THE U.S. DEPARTMENT OF ENERGY'S OFFICE OF FOSSIL ENERGY

BUDGET IN BRIEF FY 09

THE OFFICE OF FOSSIL ENERGY (FE) MANAGES THE FOSSIL ENERGY RESEARCH AND DEVELOPMENT, CLEAN COAL TECHNOLOGY, THE ULTRA-DEEPWATER AND UNCONVENTIONAL NATURAL GAS AND OTHER PETROLEUM RESEARCH FUND, AND THE ELK HILLS SCHOOL LANDS FUND. FE ALSO MANAGES AND OPERATES THE STRATEGIC PETROLEUM RESERVE, THE NORTHEAST HOME HEATING OIL RESERVE, AND THE NAVAL PETROLEUM RESERVES. EACH OF THESE ACTIVITIES IS IN SEPARATE APPROPRIATION ACCOUNTS; THE FOLLOWING IS A DESCRIPTION OF EACH PROGRAM, PROGRAM HIGHLIGHTS, AND A SYNOPSIS OF REQUESTED FUNDING IN THE FY 2009 BUDGET.

FOSSIL RESEARCH AND DEVELOPMENT

The Fossil Research and Development (FERD) program is focused on electric power generation from coal. The mission of the FERD program is to create public benefits by enhancing U.S. economic, environmental, and energy security. This mission is achieved by developing technological capabilities which will reduce emissions from coal-fueled electricity generation plants resulting in dramatic reductions of carbon emissions to achieve near-zero atmospheric emissions power production. FERD supports many Presidential initiatives and priorities including the Coal Research Initiative, Hydrogen Fuel Initiative, and FutureGen. FERD also supports the Climate Change Technology Program, which is a priority for the Department.The United States today relies on fossil fuels for about 85 percent of its energy, and the Energy Information Administration projects reliance could exceed 85 percent in 2030. Actual consumption is expected to increase by 35 percent. To help meet new demand, program activities are developing fuel systems and practices which will provide current and future generations with clean, efficient, reasonably priced, and reliable energy.

➢ FutureGen promotes advanced, full-scale integration of integrated gasification combined cycle (IGCC) and carbon capture and storage (CCS) technology to produce electric power from coal while capturing and sequestering carbon dioxide (CO_2) resulting in near-zero atmospheric emissions coal energy systems. FERD is restructuring FutureGen in a way that accelerates the commercial use of near-zero emissions clean coal technologies. The new approach proposes multiple 300 – 600 Megawatt (MW) commercial-scale demonstration clean coal power plants that will operate as demonstration facilities — as opposed to a single, 275-MW R&D facility — each producing electricity and capturing and safely sequestering at least an estimated 1 million metric tons each of CO_2 annually.

➢ Clean Coal Power Initiative (CCPI) — This is a cooperative, cost-shared program between the government and industry which will demonstrate advanced coal-based power generation technologies. CCPI projects can help accelerate development and deployment of coal technologies that could economically meet environmental standards and increase the efficiency and reliability of coal power plants. CCPI allows the nation's power generators, equipment manufacturers, and coal producers to help identify the most critical barriers to coal use and the most promising advanced technologies to use coal cleanly, affordably, and with the higher efficiencies that moderate carbon intensity.

➢ Fuels and Power Systems — This program directly supports the mission of FERD by providing R&D that could help dramatically reduce coal power plant emissions (including CO_2) and significantly improve efficiency, which would also reduce carbon emissions.

The Innovations for Existing Plants (IEP) activity supports the economic post-combustion capture, separation, and compression of CO_2 from coal-fired utility boilers.

The Integrated Gasification Combined Cycle (IGCC) activity develops advanced gasification-based technologies which will reduce the cost of coal-based IGCC plants, improve thermal efficiency, and achieve near-zero atmospheric emissions of all pollutants. These technologies will be an integral part of the carbon capture and storage demonstration projects.

The Advanced Turbines activity develops technologies for advanced turbines that will operate with near-zero atmospheric emissions and higher efficiency when fueled with coal-derived hydrogen fuels.

The Carbon Sequestration activity develops economical ways to separate and permanently store (sequester) and offset greenhouse gas emissions from the combustion of fossil fuels. The technologies will help existing and future fossil fuel power generating facilities by reducing the cost of electricity impacts and also providing protocols for carbon capture and storage demonstrations to capture, transport, store, and monitor the CO_2 injected in geologic formations.

The Fuels activity is a key component of the President's Hydrogen Fuel Initiative. This activity focuses on developing technologies to produce ultra-pure hydrogen derived from coal for both stationary and mobile applications.

The Fuel Cells activity enables the generation of highly efficient, cost-effective electricity from domestic coal with near-zero atmospheric emissions of carbon and air pollutants in central station applications. This activity also provides the technology base to permit grid-independent distributed generation applications.

Serving as a bridge between basic and applied research, Advanced Research projects foster the development and deployment of innovative systems which improve efficiency and environmental performance while reducing the costs of advanced fuels and power systems. The projects include applied research to develop technologies for high-efficiency, coal-based power and coal-based fuel systems with near-zero atmospheric emissions. The Advanced Research activity also addresses crosscutting issues, including environmental and technical/economic analyses, coal technology export, and integrated program support.

➢ Petroleum — Oil Technology and Natural Gas Technologies — Consistent with the FY 2006, FY 2007, and FY 2008, Budget Requests, the Petroleum — Oil Technology and Natural Gas Technologies research and development programs are being terminated in FY 2009.

Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Research Fund

The Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Research Fund was created by the Energy Policy Act of 2005 (Public Law 109-58) as a mandatory program beginning in FY 2007. The program is funded from mandatory federal revenues from oil and gas leases. Consistent with the FY 2007 and FY 2008 budget requests, the FY 2009 budget proposes to repeal the program through a legislative proposal.

Clean Coal Technology

The Clean Coal Technology (CCT) program is jointly funded by the U.S. Government and industry to demonstrate promising advanced coal-based technologies which will use coal cleanly and efficiently (including reducing CO_2 emissions) and help meet domestic energy needs affordably. The program is helping develop the next-generation of technologies to provide near-zero atmospheric emissions and generate efficiencies nearly twice that of the existing coal fleet. CCT also generates data for the marketplace to judge the commercial potential of these technologies.

Strategic Petroleum Reserve

As the linchpin of the U.S. energy security program, the Strategic Petroleum Reserve provides strategic and economic security against disruptions in oil supplies via an emergency stockpile of crude oil. The program also fulfills International Energy Agency commitments which include coordinated energy emergency response plans and deterrence against intentional energy supply disruptions. To further insure against supply disruptions, the FY 2009 budget proposes to double the current capacity of 727 million barrels to 1.5 billion barrels, thus increasing the drawdown capability from 4.4 MMB/day to beyond 6 MMB/day. Increasing the inventory requires expanding two existing sites and adding one new site. Land acquisition begins in FY 2008. The FY 2009 Budget Request continues activities for expansion.

Northeast Home Heating Oil Reserve

On July 10, 2000, the President directed DOE to establish a Northeast heating oil reserve which is capable of assuring a short-term supplement to private home heating oil supplies during times of very low inventories or in the event of significant threats to immediate energy supplies. The 2-million-barrel Reserve protects the Northeast against a supply disruption for up to 10 days, which is the time required for ships to carry heating oil from the Gulf of Mexico to New York Harbor.

Naval Petroleum and Oil Shale Reserves

The Naval Petroleum and Oil Shale Reserve (NPOSR) mission is to complete environmental remediation activities and determine the equity finalization of NPR-1, and to operate NPR-3 until its economic limit is reached, while maintaining the Rocky Mountain Oil Field Test Center as a field demonstration facility. Since the NPOSR no longer served the national defense purpose envisioned in the early 1900s, the National Defense Authorization Act for FY 1996 (P.L. 104-106) required the sale of the government's interest in Naval Petroleum Reserve 1 (NPR-1). To comply with this requirement, the Elk Hills field in California was sold to Occidental Petroleum Corporation in 1998, two of the Naval Oil Shale Reserves (NOSR-1 and NOSR-3) were transferred to the Department of the Interior's (DOI) Bureau of Land Management, and the NOSR-2 site was returned to the Northern Ute Indian Tribe. The Energy Policy Act of 2005 transferred administrative jurisdiction and environmental remediation of Naval Petroleum Reserve 2 (NPR-2) in California to the Department of the Interior. DOE retains the Naval Petroleum Reserve 3 (NPR-3) in Wyoming (Teapot Dome field). Environmental remediation is performed on those facilities which no longer have value to either of the missions.

Elk Hills School Lands Fund

The Elk Hills School Lands Fund provides a source of funding to fulfill the settlement agreement between DOE and the State of California with respect to its longstanding claims to two parcels of land within ("school lands") within the Reserve (NPR-1) which was sold in 1998. Under the settlement agreement and provided that funds are appropriated, payments would be made over a seven-year period (without interest), commencing in 1999. To date, the fund has paid out $300 million. The timing and levels of any future budget requests are dependent on the schedule and results of the equity finalization process.

Program Budget Highlights

Fossil Energy Research and Development

The goal of the President's Coal Research Initiative is to conduct research and development on coal-related technologies that will improve the competitiveness of domestic coal in future energy supply markets. The Administration strongly supports coal as an important part of our energy portfolio. This request expands on the President's commitment to invest $2 billion on clean coal research over 10 years, which was completed in 2008, three years ahead of schedule.

Coal (FY 2008, $493.4; FY 2009, $623.7; + $130.3) — In FY 2009, the Coal program is significantly increased to increase activity on coal with carbon capture and storage. At the centerpiece of CCS is multiple demonstration projects through FutureGen and the Clean Coal Power Initiative, which will provide early commercial-scale experience with near-zero atmospheric emission coal technologies and issues to facilitate commercial deployment. The Coal program also continues large-scale demonstration of injection and storage of carbon dioxide in geologic formations. In the Coal program funding request, an additional $23.8 million for coal research by federal employees at the Office of Fossil Energy's National Energy Technology Laboratory (NETL) is provided under Program Direction.

FutureGen (FY 2008, $74.3; FY 2009, $156.0; + $81.7) — In FY 2009, FutureGen activities include completing review and restructuring of strategic FutureGen approach, announcing project selection, and negotiating with industry partners.

Clean Coal Power Initiative (FY 2008, $69.4; FY 2009, $85.0; + $15.6) — CCPI will complete the Round 3 solicitation, proposal evaluations, and project selections of advanced technology systems that capture carbon dioxide for sequestration or beneficial reuse.

Innovations for Existing Plants (FY 2008, $36.1; FY 2009, $40.0; + $3.9) — The increase raises the number of projects included in the Carbon Capture and Storage activity, which will develop post-combustion technologies to capture CO_2 emissions.

Integrated Gasification Combined Cycle (FY 2008, $53.5; FY 2009, $69.0; + $15.5) — The increase supports construction and commissioning of the 150-ton/day integrated gas turbine/Ion Transport Membrane (ITM) air separation unit which will provide engineering design data for scale-up and demonstration. The increase also supports scale-up of the ITM membrane fabrication process to support membrane development.

Advanced Turbines (FY 2008, $23.8; FY 2009, $28.0; + $4.2) — The increase supports high-priority hydrogen turbine development for near-zero atmospheric emissions coal plants, including refinement of combustor designs and the development and testing of the turbine expander section of the machine to reduce leakage, improve efficiency, and increase power output.

Carbon Sequestration (FY 2008, $118.9; FY 2009, $149.1; + $30.2) — The increase supports site selection and characterization, regulatory permits, community outreach, and completion of site operations plan for large-scale, geologic, carbon storage tests. It also funds large-scale injections needed to continue towards injection and remaining infrastructure development. The additional funding also permits work on capture projects and initiates an effort to prepare for and augment the monitoring, mitigation, and verification (MMV) which are being conducted in the Phase III tests.

Fuels (FY 2008, $24.8; FY 2009, $10.0; - $14.8) — The decrease reflects the elimination of integrated coal-biomass processing for carbon emissions research, elimination of substitute natural gas and coal-to-liquids production research, and right-sizing the level of effort in early engineering and design studies on hydrogen production modules for near-zero atmospheric emissions coal plants.

Fuel Cells (FY 2008, $55.5; FY 2009, $60.0; + $4.5) — The increase enables four Solid State Energy Conversion Alliance (SECA) Teams to develop systems to support delivery of $400/kW fuel cell systems capable of capturing greater than 90 percent carbon in an integrated near-zero emissions coal plant.

Advanced Research (FY 2008, $37.2; FY 2009, $26.6; - $10.6) — The primary decrease reflects completion of a report on liquefied natural gas ($8 million). Reductions in Sensors and Controls Innovations projects and suspension of projects focused on membrane development for hydrogen and air separation are partially offset by increases in several areas, including studies which support multi-year strategic planning and studies to identify challenges to technologies and advanced concepts that are applicable to fossil energy systems.

Natural Gas Technologies/Petroleum- Oil Technology (FY 2008, $24.8; FY 2009, $0; - $24.8) — Because these technologies are considered mature and can be continued by private industry, these programs are being terminated in FY 2009.

Program Direction (FY 2008, $148.6; FY 2009, $126.3; - $22.3) — The decrease is due to efficiencies in support services activities, including facility, operations, maintenance, finance, information automation, administrative, and management/technical support. The decrease is also attributable to efficiencies in Other Related Expenses, such as supplies and materials, communications, utilities, and maintenance/service agreements.

Clean Coal Technology

(FY 2008, - $58.0; FY 2009, $0; + $58.0) — The FY 2009 Budget Request proposes to transfer $149,000,000 in prior-year balances to the FutureGen and CCPI projects (both of which are funded within the FERD appropriation) because these balances are no longer needed to complete active CCT projects.

Strategic Petroleum Reserve

(FY 2008, $186.8; FY 2009, $344.0; + $157.2) — The change reflects completion of land acquisition activities for the Richton, MS site in FY 2008 and the addition of expansion activities at the two existing sites and the new site in FY 2009.

Naval Petroleum Reserve

(FY 2008, $20.3; FY 2009, $19.1; - $1.2) — The decrease is due to the completion of the Risk Assessment and Corrective Active Studies to determine the cleanup requirements of the Elk Hills site (NPR-1) and reductions in operating and facility maintenance costs at NPR-3.

Northeast Home Heating Oil Reserve

(FY 2008, $12.3; FY 2009, $9.8; - $2.5) — The decrease reflects the FY 2008 repurchase of heating oil sold in FY 2007 to finance the new storage contracts. The quantity will depend on the price at the time of bid solicitation.

Fossil Energy Budget

Area	Program	FY 2009 Request (Thousand $)
Research & Development	President's Coal Research Initiative	
	Clean Coal Power Initiative (CCPI)	$85,000
	FutureGen	$156,000
	Fuels and Power Systems	
	Sequestration	$149,132
	Other Supporting Coal R&D	$163,600
	Coal-to-Hydrogen	$10,000
	Fuel Cells	$60,000
	Coal Research — NETL	$23,780
	Total Fuels & Power Systems	$406,512
	Total Coal	$647,512
	Natural Gas	$0
	Oil Technology	$0
	Other R&D/Program Direction/Mgmt. Support	$117,828
	Use of Prior Year Balances	(-$11,310)
	Total, Research & Development	$754,030
Petroleum Reserves	Strategic Petroleum Reserve	$344,000
	Home Heating Oil Reserve	$9,800
	Naval Petroleum Reserves	$19,099
	Total, Petroleum Reserves	$372,899
	Total Fossil Energy Budget	$1,126,929