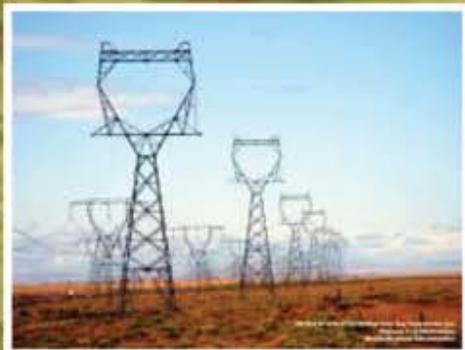


# Fiscal Year 2010 Summary of Performance and Financial Information



# Agency Reporting

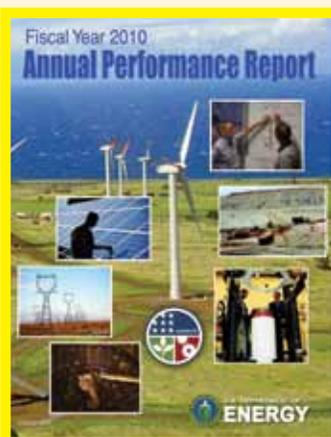
The Reports Consolidation Act of 2000 authorizes Federal agencies, with the Office of Management and Budget's (OMB) concurrence, to consolidate various reports in order to provide performance, financial and related information in a more meaningful and useful format. The Department of Energy (Department or DOE) has chosen an alternative reporting to the consolidated Performance and Accountability Report and instead produces an *Agency Financial Report*, an *Annual Performance Report*, and a *Summary of Performance and Financial Information*, pursuant to the OMB Circular A-136. The Department's FY 2010 reporting includes the following three components which are available at the website [www.energy.gov/about/budget.htm](http://www.energy.gov/about/budget.htm).



## Agency Financial Report (AFR)

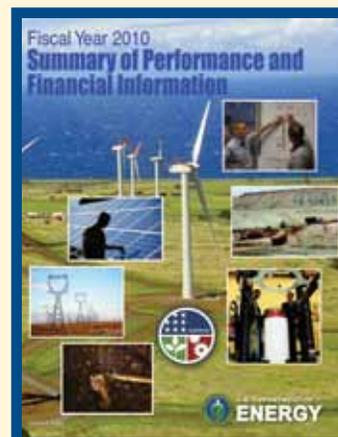
The AFR is organized by the following three major sections:

- **Management's Discussion and Analysis** section provides executive-level information on the Department's history, mission, organization, Secretarial priorities, analysis of financial statements, systems, controls and legal compliance and other management priorities facing the Department.
- **Financial Results** section provides a Message from the Chief Financial Officer, the Department's consolidated and combined financial statements and the Auditors' Report.
- **Other Accompanying Information** section provides the Inspector General's Statement of Management Challenges, Improper Payments Information Act Reporting details and other statutory reporting.



## Annual Performance Report (APR)

The APR is produced in conjunction with the Congressional Budget Justifications and provides the detailed performance information and descriptions of results by each performance measure.



## Summary of Performance and Financial Information

This document highlights the most important performance and financial information from the APR and AFR in a brief, executive format.



# Message from the Secretary



I am pleased to present the U.S. Department of Energy's *FY 2010 Summary of Performance and Financial Information*. This report provides key financial and performance information that demonstrates our accountability to the American people for both our financial results and our performance in discovering the solutions to power and secure America's future.

Over the past year, the Department's efforts have brought it closer to its goals of expanding the frontiers of science (science, discovery and innovation); creating clean energy jobs (economic prosperity); curbing the carbon pollution that threatens our planet (clean, secure energy); and reducing nuclear dangers (national security). This report is one of three integrated reports. The two other detailed reports, the *FY 2010 Agency Financial Report* and the *FY 2010 Annual Performance Report*, are available on our web site at [Energy.gov](http://Energy.gov).

Fiscal year 2010 was the second year of implementing the American Recovery and Reinvestment Act (Recovery Act). The Department contributed to the Administration's goal of stimulating the U.S. economy through ramping up its activities in energy-related areas of spending, project performance, and job creation. I am especially proud of the Department's accomplishments in obligating \$32.7 billion in Recovery Act contract and grant funds in an unprecedented 18 months to specific clean energy and science projects. Significant impacts were seen throughout the country including the weatherization of low-income homes, the clean-up of several nuclear sites, Smart Grid investments, advanced batteries grants, major investments in wind and solar power, and project commitments for carbon sequestration. Many of these activities have contributed to economic growth while laying the foundation for long-term prosperity through a clean energy economy.

This momentum needs to be sustained. However, it will require industry and government working together to accelerate innovation that addresses numerous challenges. Comprehensive energy and climate legislation—providing stable, long-term incentives that will unleash America's inventors, entrepreneurs, and industries—will be needed to truly transform how America consumes and produces energy. It is the private sector that will ultimately drive this new industrial revolution and bring it to scale. As a scientist, I am an optimist and believe we can meet this challenge and lead the world in the 21st century.

The independent public accounting firm KPMG LLP conducted an audit of the Department's fiscal year 2010 financial statements contained in the *FY 2010 Agency Financial Report*. The Department received an unqualified audit opinion. Based on our internal evaluations, I can provide reasonable assurance that the financial and performance information contained in this report is complete and reliable and accurately describes the results achieved by the Department.

As Secretary, I assure you that Department of Energy employees take their work seriously, and I commend them for their contributions.

A handwritten signature in black ink that reads "Steven Chu".

Steven Chu  
February 15, 2011

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# DOE History

The Department has one of the richest and most diverse histories in the Federal Government, with its lineage tracing back to the [Manhattan Project](#) and the race to develop the atomic bomb during World War II. Following that war, Congress created the [Atomic Energy Commission](#) in 1946 to oversee the sprawling nuclear scientific and industrial complex supporting the Manhattan Project and to maintain civilian government control over atomic research and development (R&D). During the early Cold War years, the Commission focused on designing and producing nuclear weapons and developing nuclear reactors for naval propulsion. The creation of the Atomic Energy Commission ended the exclusive government use of the atom and began the growth of the commercial nuclear power industry, with the Commission having authority to regulate the new industry.

In response to changing needs and an extended energy crisis, the Congress passed the Department of Energy Organization Act in 1977, creating the [Department of Energy](#). That legislation brought together for the first time, not only most of the government's energy programs, but also science and technology programs and defense responsibilities that included the design, construction and testing of nuclear



*Early Pantex Plant loading and packing artillery shells and bombs.*

weapons. The Department provided the framework for a comprehensive and balanced national energy plan by coordinating and administering the energy functions of the Federal Government. The Department undertook responsibility for long-term, high-risk research and development of energy technology, Federal power marketing, some energy conservation activities, the nuclear weapons programs, some energy regulatory programs and a central energy data collection and analysis program.

Over its history, the Department has shifted its emphasis and focus as the energy and security needs of the Nation have changed. On February 17, 2009, the Department was significantly impacted by President Obama signing into law the American Recovery and Reinvestment Act of 2009 (Recovery Act or ARRA). The Recovery Act more than doubled the Department's base budget by providing an additional \$36.7 billion of funding for the acceleration of a number of critical commitments in the Department's mission and activities.



*Recovery Act dollars put to work*

# DOE at a Glance

## Mission

Discovering the solutions to power and secure America's future

## Organization

DOE is comprised of 3 Offices of Under Secretaries (National Nuclear Security Administration, Energy, and Science), 4 Power Marketing Administrations, the Energy Information Administration, the Advanced Research Projects Agency-Energy, 13 staff and support offices, 22 operations and area offices, 24 research laboratories and facilities. ([Energy.gov/organization](http://Energy.gov/organization))

## Secretarial Priorities

- Science, Discovery and Innovation
- Economic Prosperity
- Clean, Secure Energy
- National Security

## Personnel

The FY 2010 workforce was comprised of 16,410 on-board federal employees and 99,370 estimated contractor employees. The large number of contractors is attributable to the highly specialized scientific and technical skill mixes required to manage and operate DOE's 17 national laboratories. ([Humancapital.doe](http://Humancapital.doe))

## Performance

	FY 2010*	FY 2009*	FY 2008	FY 2007
Targets Met	273	285	203	189
Targets Not Met	65	62	15	14
Results Unknown**	6	3	2	0
<b>Total Number of Measures</b>	<b>344</b>	<b>350</b>	<b>220</b>	<b>203</b>

\* Includes performance measures for Recovery Act projects (142 in FY 2009, 141 in FY 2010)

\*\* Results not available by end of fiscal year

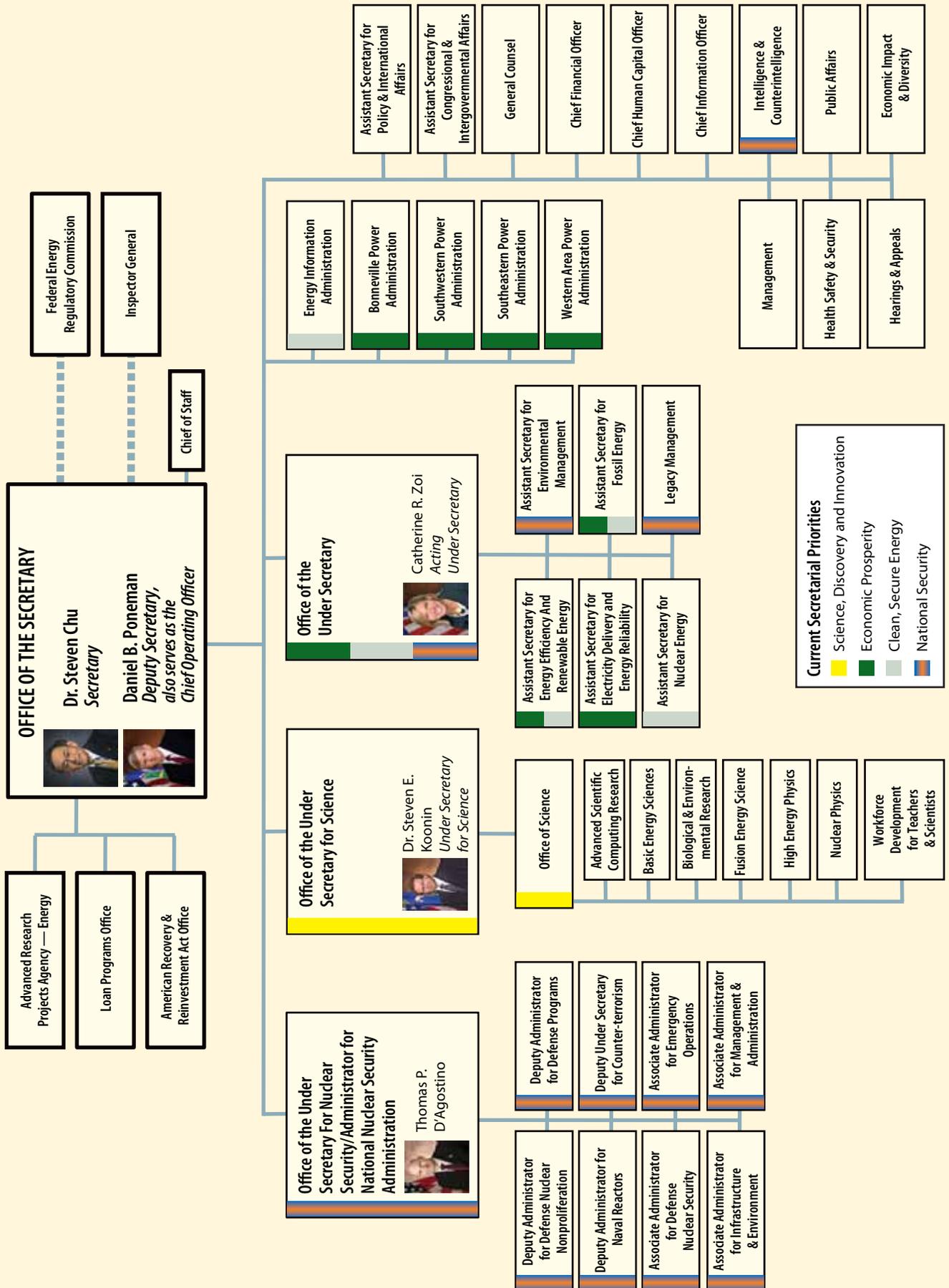
Note: Detailed performance information is available in the FY 2010 Annual Performance Report (pages 10-26).

## Financials

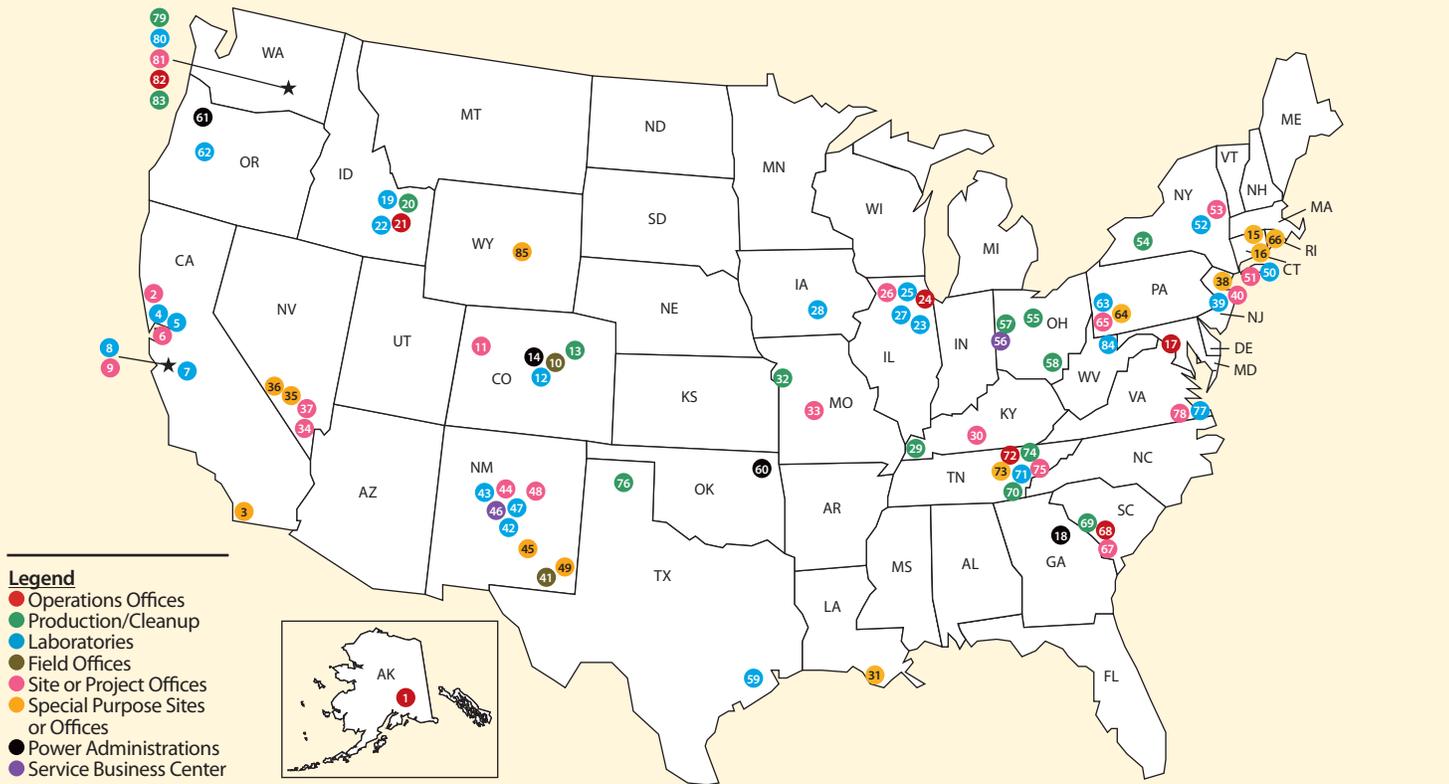
(DOLLARS IN BILLIONS)	FY 2010	FY 2009	FY 2008	FY 2007
Total Assets	\$ 181.7	\$ 182.0	\$ 133.8	\$ 130.7
Total Liabilities	\$ 355.6	\$ 361.5	\$ 344.0	\$ 337.8
Net Cost of Operations	\$ 23.8	\$ 40.1	\$ 29.4	\$ 61.5
Total Budgetary Resources	\$ 66.7	\$ 95.6	\$ 36.8	\$ 36.1
Net Outlays	\$ 32.0	\$ 24.1	\$ 21.3	\$ 20.1
<b>Audit Opinion</b>	<b>unqualified</b>	<b>unqualified</b>	<b>unqualified</b>	<b>unqualified</b>

Note: Detailed financial information is available in the FY 2010 Agency Financial Report (pages 37-41).

# Agency Organizational Structure



# Major Laboratories and Field Facilities



## Alaska

- 1 Arctic Energy Office

## California

- 2 Berkeley Site Office
- 3 Energy Technology Engineering Center
- 4 Lawrence Berkeley National Laboratory
- 5 Lawrence Livermore National Laboratory
- 6 Livermore Site Office
- 7 Sandia National Laboratories
- 8 SLAC National Accelerator Laboratory
- 9 SLAC Site Office

## Colorado

- 10 Golden Field Office
- 11 Grand Junction Office
- 12 National Renewable Energy Laboratory
- 13 Rocky Flats Closure Project
- 14 Western Area Power Administration

## Connecticut

- 15 16 Northeast Home Heating Oil Reserves

## District of Columbia

- 17 Washington D.C. Headquarters

## Georgia

- 18 Southeastern Power Administration

## Idaho

- 19 20 Idaho National Laboratory
- 21 Idaho Operations Office
- 22 Radiological Environmental Sciences Laboratory

## Illinois

- 23 Argonne National Laboratory
- 24 Chicago Office
- 25 Fermi National Accelerator Laboratory
- 26 Fermi Site Office
- 27 New Brunswick Laboratory

## Iowa

- 28 Ames Laboratory

## Kentucky

- 29 Paducah Gaseous Diffusion Plant
- 30 Portsmouth/Paducah Project Office

## Louisiana

- 31 Strategic Petroleum Reserve

## Missouri

- 32 Kansas City Plant
- 33 Kansas City Site Office

## Nevada

- 34 Nevada Site Office
- 35 Nevada National Security Site
- 36 Yucca Mountain
- 37 Office of Civilian Radioactive Waste Management

## New Jersey

- 38 Northeast Home Heating Oil Reserve
- 39 Princeton Plasma Physics Laboratory
- 40 Princeton Site Office

## New Mexico

- 41 Carlsbad Field Office
- 42 Inhalation Toxicology Research Institute
- 43 Los Alamos National Laboratory
- 44 Los Alamos Site Office
- 45 National Training Center

## New York

- 46 NNSA Service Center
- 47 Sandia National Laboratories
- 48 Sandia Site Office
- 49 Waste Isolation Pilot Plant
- 50 Brookhaven National Laboratory
- 51 Brookhaven Site Office
- 52 Knolls Atomic Power Laboratory
- 53 Schenectady Naval Reactors Office
- 54 West Valley Demonstration Project

## Ohio

- 55 Columbus Environmental Management Project
- 56 EM Consolidated Business Center
- 57 Miamisburg Closure Project
- 58 Portsmouth Gaseous Diffusion Plant

## Oklahoma

- 60 Southwestern Power Administration

## Oregon

- 61 Bonneville Power Administration
- 62 National Energy Technology Laboratory – Albany

## Pennsylvania

- 63 Bettis Atomic Power Laboratory
- 64 National Energy Technology Laboratory – Pittsburgh
- 65 Naval Reactors Laboratory Field Office

## Rhode Island

- 66 Northeast Home Heating Oil Reserve

## South Carolina

- 67 Savannah River National Laboratory
- 68 Savannah River Operations Office
- 69 Savannah River Site Office

## Tennessee

- 70 East Tennessee Technology Park
- 71 Oak Ridge National Laboratory
- 72 Oak Ridge Site Office
- 73 Office of Scientific and Technical Information
- 74 Y-12 Plant
- 75 Y-12 Site Office

## Texas

- 76 Pantex Plant and Site Office
- 79 National Energy Technology Lab – Sugar Land

## Virginia

- 77 Thomas Jefferson National Accelerator Facility
- 78 Thomas Jefferson Site Office

## Washington

- 79 Hanford
- 80 Pacific Northwest National Laboratory
- 81 Pacific Northwest Site Office
- 82 Richland Operations Office
- 83 Office of River Protection

## West Virginia

- 84 National Energy Technology Laboratory – Morgantown

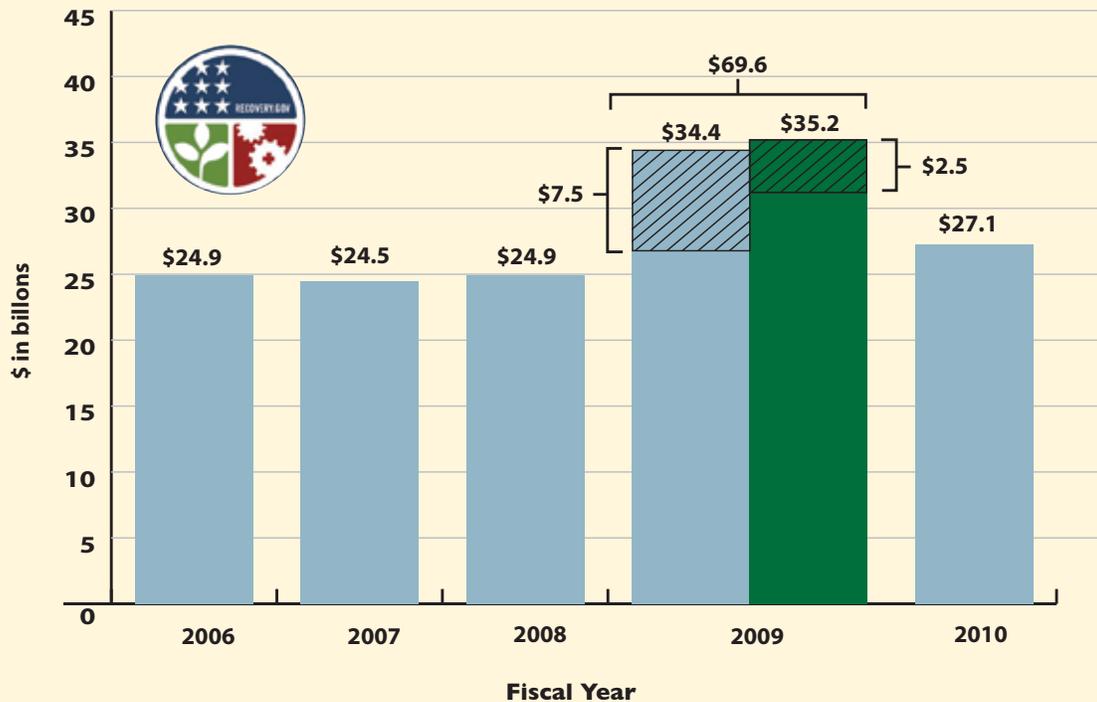
## Wyoming

- 85 Naval Petroleum Reserve No. 3 – Casper

# Financial Resources

## Adjusted Appropriated Amounts

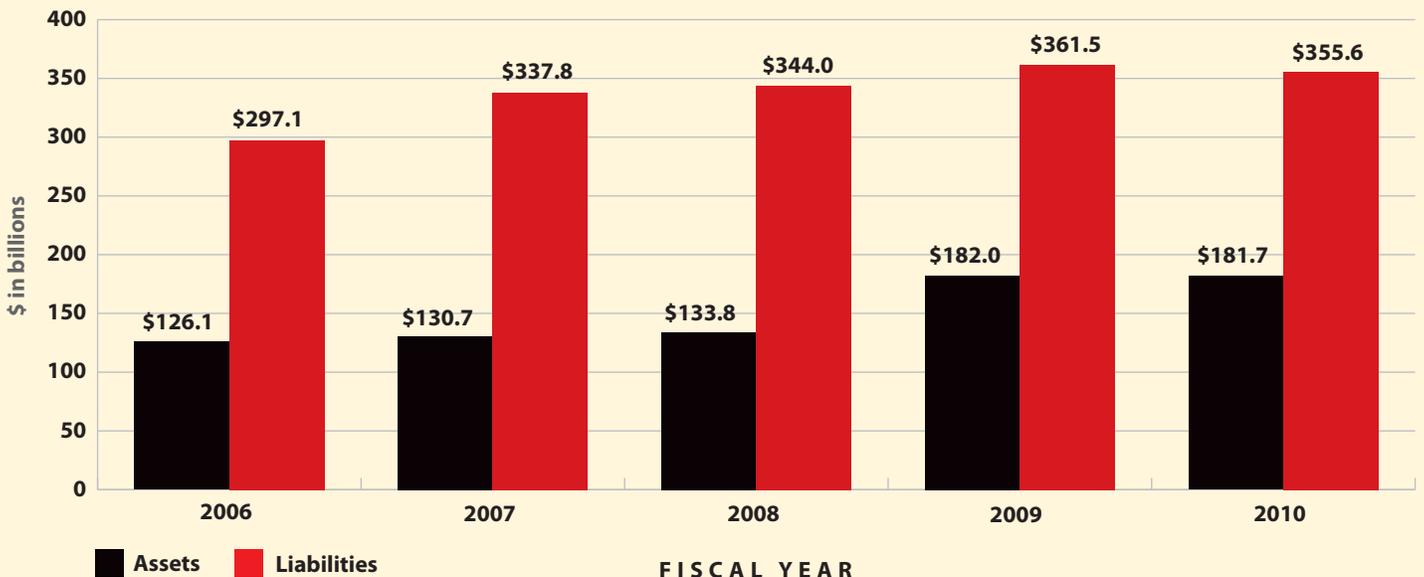
(Adjustments include appropriation transfers, reductions and appropriations temporarily not available.)



■ Base Appropriations    
 ■ Recovery Act Appropriations    
  Loan Programs

(Original \$38.7 billion of Recovery Act Appropriations was later reduced by \$3.5 billion in transfers and rescissions. Does not include the Western Area and Bonneville Power Administrations' borrowing authority and credit reform financing accounts.)

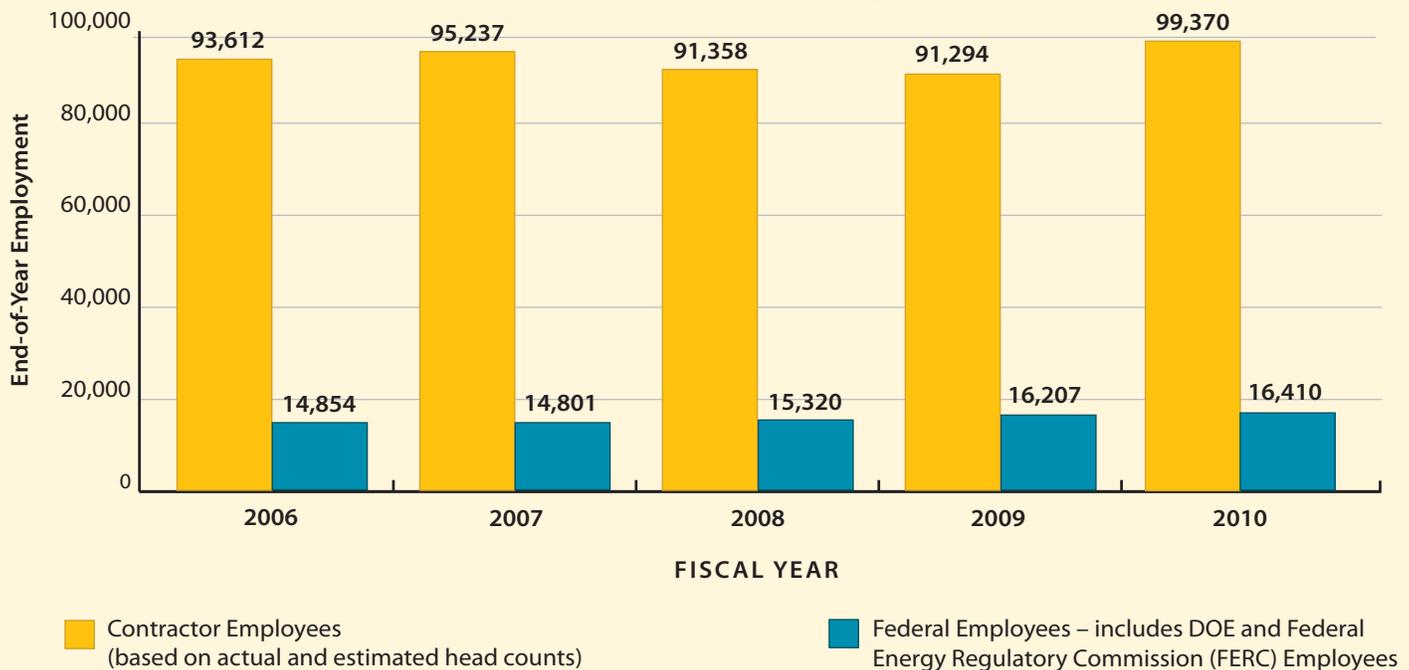
## Assets and Liabilities



■ Assets    
 ■ Liabilities

# Human Capital Resources

Federal and Contractor Employees



# Financial Management Report Card

	REQUIREMENT OR INITIATIVE	SUPPORTING INDICATORS
✓	Government Management Reform Act — Financial Statement Audit	— Unqualified Audit Opinion
✓	Federal Managers' Financial Integrity Act — Internal Controls (Section II) Financial Systems (Section IV)	— No Material Weaknesses — Financial Systems generally conform to (Section IV) requirements and no FISMA significant deficiencies identified
✓	OMB Circular A-123, Appendix A	— No Material Weaknesses
✓	Federal Financial Management Improvement Act	— Substantially comply with Federal financial management system requirements
✓	Federal Information Security Management Act (FISMA)	— Substantially comply with FISMA requirements as evidenced by annual FISMA reporting data
✓	Improper Payments Information Act	— <1% Erroneous Payment Rate — Not considered significant risk per OMB guidance

# High-Priority Performance Goals

In FY 2010, the Department of Energy established seven high-priority performance goals which are intended to focus senior leadership's attention on top administration and departmental priorities and promote better coordination across agencies on key performance priorities. These efforts are being reviewed and monitored by the White House, the Office of Management and Budget, the President's Management Council, and the Performance Improvement Council. The first results associated with these goals are expected in FY 2011. These goals are also being integrated into the formulation process for DOE's new strategic plan which is expected to be issued in FY 2011.

A "high-priority performance goal" is a measurable commitment to a specific result the federal government will deliver for the American people. DOE's goals are as follows:

- **Renewable Capacity** – Double renewable energy generating capacity (excluding conventional hydropower) by 2012;
- **Advanced Batteries** – Assist in the development and deployment of advanced battery manufacturing capacity

to support 500,000 plug-in hybrid electric vehicles per year by 2015;

- **Nuclear Loans** – Commit (conditionally) to loan guarantees for two nuclear power facilities to add new low-carbon emission capacity of at least 3,800 megawatts during 2010;
- **Retrofits** – Department of Energy and Department of Housing and Urban Development will work together to enable the cost-effective energy retrofits of 1.1 million housing units through FY 2011 (of this number, DOE programs will contribute to retrofits of an estimated 1 million housing units);
- **Secure Nuclear** – Make significant progress towards securing the most vulnerable nuclear materials worldwide within four years;
- **Nuclear Weapons** – Maintain the U.S. nuclear weapons stockpile and dismantle excess nuclear weapons to meet national nuclear security requirements as assigned by the President through the Nuclear Posture Review; and
- **Legacy Waste** – Reduce the Department's Cold War legacy waste site footprint by 40%, from 900 square miles to 540 square miles by 2011.

## Recovery Act Results

Contained in the [American Recovery and Reinvestment Act of 2009](#) (Recovery Act) were the seeds of a clean energy economy. The legislation made a down payment on America's clean energy future, with historic investments in energy efficiency, renewable energy, transportation, carbon capture and storage, and a smarter electric grid. Other initiatives included accelerating the clean-up of Cold War legacy nuclear sites and supporting technological and scientific innovation. Congress entrusted DOE with \$35.2 billion in appropriations and \$6.5 billion in Power Marketing Administration borrowing authority for these purposes. The Department was also directed to work with Treasury to provide clean energy manufacturing tax credits and generation tax grants; to date these have amounted to more than \$7 billion. The Department has worked to invest its share of this funding quickly and wisely. Detailed FY 2010 results from the DOE Recovery Act programs follow.

### Energy Efficiency

Under the Recovery Act, DOE has made an historic investment in low-income home energy efficiency. The Recovery Act provided \$5 billion for the [Weatherization Assistance](#) program to fund local agencies to perform home energy audits and weatherization services for low-income families. By August

2010, this program had improved the energy efficiency in 200,000 homes. More than 600,000 homes are expected to be weatherized by March of 2012 – each with upgrades like better furnaces, insulation, and caulking. These energy-efficient upgrades are important to the thousands of Americans who are paying less for utilities, and they are also important to the 13,000 American workers whose jobs are supported by our weatherization program.

A total of \$3.2 billion was provided to fund the [Energy Efficiency and Conservation Block Grant](#) program. The competitive portion of this program is known as Better Buildings. The leading projects under this program are defining new approaches to make energy efficiency services available to all Americans at significantly lower cost. Vice President Biden kicked off the White House's Earth Day activities this year by announcing the communities that received \$452 million in awards. This injection of funding has helped more than 2,300 cities, counties, states, territories, and Indian tribes develop their own efficiency programs, including building code development, energy audits and retrofits, efficient public lighting, and landfill gas capture. The program has created jobs while making a meaningful difference in energy usage at the local level.



*Recovery Act new hires at Hanford site in Washington.*

The [State Energy](#) program was expanded through Recovery Act funds of \$3.1 billion. Examples include the following: Michigan has supported 14 manufacturers to fill gaps in the clean energy supply chain; Indiana has supported nearly 500 wind manufacturing jobs; and Idaho has improved energy efficiency in 210 K-12 schools across the state, putting money back into school budgets. The states also received \$300 million to facilitate energy efficient [appliance rebate](#) programs.

## Clean Energy

One of the administration's programs under the Recovery Act, the [payments-in-lieu of tax credits](#) program (also referred to as the Section 1603 program), pays developers as soon as a renewable energy project is placed in service. By partnering with private industry, the Department of Treasury and DOE have funded renewable energy projects with enough capacity to power more than one million homes; that is enough clean energy to power the homes of everyone living in Boston, Seattle, Atlanta, Kansas City, and Cincinnati combined.

Together with the Department of Treasury, DOE also awarded \$2.3 billion in tax credits for 183 [clean energy manufacturing](#) projects in 43 states. This investment will be matched by as much as \$5.4 billion in private sector funding. High technology, clean energy manufacturing is quickly expanding within the United States. Domestic clean energy manufacturers like Cardinal Fastener in Bedford Heights, Ohio, received a \$480,000 tax credit to produce bolts for wind turbines and will double its workforce within the next year. Itron in West Union, South Carolina received more than \$5 million in tax credits to help it re-equip its plant to keep up with the demand for advanced smart meters. CalStar Products received \$2.4 million in tax credits for a plant in Caledonia, Wisconsin, to manufacture bricks and pavers that have 40% post-industrial recycled content and use almost 90% less energy than traditional products.

Clean energy deployment has been supported through the [Loan Guarantee](#) program. During FY 2010, DOE announced more than \$3.5 billion in loans or conditional commitments to

build renewable energy and grid electrification projects, such as AES (NY), BrightSource (CA), Abound (CO), Beacon (NY), First Wind (HI) and Blue Mountain (NV). These commitments have proven effective in bringing private capital off the sidelines and into the market. For example, the Department made a conditional commitment to Abengoa Solar, Inc., in Arizona to finance the construction of a concentrating solar power generation facility that will have 250 megawatts of capacity using parabolic trough solar collectors and an innovative thermal energy storage system.

More than \$600 million has been invested in grants toward the research, development, and deployment of [renewable energy](#). In order to accelerate innovation in the marketplace, large-scale user facilities have been supported; including a biofuels facility at the National Renewable Energy Laboratory, a wind turbine blade testing facility in Boston, batteries facilities at Argonne and Idaho National Laboratories, and a net-zero buildings research facility at Lawrence Berkeley National Laboratory.

## Transportation

Through \$3.9 billion from the Recovery Act and \$8.4 billion from the Department's [Advanced Technology Vehicles Manufacturing](#) loan program, a broad portfolio of transportation technologies have been supported. Investments include everything from plug-in hybrids and all-electric vehicles to natural gas vehicles, [advanced batteries](#), advanced biofuels, hydrogen, and improvements in internal combustion engine efficiency. These investments have created jobs, helped boost the U.S. auto manufacturing industry, and improved fuel efficiency standards. The Department is also facilitating the installation of the necessary infrastructure, including more than 20,000 charging locations in a dozen cities to support plug-in hybrid [electric vehicles](#).

A total of \$300 million was awarded in [Clean Cities](#) grants to help 25 cities expand their efforts to cut oil consumption by using high-efficiency cars, trucks, and buses that run on alternative fuels. These cities will deploy more than 9,000 alternative-fuel vehicles – 70% of which will run on natural gas. Funding also included \$100 million for projects that will improve the efficiency of heavy-duty trucks and passenger vehicles.

To meet future energy challenges, new, clean, domestic sources of fuel must be developed as well. That is why the Recovery Act included funding to help develop the next generation of [biofuels](#). More than \$700 million from the Recovery Act has been obligated to support 19 [biorefinery](#) projects. For example, Enerkem received \$50 million to build a plant in Pontotoc, Mississippi, to convert waste into biofuels. Enerkem's process reduces the volume of waste going to the landfill by 90% while creating useful fuels. The goal is to more than triple America's biofuels production in the next 12 years, cutting oil imports by \$41 billion.

## Smart Grid

The Department has invested more than \$4.2 billion in Recovery Act funds to help modernize the U.S. [electricity distribution grid](#). Modernizing the grid makes it possible to increase reliability and efficiency, allows for smart metering, enables two-way flows of electricity, and accommodates larger amounts of energy from intermittent renewable sources such as solar and wind power. Matched by more than \$5.5 billion in private sector funding, DOE is supporting 131 projects that will increase reliability and give consumers more choice and control over their energy use. Funding has been provided for the installation of more than 850 sensors to improve reliability, security and provide visibility and control across the entire U.S. transmission system; 200,000 new smart transformers; and nearly 700 automated substations that will prevent failures and allow power companies to respond more effectively when power lines are knocked down by bad weather. By 2013, the number of smart meters is expected to more than double to 26 million nationally through a combination of public and private investment.



**Hall D of the CEBAF accelerator.** *This 12 GeV Upgrade project, which will double the energy of the lab's electron beam accelerator, providing scientists with an unprecedented tool for studying the nucleus of the atom.*

## Carbon Capture and Storage

An unprecedented \$3.4 billion was provided by the Recovery Act for investment in carbon capture and storage technologies. By attracting significant private capital, DOE has been pursuing projects that will capture more than 10 million tons of carbon dioxide (CO<sub>2</sub>) annually by 2015 and help demonstrate the economic viability of carbon capture and storage by 2020. Five projects were selected to accelerate the development of advanced coal technologies with carbon capture and storage at commercial-scale. One of the five, American Electric Power, is demonstrating a chilled ammonia process that is expected to effectively capture at least 90% of the CO<sub>2</sub> from a flue gas stream. As part of the industrial carbon capture program, Archer Daniels Midland is demonstrating an advanced amine process to capture CO<sub>2</sub> from industrial flue gases and sequester the CO<sub>2</sub> in a sandstone reservoir. Conversion of captured CO<sub>2</sub> into products such as chemicals, fuels, building materials, and other commodities is also being explored.

## Cold War Legacy Clean-up

The Office of [Environmental Management](#) (EM) received \$6 billion in the Recovery Act to accelerate cleanup work at 17

sites, reducing the lifecycle costs to taxpayers. During FY 2010, EM projects created or saved thousands of jobs in communities like Hanford, Washington; Savannah River, South Carolina; and Oak Ridge, Tennessee. DOE met its goals to permanently dispose of nearly 8,400 cubic meters of transuranic waste and nearly 73,000 cubic meters of low-level waste; more than 3 million square feet of contaminated facilities have

been demolished. By September 2010, the footprint of land and structures requiring cleanup was reduced by 20%; the goal is to reduce the footprint by 40% by September 2011.

## Science and Technology

Funding of \$1.6 billion was included in the Recovery Act to advance basic research through the Department's Office of Science. Work has been accelerated on key priorities, including the [National Synchrotron Light Source II](#) at Brookhaven National

Laboratory and an upgrade to the [Continuous Electron Beam Accelerator Facility](#) (CEBAF) at the Thomas Jefferson National Accelerator Facility. Sixteen new [Energy Frontier Research Centers](#) and upgrades to the [supercomputer](#) at Oak Ridge National Laboratory are being supported.

A total of \$400 million was designated for high-risk, high-reward research through the [Advanced Research Projects Agency–Energy](#) (ARPA-E). The ARPA-E is pursuing truly transformational solutions to our energy problems. Three rounds of funding were completed through ARPA-E. The first round was a broad call for the best ideas in any area that could have a transformational impact on energy, ranging from an all-liquid metal battery that could provide grid-scale storage and cut costs by 90% to a novel carbon capture process that emulates the processes of the human body; 41 projects were funded. The second funding solicitation focused on developing better batteries, carbon capture processes, and electrofuels, which use microorganisms to harness energy and convert carbon dioxide into liquid fuels; 38 projects were funded. The final round of awards was for work in grid-scale energy storage, highly efficient cooling technologies and air conditioners, advanced power converters, and other energy technologies; 42 projects were funded. Award recipients from the first funding round have already begun negotiations on establishing manufacturing facilities in the United States; DOE is highly optimistic about the future return on these investments.

# Program Performance

The narrative below discusses FY 2010 results for the Department of Energy (DOE) programs and is aligned with the Secretary's priorities and objectives, as first presented in FY 2009. A new strategic plan is under development and is expected to be in place during FY 2011. A detailed discussion of results is presented in the [FY 2010 Annual Performance Report](#) and includes performance goals, assessment methodology, metrics, relevant external reviews, and documentation of performance data.



Vice President Biden and Secretary Chu

## **PRIORITY 1** SCIENCE, DISCOVERY AND INNOVATION

*Invest in science to achieve transformational discoveries*

### Objectives:

- Organize and focus on breakthrough science
- Develop and nurture science and engineering talent
- Coordinate DOE work across the Department, the federal government, and globally

- Advance climate science to better understand the human impact on the global environment

### Supporting Office:

Science

Scientific discovery and innovation provides the technological foundation for all of the Department's activities. Through the nurturing of scientific discoveries and delivery of major scientific tools, the Department is transforming the understanding of nature and advancing the energy, economic, and national security of the United States. This mission supports the president's plan to increase federal investment in the sciences, train students and researchers in scientific fields, invest in areas important to our clean energy future, and to make the United States a leader in climate change solutions while maintaining a role in international science and energy experiments. The Department supports more than 12,000 Ph.D. scientists who work in the 17 national labs and 25,000 visiting Ph.D.s, graduate students, undergraduates, engineers, and technicians. Key examples of FY 2010 program performance outcomes and benefits to U.S. citizens for the science priority follow.

**World's First X-ray Laser.** The [Linac Coherent Light Source](#) (LCLS) at the SLAC National Accelerator Laboratory – the world's first high-energy x-ray electron laser facility – became operational in June 2010. This is a milestone for x-ray user facilities and it advances the state-of-the-art from storage-ring-based third generation synchrotron light sources to a fourth generation linac-based light source. This is a new instrument that will enable us to see the structure of materials that we could not determine by any other means. Knowing those structures will lead to a deeper understanding of how they work and numerous new discoveries, from pharmaceuticals to solar photovoltaics. The early science program at the LCLS conducted experiments during the commissioning period; this early science program has already produced world-class transformational discoveries published in high-profile scientific journals. The unique capabilities of the LCLS have quickly attracted a robust experimental

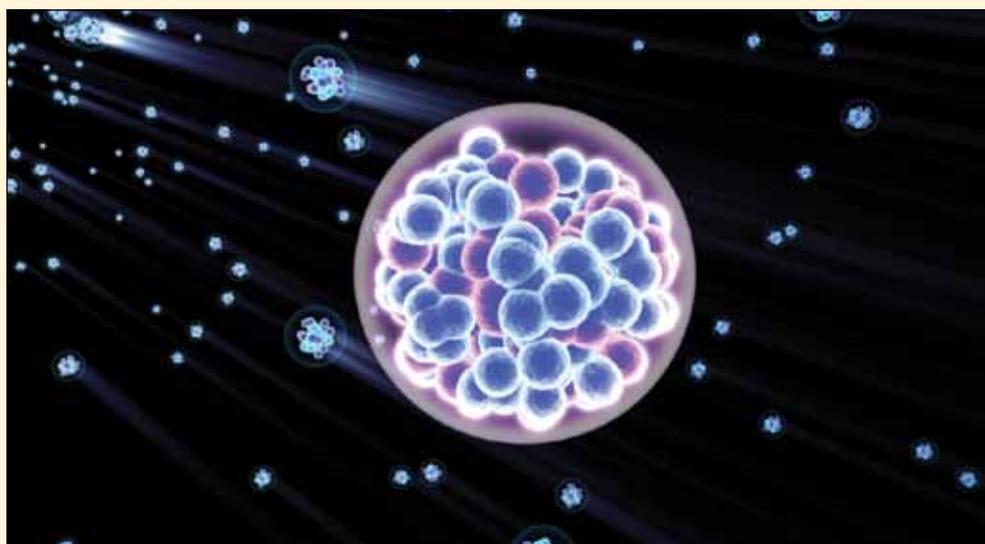
program, which has received 107 proposals involving 672 scientists from 22 countries for the fall 2010 operational period.

**Prototype Data Network.** In March of 2010, DOE's [Energy Sciences Network](#) (ESnet) completed the first milestone in constructing its Advanced Network Initiative (ANI) testbed by installing Infinera's dense wavelength-division multiplexing (DWDM) equipment. DWDM refers to optical networking systems that can send large volumes of data over multiple wavelengths of light on a single fiber. The ever growing demand for network bandwidth from large science collaborations, such as the [Large Hadron Collider](#), requires DOE's ESnet to push toward next generation technologies to keep pace. The ESnet is managing the research project on advanced networking that is deploying the U.S. 100 gigabit per second testbed to develop the tools and techniques necessary to utilize this technology in the ESnet backbone. Toward this end, ESnet participated in collaborations between the [IEEE](#) and the International Telecommunication Union's Telecommunication Standardization Sector Study Group to establish, in June 2010, a new IEEE standard governing 40 and 100 gigabit per second Ethernet operations to ensure that these new rates are transportable over optical transport networks.

**New Earth Model.** DOE has made significant improvements to the newly released version of the [Community Earth System Model](#) (CESM), a national model that is co-sponsored by DOE and the National Science Foundation. DOE improved six of the seven new elements identified as upgraded earth system components of the model. DOE's most notable contributions include the extension of a carbon-nitrogen cycle model that is prognostic for carbon and nitrogen cycles as well as vegetation phenology (the study of the annual cycles of plants and how they respond to seasonal changes in their environment); the successful development of a new sea-ice sub-model and a new land-ice model; several physical formulation improvements to the global ocean sub-model; a new detailed atmospheric chemistry model; a new radiation package; a new aerosol sub-model; and two new cloud schemes for near-surface layered clouds and the lifecycle of cirrus clouds. DOE also developed a new computer architecture that provides "plug and play" capability for the earth model.

**Progress in Bioenergy.** Significant advances were achieved in FY 2010 by the DOE [Bioenergy Research Centers](#) regarding characterization, modeling, and design of biological systems

targeting mission needs in bioenergy production. The Joint BioEnergy Institute used synthetic biology tools to redirect the fatty acid metabolism of a microbe to produce biodiesel and other important chemicals from plant biomass sugars. Complementary research at the BioEnergy Science Center achieved more than 3,000-fold improvement in the expression levels of cellulase enzymes in a yeast strain that can ferment 5- and 6-carbon sugars into ethanol. This represents an important step in improving efficiencies for biofuel production by consolidating biomass breakdown and fuel production in a single organism. Researchers at the Great Lakes Bioenergy Research Center completed a systems biology study examining gene expression and enzyme secretion by two wood-degrading fungi. The research revealed substantial differences in



*Illustration of the newly discovered element 117.*

the timing and types of enzymes expressed during wood degradation, providing new insights into the molecular mechanisms that allow degradation of complex biomass and the development of novel approaches for biofuels production.

**New Element Discovered.** An international team of scientists from Russia and the United States, including two DOE national laboratories and two universities, has discovered [element 117](#), the newest super heavy element. Discovery of element 117 was accomplished following nearly 3 months of bombardment of a radioactive berkelium-249 target (produced at the High Flux Isotope Reactor at Oak Ridge National Lab through the DOE Isotope program) with intense beams of calcium-48 at the Joint Institute for Nuclear Research cyclotron in Dubna, Russia. This discovery represents the latest and the most challenging successful step in a decades-long journey to expand the periodic table.

**Hot Graphics Cards Fuel Supercomputing.** Scientists at Thomas Jefferson National Laboratory purchased 200 [graphics processing units](#) (GPUs) to create a new type of computer cluster. The new cluster became operational in January 2010

with the express purpose of tackling the difficult mathematics behind quark-gluon interactions, a basic component in describing matter in the standard model of particle physics. Taking the output of numerical simulations – which can take more than a year of running – from supercomputers around the United States as input, the new GPU cluster is used in a second stage of analysis to deliver much more physical parameters for a variety of exotic subatomic particles than possible within resource constraints using supercomputers alone. A very attractive feature of this development is that using the GPU architecture provides five times the computer power (100 teraflops) than previously available for this research with much less cost and power use than if the full calculation was performed on a supercomputer.

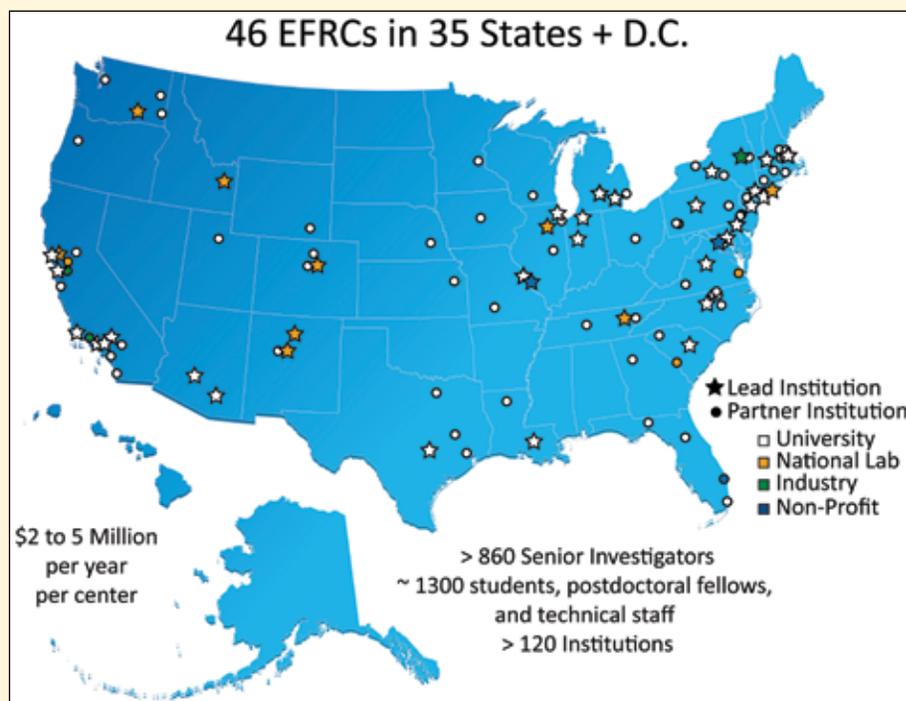
**New Scientific Workforce Training.** DOE started the [Science Graduate Fellowship](#) and the [Early Career Research](#) programs in FY 2010. The fellowship program supports outstanding students in pursuit of graduate training in basic research in areas of physics, biology, chemistry, mathematics, engineering, computational sciences, and environmental sciences and to encourage the development of the next generation scientific and technical talent in the United States. DOE awarded 150 of these fellowships during FY 2010 using \$12.5 million of Recovery Act funds and \$5 million of base funding. The Early Career Research program supports outstanding scientists early in their careers by providing competitively selected 5-year research awards to researchers who have received a Ph.D. within the past 10 years and who are untenured, tenure-track assistant professors in U.S. academic institutions or full-time employees in DOE national laboratories. In FY 2010, 68 research awards were provided through \$85 million in Recovery Act funds.

## Strategic Challenges

**Developing New Scientific Tools and Facilities.** It is necessary to incorporate work at the leading edge of discovery science – sometimes termed high-risk, high-return research – to advance the nation’s scientific capabilities. This requires identifying and developing investment strategies, primarily through substantial involvement with the research communities. A large part of these strategies include the support of the planning, design, construction, and operation of scientific user facilities in the nation. This requires recruitment of effective and forward-looking program

managers, who are experts in their fields and can effectively communicate program research priorities and interests to the scientific community; select proposal reviewers that are open to new ideas; provide guidance to merit reviewers – including guidance on consideration of high-risk, high-return research; and make recommendations on proposal selection.

**Focusing on High-Priority Research.** Basic research needs to incorporate scientific work that is relevant to the missions of energy and the environment through activities that bring together the research community and the end users; for example, the DOE technology offices and the private sector. Reports from external groups also inform the makeup of our research proposal, such as the National Academies report *America’s Energy Future: Technology and Transformation*. The results of these workshops and studies have formed the



*These integrated, multi-investigator centers will conduct fundamental research focusing on one or more of several “grand challenges” recently identified in major strategic planning efforts by the scientific community.*

basis for the Bioenergy Research Centers, the Energy Frontier Research Centers (EFRCs), and the Energy Innovation Hubs.

**Ensuring a Skilled Workforce.** There is a growing need for scientists and engineers in the private and public sectors, including researchers, to operate the national laboratories across the nation. Providing technical and scientific training is vital to ensure that America remains competitive and prosperous.

## **PRIORITY 2** ECONOMIC PROSPERITY

*Drive the revolution to create clean energy jobs and increase competitiveness*

### Objectives:

- Save Americans money through efficiency
- Increase clean energy production
- Promote the development of an efficient, “smart” electricity transmission and distribution network
- Enable responsible domestic production of oil and natural gas
- Create a green workforce
- Foster clean energy innovation and entrepreneurship

### Supporting Offices:

Electricity Delivery and Energy Reliability  
Energy Efficiency and Renewable Energy  
Fossil Energy  
Nuclear Energy  
Energy Information Administration  
Power Marketing Administrations

The Department of Energy has been working to help communities across the nation become more prosperous by providing the means to produce a clean-energy infrastructure and use energy more effectively. DOE has provided grants and incentives for efficient energy; promoting the development of an efficient, “smart” electricity transmission and distribution network; and funded the production of low-carbon energy sources, batteries, fuels, and electric transportation infrastructure domestically — programs that have helped create and save jobs. Key examples of FY 2010 program performance outcomes and benefits to U.S. citizens for the economic prosperity priority follow.

**Smart Grid Gains Momentum.** In October and November 2009, DOE announced the selection of 100 projects under the [Smart Grid Investment Grants](#) program, providing \$3.4 billion in grants to utilities and other entities for smart grid upgrades to the electric grid; and \$620 million under the Smart Grid Demonstration Program in 32 new awards for demonstrations of smart grid technologies and large-scale energy storage. Including private investment through cost shares, these two program initiatives represent a \$9.6 billion investment in modernizing the electric grid. DOE has devoted approximately \$4.2 billion to implementing smart grid programs, thereby accelerating the deployment of smart grid technologies across the transmission and distributions system. Smart grid technologies enable real-time monitoring of energy usage and automated adaptation of energy flow to save energy and reduce costs. Smart grid tools provide enhanced data through feedback from the electrical system, allowing operators to gain a wide-area picture of grid status and

increase both stability and efficiency. Enhanced data will not only let operators analyze the root causes of any problems and increase stability but, through computer control and energy management, will also monitor energy usage in real time, enabling consumers to better control their use of energy and reduce costs.

**Nuclear Power Boost.** Underscoring the administration’s commitment to jumpstart the nation’s nuclear power industry, DOE offered conditional commitments in February 2010 for \$8.33 billion in [loan guarantees](#) for the construction and operation of two new nuclear reactors at a plant in Burke, Georgia. The project is scheduled to be the first U.S. nuclear power plant to break ground in nearly three decades. The two new 1,100 megawatt Westinghouse AP1000 nuclear reactors at the Alvin W. Vogtle Electric Generating Plant will supplement the two existing reactor units at the facility. According to industry projections, the project will create approximately 3,500 onsite construction jobs. Once the nuclear reactors become operational, the project will create 800 permanent jobs.

**Solar Start-ups.** DOE announced in July 2010 the offer of a conditional commitment to Abengoa Solar, Inc., for a \$1.45 billion [loan guarantee](#) to finance the construction and start-up of a concentrating solar power generating facility. The Solana, Arizona, plant will add 250 megawatts of capacity to the electrical grid using parabolic trough solar collectors and an innovative six-hour thermal energy storage system—the first of its kind in the country. Once operational, the Solana project will supply clean electric power to approximately 70,000 homes, reducing overall CO<sub>2</sub> emissions by 475,000 tons.



**Systems Integration for Solar Technologies.** A 25-megawatt photovoltaic system in DeSoto, Florida, generates enough electricity annually to power about 3,000 homes.

Abengoa Solar estimates that the Solana project will employ approximately 1,600 workers during the construction phase of the project and create over 80 skilled permanent jobs for the plant's operation. Over 70% of the components and products used for Solana will be made in the United States. Two assembly factories will be constructed on the Solana site, and as a result of Solana's large need for mirrors (over 900,000), a new mirror manufacturing facility will be sited just outside of the Phoenix area, contributing additional direct investment and adding more jobs to Arizona's economy.

Another company, BrightSource Energy, was offered a conditional commitment for more than \$1.37 billion in loan guarantees to support the construction and start-up of Ivanpah Solar Complex, three utility-scale concentrated solar power plants located in California's Mojave Desert. The project will produce approximately 400 megawatts of electricity. It is expected to create approximately 1,000 construction jobs and about 86 operations and maintenance jobs.

**Building Efficiency Improves.** Through the [Building Technologies](#) program, DOE established seven new energy conservation standards and updated six and completed seven test procedure final rules. The program engaged more than 20 commercial building stakeholders to design a new building prototype that uses 50% less energy, and retrofit an existing building for at least 30% energy savings. The program also demonstrated solid state lighting prototypes including: a cool white light-emitting diode that delivers 117 lumens per watt and a record-breaking white organic light-emitting diode with a power efficacy of 102 lumens per watt at 1,000 candela per square meter; commercialized dynamic insulation; new Energy Star hybrid electric water heaters; and a low-cost solar water heating system. DOE also established the [Energy Star](#) criteria for water heaters and solid state lighting, and completed 30-40% whole house energy savings builder technology packages for five U.S. climate regions.

**Weatherization Exceeds Expectations.** In August 2010, DOE announced award selections for approximately 120 organizations across the country that will receive nearly \$120 million to drive innovation under the [Weatherization Assistance](#) program. These investments will enable successful weatherization agencies to expand their programs and will support new pilot projects to demonstrate innovative weatherization delivery and financial models and new technologies. This program surpassed monthly targets during 2010 — weatherizing more than 31,600 homes across the country in June alone. More than 80,000 homes were weatherized across the country during the summer. The program has created jobs in local communities, saved money for families, and reduced carbon pollution across the country.

## Strategic Challenges

**Modernizing the Electrical Grid.** The nation's ability to meet the growing demand for reliable electricity is challenged by an aging transmission and distribution system and by vulnerabilities in the energy supply chain. Despite increasing demand, there has been a long period of underinvestment in power transmission and infrastructure maintenance. Modernization requires development of digital network controls and transmission, distribution, and storage breakthroughs.

**Achieving Low-Energy Buildings.** Continued research and industry/government collaboration are required to solve the problem of developing residential and commercial buildings that use very low levels of energy to function. Breakthroughs across technology areas are needed pertaining to building materials (insulation, roofing, etc.), space-conditioning equipment, water heating, and lighting. Any increases in building efficiencies will save money for Americans and contribute to prosperity.

## PRIORITY 3 CLEAN, SECURE ENERGY

*Cut the carbon pollution that is changing our climate, while reducing our dependence on oil*

### Objectives:

- Increase energy efficiency in homes, businesses, and vehicles
- Move to clean, safe, low-carbon sources of energy
- Discover breakthroughs in energy technologies with game-changing impacts

### Supporting Offices:

[Electricity Delivery and Energy Reliability](#)  
[Energy Efficiency and Renewable Energy](#)  
[Fossil Energy](#)  
[Nuclear Energy](#)  
[Energy Information Administration](#)  
[Power Marketing Administrations](#)

Achieving President Obama's climate change goal to reduce U.S. greenhouse gas emissions 17% below 2005 levels by 2020 and 83% by 2050 necessitates contributions from the full

portfolio of available clean energy technologies – from efficiency programs and building technologies that can be deployed in the near term to long-term investments in new nuclear power

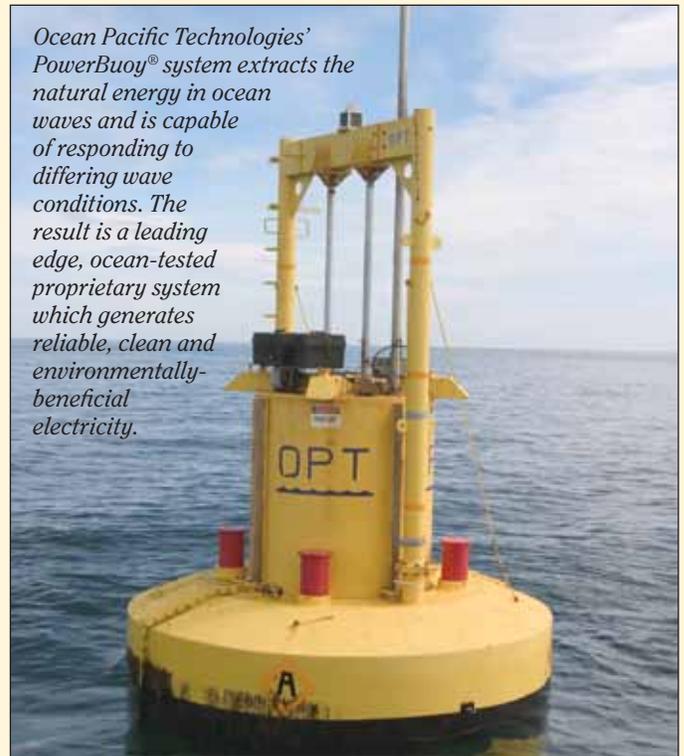
and carbon capture and storage. DOE is making investments in a variety of renewable sources of electricity generation and deploying technologies to decrease energy use in homes, transportation, and industry. Investments in energy efficiency projects through grants to states and weatherization assistance have had immediate tangible benefits by reducing energy use and lowering energy bills. Near-zero emissions coal plants will help allow fossil fuels to be used as abundant and low-carbon emitting energy resources in the future. Nuclear energy is a fundamental component of the energy mix as well, and currently supplies about 20% of the nation's electricity. Key examples of FY 2010 program performance outcomes and benefits to U.S. citizens for the clean, secure energy priority follow.

**Research in Biofuels Moves Forward.** Solicitations were issued for new integrated biorefineries, the development of an algal **biofuels** consortium, the development of an advanced biofuels consortium, accelerated alternative vehicle fuels testing, and biofuels infrastructure. Critical analytical studies have been completed and put to use for program investment and portfolio decision making. Fifteen sustainability-focused projects were initiated with domestic and international partners.

**New Milestones in Solar.** **Photovoltaics** R&D demonstrated manufacturable 23.4% efficient cells and manufactured the first 100 kilowatts of U.S.-produced T-5 product for commercial rooftops. Targets of 17-20 cents per kilowatt-hour for residential and 12-16 cents per kilowatt-hour for commercial photovoltaic systems have been exceeded. **Concentrating Solar Power** R&D developed next generation polymeric reflective coatings for troughs and towers that critically enable reduced solar field cost and enhanced performance necessary to achieve targets.

**Wind Technology Advances.** Dynamometer testing and calibration of a wind turbine gearbox that provide valuable operational data for the Gearbox Reliability Collaborative effort were completed. Eighty-one new **wind energy** project awards were selected for up to a total of \$22.3 million, more than half of which will simultaneously address market and deployment challenges.

**Water Grants Awarded.** DOE's first-ever grants for wave, tidal, and ocean current energy were awarded. These grants support the development and testing of devices; fund resource assessments; address environmental impacts and siting concerns; and establish two university-led National Marine Renewable Energy Centers to serve the emerging marine and hydrokinetic (MHK) industry as integrated facilities for research and in-water testing. The program established the primary source of information for the **water power** industry with an updated, searchable database of all wave, tidal, and ocean current technologies and projects, as well as a catalogue for MHK technology developers.



*Ocean Pacific Technologies' PowerBuoy® system extracts the natural energy in ocean waves and is capable of responding to differing wave conditions. The result is a leading edge, ocean-tested proprietary system which generates reliable, clean and environmentally-beneficial electricity.*

OCEAN POWER TECHNOLOGIES, INC.

**Vehicle Efficiency Gains.** Research and development in commercial **vehicle** hybrid engines has resulted in fuel economy gains of 10 to 12% over the past 4 to 5 years. These gains are estimated to have saved 2.4 billion gallons of fuel. The program garnered three *R&D 100* awards during the year and signed two separate license agreements to commercialize their patented composite cathode materials for advanced lithium-ion batteries. The program developed performance for significantly higher specific battery capacities, a 50% increase over conventional materials.

**DOE Takes Lead in Hybrids.** President Obama announced in March 2010 that the federal government will lead by example in replacing older cars in the federal fleet with fuel efficient hybrids and plug-in hybrid electric vehicles, reducing dependence on oil as well as cutting carbon dioxide and other pollution. DOE **led the way** on this initiative by replacing 753 vehicles with hybrids in FY 2010, bringing the total number of hybrid vehicles in DOE's fleet to 888 and generating future fuel savings for taxpayers.

**Next Steps for FutureGen.** DOE met with state of Illinois officials and private partners in Chicago in August 2010 and discussed the next steps for the **FutureGen 2.0** carbon capture and storage project in Illinois, a clean coal repowering program and carbon dioxide (CO<sub>2</sub>) storage network. This investment in the world's first, commercial-scale, oxy-combustion power plant will help to open up the over \$300 billion market for coal unit repowering and position the country as a leader in an important part of the global clean energy economy. Preparations then began for the



*Agreements with Ameren Corp. and the FutureGen Industrial Alliance formally commit \$1 billion in stimulus funding to the revised FutureGen project*

repowering of Unit 4 at the Ameren facility in Meredosia, with construction set to begin in 2012. At the same time, a process was planned to locate a site for the carbon sequestration research, repowering workforce training facility, visitor center, and long-term CO<sub>2</sub> repository.

**Carbon Task Force Established.** On February 3, 2010, President Obama sent a memorandum to the heads of executive departments and federal agencies establishing an [Interagency Task Force on Carbon Capture and Storage \(CCS\)](#). The goal was to develop a comprehensive and coordinated federal strategy to speed the commercial development and deployment of clean coal technologies. The Task Force, co-chaired by DOE and the Environmental Protection Agency, was charged with proposing a plan to overcome the barriers to the widespread, cost-effective deployment of CCS within 10 years, with a goal of bringing 5 to 10 commercial demonstration projects online by 2016. On August 12, 2010, the Task Force delivered a series of recommendations to the President. The report concludes that CCS can play an important role in domestic greenhouse gas emissions reductions and includes specific actions to help overcome remaining barriers.

**CO<sub>2</sub> Storage Projects Selected.** DOE announced in August 2010 the [selection of 15 projects](#) to develop technologies aimed at safely and economically storing CO<sub>2</sub> in geologic formations. Funded with \$21.3 million over 3 years (with \$3.4 billion from Recovery Act appropriations), these selections will complement existing DOE initiatives to help develop the technology and infrastructure to implement large-scale CO<sub>2</sub> storage in different geologic formations across the nation. These projects will support the goal to reduce greenhouse gas emissions, making the United States a leader in mitigating climate change.

**Progress in Nuclear Power Deployment.** DOE's [Nuclear Power 2010](#) program was brought to closure as planned in FY 2010.

The program was successful in achieving its stated goal of demonstrating the redesigned regulatory process. The program worked with the Nuclear Regulatory Commission and industry to demonstrate regulatory processes such as early site permits and construction and operating licenses. This work has stimulated utilities to consider building nuclear power plants, as shown in the spike in license applications from 2002 to the present. The nuclear industry has submitted 17 applications to build 26 new nuclear power plants. Thirteen applications are currently active, and seven additional applications are planned. As of summer 2010, eight utilities had ordered large, long-lead nuclear component forgings, and site preparation work for new reactors had started at four facilities.

## Strategic Challenges

**Carbon Reductions.** To achieve the president's stated goal of reducing the country's greenhouse gas emissions by 83% by 2050, DOE must assist in providing the means to mitigate CO<sub>2</sub> emissions from current coal-fueled electric power plants and industrial sources. These sources combined produce about 50% of the nation's CO<sub>2</sub> emissions. Given the high cost and amount of energy required to capture and geologically store CO<sub>2</sub> with existing technology, development of advanced low-cost technology will help overcome the barriers to commercial deployment of carbon capture and sequestration in the 2020 time frame. Widespread cost-effective deployment of carbon capture and storage will occur only if the technology is commercially available at economically competitive prices and supportive national policy frameworks are in place.

**Advances in Nuclear Power.** To ensure that nuclear energy can be part of the clean energy mix, challenges related to the increased use of nuclear energy must be addressed, both domestically and internationally. These challenges include developing technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors, as well as provide improvements in the affordability of new reactors. Developing sustainable nuclear fuel cycles that provide an integrated and permanent solution to high-level nuclear waste management is also critical. Understanding and minimizing risks of nuclear proliferation in the development of reactor and fuel cycle technologies must occur to enable the safe and secure expansion of nuclear energy.

**Industry Partnerships.** The range of energy technologies is very diverse, requiring collaboration to organize resources effectively that span multiple disciplines. Long R&D timetables make large scale demonstration projects, such as carbon capture and sequestration, difficult to manage and plan. Approaches for benefits tend to be short-sighted and isolated to specific programs, driving DOE's applied R&D efforts towards incremental outcomes. Additionally, game changing technologies can only be realized through collaboration with the private sector, the success of which depends on market factors outside DOE's control.

## **PRIORITY 4** NATIONAL SECURITY

### *Maintain nuclear deterrent and prevent proliferation*

#### **Objectives:**

- Provide a safe and effective nuclear arsenal without nuclear testing
- Reduce nuclear dangers through nonproliferation and arms control activities
- Provide safe, militarily-effective nuclear propulsion plants to the U.S. Navy
- Complete legacy environmental cleanup

#### **Supporting Offices:**

National Nuclear Security Administration  
Environmental Management  
Legacy Management

The Department continues its efforts to meet goals for nonproliferation, weapons stewardship, nuclear propulsion and legacy cleanup – leveraging science to promote national security. President Obama established goals for the United States to lead an international effort to make significant progress in securing the most vulnerable nuclear weapons around the world within 4 years; establish new nuclear nonproliferation treaties and partnerships to reduce nuclear stockpiles and ban nuclear testing; and maintain a safe, secure, and effective arsenal to deter any adversary. The federal government has the responsibility to 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 Department continues to focus its resources on those activities that will yield the greatest risk reductions, with safety as the utmost priority. DOE's diverse and technically complex cleanup mission includes: decontaminating and decommissioning (D&D) nuclear facilities, remediating contaminated soil and ground water, constructing and operating facilities to treat radioactive liquid tank waste, securing and storing nuclear material, and transporting and disposing of transuranic and low-level wastes. Key examples of FY 2010 program performance outcomes and benefits to U.S. citizens for the national security priority follow.

**Weapons Dismantled.** The [W62 dismantlement](#) program was completed a full year ahead of schedule. The United States produced the W62 in the 1970s, and the warhead saw service until recently.

**Laser Energy Milestone.** Scientists at the National Ignition Facility at Lawrence Livermore National Laboratory have successfully delivered an historic level of [laser energy](#) – more than 1 megajoule – to a target in a few billionths of a second and demonstrated the target drive conditions required to achieve fusion ignition. This is about 30 times the energy ever delivered by any other group of lasers in the world.

**Weapons Simulations.** As part of DOE's stockpile stewardship program, Advanced Simulation and Computing (ASC) has earned 3 of the top 10 spots on the latest [TOP500 supercomputer](#) list. ASC computers use models and simulations to understand and predict behaviors associated with aging weapons by, among other things, evaluating various stages of a nuclear explosion.

**Plutonium Reactor Shut Down.** On April 15, 2010, the last Russian weapons-grade plutonium [production reactor](#) was permanently shut down, 8 months ahead of schedule. Steady progress has been achieved in the construction of a fossil fuel plant to supply replacement heat to the city of Zheleznogorsk.

**Nuclear Detonation Detection.** During FY 2010, DOE delivered two new space sensor payloads for detecting and reporting [nuclear detonations](#) for the next-generation Global Positioning System satellites and developed and validated enhanced computer models for improving worldwide monitoring of seismic signals associated with nuclear detonations.

**Negotiation of New Treaty.** On April 8, 2010, Presidents Obama and Medvedev signed the New START Treaty to further limit and reduce strategic offensive arms. [DOE participated](#) throughout the National Security Council led interagency policy development process and the direct negotiation of the New START Treaty with Russia.

**Global Threat Reduction Initiative.** In February 2010, the remaining highly enriched uranium ([HEU](#)) [was removed from Chile](#), making it the fifth country to remove all of its HEU since President Obama called for an international effort to secure all vulnerable nuclear material around the world.

**Cooperation with Russia.** An agreement was established with Russian Federal Customs Service to equip all of Russia's border crossings (about 370 sites) with [radiation detection equipment](#) by the end of 2011; to date, 221 sites in Russia have been equipped. DOE assisted Russia with installation of nuclear

security upgrades at 73 Russian nuclear warhead sites and with improvement of nuclear security at 37 Russian nuclear material sites. The United States and Russia signed a [Protocol](#) amending the Plutonium Management and Disposition Agreement, which commits each country to dispose of no less than 34 metric tons of excess weapon-grade plutonium enough material for approximately 17,000 nuclear weapons.

**Key Partner in Containing BP Oil Spill.** The DOE national laboratories were tasked to look at ways to seal the [oil leak in the Gulf](#) in April 2010. At the direction of President Obama, Secretary Chu assembled a team of top scientists to monitor the progress of BP's effort to contain the leak and to help design the strategies that solved the containment dilemma. In addition, DOE with NASA and other scientific agencies had more than 200 scientists, engineers, and other experts from the national laboratories actively supported the efforts to respond to the spill. Secretary Chu also made the [data on the spill work](#) widely available on DOE's web site to ensure the public and outside experts making recommendations were fully informed.

**Cleanup Contract Awarded.** In August 2010, DOE selected a contractor for the next phase of the cleanup at the [Portsmouth](#) site in south-central Ohio. Fluor-B&W Portsmouth, LLC, will be the prime contractor for the decontamination and decommissioning of the Portsmouth Gaseous Diffusion Plant. The project and the new contract will save and create jobs locally. The contract is valued at over \$2 billion over 10 years, which includes an initial 5-year contract period plus a potential 5-year extension depending on contractor performance and the government's need. More than 30% of the total project value is expected to support work by small businesses.

**Moab Milestone Reached.** Two million tons of uranium mill tailings were shipped by rail from the Moab site to the site at Crescent Junction, Utah, for permanent disposal. This amount would fill 60 stories of the 110-story Willis Tower in Chicago, Illinois. This milestone comes only 5 months after the Moab Project shipped the first of the 16 million tons of total tailings.

**Hanford Stack Demolished.** The [K East Reactor's](#) 175-foot-high exhaust stack was brought down on July 23, 2010, at the Hanford Site in southeastern Washington State under the K Basin Closure Project. Taking down the stack clears the way for additional demolition work in the 100-K Area and forever changes the Hanford skyline. The explosive demolition also brought down heavy equipment inside the K East Reactor, including counterweights and overhead cranes that had been used during reactor operations.

**Radioactive Equipment Removed.** DOE's Central Plateau contractor completed removal of more than 120 large radioactive pieces of equipment from the deck of [U Canyon](#) during July 2010. The canyon is one of five former nuclear fuel-reprocessing plants at the Hanford Site in southeast Washington State.

U Canyon will be a model for the demolition of other canyons on the Hanford Site. Efficiencies were found that not only reduce hazards but also put the project closer to meeting DOE's goal to have the canyon prepared for demolition by 2012.

## Strategic Challenges

**Nuclear Deterrence.** In order to meet the President's goal of securing the world's vulnerable nuclear material, it will be necessary to engage nations around the world to realize opportunities to secure these materials, and to engage our global partners to provide a share of the resources and expertise needed to accomplish this ambitious goal. The challenge at home will be to rebuild the national consensus on the role of the nuclear deterrent in our national security strategy and mobilize the political and financial support to make the sustained long term investments needed to transform the Cold-War nuclear weapons complex to a robust National Security Enterprise.

**Safe Storage for Nuclear Material.** The Administration has determined that Yucca Mountain is not an option for waste storage. The [Blue Ribbon](#) Commission on America's Nuclear Future will conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle, and will provide recommendations for developing a safe, long-term solution to managing the nation's used nuclear fuel and nuclear waste.

**Developing a Nuclear Workforce.** Maintenance, design, and development of reactor plants for nuclear-powered submarines and aircraft carriers requires a highly trained engineering work force and industrial base, highly skilled sustainment of core skills, capabilities, and supporting infrastructure. There is also a need for nuclear engineers for weapons programs.



*A heater is loaded into an open cell at U Canyon as work progresses to clear the deck of the facility.*

# Financial Analysis

The Department's financial statements are included in the Financial Results section the [FY 2010 Agency Financial Report](#). Preparing these statements is part of the Department's goal to improve financial management and provide accurate and reliable information that is useful for assessing performance and allocating resources. The Department's management is responsible for the integrity and objectivity of the financial information presented in these financial statements.

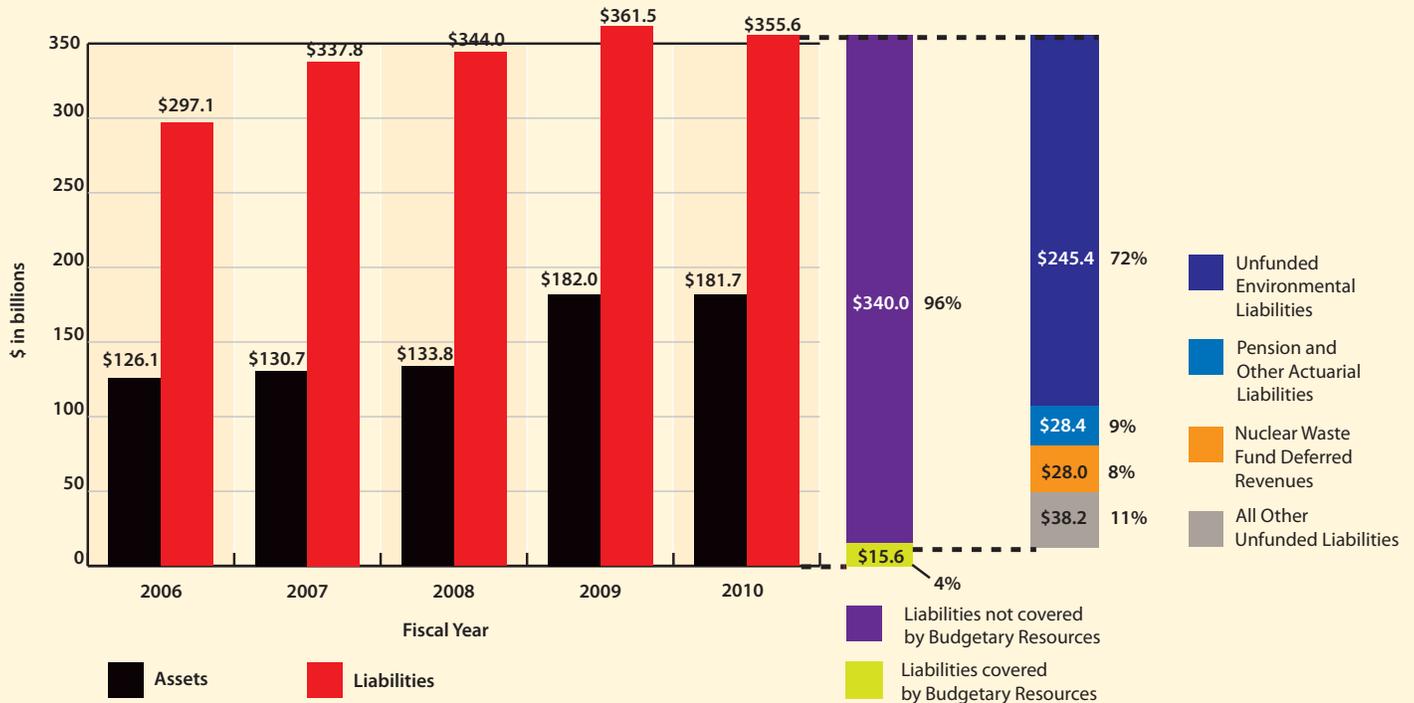
The financial statements have been prepared to report the financial position and results of operations of the entity, pursuant to the requirements of 31 U.S.C. 3515(b). The statements have been prepared from the Department's books and records in accordance with generally accepted accounting principles prescribed by the Federal Accounting Standards Advisory Board and the formats prescribed by the OMB. The financial statements are prepared in addition to the financial reports used to monitor and control budgetary resources which are prepared from the same books and records. The

statements should be read with the realization that they are for a component of the U.S. Government, a sovereign entity.

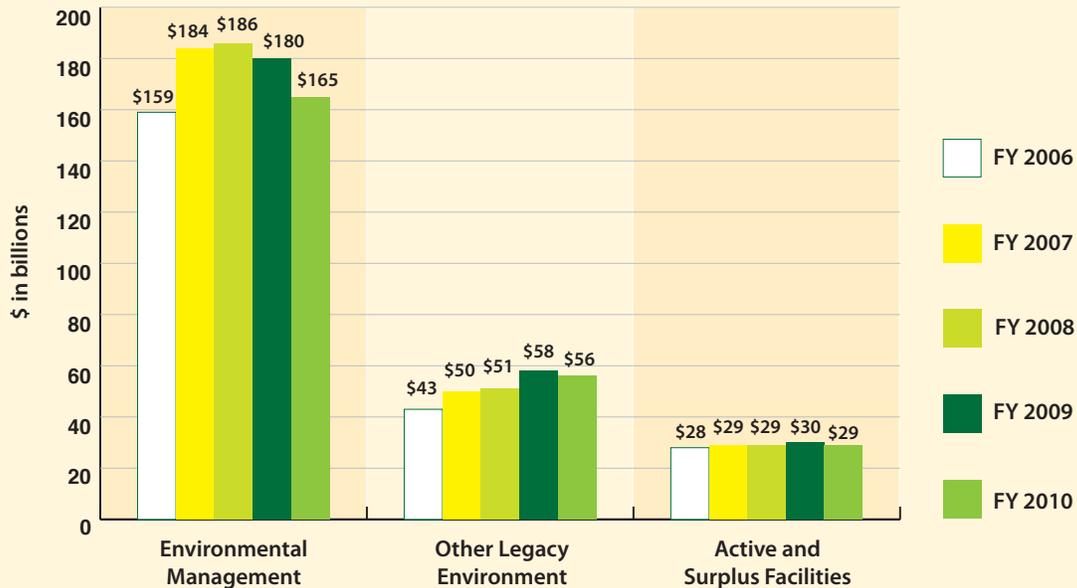
## Balance Sheet

As shown in Chart 1, The Department's total assets decreased by a net \$.3 billion from FY 2009. This is due to a \$7.4 billion decrease in Fund Balance with Treasury (FBWT) which was offset by \$7.1 billion in increases from various assets (primarily Intragovernmental Net Investments, Net Direct Loan and Loan Guarantees and Net General Property, Plant and Equipment). The \$7.4 billion FBWT decrease is primarily due to additional ARRA disbursements in FY 2010. In mid FY 2009, the Department received all of its ARRA appropriated funding and disbursed approximately \$1 billion by year-end. In FY 2010, the Department disbursed an additional \$7.2 billion of ARRA appropriated funds. Total liabilities decreased from FY 2009 primarily as a result of changes in unfunded liability estimates (see Chart 5 on page 25).

**Chart 1: Total Assets and Liabilities with Breakdown of FY 2010 Liabilities**



**Chart 2: Composition of Environmental Cleanup and Disposal Liability**



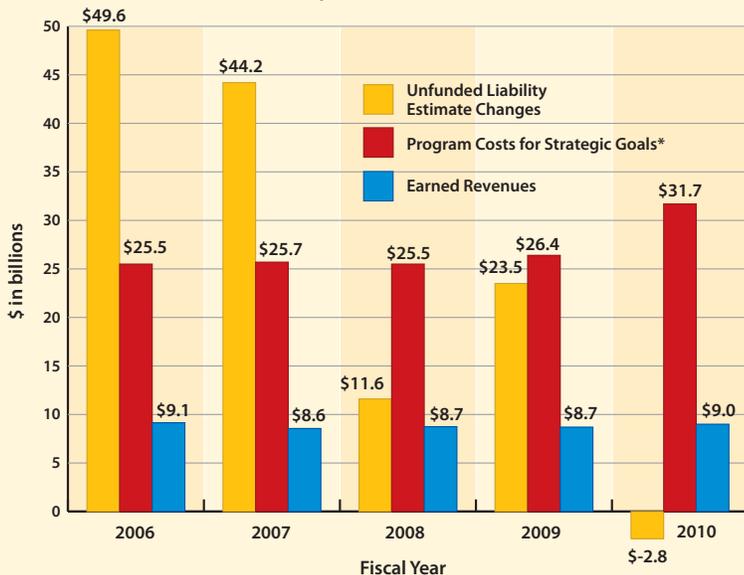
## Net Cost of Operations

The major elements of net cost (see Chart 3) include program costs, unfunded liability estimate changes and earned revenues. The Statement of Net Cost also provides program cost information along the Department’s four strategic themes (see Chart 4).

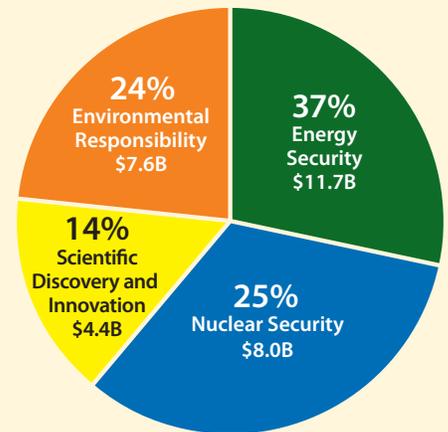
Unfunded liability estimate changes result from inflation adjustments; improved and updated estimates; revisions

in acquisition strategies, technical approach, or scope; and regulatory changes. The Department’s overall net costs are dramatically impacted by these changes in environmental and other unfunded liability estimates. Since these estimates primarily relate to past years of operations, they are not included as current year program costs, but rather reported as “Costs Not Assigned” on the Consolidated Statements of Net Cost. Unfunded Liability Estimate Changes decreased \$2.8 billion in FY 2010 (See Charts 5 and 6).

**Chart 3: Major Elements of Net Cost**



**Chart 4: FY 2010 Program Costs (Gross) Breakdown by Strategic Goals\***

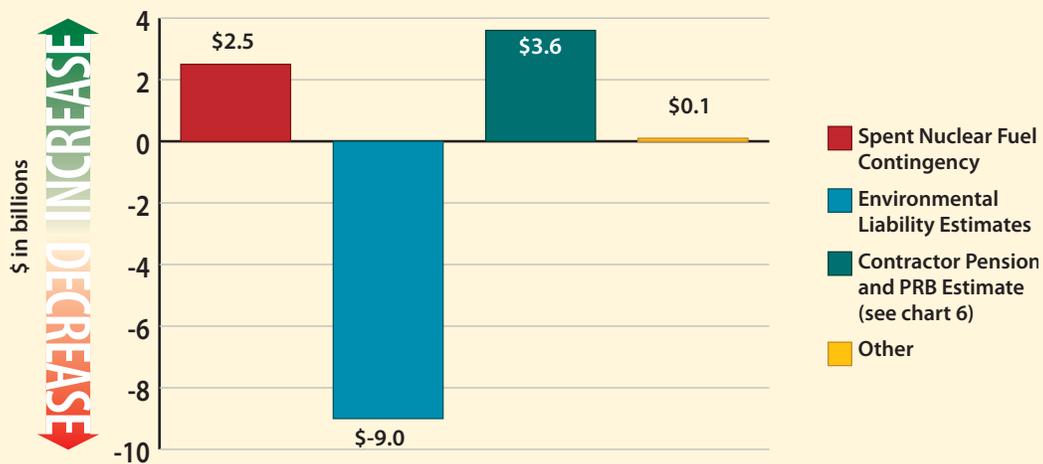


\* Program costs for strategic goals exclude certain costs not directly attributable to the strategic goals, such as the cost of reimbursable and other miscellaneous programs, costs applied to the reduction of legacy environmental liabilities and imputed costs for the occupational illness program. These excluded costs are more fully described in Notes 21-23 of the financial statements in the FY 2010 Agency Financial Report

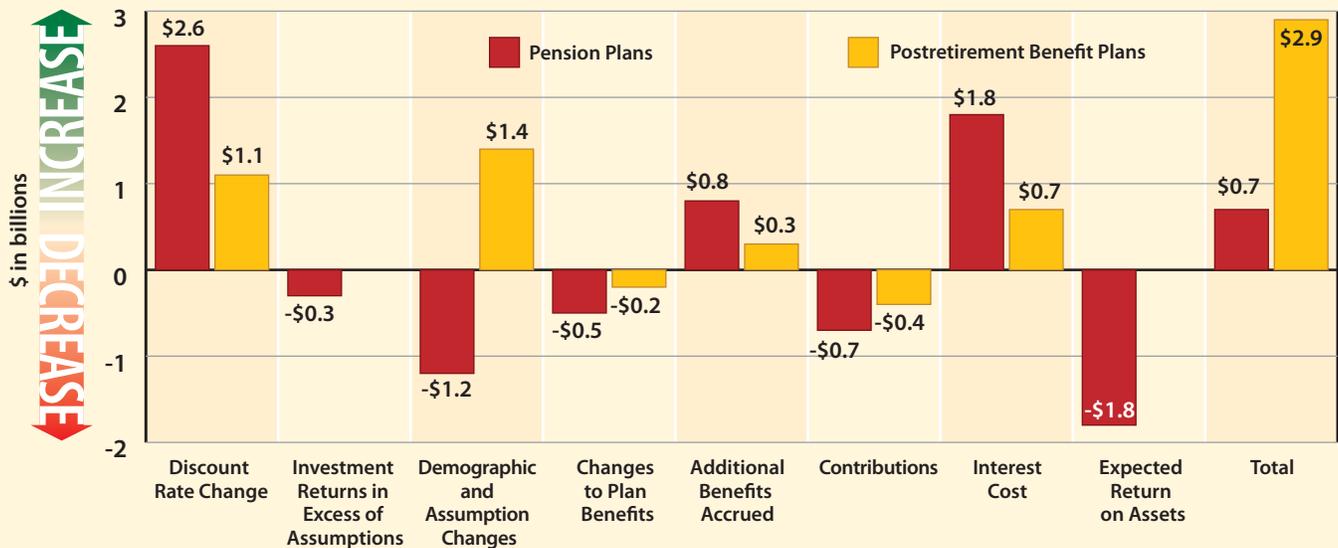
The significant environmental liability estimate decreases resulted from several factors. First, the Department restructured project estimates in FY 2010 to a lower level of detail which facilitated management attention on cost and performance of individual capital assets and operating activities on both base program and Recovery Act environmental cleanup projects. Second, the Department is beginning to realize returns on its investments in technology development that significantly reduce life cycle costs at several sites and to shorten the duration of cleanup. This is especially noticeable in the tank waste cleanup projects, which comprise approximately one-third of the Environmental Management Program's total liability. Third, the Department is achieving cost savings as it completes activities conducted with funds under the Recovery Act. And finally, the Department's cleanup activities continue to mature as a result of better project definition. This allows the Department to lower uncertainty and mitigate known risks which contributes to reducing the contingency costs associated with its projects.

The Department's FY 2010 unfunded liability estimates for contractor pension and postretirement benefits other than pensions (PRB) plans increased by \$0.7 billion and \$2.9 billion, respectively. The major components of these estimate changes are shown in Chart 6. The most significant component of the change resulted from a decrease in the rates used to discount the liabilities to present value. These discount rates are based on the yields of high-quality fixed income securities as of September 30th 2010 and 2009. Plan liabilities also changed due to differences in actual plan experience for the year compared to the actuarial assumptions for rates of retirement, termination of employment, compensation increases, health care inflation, and other demographic factors, including changes made to those assumptions to better reflect anticipated future experience. The overall increase in the pension plan liabilities were also offset by the better than expected investment return on pension plan assets for the year.

**Chart 5: Unfunded Liability Estimate Changes**



**Chart 6: Contractor Employee Pension and PRB Liability Estimate Changes**



## Budgetary Resources

The Combined Statements of Budgetary Resources provide information on the budgetary resources available to the Department for the year and the status of those resources at the end of the Fiscal Year. The Department receives most of its funding from general government funds administered by the Department of the Treasury (Treasury) and appropriated for Energy's use by Congress. Since budgetary accounting rules and financial accounting rules recognize certain transactions at different points in time, Appropriations Used on the Consolidated Statements of Changes in Net Position will not match costs for that period. The primary difference results

from recognition of costs related to changes in unfunded liability estimates. As shown in Chart 7, for FY 2010, budget authority from appropriations has decreased by \$46.1 billion from FY 2009. Budget authority decreased by \$36.7 billion due to no new authority from the Recovery Act.

The Department's Obligations Incurred decreased by \$11.7 billion from FY 2009. This \$8.8 billion decrease was due to there being no new loans in the Credit Reform Financing Accounts in FY 2010. The remaining decrease is due to normal activity.

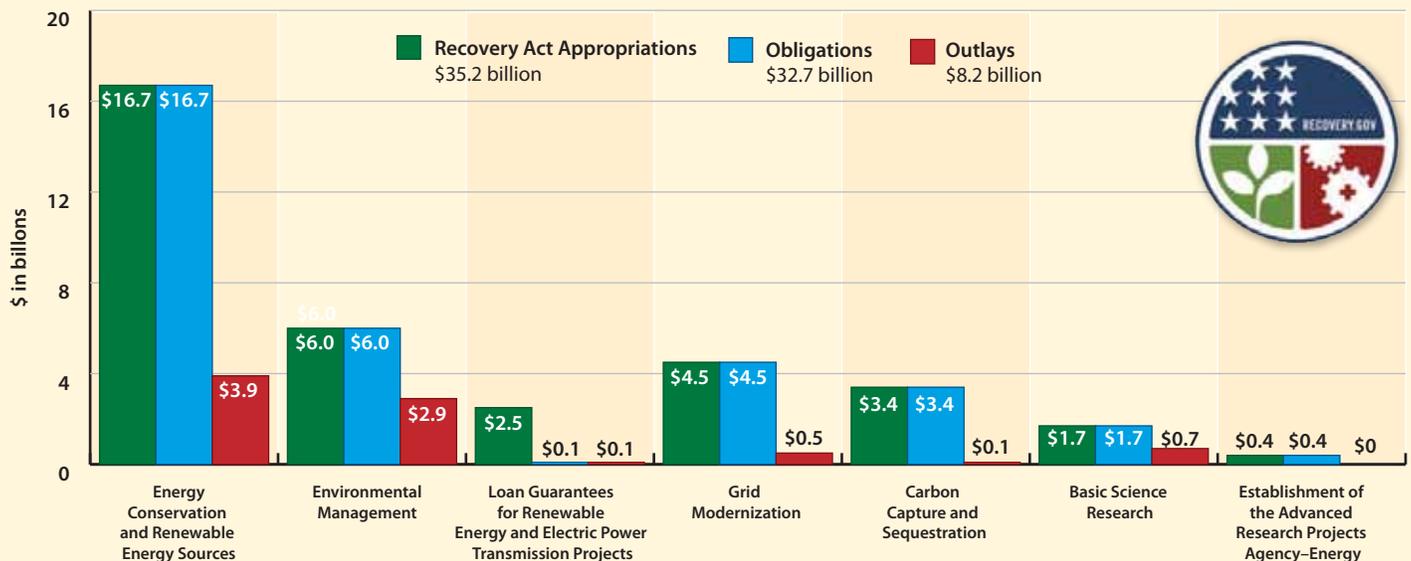
Chart 8 displays Recovery Act Cumulative Appropriations, Obligations and Outlays by major category.

**Chart 7: Obligations Incurred**



**Chart 8: Recovery Act Appropriations, Obligations and Outlays**

(Cumulative amounts below exclude the Western Area and Bonneville Power Administrations' borrowing authority and credit reform financing accounts)



**Chart 9: Linking Priorities, Budget and Cost**

2006 STRATEGIC THEME	2010 SECRETARIAL PRIORITIES	2006 STRATEGIC GOALS	FY 2010 BUDGETARY EXPENDITURES INCURRED <sup>a</sup> (\$ IN BILLIONS)	PROGRAM COST <sup>b</sup> (GROSS \$ IN BILLIONS)	
				FY2010	FY2009
Energy Security	Clean, Secure Energy	Energy Diversity	\$2.3	\$11.7	\$7.5
	Economic Prosperity				
	Clean, Secure Energy	Environmental Impacts	\$1.5		
	Economic Prosperity	Energy Infrastructure	\$5.3		
		Energy Productivity	\$3.3		
Nuclear Security	National Security	Nuclear Deterrent	\$6.8	\$8.0	\$8.7
		Weapons of Mass Destruction	\$2.2		
		Nuclear Propulsion Plants	\$0.9		
Scientific Discovery and Innovation	Science, Discovery & Innovation	Scientific Breakthroughs	\$5.0	\$4.4	\$4.1
		Foundations of Science			
Environmental Responsibility	National Security	Environmental Cleanup	\$9.0	\$7.6	\$6.1
		Managing the Legacy	\$0.4		

*a Budgetary Expenditures Incurred is synonymous with delivered orders — amounts accrued or paid for services performed, goods and tangible property received, or for programs for which no current service is required such as loans. Budgetary Expenditures are obtained from the Budgetary Standard General Ledger and are reported/recorded based on budgetary accounting rules. Includes capital expenditures but excludes such items as depreciation, changes in unfunded liability estimates, and certain other non-fund costs and allocations of Departmental Administration activities.*

*b Program Costs (Gross) are taken from the Department's Consolidated Statements of Net Cost in the FY 2010 Agency Financial Report (pages 86-87).*

# Management Challenges

DOE MANAGEMENT PRIORITIES	IG CHALLENGE AREAS FY 2010	GAO CHALLENGE AREAS
Contract and Project Administration <b>S</b> Acquisition Process Management <b>S</b>	Contract and Financial Assistance Award Management <b>S</b>	Resolve problems in contract management that place the agency at high risk for fraud, waste and abuse <b>S</b>
Security <b>D</b>	Safeguards and Security <b>D</b>	Address security threats and problems <b>D</b>
Environmental Cleanup <b>D</b> Nuclear Waste Disposal <b>D</b>	Environmental Cleanup <b>D</b>	Improve management for cleanup of radioactive and hazardous wastes <b>D</b>
Stockpile Stewardship <b>D</b>	Stockpile Stewardship <b>D</b>	Improve management of the Nation's nuclear weapons stockpile <b>D</b>
Cyber Security <b>S</b>	Cyber Security <b>S</b>	
	Energy Supply <b>D</b>	Enhance leadership in meeting the Nation's energy needs <b>D</b>
Human Capital Management <b>S</b>	Human Capital Management <b>S</b>	
Safety & Health <b>S</b>		
Recovery Act <b>S</b> and <b>D</b>		
		Revitalize infrastructure <b>S</b>

**D** Mission Direct **S** Mission Support