

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

BUDGET IN BRIEF FY 08

THE OFFICE OF FOSSIL ENERGY DIRECTS ADVANCED-TECHNOLOGY RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAMS, AND MANAGES FEDERAL ENERGY RESERVES. MOST TECHNOLOGY ACTIVITIES ARE CONDUCTED THROUGH ITS AFFILIATE THE NATIONAL ENERGY TECHNOLOGY LABORATORY. FY 2008 RESPONSIBILITIES INCLUDE THE FOSSIL ENERGY RESEARCH AND DEVELOPMENT PROGRAM, PETROLEUM AND NATURAL GAS TECHNOLOGIES, THE STRATEGIC PETROLEUM RESERVE, THE NORTHEAST HOME HEATING OIL RESERVE, THE NAVAL PETROLEUM RESERVE, AND THE ELK HILLS SCHOOL LANDS FUND.

FOSSIL RESEARCH AND DEVELOPMENT

The Fossil Energy Research and Development (FERD) program concentrates on electric power generation and coal, the nation's most abundant fossil fuel. Its goal is to ensure that economic benefits of moderately priced electricity are compatible with the public's expectations for exceptional environmental quality and improved energy security. Its mission is to deliver public benefits that enhance U.S. economic, environmental, and energy security by (1) managing and performing energy-related research that reduces market barriers to the reliable, efficient, and environmentally sound use of fossil fuels and their conversion to other fuels such as hydrogen; by (2) partnering with industry and others to advance clean and efficient fossil energy technologies toward commercialization; and by (3) supporting the development of information and policy options that ensure continuing access to adequate supplies of affordable, clean energy. The highest priority is the FutureGen Project to build the world's first plant capable of producing electric power and hydrogen from coal while capturing and sequestering carbon dioxide and operating at near-zero atmospheric emissions.

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.

FERD continues to incorporate into its program and project selection process specific criteria that are consistent with the Administration's research and development investment goals. The FY 2008 budget request also follows the National Energy Policy Act of 2005 and maintains core research and development with an emphasis on cost sharing and industry collaboration. As a result of the evaluations under the Research and Development Investment Criteria, and the Program Assessment Rating Tool, activities throughout the program emphasize research and development activities that support the FutureGen priority.

CLEAN COAL

The goal of the President's Coal Research Initiative is to conduct research and development that will improve the competitiveness of domestic coal in future energy markets. The Administration strongly supports coal as an important component of our energy portfolio. This year's request completes the President's commitment to invest \$2 billion on clean coal research over 10 years and three years ahead of schedule. The President's Coal Research Initiative includes the following components:

➤ **Clean Coal Power Initiative (CCPI)** — This is a cooperative, cost-shared program between the government and industry to rapidly demonstrate emerging technologies in coal-based power generation so as to help accelerate commercialization. The CCPI allows the nation's power generators, equipment manufacturers, and coal producers to help identify the most critical barriers to coal use in the

power sector. Technologies to eliminate the barriers are selected with the goal of accelerating the development and deployment of applications that will economically meet environmental standards while increasing plant efficiency and reliability.

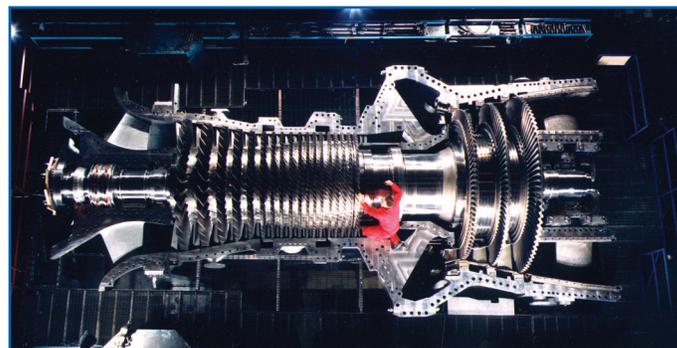
➤ **FutureGen** — This first-of-a-kind project will establish the capability and feasibility of co-producing electricity and hydrogen from coal with near-zero atmospheric emissions, including carbon dioxide. Carbon capture and sequestration is an integral component of the concept. FutureGen employs a public/private partnership to integrate technologies that ultimately will lead to new classes of plants that are fuel flexible, capable of multi-product output, have electrical efficiencies over 60 percent and operate with near-zero atmospheric emissions. Goals include electricity at costs no more than 10 percent above power from comparable plants without carbon sequestration and the ability to use coal, biomass, or petroleum coke. The project could help retain the strategic value of coal – the nation’s most abundant and lowest cost domestic energy resource. Technology development supporting FutureGen is embodied in the core research and development activity of the Fuels and Power Systems program, which is outlined below. This includes carbon capture and sequestration, membrane technologies for oxygen and hydrogen separation, advanced turbines, fuel cells, coal-to-hydrogen conversion, and gasifier-related technologies. FutureGen is additionally supported by some activities of the Clean Coal Power Initiative, which will help drive down the costs of Integrated Gasification Combined Cycle (IGCC) systems and other technologies for near-zero atmospheric emission plants.

➤ **Fuels and Power Systems** — This program provides important research for FutureGen to dramatically reduce coal power plant emissions, including carbon dioxide, and significantly improve efficiency which lowers carbon intensity, or emissions per unit of power output.

The **Integrated Gasification Combined Cycle (IGCC)** program will continue to concentrate efforts on gas stream purification to meet quality requirements for use with fuel cells and conversion processes, on impurity tolerant hydrogen separation, on elevating process efficiency, and on reducing the costs and energy requirements for oxygen production through development of advanced technologies such as membranes.

The **Advanced Turbines** program is centered on creating a turbine-technology base that will permit the design of near-zero atmospheric emission IGCC plants and a class of FutureGen-descended plants with carbon capture and sequestration. This research emphasizes technology for high-efficiency hydrogen and syngas turbines and builds on prior successes in the Natural Gas-based Advanced Turbine Systems Program.

The **Carbon Sequestration** program is developing a portfolio of technologies with great potential to reduce greenhouse gas emissions. Primary concentration is on dramatically lowering the cost and energy requirements of pre- and post-combustion carbon dioxide capture. The goal is to have by 2012 a technology portfolio enabling safe, cost-effective, and long-term carbon mitigation, management, and storage which will lead



to substantial market penetration after 2012. The program is expected to contribute significantly to the President’s goal of developing technologies to substantially reduce greenhouse gas emissions in the long term and to fill a critical need in efforts ultimately to stabilize U.S. greenhouse gas emissions.

The **Fuels** program conducts the research necessary to promote the transition to a hydrogen economy. Research targets cost reduction and increased efficiency of hydrogen production from coal feedstocks as part of the President’s Hydrogen Fuel Initiative and in support of the FutureGen project.

Advanced Research projects seek a greater understanding of the physical, chemical, biological, and thermodynamic barriers that limit the use of coal and other fossil fuels. The program funds two categories of activity. The first includes applied research programs to develop the technology base needed for the development of super-clean, very high efficiency coal-based power and coal-based fuel systems. The second is a set of crosscutting studies and assessment activities in environmental, technical and economic analyses, coal technology export, and integrated program support.

Objectives of **Fuel Cells** activity are to provide the technology-based development of low-cost, scalable, and fuel-flexible fuel cell systems that can operate in central coal-based power systems and have applications in other electric utility (both central and distributed), industrial, and commercial/residential markets (not part of the President’s Coal Research Initiative).

PETROLEUM AND NATURAL GAS TECHNOLOGIES

Consistent with the FY 2007 Budget Request, the **Petroleum – Oil Technology** and **Natural Gas Technologies** research and development programs will have no activity in FY 2008.

While there is no proposed R&D funding in FY 2008, Fossil Energy will continue to carry out important responsibilities in the oil and natural gas sector.

The Oil and Gas group will manage the Ultra-Deep and Unconventional Natural Gas Research Program mandated by the Energy Policy Act of 2005. However, the Administration will propose legislation to terminate this program, which is funded from federal oil and gas lease revenues.

In addition, FE will continue to authorize natural gas imports and exports, collect and report data on natural gas trade, and operate the Rocky Mountain Oilfield Testing Center.

FE will also oversee the loan guarantee program for the proposed Alaska Natural Gas Pipeline.

PETROLEUM RESERVES

The [Strategic Petroleum Reserve](#) mission is to provide the United States with adequate strategic and economic protection



against disruptions in oil supplies. To further insure against supply disruption, the budget proposes to begin expansion to 1.5 billion barrels. The process begins immediately with filling to the current capacity of 727 million barrels and then expanding capacity further at existing and new sites in FY 2008.

The [Northeast Home Heating Oil Reserve](#) was established in July 2000 when the President directed DOE to establish a heating oil reserve capable of assuring home heating oil supplies for the Northeast states during times of very low inventories and significant threats to immediate supply. The 2-million-barrel Reserve protects the region against a supply disruption for up to 10 days, the time required for ships to carry heating oil from the Gulf of Mexico to New York Harbor for distribution.

The [Naval Petroleum and Oil Shale Reserve \(NPOSR\)](#) mission is to complete environmental remediation activities and determine the equity finalization of Naval Petroleum Reserve 1 (NPR-1); to operate NPR-3 until its economic limit is reached, while maintaining the Rocky Mountain Oil Field Test Center as a field demonstration facility.

Because the NPOSR no longer served the national defense purpose envisioned in the early 1900s, the National Defense Authorization Act for FY 1996 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. Subsequently, the Department transferred two of the Naval Oil Shale Reserves (NOSR-1 and NOSR-3), both in Colorado to the Department of the Interior's (DOI) Bureau of Land Management. In January 2000, the Department returned the NOSR-2 site 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 De-

partment of the Interior. DOE retains the Naval Petroleum Reserve 3 (NPR-3) in Wyoming (Teapot Dome field).

ELK HILLS SCHOOL LANDS FUND

The National Defense Authorization Act for FY 1996 authorized the settlement of longstanding "school lands" claims to certain lands by the State of California known as the [Elk Hills Reserve](#). The settlement agreement between DOE and California, dated October 11, 1996, provides for payment, subject to appropriation, of 9 percent of the net sales proceeds generated from the divestment of the government's interest in the Elk Hills Reserve. Under the terms of the Act, a contingency fund containing 9 percent of the net proceeds of sale was established in the U.S. Treasury and was reserved for payment to California.

To date, the fund has paid out \$300 million. The first installment payment of the settlement agreement was appropriated in FY 1999. While no appropriation was provided in FY 2000, the Act provided an advance appropriation of \$36.0 million that became available in FY 2001 (second installment). The next four installments of \$36 million were paid at the beginning of FY 2002, FY 2003, FY 2004, and FY 2005 respectively. A seventh payment of \$84 million was made in FY 2006.

FY 2008 BUDGET HIGHLIGHTS

CLEAN COAL

Because it is so important, the FY 2008 Budget requests \$426 million for the [Clean Coal Technology Program](#) distributed over the program's various components to get the maximum benefit in the most cost-effective way.

The [Clean Coal Power Initiative's](#) proposed budget of \$73 million will fund the continuation of projects selected in two prior, competitive solicitations for promising technologies. A third round is planned in FY 2008.

[FutureGen](#), Fossil Energy's most far-reaching and visionary clean coal project, has a proposed FY '08 Budget of \$108 million. Those funds will be used to support detailed plant design and procurement, as well as ongoing permitting, preliminary design and site characterization work.

The [Fuels and Power Systems](#) proposed FY '08 Budget is \$245 million and covers R&D for several technologies important to FutureGen.

One of those critical technology areas — and a core Fossil Energy program receiving heavy emphasis — is [carbon sequestration](#). The \$79 million FY '08 Budget request will continue R&D into CO2 capture and storage, as well as measurement, monitoring and verification technologies and processes.

The Budget turns to the original [Clean Coal Technology](#) program and prior appropriations to help fund current activities. It redirects unexpended sums to the FutureGen Project and the Clean Coal Power Initiative. The original program was jointly funded by the U.S. government and industry to demonstrate

the most promising advanced technologies to use coal cleanly, inexpensively and with the higher efficiencies that moderate carbon intensity. It recognized that U.S. coal reserves are a vast and relatively low cost energy resources and that they can give the Nation a significant economic advantage; but that these benefits can be fully realized only when coal can be used in ways which are environmentally responsible and when advanced technology can achieve significantly higher efficiencies. Program demonstrations supply data the marketplace requires to judge the commercial potential of new technologies.

Specifically, the Budget proposes to cancel \$149 million in prior-year balances and, in addition, to transfer \$166 million in prior-year balances to the Fossil Energy Research and Development Program. These balances are no longer needed for active projects in the Clean Coal Technology program. The Budget proposes to redirect these funds for work on the FutureGen project (\$108 million) and to the Clean Coal Power Initiative (\$58 million).

PETROLEUM – OIL TECHNOLOGY AND NATURAL GAS TECHNOLOGIES

Consistent with the FY 2007 Budget Request, the **Petroleum – Oil Technology** and **Natural Gas Technologies** research and development programs will have no activity in FY 2008.

The Oil and Gas group will manage the Ultra-Deep and Unconventional Natural Gas Research Program mandated by the Energy Policy Act of 2005. However, the Administration will propose legislation to terminate this program, which is funded from federal oil and gas lease revenues.

STRATEGIC PETROLEUM RESERVE

The **Strategic Petroleum Reserve (SPR)** Petroleum Account, created by the Energy Policy and Conservation Act, is the source of funds to acquire, transport, and inject oil into the Strategic Petroleum Reserve. Funds in the SPR Petroleum Account are also used for incremental drawdown and other related miscellaneous costs.

Funding in FY 2008 allows the Strategic Petroleum Reserve to maintain its continual readiness posture through a comprehensive program of systems maintenance, exercises, and tests. To further insure against supply disruptions that could harm our economy, the budget includes \$168 million to begin expansion at existing and new sites to 1.5 billion barrels.

NORTHEAST HOME HEATING OIL RESERVE

Northeast Home Heating Oil Reserve contains 2 million barrels of heating oil stored at commercial terminals in the Northeast and is in good condition. The current 5-year storage contracts expire in September 2007. A request for bids will be issued in February 2007. The proposed FY 2008 budget requests \$5.3 million to continue operations. Naval Petroleum Reserve/Elk Hills School Lands Fund.

NAVAL PETROLEUM RESERVE/ELK HILLS SCHOOL LANDS FUND

The **Naval Petroleum and Oil Shale Reserve (NPOSR)** mission has evolved to complete environmental remediation activities and determine the equity finalization of NPR-1. The program continues post-sale activity related to the settlement of ownership equity shares with the former unit partner in the NPR-1 field, Chevron U.S.A., Inc.

The NPR-3 primary focus has been to apply conventional oil field management and operations to produce the stripper field to its economic limit. Revenues in FY 2008 are estimated at \$4.4 million. Co-located with NPR-3, the Rocky Mountain Oilfield Testing Center, Casper, Wyoming, provides opportunities for field testing and demonstration of upstream and environmental products. FY 2008 funding is requested for \$17.3 million.

No funding is requested for the **Elk Hills School Lands Fund** in FY 2008. The timing and levels of any future budget requests are dependent on the schedule and results of the equity finalization process.

FOSSIL ENERGY BUDGET

AREA	PROGRAM	FY 2008 REQUEST (THOUSAND \$)
RESEARCH & DEVELOPMENT	CLEAN COAL POWER INITIATIVE (CCPI)	\$73,000
	FUTUREGEN	\$108,000
	FUELS AND POWER SYSTEMS	
	SEQUESTRATION	\$79,077
	OTHER SUPPORTING COAL R&D	\$94,500
	COAL-TO-HYDROGEN	\$10,000
	FUEL CELLS	\$62,025
	TOTAL (FUELS & POWER SYSTEMS)	\$245,602
	NATURAL GAS	\$0
	OIL TECHNOLOGY	\$0
OTHER R&D/PROGRAM	DIRECTION/MGMT. SUPPORT	\$140,199
	TOTAL, RESEARCH & DEVELOPMENT	\$566,801
	CLEAN COAL TECHNOLOGY	(\$58,000)
PETROLEUM RESERVES	STRATEGIC PETROLEUM RESERVE — FACILITIES DEVELOPMENT	\$163,472
	STRATEGIC PETROLEUM RESERVE — FACILITIES EXPANSION	\$168,137
	HOME HEATING OIL RESERVE	\$5,325
	NAVAL PETROLEUM RESERVES/ELK HILLS SCHOOL LANDS	\$17,301
	TOTAL, PETROLEUM RESERVES	\$354,235
TOTAL FOSSIL ENERGY BUDGET		\$863,036