal alternatives. The Administration recognizes the Federal responsibility for managing and ultimately disposing of spent nuclear fuel and high-level radioactive waste. We remain committed to meeting our obligations for managing and ultimately disposing of spent nuclear fuel and high-level radioactive waste. Any decision to adjust the fees that support Departmental efforts to meet this responsibility must necessarily await completion of the evaluation of alternative approaches by the "blue ribbon" panel.

NEXT GENERATION NUCLEAR PLANT

Mr. Simpson: Secretary Chu, the FY2010 budget request for the Office of Nuclear Energy does not mention the Next Generation Nuclear Plant. Instead, the budget provides $191 million for research for six advanced reactor concepts. The Energy Policy Act of 2005 directed the DOE to build the NGNP demonstration plant and, under the leadership of Chairman Visclosky, this committee increased funding to get the project moving so we could get the technology into the hands of the private sector. The decision not to mention NGNP in the budget request has hampered efforts to put together a commercial-government alliance to cost-share the design, licensing and construction of the first plant. Can you tell me what are your plans for NGNP and how do you plan to meet the statutory requirement to have a plant built by 2021?

Secretary Chu: The FY 2010 budget request of $191 million represents a significant commitment to move forward with 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 Department is currently evaluating its plans for the NGNP project, which would rely on the private sector entering into a cost-sharing partnership with the Department. Key research and development that would be useful for the Next Generation Nuclear Plant project continues.

NEXT GENERATION NUCLEAR PLANT

Mr. Simpson: Secretary Chu, the Office of Nuclear Energy has instituted a 20 percent tax on R&D programs to support university research. I support funding to help train more nuclear scientists and engineers but this tax, coupled with the existing taxes for small businesses and other international work, greatly increases the cost to do work. The Next Generation Nuclear Plant, for example, has contributed over $30 million to support university R&D this fiscal year. Does DOE need a separate line item to support university research or should there be a point where an R&D program becomes a project to build something and these taxes would no longer apply? I would appreciate your thoughts on this issue.

Secretary Chu: The current structure is more effective than creating a separate program. By funding university research within the Office of Nuclear Energy (NE) research and development (R&D) programs we ensure the federal funding supports world-class targeted research that directly addresses key questions and advances the mission of NE programs while supporting nuclear energy science and engineering at universities and colleges. In FY 2009, the 20 percent allocation within the R&D programs, such as the Generation IV Nuclear Energy Systems Program, enables a close tie between the NE R&D mission and the university research community, supporting robust university research programs with a strong and meaningful linkage to the Department's core research priorities. This close tie is important and thus we think the university research funding should continue to be executed from within the R&D programs.

LOAN GUARANTEES

Mr. Simpson: Mr. Secretary, the President has promised that during his administration, decisions would be based on science and merit and not politics. Can you confirm that all decisions regarding DOE loan guarantee awards will be made solely based on the merits of the proposal and not on any political considerations? Mr. Secretary, would you please share with the subcommittee your proposed timeline for advancing another round of announcements regarding DOE loan guarantee awards? Do you have any proposed announcements scheduled within the next 30 days? 60 days? Would you agree with the subcommittee that for any project to be awarded a DOE loan guarantee, a proposed project should: have a more than reasonable chance of succeeding - proven technology; be creditworthy and rated as such by reputed financial institutions; and, generally be considered a viable project with a more than reasonable chance for repayment?

Secretary Chu: In accordance with Title XVII, "No guarantee shall be made unless the Secretary determines that there is reasonable prospect of repayment of the principal and interest on the obligation by the borrower." The Department has implemented a number of policies and procedures to ensure that all loan guarantees are made solely based on the technical and financial merits of the proposed project. In addition to tools such as the credit subsidy model for calculating risks associated with the project, each project undergoes a rigorous due diligence, and is ultimately reviewed by the Department's Credit Review Board.

LOAN GUARANTEES

Mr. Simpson: Do you believe the DOE loan guarantee program as currently constituted is workable? Do you have adequate funds and the right authority to make timely and useful decisions? If not, what would you like to see this subcommittee or Congress consider that would help you do your job with regard to issuing loan guarantees?

Secretary Chu: As of today, a cadre of seasoned professionals with extensive energy experience, principally in project finance, has been hired. Currently, 20 full-time equivalent employees are on board and they are augmented by 16 contractors for a total of 36 people. The LGP is continuing to recruit and hire qualified personnel of the highest caliber, as expeditiously as possible, to complete the project evaluation, environmental compliance with a focus on NEPA, due diligence, credit underwriting and monitoring and oversight activities. The Department is not seeking additional loan guarantee authority or additional appropriations for credit subsidy costs in FY 2010.

LOAN GUARANTEES

Mr. Simpson: Mr. Secretary, in a recent statement at the Reuters Global Energy Summit, you said that the current nuclear loan guarantees would "probably not go beyond four projects", but that more projects could be funded if Congress were to budget more money for the loan guarantee program. How much more money would you need in FY2010 to support the additional projects?

Secretary Chu: The Department is not seeking additional loan guarantee authority or additional appropriations for credit subsidy costs in FY 2010.

RESEARCH AND DEVELOPMENT TO COMMERCIAL DEPLOYMENT

Mr. Simpson: Secretary Chu, your budget provides strong support for science and basic research but the link to commercialize technology and get new technologies deployed seems weak. Can you tell us how you plan to address the so-called technology "Valley of Death" between research and development and the leap to commercial deployment?

Secretary Chu: The Department supports several efforts targeted at bringing new technologies to commercial deployment. For example, the Office of Energy Efficiency and Renewable Energy (EERE) Commercialization and Deployment Team takes an aggressive approach to bridging the gap between R&D and venture capital funding and marketing. The Team uses multiple strategies such as programs (e.g., the Entrepreneur in Residence [EIR] program), license agreements, and technology showcases to identify opportunities and interest investors. EERE provides joint funding for projects, develops business opportunities through competitive solicitations, and tracks both Federal and State incentives. The goal is to increase the rate and scale of energy efficiency and renewable energy technology market penetration. Likewise, the DOE Small Business Innovation Research (SBIR) and Small Business Technology Transfer Research (STTR) programs are also an effective mechanism that the Department uses to bring technologies important to the DOE mission into commercialization. The program supports the R&D for proof of concept and development of prototypes, as well as provides commercialization assistance to help the businesses develop business plans, conduct market research, and interface with targeted investors.

This year the Department initiated the Advanced Research Program Agency-Energy (ARPA-E) with funds provided in the American Recovery and Reinvestment Act of 2009 and within our FY 2009 base appropriation. ARPA-E is specifically focused on supporting scientists and technologists to take immature technologies that promise to make a large impact on key DOE missions and develop them beyond the "valley of death" that prevents many transformational new technologies from becoming a market reality.

DEPARTMENT OF ENERGY OVERSIGHT

Mr. Simpson. Secretary Chu, I have read with interest your statements regarding the need to make DOE more efficient. As a former lab director, can you share your thoughts on DOE oversight in the field and how we can make the system work better so more funds go toward energy research and development?

Secretary Chu. As you note, prior to my role as Secretary of Energy, I was the director at Lawrence Berkeley National Laboratory, so I am personally familiar with the costs and impacts on operational efficiency that can result from bureaucracy, overlapping oversight, and overly-restrictive requirements. As Secretary of Energy, I am firmly committed to improving business efficiency and reducing overhead within DOE. As I have stated on several occasions, increased efficiency, particularly in our national laboratories, is essential as one means of making more resources available for key energy programs that are important to the national economy, environment, and energy security. While I believe that changes are needed to improve efficiency and I am committed to making appropriate changes, we must ensure that such changes do not degrade safety or cause adverse impacts to our workers, the public, or the environment.

We are concurrently examining options that will improve efficiency of DOE's current regulatory approach, including options for: (1) streamlining oversight and reducing bureaucracy, with a particular focus on improving efficiency at DOE national laboratories and (2) improving DOE directives by ensuring that they promote flexibility and efficiency as well as ensure safe and compliance operations, with a focus on identifying and eliminating or revising those requirements that stifle efficiency and innovation but do not substantially enhance safety. In evaluating these options, I will be soliciting input from various sources including DOE laboratory directors, and members of Congress. We also plan to rely heavily on the insights from the previous studies and pilot programs that evaluated various oversight options.

LAB INTERACTION

Mr. Simpson: Secretary Chu, I would also like to get a sense of how you want to remove the stovepipes at DOE. From my experience, the science labs, the weapons labs and the applied energy labs seem to compete with each other as much as they cooperate. How do you see lab interaction?

Secretary Chu: Our system of labs is typical of all high-performance science and technology enterprises: collaborative and competitive processes are always present at every scale of our work. All of us, from Department leadership to the Labs' investigators are very facile in moving between competitive and collaborative processes, depending on what best achieves the larger goal. The job I have is to set the larger goals, provide the efficacious business processes that facilitate maximum creativity, and hold the Labs accountable for progress toward those goals. "Stovepipes," which artificially bias strategy toward competition, do need to be addressed in their own right. I want to see maximum interaction in healthy competition and healthy collaboration to achieve our goals.

NUCLEAR ENERGY

Mr. Simpson: Secretary Chu, after having more than a decade of experience in Congress following DOE issues, I have learned that one of DOE's (and other Agencies as well) major shortfalls is its lack of consistency and ability to follow ideas through to completion. Whether it is research on hydrogen vehicles, support for Yucca Mountain, the need for R&D to support cleanup of DOE sites, or fuel cycle research, it seems that one Energy Secretary or Undersecretary will show up and start us down one path, and then a few years later, a new group of DOE people arrive and change paths completely. In order for the nation to effectively tackle the energy challenges we face, we need consistent policies that have broad bi-partisan support. It will do us no good if your initiatives are thrown overboard by the next Secretary of Energy. What can we do to reach an enduring consensus on policies and stick with them so we can really make progress? I think the long-lead times required to restart the nuclear industry in this country makes this need for consistency and consensus particularly urgent in the field of nuclear energy.

Secretary Chu: Nuclear power currently supplies nearly 20 percent of the Nation's electricity and approximately 70 percent of its greenhouse gas-free electricity. Nuclear power will continue to be an important part of our energy mix and the Department is committed to supporting such use in a safe and secure manner that minimizes proliferation concerns.

The FY 2010 request supports innovative applications of nuclear technology to develop new nuclear generation technologies and advanced energy products, develop advanced proliferation-resistant nuclear fuel and waste management technologies and maintain national nuclear capabilities to meet future challenges. The multi-disciplinary Energy Innovation Hubs (Hubs) will accelerate innovation by providing an opportunity for additional focus on modeling and simulation and extreme materials R&D.

PENSIONS

Mr. Simpson: Secretary Chu, your budget request includes funds to shore up the DOE contractor pension funds. In my own state of Idaho, the pension problem is a serious concern to both my constituents and me. This problem is nobody's fault, but it is one more consequence of our struggling economy as the stock market losses have hurt DOE contractor pension plans and pension plans of many other Americans. Can you tell me what is the actual shortfall being faced in DOE as a whole? How have you (or have you) addressed this issue in the FY2010 budget? Is there an estimate today of how large the problem is and how much might be needed in the future?

Secretary Chu: The FY 2010 budget request supports the Department's missions and allows contractors to make all required payments to their defined-benefit (DB) pension plans. The current DOE projection for contractor employee defined-benefit (DB) pension reimbursements in FY 2010 is approximately $1.4 billion. There is no estimate today of the funding that will be required beyond FY 2010, as funding will depend on the status of the investment portfolios and applicable interest rates. The Department will continue to closely monitor the funded status of contractor DB pension plans to help formulate projections for the amount of funding that will be necessary to meet its obligations in each fiscal year to reimburse contractor DB pension costs.

YUCCA MOUNTAIN

Mr. Simpson: Could you please describe the scientific reasons why you believe that the Yucca Mountain site is not an option? Could you please provide the Subcommittee with a detailed explanation for your determination as to why the Yucca Mountain program is "no longer an option"? Currently, any settlements reached with nuclear reactor owners due to the missed nuclear waste deadline are paid for by the Justice Department and the federal Judgment fund. As of October of 2007 (close to two years ago), more than $290 million of awards and settlements had been paid from the Judgment Fund. Given that it is your department decision to terminate Yucca Mountain, would it make more sense for you to take over responsibility for the payment of these settlements?

Secretary Chu: The Administration does not view Yucca Mountain as a workable option. This decision is not based on a determination that a repository at the Yucca Mountain site could not meet regulatory requirements but rather reflects the Administration's belief that we can find a better solution that achieves a broader national consensus.

Regarding settlement payments, the Department will not assume responsibility for the payment of utility settlements from the Department of Treasury. In 2002, the 11th U.S. Circuit Court of Appeals ruled that the Department was not authorized under the Nuclear Waste Policy Act to spend Nuclear Waste Fund monies on settlement agreements aimed at compensating utilities for onsite storage costs.

YUCCA MOUNTAIN

Mr. Simpson: The Administration's budget proposal states that it includes "the minimal funding needed" to explore alternatives for nuclear waste disposal and to continue participation in the license application. However, I have been told that given the range of activities required to keep pace with the license application, the DOE funding request is insufficient. Is it possible that this funding is not sufficient to perform the activities necessary to comply with the NRC's licensing requirements? If Yucca Mountain is indeed no longer an option as you have stated why have you continued to request funds to continue licensing for a project that you have already determined to be unworkable?

Secretary Chu: The budget request includes the minimal funding needed to explore alternatives for nuclear waste disposal and to continue participation in the Nuclear Regulatory Commission license application process, consistent with the provisions of the Nuclear Waste Policy Act. The experience gained in the current licensing proceeding can inform the subsequent licensing of any future waste disposal alternative

YUCCA MOUNTAIN

Mr. Simpson: According to a report issued by your own Department, the ongoing liability associated with the Department's current delay in waste acceptance is $11 billion, and that assumes that the operation of the Yucca Mountain repository begins in 2020, 22 years behind schedule. For each additional year of delay, your Department estimates that there may be hundreds of millions of dollars of additional damages. Does the Department of Energy or the Justice Department have any estimates as to what the Federal Government liability would be under a gross breach of contract due to Yucca Mountain not being an option? What will be the federal government's additional liability (for both commercial and defense waste) for every year that the opening of a nuclear repository is delayed beyond 2020? The DOE has collected more than $28 billion in fees and interest payments from the nuclear industry to pay for a nuclear repository, and this fund is estimated to grow about $1.5 billion per year. I have been told that there is a possibility that DOE could be found in complete default on its NWPA contracts and be ordered to refund all the nuclear waste fees that have been collected, in addition to having to pay the utilities' extra at-reactor storage costs. Does DOE have a plan for how it would pay to reimburse the utilities?

Secretary Chu: The Department has estimated the liability resulting from the delay in beginning waste acceptance in 1998 would be $12.3 billion, assuming performance beginning in 2020. On average, each year of delay beyond 2020 would increase potential liability by up to $.5 billion. The amount of Government liability that might result from a "full" breach of contract would be based on a number of variables that are not quantifiable at this time.

YUCCA MOUNTAIN

Mr. Simpson: You have proposed to convene a "blue-ribbon" panel of experts to evaluate alternative approaches to Yucca Mountain. What criteria are being used to assemble the Blue Ribbon Panel to study storage? Will this panel look at all options for waste disposal, including Yucca Mountain? If the Panel determines that Yucca Mountain is a viable option and perhaps the best option based on the science and the recognition that the federal government has already spent $8 billion to develop this site, will it be permitted to include Yucca as the best option, or even an option, in its recommendations?

Secretary Chu: No final decisions concerning the charter of the "blue ribbon" panel have been made yet. Moreover, it would be inappropriate for the Department to speculate on any recommendations the panel may have in the future. As we go forward with convening the panel, I will keep Congress informed of our progress.

YUCCA MOUNTAIN

Mr. Simpson: Secretary Chu, I noticed that the President's budget has substantially increased the amount of funding for the NRC to review the DOE Yucca Mountain license application. In this process, the NRC is requiring the DOE Yucca Mountain team to provide additional quality-assured technical responses to hundreds of important safety issues and questions. I have been told that the Yucca Mountain Management and Operating contractor expert technical staff will be reduced by approximately 90% based on the FY 2009 and proposed FY2010 budgets. For example, I have heard that the proposed FY 2010 budget request supports fewer than 20 engineers to answer complex pre-closure safety questions. If this is so, can you please explain how the DOE technical team can support their end of the licensing process with such limited resources for technical experts?

Secretary Chu: The budget request includes the minimal funding needed to continue participation in the Nuclear Regulatory Commission license application process, consistent with the provisions of the Nuclear Waste Policy Act.

YUCCA MOUNTAIN

Mr. Simpson: Mr. Secretary, the DOE congressional budget request for the Yucca Mountain project states that the funding request supports the "minimal level" needed to support the NRC licensing process. I quote from the request, "This NRC licensing process will require a significant DOE effort to respond to potentially multiple rounds of highly technical, detailed NRC RAIs; provide technical, scientific, and legal support for court challenges; and maintain and update the LA and supporting documents as issues resulting from contentions are resolved and RAIs are responded to. Additionally, the Atomic Safety and Licensing Board will continue the LA hearing process; which will also require significant DOE effort to provide technical, scientific, licensing and legal support for the NRC hearing process." Mr. Secretary, even the Department acknowledges that significant resources will be required just to support a "minimal" effort to continue the licensing process. So, Mr. Secretary, by minimal effort, are you still intending to be 100% in compliance with NRC Requirements and expectations?

Secretary Chu: The budget request includes the minimal funding needed to explore alternatives for nuclear waste disposal and to continue participation in the Nuclear Regulatory Commission license application process, consistent with the provisions of the Nuclear Waste Policy Act.

Mr. Simpson: Keeping in mind the necessity of 100% NRC compliance, would you agree that the DOE responses to NRC's RAIs should be of high quality and comply with DOE's quality assurance program? Would you agree that the DOE RAIs responses to NRC questions should be based on sound technical and engineering bases, rather than just having the DOE licensing staff alone try to respond without the needed analyses and calculations? Can you assure me that the DOE budget request includes the necessary funding for the technical and engineering analyses to respond to RAIs? Would you agree that any DOE work must comply with its own engineering and design control process and therefore funds are needed to be provided for engineering change notices, hazard analyses, calculation updates, LA updates, etc? Do you intend to comply with NRC licensing requirements related to maintaining and updating the LA? Do you intend to maintain and update the EIS and issue supplements to the EIS as necessary and required by the NRC? Can you tell me when the Department is planning to submit this update to the NRC?

Secretary Chu: The budget request includes the minimal funding needed to explore alternatives for nuclear waste disposal and to continue participation in the NRC license application process, consistent with the provisions of the Nuclear Waste Policy Act. The Department plans to provide the Nuclear Regulatory Commission the requested environmental information and analysis in the near future.

YUCCA MOUNTAIN

Mr. Simpson: Under the FY2009 appropriation of $288.4 million, or almost $100 million below FY08, for the Yucca Mountain program, I understand there were approximately 500 layoffs. Are you concerned that your requested cut of another $100M (down to $196M) will not be sufficient to answer NRC RAIs and engineering support activities which are necessary to support the licensing process? Should you become aware of a backlog or delay in responding to NRC RAI's, would you commit to let me know as soon as you are aware of any backlog?

Secretary Chu: The budget request includes the minimal funding needed to explore alternatives for nuclear waste disposal and to continue participation in the Nuclear Regulatory Commission license application process, consistent with the provisions of the Nuclear Waste Policy Act. Thus far there have been no significant delays in responding to Requests for Additional Information from the Nuclear Regulatory Commission.

YUCCA MOUNTAIN

Mr. Simpson: Mr. Secretary, given the stated expectations of the Administration to maintain the License Application and supporting documents, what specific metrics are you monitoring to insure that adequate progress is being made? Based on your personal assessment, are you meeting this commitment?

Secretary Chu: The budget request includes the minimal funding needed to explore alternatives for nuclear waste disposal and to continue participation in the Nuclear Regulatory Commission license application process, consistent with the provisions of the Nuclear Waste Policy Act.

ENVIRONMENTAL MANAGEMENT BUDGET

Mr. Simpson: Secretary Chu, when it comes to the Environment Management budget, regardless of which Administration or Energy Secretary is in charge, we hear the same story every year. This year, the cleanup budget is down $162 million from FY09 and the budget for the Idaho Cleanup Project in my state is down almost $70 million from FY09. In addition, DOE has said that almost $300 million of the EM budget will go to address the expected pension plan shortfall, so the budget to do actual cleanup work is down even further.

Secretary Chu: The Office of Environmental Management's (EM) overall goal is to complete its legacy cleanup work in a safe, secure, and compliant manner, on schedule and within budget. EM will pursue its cleanup objectives and regulatory compliance commitments to achieve the greatest environmental benefit and the largest risk reduction. EM will also maintain best business practices to maximize cleanup progress. To support this approach EM has prioritized its cleanup activities:

- 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 decontamination & decommissioning

A major portion of EM's Fiscal Year 2010 budget request remains devoted to building the capability for tank waste treatment and disposition which is one of the Program's primary risks and largest cost driver. While maintaining momentum to develop and build these capabilities, EM will also continue to seek ways to maximize reduction of environmental, safety, and health risks in a safe, secure, compliant, and cost-effective manner.

ENVIRONMENTAL MANAGEMENT BUDGET

Mr. Simpson: Secretary Chu, when it comes to the Environment Management budget, regardless of which Administration or Energy Secretary is in charge, we hear the same story every year. This year, the cleanup budget is down $162 million from FY09 and the budget for the Idaho Cleanup Project in my state is down almost $70 million from FY09. In addition, DOE has said that almost $300 million of the EM budget will go to address the expected pension plan shortfall, so the budget to do actual cleanup work is down even further. While almost all of the sites see a reduction in proposed funding, it looks like once again, the DOE budget actually punishes those sites with good performance records over the past few years, like Idaho and Oak Ridge, with the sharpest funding cuts. Why does it seem that your cleanup budget is punishing sites like Idaho, or Oak Ridge, that have had very good performance over the past few years in terms of cleanup? What kind of message does this send to contractors that are performing well and doing the job you asked them to do?

Secretary Chu: The Office of Environmental Management's (EM) overall goal is to complete its legacy cleanup work in a safe, secure, and compliant manner, on schedule and within budget. EM will pursue its cleanup objectives and regulatory compliance commitments to achieve the greatest environmental benefit and the largest risk reduction. EM will also maintain best business practices to maximize cleanup progress. To support this approach EM has prioritized its cleanup activities:

- 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 decontamination & decommissioning

A major portion of EM's Fiscal Year 2010 budget request remains devoted to building the capability for tank waste treatment and disposition which is one of the Program's primary risks and largest cost driver. While maintaining momentum to develop and build these capabilities, EM will also continue to seek ways to maximize reduction of environmental, safety, and health risks in a safe, secure, compliant, and cost-effective manner.

ENVIRONMENTAL MANAGEMENT BUDGET

Mr. Simpson: The FY 2010 budget notes that funding for many of the cleanup sites, including at Idaho, is due in part to the funding provided for EM in the stimulus bill. For cleanup programs to be successful, the sites must have long-term, sustainable and reliable funding. The stimulus funding was always meant to be over and above the annual budget; it was never meant to be a substitute for regular appropriations process, but that is exactly what happened in this budget. If it weren't for the stimulus funds, your own officials have told me that the FY 2010 budget would be out of compliance with DOE's legal obligations. Why has the Department reversed course and decided to use stimulus funds as a substitute for annual budgets? Can you tell me what you plan to do to ensure that DOE continues to provide long term, sustainable budgets to make sure that cleanup moves forward and sites remain in compliance with state agreements?

Secretary Chu: The Environmental Management (EM) program is arguably the largest cleanup effort in the world and has had a mixed record of success over the past 20 years. The major, ongoing challenge to ensuring that cleanup moves forward and sites remain in compliance with state agreements is achieving intended results for the resources expended. The Department is committed to transforming the EM program by focusing on transparency, accountability, professional development, technology, hard work, and a commitment to excellence. Improving program performance will provide the Department, the Administration, and Congress the confidence needed for successful completion of the EM mission.

As described in the fiscal year (FY) 2010 budget, the EM FY 2010 budget request focuses on the highest risks associated with the cleanup program: the management and disposition of tank waste, surplus spent nuclear material, and spent nuclear fuel. The funding provided to EM in the Recovery Act of 2009 is designed to save and create jobs quickly, while accelerating the EM cleanup mission. To meet the goals of the Recovery Act, EM selected already planned projects for funding. These projects can be most readily accelerated to reduce the EM Program footprint while putting Americans to work in productive jobs with long-term benefit. As a result, Recovery Act funding is targeted to such well-understood activities as soil and ground water remediation, radioactive solid waste disposition, and facility decontamination and decommissioning. These activities represent "shovel-ready" work that already has a defined cost, scope and schedule; an established regulatory framework; proven technologies, proven past performance, and existing contract vehicles. Recovery Act funds are being used to fund activities that meet both EM's mission goals and the goals of the Recovery Act.

DOE'S CLEANUP EFFORTS

Mr. Simpson: Those of us who represent cleanup sites in Congress, including Mr. Wamp next to me and Doc Hastings from Washington, have worked for years to improve the budget baselines for cleanup to get them to adequate levels. As you know, cleanup is a long-term obligation -- these sites will require billions of dollars over the next 30 years or even longer before this commitment is met. My interest in cleanup is not just a parochial interest. Without proper cleanup of the nuclear mistakes of the past there will be no revitalization of nuclear energy in the future. With that in mind, what relationship do you see between the DOE's cleanup efforts and its ability to move forward with a new nuclear future? Do you agree that meeting your commitments on cleanup is a crucial component of moving forward on a revitalization of nuclear energy?

Secretary Chu: The challenges associated with resolving nuclear waste issues, resolving the so-called "back end" of the nuclear fuel cycle, is often cited by opponents of nuclear energy as one reason not to expand the use of nuclear energy. While these challenges are certainly complex, they are being addressed through transformational research and development programs in the Department's Offices of Science, Nuclear Energy, and Environmental Management. We look to the results of such transformational research and development, in combination with informed public policy, to ultimately support development and deployment of a full suite of new, sustainable, economic, carbon neutral energy solutions.

CLEANUP FUNDING PLAN AFTER RECOVERY ACT

Mr. Simpson: As you know, sites can expect to receive stimulus funds through FY2011. Can we assume that the FY2011 cleanup budget will also see sharp decreases in funding because of the continued availability of stimulus funds? And if so, what will happen to the budget baseline when we come to FY2012 and the stimulus money is no longer available to compensate for the large cuts in the program? Does the Department have a long-term multiyear plan that lays out what the cleanup funding plan is after stimulus dollars are gone?

Secretary Chu: Given the depth and breadth of the global challenges we face, and the pending budget formulation processes, it would be premature to comment on the cleanup budget for FY 2011 and FY 2012. The Department remains committed to cleaning up the legacy of nuclear weapons production in a manner that protects human health and the environment.

EXPANDING SCOPE OF RESEARCH INITIATIVES

Mr. Simpson: Mr. Secretary, I think you would agree that not all innovative projects which can reduce our energy consumption or reduce green house gases neatly fall within DOE's current, rather stove-piped structure. For example I know of a research project in our neighboring state of Wyoming which will test a method of capturing large amounts of methane gas at a major mining operation and converting it to an energy source. I understand methane is unusually intensive as a green house gas. Thus, if this R&D proves successful, it will both save significant amounts of energy from conventional sources and reduce green house gases. Unfortunately, this is one example of an R&D project does not fall within the Department's Innovative Technologies—because it is not a proven technology or one that can be licensed to government, or Fossil Fuels programs—because methane is not a fossil fuel even though the methane is being released during the mining of fossil fuels. While this may not be a traditional DOE project, in my view this is precisely the sort of project DOE should be encouraging if not with some seed funding, then at least by offering expertise and seeing how it might be applicable in other non-coal mining situation where methane gas may be present. Have you considered how to address research initiatives that do not neatly fit within existing Department pigeonholes but may offer significant promise?

Secretary Chu: Siloed thinking will not be tolerated at DOE. The best science, engineering and technological research will guide DOE's practices in the future. The SBIR/STTR and ARPA-E programs, for example, provide an outlet for R&D activities that may not otherwise fit within a particular program office.

○