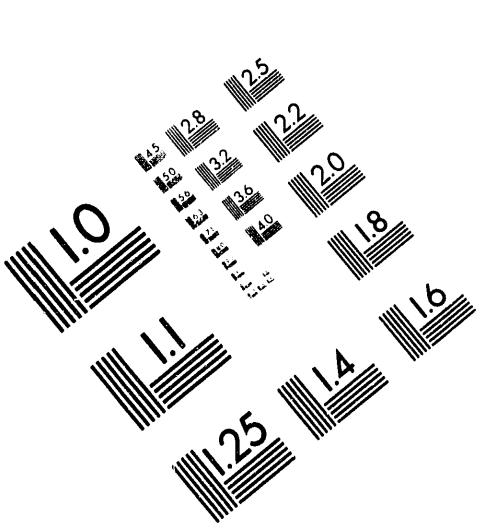

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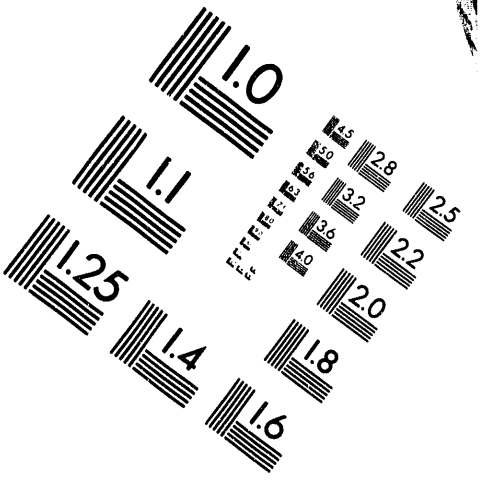

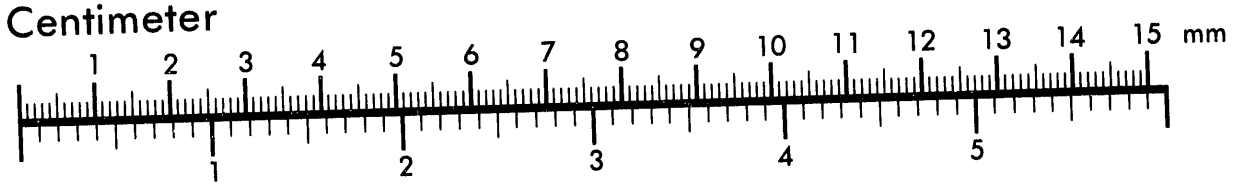

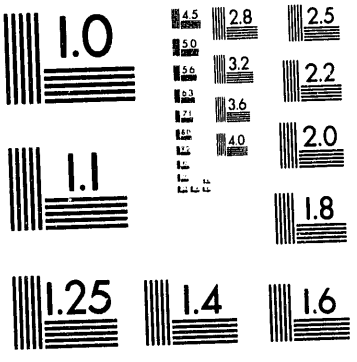

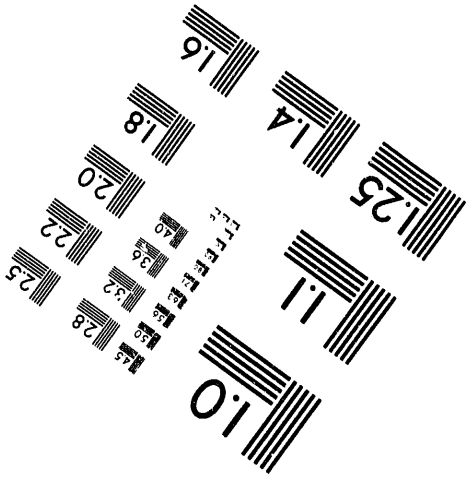

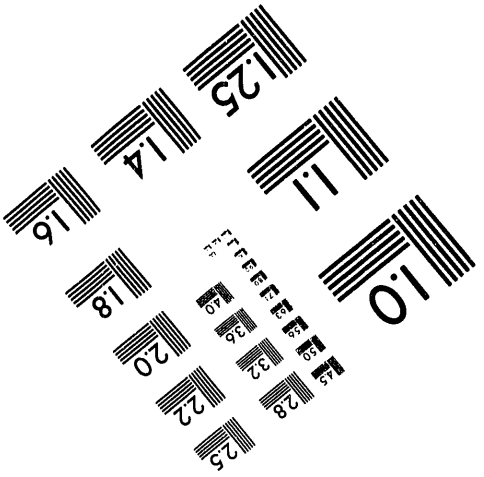

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DOE/CR-0014

United States Department of Energy

Budget Highlights

Hazel R. O'Leary
Secretary of Energy

April 1993

Office of Chief Financial Officer

FY 1994

MASTER

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Policy Overview

Introduction

The President's Fiscal Year 1994 budget request for the Department of Energy reflects the Administration's goal of redressing the balance between the Nation's energy and economic requirements and protection of the environment. The Department plans to undertake a careful restructuring of its national defense responsibilities, in line with post Cold War exigencies; contribute to the Administration's deficit reduction objectives; and fulfill the President's commitment to invest in science and technology development and transfer.

Within the constraints of the fiscal year (FY) 1994 budget, I am committed to the maximum feasible implementation of the Energy Policy Act of 1992. I pledge to work with Congress to assure that all priority requirements of this important legislation are carried out, in 1994 and later years.

The Department must fulfill its environmental restoration and waste disposal responsibilities. The FY 1994 budget will allow us to meet our obligations in the long process of cleaning up defense and civilian installations.

The Department's mission is broad and wide-ranging, but so are its scientific and technological capabilities. We have the opportunity to mobilize the intellectual resources of the National Laboratories, and other research and development centers managed by the Department, and respond to the President's call for change.

President's Goals

President Clinton has stated his belief that the Department of Energy has been underutilized. In his report *A Vision of Change for America,* which was presented to the Congress on February 17, 1993, he stated that ... "Without thoughtful energy policies, our nation will remain dependent on foreign oil and special interests. The Administration will launch initiatives to develop new, clean, renewable energy sources that cost less and preserve the environment. We will also encourage energy efficiency and conservation to lower the energy bill for middle-class Americans, and lessen our vulnerability to events outside our control."

The President's plan has three key elements: economic stimulus to create jobs now while laying the foundation for long-term economic growth; long-term public investments to increase the productivity of our people and businesses; and a serious, fair, and balanced

deficit-reduction plan to stop the government from draining the private investments that generate jobs and increase incomes.

The President's vision for change in America is comprehensive. As shown in this document and the FY 1994 budget request, the Department of Energy will play an important role in its success. DOE's FY 1994 budget request of $19.6 billion provides the essential resources to begin the changes necessary to support his vision and his plan.

DOE's Response

The President has identified the Department of Energy as an integral part of his program for national investment and renewal. His goals for DOE are clearly reflected in his short-term economic stimulus package for FY 1993 which includes $148.7 million for DOE activities; primarily in the areas of energy conservation, alternative-fueled vehicles for the Federal Fleet, and transfer of defense-related and civilian technology from our National Laboratories to the private sector.

As part of his longer-term investment strategy for FY 1994–1998, the President has proposed to substantially redirect DOE's research and development (R&D) priorities. In addition to continuing increased support for the programs included in the stimulus package, emphasis has also been placed on natural gas utilization R&D, increased support for States to carry out conservation and low-income weatherization activities, expanded renewable energy and energy efficiency R&D, fusion energy research, the construction of the Advanced Neutron Source for support of scientific research and medical isotope production, the construction of the B-Factory for high energy physics research, and enhanced funding for Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) initiatives.

In addition to the aforementioned funding increases, the President has proposed the following programmatic restructuring: elimination of the research and development funding support and related facility funding for nuclear reactors that have no commercial or other identified application; debt repayment reform and market incentives for the Federal Government's Power Marketing Administrations; extension of the project schedule for the Superconducting Super Collider; reduced funding for Defense Programs weapons activities but new support for workers affected by Defense Programs redirection; increased cost-effectiveness in the management of the Federal uranium enrichment activities; a slowdown of the fill rate for the Strategic Petroleum Reserve; and introduction of a broad-based tax on all types of energy, based on the energy content of the fuel (measured in British Thermal Units) to reduce the deficit, increase efficiency, and improve environmental quality.

What the Budget Reflects

DOE has four principal missions: Energy, with emphasis on implementation of the Energy Policy Act of 1992 (EPACT); National Defense; Environmental Restoration and Waste Management; and Science and Technology Research, Development, Transfer, and Commercialization. Each of these areas is at a critical juncture and, as is described below, each has an impact on the Department's FY 1994 budget request.

EPACT Implementation

The 30 titles of the EPACT Legislation signed into law in October 1992 contain over four hundred requirements for DOE action (many subject to appropriation) and affect virtually every aspect of energy supply and utilization. Over two hundred of these requirements have statutory completion dates ranging from 30 days of enactment to year 2010 deadlines. The EPACT requirements predominantly fall within the purview of the Energy Efficiency and Renewable Energy (EE/RE) Program. For this reason, the EE/RE budget for FY 1994 has been increased by $275 million. Further, higher increments are planned for FY 1995–1998 in order to fully support EPACT implementation.

National Defense

The diminishing strategic military threat, due to the end of the Cold War and break-up of the Soviet Union, has provided the opportunity to redirect funds from weapons production activities to other DOE critical missions. For the future, the main tasks of the nuclear weapons complex will be the dismantlement of weapons, the protection of nuclear materials, and the maintenance and surveillance of the residual nuclear weapons stockpile. As we consolidate the complex, however, the Nation must be assured that we will retain the capability to produce components for the enduring stockpile in the event, for example, we find that certain weapons have deteriorated with age or that we must rebuild our arsenal. To further support this, the Administration intends to comply with Congressional direction on underground nuclear testing. The National Defense redirection will provide a net reduction of $1.25 billion in FY 1994.

Environmental Restoration and Waste Management

The Administration is firmly committed to honor the government's obligation to clean up the DOE nuclear weapons complex in order to protect our environment and the health and safety of our citizens. This is coupled with the determination to achieve those objectives as efficiently and cost-effectively as possible. While some steps have been taken in recent years to improve management of the cleanup effort, additional management reforms will help ensure that the government's investments are wise,

prudent, and effective, and that our goals are achieved as efficiently as possible. The Administration's budget request for FY 1994 is $6.5 billion, an increase of 18 percent.

DOE has the responsibility for cleaning up 4,000 sites that represent 26,000 acres that contain hazardous wastes and contaminated soil, groundwater, and structures. As the weapons complex is consolidated and downsized, facilities no longer needed will be turned over to DOE's Environmental Restoration and Waste Management Program for decommissioning and decontamination. In addition to the weapons-related contamination, the Department is responsible for the management and disposal of radioactive and hazardous wastes resulting from research and uranium enrichment activities. The cleanup task is formidable and is further compounded by a current lack of adequate technology to address all of the environmental problems and by a complex regulatory regime.

We will need to aggressively pursue innovative cleanup technologies and move to demonstrate and use promising technologies, such as sensors, that can greatly improve characterization/monitoring of contamination, and robotics. These technologies will be key to decommissioning and decontamination activities and to minimizing worker exposures to harmful compounds.

In the regulatory area, we will need to negotiate with Federal and State regulatory agencies and work toward reasonable, risk-based standards; a more streamlined remedy selection process that allows for the use of innovative technologies; the ability to change milestones based on risk and cost reduction through new technology; and reconciliation of conflicting regulatory requirements. We must include the public in this dialogue, which must involve frank discussions of risk, resources, and priorities.

Science and Technology

The Clinton Administration believes investments in R&D constitute the strongest and most consistent positive influence on long-term productivity growth, and views the DOE National Laboratories as preferred instruments to help achieve this goal. DOE currently invests approximately $2.9 billion a year in fundamental research. American science, education, and industry can and should benefit from this investment. I intend to concentrate the Department's basic research efforts on: (1) supportive research related to energy, environment, and medical and biological areas, (2) the general sciences, supporting the national high energy and nuclear physics programs, and (3) technology transfer. Partnerships with the private sector should be an important part of the new mission of the laboratories. To promote these partnerships and technology transfer, the FY 1994 budget request includes an increase of $30 million for Cooperative Research and Development Agreements (CRADAs) at non-defense National Laboratories with an additional $50 million for each FY 1995–1998. The budget also includes increases of: $78 million for DOE's portion of Federal Coordinating Council on Science, Engineering and Technology (FCCSET) initiatives, $108 million for the Superconducting Super Collider,

$26 million for construction of the Advanced Neutron Source, $36 million for construction of the B-Factory, and $20 million for the fusion energy Tokamak Physics Experiment.

Policy Impacts Reflected in the FY 1994 Budget

Both the supplemental FY 1993 stimulus package and the FY 1994-1998 investment and cost-savings plans proposed by the Administration begin the changes in DOE's policy direction that will be necessary to bring about President Clinton's vision for change in America. The highlights of these policy changes as reflected in the FY 1994 budget request are described below:

Investments

Energy Efficiency and Renewable Energy: EPACT contains new Federal responsibilities including: (1) establishment of new energy efficiency standards, (2) authorization for enhanced research programs, and (3) new demonstration/commercialization programs for renewable energy and energy efficiency. The investment initiative progressively increases funding through FY 1998 for a total increase of $1.9 billion. The increased funding will be distributed roughly equally among the four major program areas: solar and renewable energy, and industrial, transportation, and buildings energy efficiency R&D. The largest increases will go to technology transfer and commercialization, advanced materials, industrial wastes and materials processing, electric hybrid and alternative-fueled vehicles, and advanced building systems technologies.

Federal Energy Management: The Federal government is the largest single user of energy in the Nation, spending almost $11.3 billion annually in energy costs. The initiative is an overall Federal investment of $1.4 billion over the next five years. The four biggest energy-consuming agencies—Defense, Energy, Veterans Affairs, and the General Services Administration—will be funded directly for their in-house energy management programs while DOE will be funded for energy efficiency improvements proposed by all of the remaining Federal agencies, and for a greatly increased program of training and energy audits.

Weatherization: DOE provides funds to States to help pay for home weatherization improvements for low-income citizens. The proposed initiative of increased funding of $60 million in FY 1994 and $100 million per year through FY 1998 would be distributed differently than the typical "formula grants" in order to increase the leverage received on taxpayer funds. Matching funds of at least 1:1 will be required from States or utilities.

Alternative-Fueled Vehicles: This initiative provides $18 million in FY 1994 and $30 million each following year through FY 1998 for the purchase and/or conversion of petroleum based gasoline powered motor vehicles to alternatively-fueled vehicles for the Federal fleet. We anticipate that approximately one-half of these purchases/conversions will utilize natural gas.

Natural Gas Utilization: We need to increase the use of natural gas because it is cleaner than other fossil fuels, creates jobs , and is an abundant domestic resource. This investment initiative adds $14 million to Fossil Energy's gas turbine program in FY 1994 and provides increases over the period FY 1995 to 1998 totaling $368 million. This initiative will significantly contribute to DOE's natural gas efforts which are contained within the Energy Efficiency and Renewable Energy, Fossil Energy, and Energy Research programs. The Department's FY 1993 natural gas activities are funded at $157.6 million which will grow by $38.4 million to $196 million in FY 1994. Over 60 percent of this growth is in utilization R&D. A critical new feature is to involve segments of the natural gas industry in the design and operation of research programs to help ensure that the enhanced R&D is relevant to the needs of industry and the market place. It will also provide an opportunity for private sector cost sharing, thereby increasing the overall level of gas usage.

Advanced Neutron Source: This initiative would fund the design and construction of an advanced neutron source to serve as a national user facility to perform materials research, to produce rare isotopes for medical diagnosis, treatment, and research, and to perform research using neutron irradiation techniques. The facility would accommodate approximately 1,000 user groups from industry, universities, and Federal laboratories. The total projected cost of the facility is about $2.7 billion and this initiative adds $26 million in FY 1994 with an additional $1.2 billion between FY 1995 and FY 1998.

B-Factory: The B-Factory is a high energy physics initiative that funds the design and construction of a high luminosity electron-positron colliding beam machine for the purpose of studying the fundamental aspects of the structure of matter. This initiative includes $36 million in FY 1994 to initiate construction.

Fusion Energy Research: Fusion offers the promise of abundant energy from readily available fuels with low environmental impact. The United States must maintain a vital domestic research program to support our participation on the International Thermonuclear Experimental Reactor (ITER)—a joint effort with the European Community, Japan, and Russia. This initiative would allow for construction of a new facility, the Tokamak Physics Experiment. An increase of $20 million is proposed for this project in FY 1994 with an additional $352 million over FY 1995 to FY 1998.

Cooperative Research and Development Agreements (CRADAs): CRADAs are one of the mechanisms by which the National Laboratories can work with industry to transfer lab-developed technology and know-how to the private sector and improve our

competitiveness in world markets. The funds go to the laboratories to pay for their share of the jointly agreed-upon R&D in the CRADA. The private sector partner is given proprietary rights to laboratory work under each CRADA, including rights to inventions made under the CRADA. This initiative provides increased funds of $30 million in FY 1994 and $50 million per year through FY 1998 for non-defense laboratories. In addition, as part of the President's stimulus package, an increase of $47 million of FY 1993 funds was proposed for CRADAs at non-defense laboratories and $47 million in FY 1993 funds that were appropriated for research and development of nuclear weapons at the Department's defense laboratories was proposed to be redirected to research in dual-use technologies.

Federal Coordinating Council on Science, Engineering, and Technology (FCCSET) Initiatives: As the fields of science and technology have progressed and as applications of scientific advances have improved, it has become obvious that a single field of science can have applications in numerous different areas that are governed by different Federal departments and agencies. Of the five areas addressed by FCCSET, DOE has been the leader of three: high performance computing and communications, math and science education, and biotechnology; and an active participant in the others: materials processing and advanced manufacturing. This initiative proposes an increase of $78 million in FY 1994 to support DOE's Office of Energy Research program in these areas.

Cost Savings

National Defense: Programmatic savings resulting from the redirection of National Defense programs amounts to $1.35 billion for FY 1994. These savings will accrue from reduced requirements, providing a minimum capability to produce nuclear weapons materials, delaying the nuclear and non-nuclear consolidation reconfiguration initiative, reducing laboratory nuclear weapons R&D, and placing K-Reactor in a cold standby status. Job dislocations resulting from these reductions will be offset by a $100 million comprehensive worker retraining and assistance program that results in a net reduction of $1.25 billion in the FY 1994 National Defense request.

Coal: While coal is our Nation's most abundant energy resource, the challenge is to use it cleanly. The Administration fully supports continuing Rounds IV and V of the Clean Coal Technology Demonstration Program on schedule. The coal R&D Program has narrowed its focus to concentrate largely on further advances in efficiency and environmental performance for coal-based electric power systems. Programs that have completed their development phases, such as magnetohydrodynamics and coal-fired heat engines are being phased out. Programs with very long-term market potential, such as coal liquefaction, are being scaled back.

Nuclear Advanced Reactor Program: The Administration proposes necessary funding in the R&D area for maintaining the operation of the current generation of reactors and the licensing actions for reactors that have commercial interest. Also included, are the

necessary funds to support the minimum essential elements of the Integral Fast Reactor and Light Water Reactor Actinide Recycle programs to allow demonstration of the waste management potential of actinide recycle. The FY 1994 budget request eliminates the R&D funding support and related facility funding for the liquid metal and the high-temperature gas-cooled reactors that have no commercial or other identified application. Included, however, are the necessary funds for termination costs as well as for safety-related activities that are required to place the test facilities in a safe shutdown condition.

Uranium Enrichment: DOE's uranium enrichment program will be conducted by a government corporation, known as the U.S. Enrichment Corporation, as of July 1, 1993, as required by the Energy Policy Act. It will be required to operate as a commercial business enterprise on a profitable and efficient basis. The Administration is also proposing to speed up the purchase of enriched uranium from the republics of the former Soviet Union in furtherance of our nuclear non-proliferation policies. The estimated savings are $1.8 billion over five years.

Power Marketing Administrations (PMAs): The Federal government owns and operates 5 PMAs which sell electric power generated at 123 hydroelectric dams across the country. Congress intended that the full cost of the power portions of these facilities be repaid by power customers. Although proposals to recover the full cost of PMA-supplied power have been studied for years, the Administration's initiative is different in that it combines a modest repayment reform, which does not involve changing interest rates, with a powerful market-based incentive for customers to reduce electricity consumption through demand side management programs and switching to the direct use of natural gas. Based on this initiative, it is estimated that an additional $100 million in annual receipts will be collected beginning in FY 1996.

Strategic Petroleum Reserve: The Strategic Petroleum Reserve currently contains over 570 million barrels of oil. This stockpile has served well in defusing the impacts of the oil disruption experienced during Iraq's invasion of Kuwait. The U.S. today obtains less than one-quarter of its oil from OPEC countries, and the rate at which we continue to fill the Reserve can be slowed. The Administration proposal is to reduce the fill rate from 34,000 barrels of oil per day to 13,300 barrels per day.

Redirections

Superconducting Super Collider: The Administration is committed to the development of the superconducting super collider as a major contribution to scientific information for the future. The Administration believes, however, that in order to ensure that all of the components of this project are technologically effective, the project schedule should be extended by three years to 2002.

National Laboratories: The Clinton Administration views the Department's National Laboratories as an important element in efforts to develop new technologies to stimulate

long-term economic growth. In fields like high-energy physics, biological and environment research, nuclear physics, materials sciences, and aeronautics, the National Laboratories provide key facilities used by researchers in academia, Federal Laboratories, and industry. In addition, in many fields, researchers at these laboratories are world leaders. In light of today's post-Cold War era, the Administration will reassess the laboratories key roles in basic research, cooperation with industry and universities, and the most effective use of the talented and experienced men and women working there.

Special Responsibilities

Support for DOE Displaced Workers: With the end of the Cold War, the Department has the opportunity to redefine its defense mission. Our national security responsibilities required the employment of thousands of Federal workers and over 100,000 contractor employees. The Administration is committed to assist this dedicated workforce to cope with the effects of the declining defense budget. DOE will focus its efforts on retraining employees to perform environmental cleanup tasks and restoration of the nuclear material sites. In addition, the Administration's investment initiatives in high technology will help stimulate new opportunities for the technical and highly skilled workforce represented in the National Laboratories.

Future Directions

The FY 1994 budget process has initiated the redirection of Departmental priorities. Further work will be required. To that end, on March 7, 1993, I launched a comprehensive policy review of all critical Departmental missions. I expect this review to contribute to a rethinking of DOE's fundamental responsibilities, and how those responsibilities are carried out. My aim is to build a strong consensus among internal and external stakeholders on Departmental priorities, ways of achieving results rather than merely managing programs, and means to more comprehensively coordinate energy policy among departments and agencies.

A consistent theme of the Clinton Administration has been the absolute necessity for all government agencies to work together. The Nation cannot afford a government with conflicting policies and wasteful duplication. This is especially true in the areas of energy, the environment, the economy, education, and technology development and transfer. Because the Department and its National Laboratories play such a central role in each of these areas, DOE will build a strong record of coordination and cooperation with key partners in the President's Cabinet.

Finally, I fully recognize that successful government depends on a strong partnership between the Executive Branch and Congress. I made a commitment during my confirmation hearings that I would regularly consult with Congress and provide reliable and timely information to our oversight committees. I intend to honor the letter and spirit of this pledge.

Hazel R. O'Leary
Secretary of Energy

FY 1994 Budget Highlights

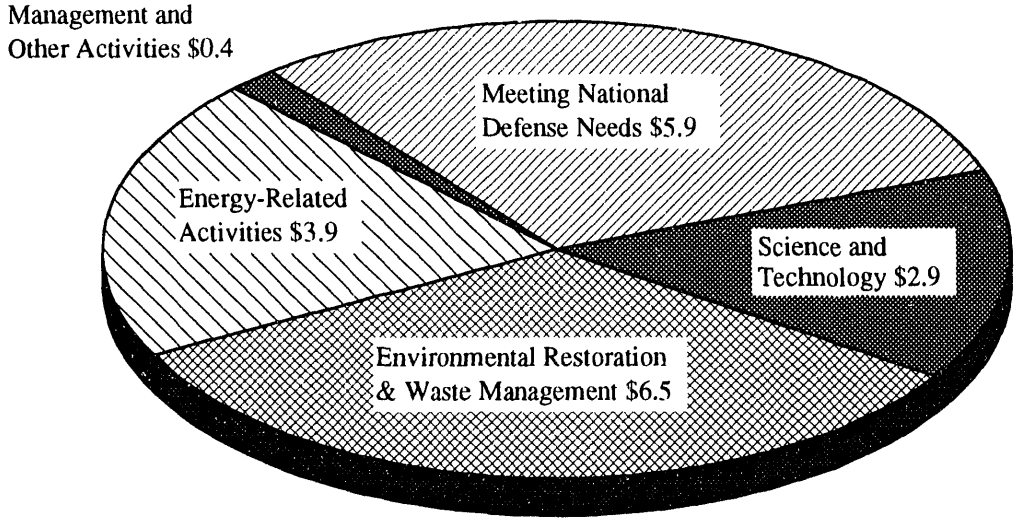
The Policy Overview details new initiatives for the coming year, and outlines priorities for the future. The purpose of the Budget Highlights is to present the complete FY 1994 budget request for the Department of Energy in a summary form.

The FY 1994 budget presentation which follows is organized by the Department's major missions, as identified and described in the Policy Overview. These missions include Energy-Related Activities; Environmental Restoration and Waste Management; Science and Technology; and National Defense. Support for the Energy Policy Act (EPACT) is included within these broader categories. In addition, the Department's management oversight functions are described under the heading Management and Other Activities.

The FY 1994 budget request for the Department of Energy is $19.6 billion. The following chart displays the request for new budget authority.

DOE Budget Request

(Dollars in Billions)



FY 1994 Budget Authority - $19.6 Billion

The following table compares the budget request for FY 1994 with the estimated FY 1993 funding levels displayed on a comparable basis. The budget is displayed by major missions, as described above.

Major Missions of the Department of Energy	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Energy-Related Activities	$3,442.7	$3,926.4
Environmental Restoration and Waste Management	5,495.1	6,462.3
Science and Technology	2,704.4	2,923.0
Meeting National Defense Needs	7,164.3	5,910.0
Management and Other Activities	183.8	341.9
Total, Department of Energy	$18,990.3	$19,563.6

The budget request of $19.6 billion is about three percent over the estimated FY 1993 funding level of $19.0 billion. Funding increases for Energy-Related Activities, Environmental Restoration and Waste Management, Science and Technology, and Management and Other Activities more than offset a major decrease in funding for Meeting National Defense Needs.

The major increase in funding for **Energy-Related Activities** is due to major investments in energy efficiency and renewable energy programs and additional requirements for the Clean Coal Technology program, which more than offset decreases to Nuclear Energy and the Power Marketing Administrations.

Funding for the Department's **Environmental Restoration and Waste Management** mission continues its rapid growth, increasing more than 18 percent over the FY 1993 level.

The budget for **Science and Technology** programs increases by 8 percent over FY 1993. The funding request for the Superconducting Super Collider, although above the FY 1993 level, is less than originally planned and represents an Administration decision to slow the pace of the project to effect near-term budget savings.

The significant increase for **Management and Other Activities** is misleading. The program levels are only slightly higher in FY 1994 than FY 1993, but reductions to expected offsetting revenues exaggerate the requirement for new budget authority.

Energy-Related Activities

The Department's support for Energy-Related Activities is reflected in three principal areas. Increasing the efficiency of energy end-use is the focus of our conservation research and development activities. Also, we seek to secure future energy supplies by diversifying fuel sources, by developing technologies which make use of indigenous resources, and by reducing our vulnerability to energy supply disruptions. Finally, the Department's environmental oversight activities assure that our facilities are operated in accordance with all applicable regulatory requirements and do not impose an environmental burden on the public.

	Budget Authority (in millions)	
Energy-Related Activities	FY 1993 Estimate	FY 1994 Request
Increasing Energy Efficiency	$584.5	$788.8
Securing Future Energy Supplies	2,694.3	2,987.8
Enhancing Environmental Quality	163.9	149.8
Total, Energy-Related Activities	$3,442.7	$3,926.4

Support for high-payoff research and development technologies emphasized in the Energy Policy Act of 1992 is included as part of this larger category, with $116 million in increased funding for energy efficiency and solar and renewable energy technologies related directly to Energy Policy Act initiatives. Other investment and savings initiatives of the Administration are included in this section, including additional support for fusion energy, natural gas utilization, and low-income weatherization grants; elimination of funding for advanced nuclear reactors; and reduction in the fill rate for the Strategic Petroleum Reserve.

Increasing Energy Efficiency

The need for improvements in the efficiency of energy use has never been more clear. Energy conservation and efficiency improvements in homes, commercial buildings, transportation, and industry can contribute significantly to offsetting increased energy demand. In addition, reducing energy consumption in Federal facilities and in low-income homes are major themes of the Administration. The FY 1994 budget of $788.8 million for Energy Efficiency activities is 35 percent higher than the FY 1993 appropriations. This growth reflects the Administration's commitment to an aggressive program of research and development in promising technology areas, such as efficiency in the buildings, industry, transportation and utility sectors of the economy, and to

providing technical and financial assistance in these areas to the States and to the public. Toward these ends, the Office of Energy Efficiency and Renewable Energy seeks to work with industry to strengthen the technology base leading to new products and processes for the commercial market. Program activities range from basic research in universities and national laboratories to applied research and development and proof-of-concept projects with industrial firms. A strong and balanced program is proposed for FY 1994 to contribute toward strengthening the nation's energy security, promoting energy efficiency, and increasing industrial competitiveness and Federal technology transfer.

	Budget Authority (in millions)	
Increasing Energy Efficiency	FY 1993 Estimate	FY 1994 Request
Utility Sector	$5.0	$6.8
Buildings Sector	59.6	98.4
Transportation Sector	167.9	184.7
Industrial Sector	112.8	137.1
Technical and Financial Assistance	330.8	346.5
In-House Energy Management	21.9	26.2
Policy and Management	3.6	4.9
Subtotal, Increasing Energy Efficiency	701.6	804.6
Less Use of Proposed Supplemental	-101.7	—
Less Recoveries from Petroleum Overcharge	-15.4	-15.8
Total, Increasing Energy Efficiency	$584.5	$788.8

Utility Sector

Requested funding for Utility Technologies research sector is $6.8 million (a 36 percent increase from the FY 1993 level). This includes support for more widespread adoption of integrated resource planning, as required by the Energy Policy Act of 1992. These efforts which will help utilities improve ability to choose among various supply and demand options, reduce demand for electricity, and increase end-use efficiency.

Buildings Sector

Residential and commercial buildings consume over a third of all U.S. primary energy use—more than any other sector and over two-thirds of all the electricity we generate. The FY 1994 request for the Office of Building Technologies is $98.4 million, a 65 percent increase over the FY 1993 level.

The Department works closely with industry on cost-effective, commercially attractive energy-efficient and renewable energy technologies, and supports market-oriented policies which encourage their rapid introduction. Together with the contributions of the private sector, state and local governments, and utility companies, the potential exists to stabilize total energy use in buildings at about 30 quads despite an anticipated doubling of the buildings stock over the next four decades.

The Department's research on building technologies focuses on improving the performance and cost-effectiveness of the building as an integrated system as well as key energy-related components such as: the building envelope, construction materials, (walls, roofs, foundations, and glazing); lighting equipment and controls (including daylighting); heating and cooling techniques (including natural gas and solar utilization); thermal distribution systems; and appliances and commercial equipment (such as refrigeration systems). The program focuses special attention on energy-efficient replacements for ozone-destroying chlorofluorocarbons (CFCs) in refrigerants and foam insulation and on strategies to identify, measure, and mitigate indoor air quality problems in both homes and non-residential buildings. A promising new area of work involves "smart" windows with active electrochromic coatings that can control the window's optical and thermal characteristics based on changing weather and needs inside the building.

There are enormous opportunities for improved energy efficiency in Federal facilities and operations. The government itself uses about two percent of all energy used in the nation and spends over $4 billion a year for fuel and power in Federal buildings alone. The Federal Energy Management Program coordinates interagency efforts to achieve cost-effective energy savings, tracks and reports on progress, sponsors demonstration projects, and evaluates new initiatives. The President's stimulus and investment proposals add $6.9 million in FY 1993 and $16.0 million in FY 1994 to this program.

Congress has also established legislative requirements for DOE to develop, promulgate, and periodically update efficiency standards for certain residential appliances and for new Federal buildings. Working with other national, state, and industry/professional organizations, the Department also issues voluntary guidelines to help improve efficiency in new, non-Federal residential and commercial buildings.

Transportation Sector

Nearly two-thirds of the petroleum consumed in the Nation—roughly half imported—is used for transportation. In addition, the transportation sector is a major contributor to the Nation's air pollution, particularly urban smog. Transportation energy efficiency improvements and the use of alternative transportation fuels should allow continued growth in travel while simultaneously reducing petroleum consumption. Moving beyond the near-term, this budget also aims to accelerate the commercial availability of technologies which can achieve a more substantial reduction in imported petroleum use—and significantly reduce transportation's role in the environmental equation—by

the year 2010. The FY 1994 budget request of $184.7 million is 32 percent higher than the FY 1993 enacted level, (excludes FY 1993 proposed stimulus of $28.2 million).

DOE continues to support the U.S. Advanced Battery Consortium (USABC) in FY 1994. This increased budget of $40.7 million reflects the rapidly increasing battery consortium activities aimed at achieving commercialization of battery technologies by the mid-1990s. It also follows the initiative taken by the major U.S. automakers, who formed the USABC in FY 1991. To complement this initiative for all electric vehicles, DOE is also proposing to support a new initiative for developing key technologies for electric hybrid vehicles, which combine energy storage with a small, clean, efficient power source, such as gas turbines or fuel cells. These vehicles could offer the same kind of refueling and virtually unlimited range of today's cars but with greatly reduced fuel consumption and emissions.

DOE continues to purchase a variety of alternative-fueled vehicles (AFVs) for placement in the Federal fleet and for data-gathering. AFV demonstrations will provide quantitative operating experience in a variety of environments and driving conditions. In FY 1993, DOE is accelerating the alternative fuel capability of the Federal fleet through substantial scale-up of the acquisition of new vehicles and modification of existing vehicles to dedicated and dual-fueled configurations. The Alternative Fuel Vehicle effort is part of the President's FY 1993 Supplemental (Stimulus Package) request. The proposed funding of $34.5 million in FY 1994 will allow the Federal government to purchase at least 7500 AFVs and help introduce AFVs into the marketplace.

Industrial Sector

Industry accounts for about one-third of the total energy use in the United States. Significant improvements in industrial energy efficiency can be achieved by technologies being developed and demonstrated by the Office of Industrial Technologies. The FY 1994 budget request of $137.1 million is 22 percent above the FY 1993 level. Elements of the FY 1994 Industrial Sector program contribute to increasing process efficiency, reducing industrial waste, and increasing energy supply.

A. Process Efficiency Technologies

Significant opportunities for energy efficiency and productivity improvements may be found in the basic process industries, such as the primary metals, pulp and paper, chemicals, petroleum refining, and food processing industries. Proposed process improvement R&D activities are expected to yield important technologies, such as advanced water removal and drying systems for paper production, rapid glass refining, near net-shape casting of steel sheet, use of membranes to replace or assist conventional distillation systems, new improved electrode materials for alumina reduction cells, direct iron making technology, and additional key technologies for the integrated paper mill and petroleum refinery of the future.

B. Waste Reduction Technologies

Opportunities for further energy efficiency improvements are found in waste heat and waste material byproduct minimization and utilization. Consumer product recycling or reuse must also be included in this broad objective. Program activities include several waste conversion processes, recovery of energy from liquid waste streams, improved high-temperature lift heat pumps, technology for the conversion of plastics to feedstock material, design for recycle activities, and improved use of waste heat through process thermal integration.

C. Supply Technologies

Even with the efficiency gains envisioned in the program goals, industry will require substantially increased energy supplies. Shortage of some energy sources could limit production and force uneconomical fuel switching, resulting in more costly industrial products. Opportunities for improved industrial energy supply may be found in such areas as the cogeneration of process heat and power, the utilization of municipal solid waste and other renewable sources for energy or feedstocks, electric motor drive systems, and solar energy applications. Examples of activities include the development of high-performance steam turbine and advanced gas turbine systems for industrial cogeneration applications, the production of chemical-industry feedstock from cellulose resources waste and biomass materials, the development of information and design tools to enable the specification of more efficient electric motor drive systems and the development of solar thermal techniques applicable to industrial processes.

D. Infrastructure

Complementing these technical opportunities are important infrastructure opportunities to improve the energy situation in the industrial sector. Barriers to needed investment in innovative technologies include a lack of sufficient technical and market knowledge, limited availability of specialized information to small- and medium-size industrial firms, and lack of trained personnel to perform energy-related and process waste-related technical analyses of industrial facilities. The proposed program attacks these barriers via the Energy Analysis and Diagnostic Center program and other technology transfer activities, such as technical document distribution, meetings and conference support, which are closely coordinated with related programs in States and localities and with the EE/RE Technical and Financial Assistance program.

Conservation Technical and Financial Assistance

Transferring new energy-efficient technologies into practical use and extending the benefits of energy-saving methods and strategies nationwide is fundamental to

significantly reducing energy demand. The Technical and Financial Assistance program operates a number of grant, technical assistance, and information programs.

Through the operation of three formula grant programs, the Office of Technical and Financial Assistance (OTFA) supports and encourages energy efficiency and renewable energy use at the State and local levels, in the private sector, and by nonprofit institutions. In FY 1994, OTFA is proposing a significant increase in these grant monies to encourage states to leverage private sector involvement in the deployment of energy efficiency and renewable energy technologies. The FY 1994 grants request is 31 percent above the amount enacted in FY 1993.

In-House Energy Management

The goal of the In-House Energy Management Program is to reduce energy consumption and utility/energy costs for the Department of Energy facilities. The program is structured to survey and study facilities and processes owned by DOE to identify retrofits and modifications which will save energy and have a high return on investment. The retrofit projects for the program have a payback of slightly greater than three years. The FY 1993 budget for In-House Energy Management includes a supplemental of $0.9 million for surveys, studies, and utility assessments identified in the President's Economic Stimulus and Investment Package for short-term stimulus items.

The FY 1994 budget for the In-House Energy Management Program ($26.2 million) includes $6.0 million in budget authority included in the President's Economic Investment Package.

Securing Future Energy Supplies

Improving the Nation's ability to secure future energy supplies is a major goal of the Department of Energy. We seek to achieve this goal by research and applied technology development aimed at diversifying energy sources by promoting increased use of indigenous resources, including oil and gas, coal, nuclear, and renewable energy; and by aggressively pursuing the promise of fusion energy. We also support efforts to increase the efficiency of electric energy distribution and storage.

A critical element of this theme is reducing the Nation's vulnerability to energy supply disruptions. We approach this in two ways, through a targeted research and development program and by maintaining an emergency response capability. We are pursuing an aggressive multi-agency research and development program aimed at potentially high-payoff technologies for reducing U.S. oil vulnerability. The elements of this program include research and development on biomass and other alternative fuels, advanced vehicle propulsion systems, and enhanced oil recovery. To better ensure early

commercial application of successful technologies, this research and development will be based on cost-shared joint government-industry-university models wherever possible. The budgets for programs which are part of our emergency response capability include the Strategic Petroleum Reserve, the Naval Petroleum and Oil Shale Reserves, and the Office of Emergency Preparedness. The following table displays the funding associated with these efforts.

	Budget Authority (in millions)	
Securing Future Energy Supplies	FY 1993 Estimate	FY 1994 Request
Energy Supply and Distribution	$2,272.8	$2,574.6
Preparing for Energy Emergencies	421.5	413.2
Total, Securing Future Energy Supplies	$2,694.3	$2,987.8

Energy Supply and Distribution

Energy supply technologies supported by the Department seek to expand production of domestic supplies of oil and gas; develop liquid fuels for transportation from new sources, such as biomass and coal; pursue ways to burn coal more cleanly; facilitate the use of nuclear power by supporting the standardization and licensing of the current generation of nuclear reactors, and by developing improved nuclear technologies to help solve the problem of nuclear waste disposal; and expand the use of renewable resources, including solar energy. Fusion, a power source of immense promise, is strongly supported, as are energy storage and distribution technologies and the Power Marketing Administrations, which distribute and sell power from Federal facilities.

Energy Supply and Distribution	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Fossil Energy	$430.0	$657.4
Nuclear Energy	345.4	284.0
Nuclear Waste Disposal	379.8	380.7
Uranium Supply and Enrichment Activities		
Uranium Enrichment	1,373.8	160.0
Revenues	-1,462.0	—
Total, Uranium Supply and Enrichment	-88.2	160.0
Fusion Energy	339.7	347.6
Solar and Renewable Energy	257.3	327.2
Power Marketing Administrations	804.4	451.5
Subtotal, Energy Supply and Distribution	2,468.4	2,608.4
Use of Prior Year Balances and Other Adjustments	-195.6	-33.8
Total, Energy Supply and Distribution	$2,272.8	$2,574.6

Fossil Energy

Research, development, and demonstration in the Fossil Energy program is aimed at allowing us to extract more effectively and use more cleanly and efficiently our abundant supplies of fossil fuels. Key efforts include the Clean Coal Technology program and fossil energy research and development programs addressing coal, oil, and gas resources.

Fossil Energy	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Clean Coal Technology	—	$250.0
Fossil Energy R&D		
Coal Research and Development	188.6	141.3
Petroleum and Gas Technologies	143.0	181.8
Policy and Management	70.7	62.7
Other Fossil Energy R&D	26.7	20.6
Total, Fossil Energy R&D	429.0	406.4
Liquified Gaseous Fuels Spill Test Facility	1.0	1.0
Subtotal, Fossil Energy	430.0	657.4
Use of Prior Year Balances and Other Adjustments	-13.8	-11.0
Total, Fossil Energy	$416.2	$646.4

Clean Coal Technology

The Clean Coal Technology Program is a multi-round demonstration program aimed at introducing innovative methods for using coal more cleanly, efficiently, and economically. It will take the best, most promising and efficient of the advanced coal-based power generation, fuel processing, and emissions control technologies and move them from the developmental stage to the threshold of the commercial marketplace. Technologies demonstrated in this joint government-industry program will reduce substantially emissions of acid rain-causing pollutants. Industry has a particularly strong incentive to develop and adopt such technologies given the more stringent air emission requirements imposed for the 21st century by the 1990 Clean Air Act Amendments. In addition, the most recent rounds of competition have emphasized higher efficiencies which can reduce the release of carbon dioxide, a greenhouse gas. The program requires at least 50 percent cost-sharing with industry and provides for recoupment of public investments from major commercial successes. So far, the industrial share has exceeded 60 percent for the 41 projects which are either currently active or have completed their test programs. A fifth set of projects is scheduled to be named by the Department on or before May 6, 1993. The FY 1994 appropriation request of $250 million continues funding for Rounds IV and V of the program.

Fossil Energy Research and Development

A. Coal Research and Development

The Coal Research and Development Program has narrowed its focus in FY 1994 to concentrate on improving the environmental acceptability of coal use in electric power generation—the market where it is projected to remain a dominant fuel for the foreseeable future. The FY 1994 budget request, $141.3 million, includes efforts to develop ultra-high efficiency technologies such as pressurized fluidized bed combustion, integrated gasification combined cycle, low emission boiler systems, and indirectly fired coal cycles. It also supports efforts to improve coal preparation and environmental control technologies and to expand their application to the removal of impurities that can create potential toxic air emissions. Exploratory efforts will continue to examine ways of capturing and using carbon dioxide produced by coal combustion. The program will also continue the development of technologies at laboratory and bench scales that can reduce the costs of producing transportation-grade liquid fuels from coal.

In each of the major areas of coal technology, research will be carried out to explore even more advanced concepts, and a crosscutting program involving research in materials, components, and other generic areas will continue.

B. Petroleum and Gas Technologies

The Petroleum and Natural Gas programs are proposed for significant increases in funding in FY 1994. The near-term strategies for the Petroleum program focus on identifying and maintaining economic access to geologic classes of U.S. reservoirs that are in danger of being prematurely abandoned despite containing large amounts of potentially recoverable crude oil. In FY 1994, given our increasing concern about the rate of oil field abandonments in the U.S., we are proposing to accelerate this program. Rather than continuing to concentrate on one class of endangered reservoirs each year as we proposed in FY 1993, we are recommending to Congress that at least two classes be targeted each year.

The first two priority classes of reservoirs have been designated and competitions run. In the first, termed "fluvial dominated deltaic reservoirs," we selected 14 projects in nine states for $48 million in federal funding that will be combined with $65 million in industry funding. In the second reservoir class, "shallow shelf carbonate reservoirs," we expect to select another set of projects in April. In FY 1994, we propose to conduct the competition for the third and fourth reservoir classes and begin work on the fifth and sixth classes. Reservoirs within these six classes are estimated to contain between 60%–70% of the additional light oil we believe may be possible to recover through the use of improved and advanced technologies.

Supporting this field effort is continued research to improve our knowledge of reservoir characteristics and fluid flow, and to use that knowledge in developing better ways to locate and produce additional quantities of economical crude oil.

In the Natural Gas program, efforts are expanding in resource and extraction, delivery and storage, and utilization. Funding increases are being proposed largely in response to the recently passed Energy Policy Act and the energy priorities identified by President Clinton. We are proposing to continue efforts to improve production from both conventional and non-conventional formations. We will expand our work in secondary gas recovery, moving from south Texas fields to sandstone deposits in the mid-continent region. We will continue our joint efforts with industry and other Federal agencies to compile "gas atlases" that will give us additional certainty as to the quantities of U.S. gas resources and reserves. We will begin a new drilling initiative as well as a new program to produce natural gas from coal seams that are interbedded with other gas-bearing formations. We will continue work in low permeability formations, in fracture technology and diagnostics, and in upgrading low-quality natural gas.

We are again proposing new efforts to improve the nation's delivery and storage of natural gas. New gas storage technology and improved methods for tracking deliverability in the lower 48 states are necessary to build consumer confidence that natural gas is a reliable fuel of choice.

In FY 1994, as part of our natural gas utilization efforts, we have proposed to transfer the fuel cell program from the coal research and development program to the natural gas program. Fuel cells will likely enter the marketplace first as natural gas-powered systems. Also in FY 1994, as part of the President's long term investment strategy, we are proposing to accelerate work in advanced gas turbine systems. This program, which began in FY 1992, will be well underway in FY 1994 with efforts concentrating on innovative cycle design and testing. The Office of Fossil Energy will focus on turbine systems for utility applications, while the Office of Energy Efficiency and Renewable Energy will concentrate on industrial systems. Also in gas utilization, we will continue research into the conversion of natural gas to liquid fuels.

The Oil Shale R&D program has been de-emphasized in recent years to allow funding to be concentrated on other, nearer-term sources of liquid fuels. This year, we are not requesting any further funding for oil shale research.

C. Policy and Management

Program direction and management support funds are provided for the costs associated with Fossil Energy headquarters and field personnel, including the Morgantown, West Virginia, and Pittsburgh, Pennsylvania, Energy Technology Centers, the Bartlesville, Oklahoma, Project Office and the Metairie, Louisiana, Site

Office, overhead expenses and contract support. The FY 1994 budget request is $62.7 million.

Liquefied Gaseous Fuels Spill Test Facility

A related program is the Liquefied Gaseous Fuels Spill Test Facility. This unique facility in Nevada is the site of user-sponsored spill tests supporting safety research in the handling, shipping and storage of liquefied gaseous fuels and other hazardous fluids. The FY 1994 request is $1.0 million.

Nuclear Energy

The Department's nuclear technology programs are divided into two parts — technologies supporting development of civilian nuclear power and technologies providing power for manned and unmanned space activities.

	Budget Authority (in millions)	
Nuclear Energy	FY 1993 Estimate	FY 1994 Request
Civilian Reactor Development		
Light Water Reactor	$58.7	$57.8
Advanced Reactor Research and Development	60.0	15.0
Facilities	94.1	6.9
Termination Costs	—	84.7
Other Nuclear Energy	48.1	66.5
Total, Civilian Reactor Development	260.9	230.9
Space Power Technologies	84.5	53.1
Subtotal, Nuclear Energy	345.4	284.0
Use of Prior Year Balances and Other Adjustments	-46.1	-17.0
Total, Nuclear Energy	$299.3	$267.0

A. Civilian Reactor Development

Maintaining nuclear power as an option to meet the Nation's growing demands for electricity is one objective of the Department of Energy. Nuclear power can provide a secure and clean domestic source of energy generation without emissions of greenhouse gases or acid rain precursors. The Civilian Reactor Development

program is focused on advanced light water reactors and includes actinide recycle activities.

1. Light Water Reactor

   The major goal of this program is to make commercially standardized Advanced Light Water Reactors (LWRs) available at the earliest possible time, to ensure their contribution to the minimum of 200 gigawatts of new electrical generation capacity projected to be required by the year 2010. The LWR program budget for FY 1994 is $57.8 million.

   In FY 1994, the program is co-funding work towards securing the Nuclear Regulatory Commission (NRC) certification for the General Electric Advanced Boiling Water Reactor and the Combustion Engineering System 80+ Advanced Pressurized Water Reactor. Co-funded design work will continue on smaller (600 megawatts), simplified, more passively safe reactors and on resolving issues with the NRC for the Westinghouse AP-600 and the General Electric Simplified Boiling Water Reactor (SBWR) Plants. NRC's schedules for design certification have been delayed when compared with schedules that were available one year ago. The Department plans to continue discussions with NRC concerning certification schedules. The Department, in a cost-shared activity with industry, will continue the program to demonstrate the workability of new regulations allowing for site permits in advance of specific plant commitments.

   We will continue the cost-shared program with the utility industry for first-of-a-kind (FOAK) engineering activities to produce Advanced Light Water Reactor (ALWR) designs suitable for commercial standardization. During FY 1994, the design to be included in this program will be reviewed and design-specific activities will be initiated. Early site permits and standardized commercial designs, together with the advanced safety features built into these new LWRs, will resolve problems which burdened the nuclear power industry in the past. With these problems overcome, the future should be brighter for the resurgence of nuclear power as a major component of our domestic energy supply.

   We are also continuing to support resolution of technical issues associated with plant life extension.

2. Advanced Reactor Research and Development

   In an effort to reduce Federal spending, the Advanced Liquid Metal Reactor design and the Modular High Temperature Gas-Cooled Reactor design programs have been recommended for phaseout commencing May 1, 1993. The Nuclear Energy Robotics programs will also be closed down when the contract expires December 31, 1993. The facilities in Idaho used to support these R&D programs, including the Experimental Breeder Reactor-II, the Fuel Manufacturing Facility,

the Transient Reactor Test Facility, the Zero Power Physics Reactor, the Hot Fuel Examination Facility, and the Energy Technology Engineering Center in California will be phased out. The funding for closing these programs and facilities are included in the budget request for Termination Costs.

The only advanced reactor program remaining is for Actinide Recycle. This technology demonstration program will evaluate the technical and economic feasibility of an innovative nuclear fuel cycle technology contributing to the long-term radioactive waste management system. If successful, this technology offers the potential to significantly expand the useable capacity of a geologic repository to safely and economically use the most long-lived portions of nuclear waste to fuel future advanced reactors. The FY 1994 request of $15.0 million will support both the pilot-scale recycling of actinides within a closed metal fuel cycle, and engineering-scale testing that will demonstrate the potential to extend pyrometallurgical techniques to include separating actinides from light water reactor spent fuel.

3. Facilities

The FY 1994 request of $6.9 million provides for the Fuel Cycle Facility and the Analytical Laboratory, the two facilities needed to conduct research and development activities for the Actinide Recycle program.

4. Termination Costs

The FY 1994 request of $84.7 million will fund the cost of closing out the Advanced Reactor Research and Development activities and related facilities. It will also support the continued surveillance and maintenance of the previously shut down Tower Shielding Facility. Pending Congressional approval, closeout of the facilities at Argonne National Laboratory-West will be initiated on May 1, 1993 with the exception of the Fuel Cycle Facility and the Analytical Laboratory which will be funded under the Advanced Reactor R&D program. Shutdown of Nuclear Energy operations at the Energy Technology Engineering Center will be initiated on October 1, 1993.

5. Other Nuclear Energy

This category includes principally landlord expenses for the Oak Ridge site, which is managed by the Office of Nuclear Energy; certain residual activities for the uranium enrichment program; and program direction and policy and management expenses for managing nuclear energy programs. The residual activities for uranium enrichment ($17.1 million), a new item for FY 1994, include funding for personnel to manage certain uranium enrichment functions that do not transfer from the Department to the United States Enrichment Corporation, such as maintenance, warehousing, management of the highly

enriched uranium (HEU) stockpile and shutdown of the HEU facility, and occupational safety and health oversight.

B. Space Power Technologies

The Atomic Energy Act gives the Department responsibility of supporting both civilian and military requirements for radioisotope and reactor power systems for space applications. Two programs are supported to meet these requirements — Advanced Radioisotope Power Systems and Space Reactor Power Systems.

The Advanced Radioisotope Power Systems program will continue to provide the sole capability to develop and produce radioisotope power systems for NASA and DOD space and terrestrial missions. For over 30 years, these maintenance-free power systems have proven to be reliable and capable of producing electrical power for remote applications in excess of ten years. This program also provides for acquiring and processing the required Plutonium-238 fuel, and all aspects of manufacturing, quality assurance, reliability, and operational safety. In FY 1994, this program will focus on producing general purpose heat source radioisotope thermoelectric generators for NASA's Cassini mission to be launched in 1997. The Advanced Radioisotope Power Systems FY 1994 budget is $48.1 mission.

The Space Reactor Power Systems program provides for the development of space reactor power systems for future civilian and military missions and nuclear propulsion systems for space applications. This program is recommended for significant reduction beginning May 1, 1993. The FY 1994 request of $5.0 million provides only for conducting studies on space reactor and propulsion systems and technologies for use by NASA, DOD and commercial interests. Also in FY 1994, DOE will continue an independent safety study of the Russian Topaz II space nuclear power system, in parallel with Strategic Defense Initiative Organization (SDIO) plans to modify the system. No funding is requested for the SP-100 and DOE thermionic space reactor programs.

Nuclear Waste Disposal

Nuclear Waste Fund

Established by the Nuclear Waste Policy Act (NWPA) of 1982, as amended, the Nuclear Waste Fund Program's goal is to dispose of spent nuclear fuel and high-level nuclear waste from commercial and defense activities in a permanent geologic repository. The Nuclear Waste Policy Amendments Act of 1987 designated Yucca Mountain, Nevada, for detailed scientific investigation activities in order to evaluate site suitability for a permanent geologic repository. It also authorized the siting, construction, and operation of a Monitored Retrievable Storage (MRS) facility, subject to certain conditions. Elements

of the program, including schedules, are currently under review by the Secretary of Energy to assure the Department of Energy is meeting its responsibilities under the Nuclear Waste Policy Act as amended.

The FY 1994 budget request for the Nuclear Waste Fund seeks to balance continued progress and productivity enhancement against cost containment, while providing full compliance with all applicable environmental, safety, health, and quality assurance requirements. Within an overall framework of budgetary restraint, the request focuses on the earliest possible suitability determination of the Yucca Mountain candidate repository site, emphasizing visible and consistent progress in underground exploration, while continuing ongoing surface-based investigations at the site.

The FY 1994 budget request for activities mandated by the NWPA, as amended, totals $380.0 million, of which $260.0 million is requested from the Nuclear Waste Fund, and $120.0 million is requested in the Defense Nuclear Waste Disposal appropriation. Although a separate budget request has been submitted for the latter, the funding provided from that appropriation will be used entirely to support Yucca Mountain site characterization activities, as was done in FY 1993.

The combined request of $380.0 million includes $261.9 million to continue site characterization activities at the Yucca Mountain candidate repository site, including construction of the Exploratory Studies Facility and ongoing surface-based testing. Funding of $15.7 million for MRS-related activities including Multipurpose Canister (MPC) development is requested, which will meet the requirements for storage, transportation and, eventually, disposal, using overpacks suitable for each function. Concurrently, the Office of Civilian Radioactive Waste Management, would continue any viable Monitored Retrievable Storage siting initiatives. The Transportation System request of $16.2 million provides for development of the MPC transportation overpack and continued cask design activities. Funding of $3.5 million is requested for Waste Acceptance activities to manage the Standard Disposal Contract, establish and verify fees paid into the Nuclear Waste Fund, and develop the Nuclear Waste Fund fee adequacy analysis. The request also provides $9.5 million to maintain the quality assurance program, $15.1 million for systems integration and regulatory compliance activities, and $58.1 million for program management, which includes Federal salaries, benefits, and travel; strategic planning; international program support; external relations; program control and administration; and information management.

Defense Nuclear Waste Disposal

A separate appropriation for Defense Nuclear Waste Disposal was established as part of the FY 1993 Energy and Water Development Appropriation (P.L. 102–377) in lieu of a payment from the Federal government into the Nuclear Waste Fund for the disposal of defense high-level waste in the repository. The FY 1994 request of $120.0 million will

be used entirely to support site characterization of the Yucca Mountain, Nevada, candidate repository site, as was done in FY 1993.

Civilian Radioactive Waste Research and Development

Consistent with Title II of the Nuclear Waste Policy Act of 1982, as amended, the purpose of the Civilian Radioactive Waste Research and Development Program is to develop and demonstrate new technologies which will allow an increase in the current on-site (at-reactor) storage capacity and to conduct generic research and development on spent fuel in storage. The FY 1994 request of $0.7 million continues the monitoring of casks containing fuel from dry storage demonstration projects and research and development on long-term spent fuel storage.

Uranium Supply and Enrichment Activities

The Energy Policy Act of 1992 transferred most uranium enrichment functions from the Department to the newly established United States Enrichment Corporation, effective July 1, 1993. The responsibility for production and marketing of enriched uranium will transfer to the Corporation, although the Department will continue to own the gaseous diffusion plants where the uranium is enriched. The Corporation will lease the facilities from the Department, and will reimburse the Department for the cost of administering the lease. The Department will also retain ownership of the Advanced Vapor Laser Isotope Separation and alternative enrichment technologies, and in the interim will conduct work only as requested by the Corporation on a reimbursable basis. Environmental cleanup activities related to previous enrichment operations conducted by the Department prior to July 1, 1993, remain the responsibility of the Department, with funding to be provided from the Defense Environmental Restoration and Waste Management appropriation account and the Uranium Decontamination and Decommissioning Fund which are described in the Environmental Restoration and Waste Management section which follows. The only activity to be funded in the FY 1994 Uranium Enrichment Program is $160.0 million for the final demand charge payment to the Tennessee Valley Authority as part of a 1987 contract settlement.

Fusion Energy

Fusion continues to offer the promise of a safe, environmentally attractive, secure, and competitively-priced source of energy. The development of fusion as an energy source could help the energy security of the United States, help ensure continued economic growth in the future and make us a supplier of energy technologies to other countries. Operation of a fusion reactor would not contribute to acid rain or global warming problems and the deuterium fuel required for fusion is plentiful and could be readily obtained from sea water.

Given that the nation will need new sources of energy in the next century, a goal-oriented fusion development program can make a meaningful contribution to the nation's energy prospects.

The Congress and the Administration have recognized the potential of fusion energy. The Energy Policy Act of 1992 directs the Secretary of Energy to conduct a fusion energy program that "...by the year 2010 will result in a technology demonstration which verifies the practicability of commercial electric power production...."

The Department has established a goal-oriented program with milestones that will provide for a technology demonstration, as cited in the Energy Policy Act of 1992, by 2010, an operating demonstration plant by 2025, and an operating commercial power plant by about 2040. Achieving these goals will require that we gain an understanding of the complex processes involved in fusion and that we develop the technologies and industrial infrastructure needed for the practical application of fusion energy.

The FY 1994 budget request of $347.6 million continues to support the fusion goal-oriented energy development program. This budget request allows us to address the scientific and technological issues which must be addressed to achieve the program's goals. These issues are ignition physics, fusion nuclear technology, magnetic confinement configuration optimization, and low activation materials development.

The Magnetic Fusion Energy budget provides for a concentrated effort on tokamaks and on an integrated international approach to demonstrate the scientific and technological feasibility of fusion power. Four essential elements of the fusion plan are all supported by the FY 1994 budget. The first is conducting deuterium-tritium experiments at the Tokamak Fusion Test Reactor (TFTR), making TFTR the first program to perform extensive D-T experiments to provide important data on plasma self-heating. The second is U.S. participation in the engineering design phase of the International Thermonuclear Experimental Reactor (ITER). The purpose of ITER will be to demonstrate many of the reactor technologies needed for fusion power. The third element involves supporting construction of an experimental facility to develop advanced tokamak modes that could lead to more efficient and, therefore, a more attractive demonstration reactor. The Tokamak Physics Experiment (TPX) will have the capability to operate for long pulses and to develop advanced tokamak operating modes. The TPX effort is a Departmental investment initiative. Conceptual design is being completed and initiation of Title I design will begin in FY 1994. The fourth element is a strong base physics and technology research program required to support ITER, TPX, and a demonstration reactor.

In addition, funds are requested for Inertial Fusion Energy to continue research on heavy ion accelerators.

These programs will continue to take full advantage of international collaboration while maintaining a sound domestic program. Increased involvement of industry will also be pursued.

Solar and Renewable Energy

The FY 1994 budget of $327.2 million for Solar and Renewable Energy research and development is 30 percent higher than the FY 1993 level. This growth reflects the Administration's commitment, reinforced by the Energy Policy Act of 1992, to an aggressive program of research and development of promising technologies that will increase the environmentally protective production and use of domestic energy resources. Toward this end, the Department of Energy seeks to work with industry to strengthen the technology base leading to new products and processes for the commercial market. Program activities range from basic research in universities and national laboratories to applied research and development and proof-of-concept projects with industrial firms. A strong and balanced program is proposed for FY 1994 to contribute toward strengthening the nation's energy security, promoting energy efficiency, and increasing industrial competitiveness and Federal technology transfer.

	Budget Authority (in millions)	
Solar and Renewable Energy	FY 1993 Estimate	FY 1994 Request
Solar Energy	$187.4	$248.3
Geothermal	23.4	24.0
Hydroelectric Systems	1.0	1.1
Electric Energy Systems and Storage	42.6	49.9
Policy and Management	2.9	3.9
Subtotal, Solar and Renewable Energy	257.3	327.2
Use of Prior Year Balances and Other Adjustments	-6.4	—
Total, Solar and Renewable Energy	$250.9	$327.2

Renewable energy technologies have the potential to add significantly to the Nation's domestic energy supply and reduce our vulnerability to energy supply disruptions with minimal adverse impacts on the environment. Technologies now under development will increase the already significant contribution that renewable energy makes to the Nation's electric energy needs by reducing their cost and improving their performance. Renewable energy technologies include solar technologies, geothermal and hydropower. Solar technologies encompass photovoltaics, solar thermal, biofuels, and wind energy systems.

Solar Energy

Past research by DOE and industry has reduced photovoltaic (PV) systems costs by more than a factor of three since 1982. PV technology has evolved into a cost-effective, commercial energy source for many remote stand-alone and utility applications, such as water pumping, vaccine refrigeration, lighting, communications, switching, and rural electrification. The PV market is estimated to be growing at nearly 30% per year. In FY 1994, $78.0 million is requested (up from $65.5 million in FY 1993) to help U.S. industry advance the photovoltaic manufacturing process technology to the point where photovoltaic technology is a competitive energy option for peak load electric generation by the mid-1990s and an option for intermediate load capacity by the end of the decade. Research will emphasize those materials and devices that, when encapsulated into modules and used in photovoltaic energy systems, will generate electricity for 12¢/kWh in the near term (1995) and 6¢/kWh in the mid-term (2005) and serve a growing energy market in the process.

Since 1984, more than 350 megawatts (MW) of solar thermal generating capacity (in the form of parabolic troughs) have been added to this Nation's energy supply, enough to serve the residential needs of 500,000 people. DOE's Solar Thermal ($32.7 million) program is assisting in the development of two other options in addition to parabolic troughs: central receivers and solar parabolic dishes in combination with Stirling engines. Other areas of emphasis include use of concentrated solar energy to break down toxic organic wastes; supplying process heat to industry; and encouraging exports of technology to developing countries.

Solar energy use in buildings, particularly solar hot water systems appear poised for a major increase in utilization in the near future. This is due to active state and local programs such as in California, significant interest in the utility sector, and advances in performance and reliability. DOE will be working with these organizations to develop, test, and provide valid data to enable their rapid commercial introduction.

By the end of 1991, over 16,000 commercial wind turbines were in place, primarily on windfarms in California, where approximately 1,500 MW of capacity is installed. Total production of electric energy from California windfarms increased from 2.1 billion kWh in 1989 to 2.4 billion kWh in 1990. From 1986 through 1990, reliability of new turbines increased significantly, with reliability on the better turbines increasing to 95%. Several utilities outside of California announced windfarm projects or pilot plants. The DOE Wind Energy Technology Program ($30.4 million) will assist utilities and industry in developing new applications and will explore the potential for major cost/performance improvements in wind technology through advanced components, such as airfoils, and improvements in understanding the basic physics of wind energy. A major thrust of the program is the continuation of the Advanced Wind Turbine Program, which will restore U.S. industry to the leading edge of wind technology.

Biomass combustion currently accounts for approximately 5 percent of the total energy consumption in the United States, primarily in the industrial, residential, and utility sectors. Electricity produced by biomass has grown from 200 MW in the early 1980s to nearly 8,000 MW today. Biomass can also be a major source of alternative transportation fuels. Ethanol from biomass has the potential to provide up to 1.8 million barrels per day of cost-competitive alternative fuel. The FY 1994 budget for biofuels energy systems is $58.2 million, about $10 million above the FY 1993 level.

Geothermal

Geothermal energy—the heat of the earth—may be one of the largest, most reliable, and widespread renewable energy sources available. There are four categories of geothermal energy that vary in character according to the form in which they occur: hydrothermal (including hot water and steam), geopressured, hot dry rock, and magma. All forms of the resource are potentially capable of electric power generation if sufficient heat can be obtained for economical operation. Lower-temperature resources can be used directly for space heating and cooling, commercial greenhouses, fish hatcheries, and industrial processes. Working cooperatively with industry, the Department's geothermal energy program ($24.0 million) emphasizes development of the reservoir, drilling, and conversion technologies necessary to exploit the full potential of hydrothermal baseload electric power by the mid-term and hot dry rock in the long term. These efforts are complemented by a new exploration initiative to expand the economic hydrothermal resource base by a factor of ten over today's generating capacity. Furthermore, the program is aggressively addressing near-term problems of immediate concern to industry, such as direct heat applications, thermally enhanced recovery of oil, and pressure draw-down at the Geysers geothermal field in California.

Hydroelectric Systems

Hydroelectric power capacity in the United States was 73 gigawatts as of January 1993. Development of additional capacity and relicensing of existing capacity is being hindered by complex regulatory issues, especially in the environmental area. The Hydroelectric Systems Program ($1.1 million) is aimed at resolving technical and institutional regulatory impediments to maintaining and expanding hydroelectric capacity without undesirable environmental impacts. Studies and coordinating activities involving the various interested parties are conducted in order to determine the effectiveness of environmental mitigation practices related to dissolved oxygen, in-stream flow, and fish passage.

Electric Energy Systems and Storage

The expansion of the electric power network over the upcoming decade, coupled with the introduction of intermittent and dispersed generation sources, will present a variety of new challenges to maintaining an adequate and reliable supply of electricity. Many of these will be resolved through development of more efficient ways to transmit increasing amounts of electric power and deployment of utility battery storage systems vital to the control and efficiency of the grid as major capacity additions begin to occur in the mid-term.

The Department supports research ($6.1 million) to improve the capacity, reliability, efficiency and control of these systems. The Department also supports increased research ($10.0 million) on potential health effects from exposure to electric and magnetic fields associated with electric transmission, distribution and use, as well as exposure assessments, mitigation option, analyses, and associated communication activities. The expanded efforts in FY 1994 are in response to requirements of the Energy Policy Act of 1992.

The Department's program in applied High Temperature Superconductivity (HTS) ($20.7 million), holds the promise of fundamental efficiency improvements in electricity generation, transmission, distribution, and storage. The Department is pursuing the joint development of HTS technology through innovative cooperative research agreements between selected DOE laboratories (Argonne, Los Alamos, and Oak Ridge) and the private sector. With this approach, many government/industrial partnerships have been formed for the development of practical superconductivity products, opening the door to a potential multi-billion dollar international market in the next decade. As required by the Energy Policy Act of 1992, the FY 1994 HTS program includes several multi-year projects led by competitively selected, vertically integrated teams which will develop and test HTS prototype electric power devices. Electric Energy Systems and Energy Storage programs have a combined budget request of $49.9 million in FY 1994.

Power Marketing Administrations

The Power Marketing Administrations (PMAs) market electricity generated primarily by Federal hydropower projects. Preference for sale of power is given to public bodies and cooperatives. Revenues from selling power and transmission services of the five PMAs are used to repay annual operation and maintenance costs, repay the capital investments with interest, and assist capital repayment on irrigation features of certain projects.

The President's budget proposes that the PMAs will generate $100 million of additional revenues annually, starting in FY 1996. These additional revenues will come from reform of repayment practices and market-driven conservation initiatives, including fuel switching and new conservation activities.

Power Marketing Administrations	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Alaska	$3.8	$4.0
Bonneville	371.6	18.2
Southeastern	34.4	34.7
Southwestern	36.1	34.4
Western Area	358.5	360.2
Subtotal, Power Marketing Administrations	804.4	451.5
Use of Prior Year Balances and Other Adjustments	–41.7	–5.8
Total, Power Marketing Administrations	$762.7	$445.7

Purchase agreements have been successfully negotiated for the Department to sell the two hydroelectric projects owned and operated by the Alaska Power Administration (APA). This divestiture will be accomplished with no significant power rate increases for ratepayers. Administration activities will be coordinated with the Congress and existing power customers, and implementation will not proceed until there are necessary legislative approvals. The FY 1994 budget assumes that divestiture will be authorized and implemented by the end of FY 1994. A program level of $4.0 million for the full year has been requested for FY 1994. The Department will transmit legislation to Congress authorizing this sale.

Bonneville Power Administration (BPA) is the Federal electric power marketing agency in the Pacific Northwest. BPA provides about 80 percent of the region's electric power transmission capacity. Operating on a self-financed revolving fund basis, BPA does not require appropriations to finance its day-to-day operations. It does, however, require borrowing authority for its capital investment activities. In FY 1994, these include increased conservation investments; spending to improve transmission system reliability; completion of Third AC Intertie facilities; an increased emphasis on replacing obsolete and maintenance-intensive transmission and PCB-contaminated equipment; and, construction of fish protection and enhancement facilities. In FY 1994, $434.2 million is expected to be obligated for capital investment.

The sharp decline in estimated net budget authority for the Bonneville Power Administration between FY 1993 and FY 1994 is due primarily to a reduced need for borrowing authority and an increased level of federal debt repayment. Borrowing authority decreases because of completion of major construction projects, primarily the Third AC Intertie. Federal debt repayment increases because of an unscheduled amortization payment received from non-Federal participants in the Third AC Intertie.

Power generated at 22 Federal hydroelectric generating plants in a ten-state area is marketed by the Southeastern Power Administration (Southeastern). Southeastern sells wholesale power to publicly and cooperatively owned electric distribution utilities using wheeling agreements with the region's large private utilities to provide firm power to its customers. Southeastern does not own or operate any transmission facilities. During FY 1994, a program funding level of $34.7 million is required for operation and maintenance and purchase power and wheeling charges. This includes $5.0 million in carryover funds.

The Southwestern Power Administration (Southwestern) operates in a six-state area as a marketing agent for hydroelectric power produced at 24 U.S. Army Corps of Engineers dams, selling wholesale power primarily to publicly and cooperatively owned electric distribution utilities. It also operates and maintains transmission lines, substations and switching stations. A program funding level of $34.4 million for FY 1994 is requested by Southwestern for operation and maintenance, purchase power and wheeling, and construction: $33.6 million derived from new budget authority and $0.8 million carried over from prior years.

The Western Area Power Administration (Western) markets electric power in 15 central and western States from federally owned power plants operated primarily by the Bureau of Reclamation, U.S. Army Corps of Engineers, and the International Boundary and Water Commission. The budget request for Western covers construction and rehabilitation of power transmission facilities, extensive operation and maintenance activities for power marketing and transmission, and purchase power and wheeling expenses to meet contractual obligations for the delivery of power. Western's activities are primarily financed through a combination of appropriated funds and revenue collections. The program funding level is $360.2 million. Of this amount, $353.0 million is new budget authority, and $7.2 million is permanent budget authority transferred from the Department of Interior. The new budget authority includes Western's first time contribution of $5.0 million in the Utah Reclamation Mitigation and Conservation Account.

Preparing for Energy Emergencies

The Department of Energy has a number of programs in place which serve to reduce the vulnerability of the U.S. to energy emergencies, such as energy supply disruptions, and foster international cooperation in global energy issues.

Preparing for Energy Emergencies	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Strategic Petroleum Reserve	$176.2	$173.1
Emergency Preparedness	9.2	8.9
Naval Petroleum and Oil Shale Reserves	236.1	231.2
Total, Preparing for Energy Emergencies	$421.5	$413.2

Strategic Petroleum Reserve

The Strategic Petroleum Reserve was created in 1975 to provide the United States with adequate strategic and economic protection against severe oil supply disruptions. The Strategic Petroleum Reserve program is currently directed toward providing for the storage of 750 million barrels of crude oil in underground salt caverns at five sites located in the Gulf Coast area and connected to major private sector distribution systems.

The FY 1994 budget request proposes continuation of a responsible level of operations and a maintenance program to assure a cost effective capability to respond to a Presidentially ordered drawdown. At the end of February 1993, the Strategic Petroleum Reserve crude oil inventory was 576 million barrels. The FY 1994 budget request provides for fill of the Reserve at a rate of 13,300 barrels per day. This is a decrease from the FY 1993 fill rate, and represents one of the Administration's savings initiatives aimed at controlling the deficit. The initial maximum drawdown rate for the Strategic Petroleum Reserve is 3.5 million barrels per day and is limited by availability of inventory at the Big Hill site. In FY 1994, completion of distribution enhancements process will expand future drawdown and distribution capabilities to 4.3 million barrels per day.

The Department has continued planning activities for the expansion of the Strategic Petroleum Reserve to one billion barrels. A draft Environmental Impact Statement for the five candidate sites was completed in October 1992, and a series of public hearings was held during December 1992. The Department is currently reviewing the more than 900 public comments received during the environmental impact statement process.

Emergency Preparedness

The Emergency Preparedness program leads the Department's efforts to develop and direct energy emergency preparedness planning, operational, and response programs to

meet the goal of reducing U.S. vulnerability to the adverse impacts of domestic and international supply disruptions.

To achieve this goal during FY 1994, the Emergency Preparedness program will develop reliable and flexible systems which detect emergencies, assess their severity and provide for effective responses; develop and test plans, procedures, and capabilities to respond to emergencies; determine vulnerabilities to supply disruptions that could result in significant adverse impacts to the U.S.; and determine which options to adopt and response actions to implement.

Naval Petroleum and Oil Shale Reserves

The statutory mission of the Naval Petroleum and Oil Shale Reserves (NPOSR) program is to explore, prospect, conserve, develop, use, and operate the Reserves; to produce the Reserves at their maximum efficient rates; and to use, store, sell, or otherwise dispose of production from the Reserves. The Naval Petroleum Reserves produce oil and gas which is sold competitively on the open market or transferred to either the Strategic Petroleum Reserve or the Department of Defense. The FY 1994 budget request provides for the continued operation and production of NPR-1 (Elk Hills) and NPR-3 (Teapot Dome) at maximum efficient rates through FY 1994. Production in FY 1994 is estimated at 62,500 barrels of oil per day from NPR-1 and 2,260 barrels per day from NPR-3. The FY 1994 budget request is $231.2 million, a decrease of $4.9 million over FY 1993. It also proposes to delete the NPOSR appropriation language which provided that the program retain the revenues it generates to offset the costs of operations. Revenues are estimated at $504.0 million in FY 1994.

To maximize production and revenues, operation of the Reserves will focus on producing and maintaining existing wells, implementing pressure maintenance programs, systematically drilling for reservoir development, developing gas resources, and applying enhanced recovery techniques. Other areas of emphasis include environment and safety, financial management, quality assurance, and Total Quality Management.

Production of the Reserves is currently authorized through April 5, 1994. A Presidential decision on whether to reauthorize production for another three years beyond this date will be made and submitted to Congress in FY 1994.

Enhancing Environmental Quality

Independent internal environment, safety, and health oversight activities include routine monitoring and management oversight to ensure that facilities are operated consistent with Departmental orders and applicable external regulatory requirements. This category

includes principally the oversight functions of the Office of Environment, Safety, and Health. It also includes the Office of Nuclear Safety, which provides independent oversight of DOE nuclear safety activities through the continuous assessment of DOE and contractor nuclear safety standards and performance, and the Nuclear Safety Policy activities managed by the Office of Nuclear Energy.

	Budget Authority (in millions)	
Enhancing Environmental Quality	FY 1993 Estimate	FY 1994 Request
Office of Environment, Safety and Health	142.3	144.8
Office of Nuclear Safety	25.6	25.0
Nuclear Safety Policy	—	15.0
Subtotal, Enhancing Environmental Quality	167.9	184.8
Use of Prior Year Balances and Other Adjustments	-4.0	-35.0
Total, Enhancing Environmental Quality	$163.9	$149.8

Office of Environment, Safety, and Health

The Office of Environment, Safety and Health (EH) is the Secretary's principal advisor on the environment, and occupational and public health. The office also manages the Security Evaluations program, which is described in the Defense section. In carrying out its mission, EH seeks to protect the health, safety, and security of our workers and the public, and protect the environment. To this end, EH verifies, validates, and assesses compliance with applicable laws, regulations, rules, and standards; promotes understanding of environmental, safety, health and security requirements; develops and recommends policies; manages health studies; certifies transportation packages and approves National Environmental Policy Act (NEPA) documents.

Office of Nuclear Safety

The Office of Nuclear Safety is responsible for independent oversight of nuclear safety management processes, programs and performance at the Program Secretarial Office, DOE Field Office and DOE contractor levels. Nuclear Safety has established programs that are directed towards ensuring that DOE facilities are being operated within the framework of clear, current, and comprehensive safety standards. The Office seeks to improve line management ownership and accountability for nuclear safety by including assessments of readiness for startup of new facilities or the restart of facilities shutdown for safety reasons. The Office has developed programs to enhance communication and cooperation on nuclear safety issues among the various levels of DOE and contractor

organizations. Daily facility operations are monitored by Nuclear Safety employees located at six nuclear facility sites. This on-site presence provides direct and continuing interaction between independent oversight at Headquarters and activities in the field involving nuclear safety. Under the authority of the Price Anderson Amendments Act of 1988, the Office has responsibility for enforcement of the Department's nuclear safety requirements. The Office also assists the Secretary in meeting external responsibilities for assessing nuclear safety, including oversight of DOD reactors, coordinates safety reviews for NASA space launches involving radioactive material, and provides oversight of the gaseous diffusion plants during their transfer operations to a government controlled corporation.

Nuclear Safety Policy

This activity funds the staff required for the development, maintenance and interpretation of nuclear safety requirements and standards for all DOE nuclear facilities. This activity is currently managed by the Assistant Secretary for Nuclear Energy.

Environmental Restoration and Waste Management

The Department's FY 1994 budget proposal for Environmental Restoration and Waste Management totals $6,462.3 million. This constitutes almost one-third of the budget proposed for the entire Department, and represents an increase of $967.2 million, approximately 18 percent above the amount appropriated by Congress in FY 1993 for this program. This increase includes $373.7 million for facilities transferred from Defense Programs and $286.3 million for the Uranium Enrichment Decontamination and Decommissioning Fund created by the Energy Policy Act. This rapid growth and increasing importance is why Environmental Restoration and Waste Management has become the fourth mission area in DOE. Overall, the FY 1994 Environmental Restoration and Waste Management budget presents a credible program which assures immediate public/worker health and safety and environmental protection, meets most compliance agreement requirements on schedule, maintains essential program management support, and maintains a minimal but effective technology development program. The budget for Environmental Restoration and Waste Management is displayed in the following table.

	Budget Authority (in millions)	
Environmental Restoration and Waste Management	FY 1993 Estimate	FY 1994 Request
Corrective Activities	$60.5	$26.5
Environmental Restoration	1,852.2	1,913.7
Waste Management	3,336.4	3,095.4
Facility Transition and Management	17.9	721.4
Technology Development	336.9	401.0
Transportation Management	19.8	20.1
Program Direction	50.8	91.9
Uranium Enrichment Decontamination and Decommissioning Fund	—	286.3
Subtotal, Environmental Restoration and Waste Management	5,674.5	6,556.3
Use of Prior Year Balances and Other Adjustments	-179.4	-94.0
Total, Environmental Restoration and Waste Management	$5,495.1	$6,462.3

The DOE Environmental Restoration and Waste Management Five-Year Plan is the cornerstone of the Department's long-term strategy to consolidate and coordinate DOE's cleanup activities. The Five-Year Plan combines cleanup activities in the areas of Defense Programs, Nuclear Energy, and Energy Research, treats them as a unified program, and establishes an agenda for compliance and cleanup against which progress will be measured. The Office of Environmental Restoration and Waste Management (EM) which

was established to administer the Five-Year Plan and manage the cleanup program, provides centralized management and planning for control and validation of costs, schedules and priorities of projects contained in the Five-Year Plan.

The FY 1994 budget request is being proposed under three separate appropriations. The Defense Environmental Restoration and Waste Management appropriation is for defense-related activities. The Energy Supply Research and Development appropriation funds non-defense activities. In addition, cleanup of uranium enrichment facilities is funded from the Uranium Enrichment Decontamination and Decommissioning fund.

The Department's initial Environmental Restoration and Waste Management Five-Year Plan, a major environmental initiative to set program direction and drive decision-making, was published in August 1989. The Department published its second annual update in June 1990, identifying proposed work activities for fiscal years 1992 through 1996. The third annual update, for fiscal years 1993–1997, was published in August 1991. The FY 1994–FY 1998 Plan was published in January, 1993. As part of the Department's integrated planning, budget, and control efforts, a strategic plan has been developed to identify longer-term goals, objectives, issues, and strategies for the EM organization.

Corrective Activities

Corrective Activities are necessary to bring active and standby facilities into compliance with applicable local, State and Federal regulations. The major regulatory drivers are the Clean Air Act, Resource Conservation and Recovery Act (RCRA), Safe Drinking Water Act, and the Toxic Substances Control Act (TSCA). The Department plans to complete all corrective activities in the late 1990s.

Environmental Restoration

The Environmental Restoration program includes the assessment and clean-up of surplus facilities and inactive sites. The objectives of the Environmental Restoration Program are to stabilize radioactive waste or perform decontamination and decommissioning at contaminated DOE and legislatively authorized non-government facilities and sites; to conduct assessments and characterization of DOE sites to determine if there is the potential for radioactive and hazardous waste releases; and to protect human health and the environment. Also included under Environmental Restoration are continued characterization efforts at the Fernald Environmental Management Project in Fernald, Ohio, in accordance with the Consent Agreement with the Environmental Protection Agency. Funding also will provide for continued removal actions, remedial action design, waste management efforts, environmental monitoring, and landlord activities,

while ensuring protection to public health, worker health and safety, and the environment.

Waste Management

The Waste Management program activities are focused on effectively managing the minimization, treatment, storage, and disposal of radioactive, hazardous, mixed, and sanitary wastes generated as a result of ongoing operations at active sites. These activities are critical to supporting the Department's major nuclear programs conducted by the Offices of Defense Programs, Energy Research, and Nuclear Energy. To carry out its responsibilities in these areas, the Department operates a large industrial complex located at various manufacturing, processing, testing, and research and development installations across the country. Operations connected with this complex include various basic and applied research activities and nuclear energy development and applications, in addition to manufacturing and processing of enriched uranium and processing of spent nuclear fuel and other irradiated materials. These operations routinely generate and require treatment, storage and disposal of various amounts of radioactive, non-radioactive, and mixed waste products. Included in this program are RCRA and TSCA permitted facilities to meet program and regulatory requirements, the West Valley Demonstration Project, Defense Waste Processing Facility, the Hanford Tank Waste Remediation System, the Waste Isolation Pilot Plant, and production expenses associated with headquarters and field office management of the Waste Management and Corrective Activities program activities. The reduction in budget requirements in FY 1994 is due solely to a structural change. Funding, in the amount of $347.7 million, for certain major defense production facilities formerly carried in Waste Management is transferred to the Facility Transition budget in FY 1994.

Technology Development

The Environmental Restoration and Waste Management Technology Development program is a needs driven and effective, national program. FY 1994 activities will include continuing to deliver complete technology systems within the window of opportunity which reduce cost and worker exposure during environmental restoration and waste management. Technology Development efforts will include maintaining interface with stakeholders to provide technology systems which meet regulatory and institutional requirements. The program will focus on defining future Environmental Restoration and Waste Management manpower needs and implementing environmental education programs to meet the EM 30-year cleanup goal. Continuing active partnerships with U.S. industry, the national laboratories, other Federal agencies, universities, and appropriate international participants to provide technologies to DOE and transfer technology systems to industry will be included within the FY 1994 activities.

Transportation Management

Transportation Management is responsible for assuring the safe, secure, and economical transportation of DOE materials, including radioactive and other hazardous materials and waste, to meet the needs of Departmental programs. Transportation Management includes traffic operations training, transportation systems and packaging development and testing, regulatory and risk analyses, emergency preparedness, and public outreach.

Facility Transition

The Office of Facility Transition and Management within EM coordinates and oversees the orderly transition of contaminated installations/facilities from other Program Secretarial Officers (PSO) to EM once they are determined by the donor PSO to be surplus to their mission. Contaminated surplus facilities are being transferred to EM to be maintained in a safe, cost-effective and environmentally sound and worker protective status until they can be cleaned up and reused or decontaminated and dismantled. The FY 1994 budget of $721.4 million includes $347.7 million for former defense production facilities previously budgeted for in Waste Management, and $373.7 million for newly transferred facilities.

The Office of Facility Transition will conduct landlord activities at Richland, Idaho, and Rocky Flats, including management of construction/general plant projects, conducting condition assessments for buildings to address deficiencies, and providing site infrastructure support. Deactivation activities include transition planning, initiation of materials transfers, and the conduct, development and implementation of deactivation activities.

Science and Technology

The Department of Energy has a significant role to play in maintaining this Nation's technological preeminence and, as a consequence, its economic competitiveness in an increasingly competitive world economy. The Department funds a substantial portion of the Nation's basic research, and has committed itself to improving science and mathematics education in the United States. Technology transfer programs help move technologies that industry has identified as having commercial value to the commercial marketplace. The budgets for science and mathematics education programs and for technology transfer are included in their parent programs described in this and other sections of the Budget Overview. Amounts for these activities are displayed below, but are not added to the total to avoid double counting.

	Budget Authority (in millions)	
Science and Technology	FY 1993 Estimate	FY 1994 Request
Fundamental Science Research	$2,689.4	$2,908.1
Science and Mathematics Education (non-add)	*(104.5)*	*(128.4)*
Technology Transfer (non-add)	*(208.8)*	*(255.9)*
Technical Information Management	15.0	14.9
Total, Science and Technology	$2,704.4	$2,923.0

Fundamental Science Research

Maintaining scientific and technological preeminence is key to this Nation's ability to compete in the increasingly competitive world economy. Many of the products and processes which will be important in the future will have their origin in the basic and applied research and development being carried out in the Department's National Laboratories and our contractors' facilities. Major program areas which contribute to the goal of maintaining our scientific and technological competitiveness are shown in the following table.

Fundamental Science Research	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
High Energy Physics	$613.4	$627.8
Nuclear Physics	309.1	322.3
Superconducting Super Collider	517.0	640.0
Basic Energy Sciences	860.7	802.0
Advanced Neutron Source	—	39.0
Biological and Environmental Research	385.2	416.1
Multi-program Energy Laboratories—Facilities Support	26.7	41.6
University Programs	55.7	58.0
ER Laboratory Technology Transfer	57.1	39.3
Analysis and Program Direction	25.0	30.0
Isotope Production and Distribution	5.0	3.9
Subtotal, Fundamental Science Research	2,854.9	3,020.0
Less: Use of Proposed Supplement	–47.0	—
Use of Prior Year Balances and Other Adjustments	–118.5	–111.9
Total, Fundamental Science Research	$2,689.4	$2,908.1

High Energy Physics

High Energy Physics research is aimed at understanding the nature of matter and energy at the most fundamental level and the basic forces which govern all processes in nature. The ability to carry out research at the forefront of knowledge is critically dependent on the experimental capabilities of large particle accelerators, colliding beam devices, and large particle detectors. These devices require state-of-the-art technology in such areas as high-speed computing, fast electronics, superconducting magnets, and other high technology areas. Moreover, high energy physics has been the basis for many advances in applying accelerator technology to such important areas as medical diagnostics.

Funding for FY 1994 High Energy Physics programs is $627.8 million. Of this, $148.6 million is provided to support research for university and laboratory based groups conducting experimental and theoretical research; $268.4 million is provided for facility operations; and $59.4 million is provided for High Energy Physics technology which will provide the technological base for maintaining and improving the scientific effectiveness, reliability and efficiency of existing and future facilities. Capital equipment is funded at $65.1 million. Construction projects are included at $86.3 million and provide $12.2 million for general plant projects, $13.1 million for accelerator

improvements, $25.0 million for continuing construction of the Fermilab Main Injector (total estimated cost of $229.6 million) and $36.0 million for the B-Factory, which is a Departmental investment initiative. The B-Factory is a high energy physics initiative that funds the design and construction of a high luminosity electron-positron colliding beam machine for the purpose of studying the fundamental aspects of the structure of matter. Competing proposals from the Stanford Linear Accelerator Center and from Cornell University will be evaluated jointly with the National Science Foundation before site selection is made.

Nuclear Physics

Nuclear Physics research is targeted toward understanding the structure of atomic nuclei and the fundamental forces required to hold nuclei together. The program is centered around an active experimental research program and the design and fabrication of sophisticated detectors, coupled with the development of creative theoretical concepts and support of other disciplines based on nuclear technology. In addition, the construction, operation, and maintenance of accelerator facilities are needed to provide the beams of particles upon which the experiments are based. Funds are included to continue construction of the Continuous Electron Beam Accelerator Facility (CEBAF) and the Relativistic Heavy Ion Collider (RHIC) in order to maintain our world leadership position in nuclear physics.

Funding for FY 1994 Nuclear Physics programs is $322.3 million. Operating expense program support is $199.3 million, which includes funding for the subprogram activities of Medium Energy Physics ($91.5 million), Heavy Ion Physics ($67.4 million), Low Energy Physics ($25.6 million), and Nuclear Theory ($14.8 million). Capital equipment requirements are funded at $29.0 million.

Construction is funded at $94.0 million; general plant projects and accelerator improvements and modifications are supported at $7.4 million, the RHIC at $70.0 million (total estimated cost of $477.3 million), and the CEBAF at $16.6 million (total estimated cost of $313.2 million).

Superconducting Super Collider

The Superconducting Super Collider (SSC) is a proton-proton collider having an energy of 20 TeV per beam that will permit exploration of this new domain of physics research which cannot be reached by any other facility either in existence or planned. The goal of the SSC is to explore areas of the TeV mass region where advancements will expand knowledge of the fundamental nature of matter and energy, and enable the U.S. high energy physics program to remain at the research frontier into the next century. The SSC is a critical part of the Administration's initiative to strengthen the position of the Nation as a world leader in science and technology.

Federal funding of $640.0 million is requested in FY 1994 for the SSC. It is expected that the budget request will be augmented by substantial non-Federal contributions. The Federal budget request for FY 1994 includes $104.4 million for continued research and development on superconducting magnets and other accelerator systems and detector systems; $50.0 million for capital equipment funds, primarily for prototype of detector and accelerator subsystems; and, $480.6 million for construction. The construction funding is primarily for detailed design of both technical and conventional facilities, the magnet industrialization program, fabrication of injector and collider technical systems and components, and on-site construction of conventional facilities. There is also $5.0 million for laboratory operations costs not directly related to project construction that are not included in the total project cost.

Ellis County, Texas is the site for the SSC. Currently the Department is reestimating the project completion and total project cost as a result of the most recent FY 1994 Presidential budget guidance which calls for a stretch-out of the SSC program to ensure that all components are technically effective and that adequate managerial controls are in place. Due to the magnitude of the changes in the funding profile, a detailed reevaluation of the project schedule, the approach to accomplish major tasks, and the laboratory staffing plan will be required. The revised project plan developed by the laboratory will be subject to a detailed cost and schedule review by the Department. The reestimate will be formalized with a baseline change by the end of FY 1993. The impact of the reevaluation is a reduction in planned outlays in FY 1994–1998, a 3-year delay in schedule, and a $2 billion increase in the as-spent project cost. This estimate of the change is believed accurate within 20 percent at this time. The program changes will be discussed with current and planned non-Federal contributors and the impact in this area will be reflected in the baseline change.

Basic Energy Sciences

The Basic Energy Sciences (BES) program is an essential component of both the Departmental and Federal commitment to research and development in the U.S. today. Working with National Laboratories, universities, industry, and other government agencies, the BES program supports research which provides the foundation for new technologies and improvements to existing technologies which are crucial to achieving the goals of the Energy Policy Act of 1992.

The research in BES is grouped into six major areas: materials sciences ($277.0 million), chemical sciences ($169.0 million), applied mathematical sciences ($106.2 million), engineering and geosciences ($37.9 million), energy biosciences ($26.7 million), and advanced energy projects ($11.4 million). BES has a heavy involvement in major scientific user facilities: the High Flux Beam Reactor and the National Synchrotron Light Source at Brookhaven National Laboratory; the Combustion Research Facility at Sandia National Laboratories, Livermore; the High Flux Isotope Reactor and the Radiochemical Engineering Development Center at Oak Ridge National Laboratory; the Stanford

Synchrotron Radiation Laboratory at Stanford University; the Intense Pulsed Neutron Source at Argonne National Laboratory; and the 1–2 GeV Synchrotron Radiation Source at Lawrence Berkeley Laboratory. In addition to these existing facilities, the BES program is also supporting construction of a major new scientific facility, the 6-7 GeV Synchrotron Radiation Source. Operation of these major facilities account for $192.5 million of the BES funding requirements. Also included in the BES request is $9.4 million required for program and management support staff.

In response to several government-wide initiatives to strengthen critical U.S. technology, the BES program is expanding research in three areas. First, the budget request includes an enhancement for materials research as part of the U.S. Advanced Materials and Processing Program. Second, the budget request takes into consideration the need to strengthen the area of biotechnology in support of the Federal Coordinating Committee on Science, Engineering, and Technology (FCCSET) recommendations. Third, the budget includes the DOE contribution for the second year of the FCCSET High Performance Computing and Communications Program.

Capital equipment in the amount of $44.9 million is requested in addition to the operating funds mentioned above.

The largest element of the overall budget for construction projects ($119.5 million) is the $107.0 million provided for the 6-7 GeV Synchrotron Radiation Source at Argonne National Laboratory. Also included is $7.5 million for Accelerator Improvement Projects and $5.0 million for general plant projects.

Advanced Neutron Source

The Advanced Neutron Source (ANS) is to be a State-of-the-art research reactor facility that will replace two existing but aging facilities: The High Flux Beam Reactor (HFBR) and High Flux Isotope Reactor (HFIR). The ANS is specifically designed for three types of research activity: (1) neutron scattering to study properties and behavior of materials including structural, electronic, magnetic, and biological materials; (2) isotope production, such as californium-252 needed for cancer therapy and medical research; and (3) radiation effects to study the degradation of materials due to neutron irradiation. The budget provides $12.0 million for operating expenses, $1.0 million for capital equipment, and $26.0 million for construction.

Biological and Environmental Research

The Biological and Environmental Research (BER) program provides the scientific foundation for the understanding and anticipation of the long-term health and environmental consequences of energy use and development, and for solutions of major biomedical and environmental problems. The program gives particular emphasis to the

development and application of biotechnology to fulfill Departmental objectives and reflects the priorities developed in the Energy Policy Act of 1992.

The BER program includes several areas of scientific research: analytical technology ($9.8 million), involving development of advanced instrumentation and dosimetry capability; environmental research ($49.7 million), including atmospheric, marine and terrestrial research activities; health effects research ($38.9 million), investigating the health impact of radiation and energy related chemical exposure; general life sciences research ($109.6 million), involving fundamental cellular and molecular level studies, including human genome research; and medical applications studies ($39.8 million), developing advanced techniques for the application of radiation and radionuclides for diagnosis and therapy. Support for capital equipment ($21.6 million), and program direction activities ($7.1 million) is provided. Construction for the BER program includes: the Human Genome Lab at Lawrence Berkeley Lab ($2.2 million); the Structural Biology Center, Argonne National Laboratory ($4.0 million); Advanced Light Source Structural Biology Support Facilities, Lawrence Berkeley Laboratory ($0.6 million); Brookhaven Linear Isotope Producer, Brookhaven National Laboratories ($6.0 million); Environmental & Molecular Science Laboratory, Pacific Northwest Laboratories, ($33.0 million); and general plant project ($3.5 million).

A major element of the Biological and Environmental Research program is directed toward gaining a better understanding of global change. BER's global climate change research program ($90.3 million) is an integral part of the U.S. Global Change Research Program (USGCRP) which is developed and coordinated by the Committee on Earth and Environmental Sciences (CEES). Nine agencies have joined forces to create the USGCRP which has become a paradigm of interagency cooperation and a model for the international collaboration to address this potentially serious environmental problem.

While the USGCRP adopts the long-term and holistic approach to the study of global environmental change, the DOE component focuses on reducing scientific uncertainties of global climate change in the shorter term (within ten years); DOE mission needs dictate such an emphasis. DOE research seeks to improve climate change prediction significantly by acquiring the critical data necessary to quantify the role of clouds and oceans in climate change and enhance the climate model computing systems. DOE also continues the work to elucidate the sources and sinks in the global carbon cycle and quantify impacts of climate change and increasing greenhouse gases on human and natural resources.

Multi-program Energy Laboratories—Facilities Support

Providing for the ongoing rehabilitation, upgrade and replacement of support facilities necessary to the continued operation of the Department's nondefense multi-program laboratories is the goal of the Multi-program Energy Laboratories—Facilities Support program, managed by the Office of Energy Research. These laboratories range in age

from 22 to 42 years and are very heavily utilized, which makes this program essential to their continued operation. The Tiger Team Remediations subprogram will provide support necessary to correct deficiencies identified by the Tiger Team reviews that are related to the Office of Energy Research responsibilities. During FY 1994 the program will fund activities at Argonne National Laboratory, Brookhaven National Laboratory, Lawrence Berkeley Laboratory, Oak Ridge National Laboratory, and Pacific Northwest Laboratory.

University Programs

The Office of Energy Research, through its Office of University and Science Education, manages a number of university programs, most of which are described in the following section on Science and Mathematics Education.

Other programs support efforts to strengthen university capability to perform long-range research and development. One subprogram, University Research Instrumentation (URI), provides competitive support for the acquisition of state-of-the-art research instrumentation by DOE-sponsored university researchers ($5.6 million). Another subprogram, University Reactor Fuel Assistance, provides support for refueling and related activities for university nuclear research and training reactors including the continued conversion of university reactors to Low Enriched Uranium (LEU) fuel ($3.7 million).

Analysis and Program Direction

The Energy Research Analysis (ERA) program provides the capability for independent, rigorous assessment of the base of research that underlies a variety of energy technologies. Assessments are consolidated under one organization, the Office of Energy Research, in fulfillment of legislated responsibility for the Director to advise the Secretary on the agency's research and development programs. Program Direction provides the staffing and associated funding to provide overall direction of the programs of the Office of Energy Research.

Isotope Production and Distribution

The Department of Energy Isotope Production and Distribution (IP&D) program, now operating for the third year as a business entity through the application of a revolving fund, has continued to produce and market essential isotope products and services for medical diagnosis and therapy, industrial and agricultural applications, and for research uses. The production and supply of these widely varied isotopes for a rapidly growing list of applications will continue in response to market and research needs. Additionally, new isotope products and services will be developed and introduced in response to

changing technological and societal needs. New DOE products for medical applications now being investigated for early introduction include molybdenum (Mo-99), iodine (I-125 and I-131), and xenon (Xe-133). The FY 1994 request is for $3.9 million in appropriations to replenish working capital used for startup expenditures on additional isotopes required in research and other essential applications. The IP&D Program operates on a revolving fund basis, and it is challenged with uncertainties in revenues and expenses as in any new business. Currently, the Arthur Andersen and Co. recommendations are being evaluated for making the program efficient and sustainable and identifying the crucial conditions which are required.

Science and Mathematics Education

The Department's science, mathematics, and engineering education programs are an essential component of the overall Federal commitment to ensuring the Nation's continued international economic and technological competitiveness. Future success in meeting the Department's science, energy and defense research and development missions is also heavily dependent on the quantity and quality of the scientific and technical workforce.

The DOE FY 1994 funding request of $128.4 million for science, mathematics, and engineering education closely tracks the overall Federal priorities established by the Federal Coordinating Council for Science, Engineering and Technology Committee on Education and Human Resources (FCCSET CEHR) for support for precollege, undergraduate and graduate-level programs. DOE funding for science education is provided through nearly all DOE program offices, but primarily through the Office of Energy Research and the Office of Environmental Restoration and Waste Management.

The $128.4 million request represents a 23 percent increase over the FY 1993 enacted level. The precollege portion of this budget ($32.3 million) has increased 18 percent over FY 1992, and has more than tripled since FY 1990, reflecting emphasis on programs supporting the National Education Goals.

One of the new initiatives highlighted in the President's Budget is a FCCSET CEHR multi-agency program to provide intensive training opportunities for precollege teachers at Federal laboratories. This program initiated in FY 1993, implemented by DOE through the Office of Energy Research is $4.3 million.

The University and Science Education Program in the Office of Energy Research has two major subprograms primarily devoted to precollege and undergraduate support. The first subprogram, Laboratory Cooperative Science Centers ($35.8 million), is a laboratory-based program which includes support for precollege student and teacher research and training; for undergraduate, graduate and faculty research appointments; and for a number of rural/urban school partnerships administered by the DOE

laboratories. The second subprogram, University Programs ($12.8 million), is a college/university-based program which includes support for efforts encouraging more young people, including underrepresented women and minorities, to pursue energy-related scientific and technical careers through such efforts as the Prefreshman Enrichment Program for 7,000 middle school students, summer and semester-length research appointments at DOE laboratories for undergraduate students, and support for DOE laboratory/minority university alliances.

The Office of Environmental Restoration and Waste Management provides support for the development of new undergraduate-level education and curriculum development programs on environmental remediation issues and topics. Support is also provided for undergraduate scholarships in disciplines related to environmental remediation to encourage more students to pursue careers in these critical fields. This support also includes funding for regional partnerships among university consortia, DOE laboratories and private industry to develop joint research and education initiatives on environmental remediation topics and issues.

At the graduate level, support is provided for pre- and postdoctoral research fellowship awards by the four major program offices in the Office of Energy Research. A continued initiative is the postdoctoral fellowship program that will provide ten 3-year awards in physical sciences, engineering and mathematics. Additional graduate research fellowships in designated disciplines and research areas are also provided by the Office of Nuclear Energy, the Office of Environmental Restoration and Waste Management, the Office of Civilian Radioactive Waste Management, and the Office of Environment, Safety and Health.

In the area of public science literacy education, a new FCCSET CEHR budget category in FY 1994, the Department's request is $4.3 million, evenly divided between media disseminated programs (Public Broadcasting Service series and special programs for students, teachers and families), museum exhibits, and consumer information programs on science issues.

Technology Transfer

Transferring technological knowledge from the scientists and engineers supported by the Department in universities, the Department's National Laboratories, and other major contractors to U.S. industry for application to practical needs at home and enhanced competitiveness abroad has become one of our highest priorities. The science and technology developed in DOE research programs, laboratories, and non-laboratory facilities help to form a knowledge base that is one of our most valuable National assets.

Technology transfer is the process of making Federally funded science and technology more responsive to the needs of users in industry, academia, and state and local

government. These users will then develop the technology further, into new products, processes, materials, and services.

Technology transfer has been established as a fully integrated mission of all Departmental elements and laboratories. This activity element provides sustained funding and resources necessary to implement the technology transfer mission, including support for activities that help bridge the gap between the point where Federal research and development stops and the point where industry can commit to commercial applications.

The FY 1994 budget contains budget line items valued at $255.9 million specifically identified for technology transfer. The Environmental Restoration and Waste Management line item ($13.5 million) is Technology Integration, in Defense Programs it is dual-use Technology Transfer Initiative ($203.0 million), and the Energy Research line item ($39.4 million) is Technology Transfer. Most of these line-item technology transfer funds are for support of Cooperative Research and Development Agreements (CRADAs). The Administration strongly supports technology transfer, and has included $47 million for additional CRADAs at the National Laboratories as part of the FY 1993 stimulus package. This direct funding, however, considerably understates the magnitude of the Department's technology transfer activities. Direct research program funds constitute the majority of the Departments technology transfer funding, and support activities such as cost-shared projects, program administration, and the Federal Laboratory Consortium (FLC). The applied research programs, Fossil Energy, Energy Efficiency and Renewable Energy, Nuclear Energy, Defense Programs, and Environmental Restoration and Waste Management, most frequently incorporate technology transfer directly into their research programs. The dollar value of these activities exceeds the amount shown above for the specific line items. Each DOE laboratory has an Office of Research and Technology Assessment (ORTA) or a similar office, which oversees the laboratory's program. Similarly, each DOE field office has resources devoted to technology transfer.

Technical Information Management Program

The Technical Information Management Program is responsible for ensuring that the Scientific and Technical Information (STI) resulting from the agency's multi-billion dollar research and development investment is effectively managed, controlled, and disseminated; that management of STI is considered an integral part of research and development efforts from the initial planning stage through project completion; and that STI is effectively utilized to support informed programmatic decisions.

National Defense

The end of the Cold War and proposed conventional and nuclear arms agreements with the Commonwealth of Independent States (CIS) have resulted in the reduced threat of nuclear war and has permitted a change in budget priorities. In recognition of reduced world tensions the Administration is proposing significant savings in the DOE Atomic Energy Defense Activities budget request. However, the Department will continue to fulfill its primary mission for the maintenance of the Nation's nuclear weapon deterrent in a safe and environmentally acceptable manner. The Department will continue its expansion of the nuclear weapon nonproliferation program that was initiated in FY 1993 as well as provide additional support for current and prospective arms control treaties and agreements. The Naval Reactors program will continue to develop an advanced nuclear reactor plant intended for the new attack submarine (SSN) class that is required by the Navy to maintain a viable SSN force and industrial base.

	Budget Authority (in millions)	
Meeting National Defense Needs	FY 1993 Estimate	FY 1994 Request
Weapons Research, Development and Testing	$1,955.4	$1,784.5
Weapons Stockpile Support	2,350.8	1,892.5
Program Direction	329.8	284.1
Complex Reconfiguration	26.0	163.5
Materials Support	1,602.4	1,137.2
Verification and Control Technology	342.5	368.8
Safeguards and Security	83.1	90.2
Security Evaluation	15.2	15.0
Security Investigations	57.3	53.3
Worker Training and Adjustment	—	100.0
New Production Reactors	184.0	—
Naval Reactors	807.0	767.7
Subtotal, Meeting National Defense Needs	7,753.5	6,656.8
Use of Prior Year Balances and Other Adjustments	-589.2	-746.8
Total, Meeting National Defense Needs	$7,164.3	$5,910.0

Weapons Research, Development and Testing

The Weapons Research, Development and Testing program supports force structure requirements as defined in the Nuclear Weapons Stockpile Memorandum (NWSM), promotes technological advancement and insures against technological surprise by timely identification and understanding of potential threats to the national security. This program also supports national emergency preparedness assets as well as the transfer of nonsensitive defense technology to the private sector. The FY 1994 funding request supports an estimated 16 percent decline in laboratory staffing from the FY 1993 level, although not all mission areas are projected to decline equally. Emphasis will be placed on accelerated warhead dismantlement, storage, and disposal activities; preparation for limitations on underground testing; and technological support for reconfiguring the nuclear weapons complex. Increased funding is provided for Technology Transfer initiatives. The FY 1994 budget level for weapons testing preserves the option to conduct underground tests consistent with the Congressional direction contained in Public Law 102–377.

Weapons Stockpile Support

The Weapons Stockpile Support program encompasses the maintenance, surveillance, and dismantlement of those nuclear weapons specified in the NWSM. Although there are no requirements for new weapons throughout the planning period, maintenance and surveillance of the residual stockpile continues and dismantlement, transportation, and disposal activities, on weapons returned from the stockpile, have been increasing.

Weapons Program Direction

The Weapons Program Direction program supports personnel and contractual services for the Federal management direction and administration of the Weapons program missions. This program provides payments to contractors at Defense Programs sites who are involuntarily separated because of reductions in Defense Programs activities. The Office of Emergency Management supports the Department's Emergency Management System and the Emergency Operations Center.

Weapons Complex Reconfiguration

The Reconfiguration program supports the efforts to reconfigure the nuclear weapons complex into one that is smaller, less diverse, and more efficient and cost effective than today's complex. In recognition of changing priorities, needs, and fiscal considerations, the schedule for nonnuclear consolidation has been delayed from that identified in last

year's request. The pace of this effort will depend upon the findings of an outside review directed by the Secretary.

Materials Support

The Materials Support Program provides nuclear materials to meet national defense requirements. The nuclear materials required to support the Nation's nuclear weapons program are tritium, plutonium, and highly enriched uranium. For the foreseeable future, all material requirements will be met from existing supplies or retired weapons. K-Reactor will be placed in cold standby status in FY 1993. Idaho Chemical Processing Plant has been transitioned to the Office of Environmental Restoration and Waste Management for eventual decommissioning and decontamination. Processing activities will continue to stabilize nuclear materials and to support the NASA Cassini mission.

Verification and Control Technology

The Verification and Control Technology program supports the development and execution of U.S. national security and foreign policy in the areas of treaty verification, arms control, nonproliferation, and intelligence. Program activities include Detection Technology, Analytical Support, Nuclear Nonproliferation Policy, the Reduced Enrichment Research and Test Reactor Program, Export Controls, International Safeguards, Treaty Implementation, Threat Assessment, Counterintelligence, and Technical Support. The increase in FY 1994 funding requested for arms control and nonproliferation activities is required to enhance U.S. and international nonproliferation capabilities in the areas of: detection technology, technical analysis, export controls, and international safeguards. The FY 1994 program also provides for the continued support of verification technology development programs at the Department's national laboratories; the continued support of U.S. activities aimed at assisting Russia and other states of the former Soviet Union in critical areas such as nuclear warhead dismantlement, emergency response capabilities, export control, and nuclear materials control and accounting; and the completion of construction of the center for National Security and Arms Control at Sandia National Laboratory. The FY 1994 program for intelligence activities provides for increased proliferation intelligence of selected nuclear weapons states, and continues participation by the DOE in the Director of Central Intelligence's Nonproliferation Center. The FY 1994 intelligence program also provides for the continued development of the DOE counterintelligence program to deter and neutralize foreign intelligence services' actions to acquire classified or sensitive DOE information; and continue threat assessments of DOE's facilities and operations including threats involving nuclear material.

Nuclear Safeguards and Security

The Nuclear Safeguards and Security program is responsible for developing measures to assure adequate, cost-efficient, and effective protection of the Department's nuclear weapons, nuclear materials, facilities, and classified information against theft and sabotage, espionage and terrorist activity, with continuing emphasis on protection against the insider threat. The FY 1994 request allows the program to continue as a key DOE infrastructure program designed to ensure state-of-the-art technology protection for Departmental and global change.

Security Evaluations

This program provides for independent oversight of the effectiveness of DOE safeguards and security policies and programs. This is accomplished by conducting inspections and assessments of safeguards and security policies, programs, and their implementation. Assessments of the effectiveness of protection policies and programs are conducted to provide a consolidated statement of the status of protection programs over the entire DOE complex. This program also budgets for the Radioactive Materials Packaging Certification program, which certifies that radioactive material packages are in compliance with Federal safety regulations.

Security Investigations

The Security Investigations program funds background investigations for DOE and contractor personnel who, in the performance of their official duties, require security clearance permitting access to Restricted Data, National Security Information, or Special Nuclear Material. The FY 1994 request continues this vital personnel security clearance program.

Worker Training and Adjustment

In accordance with Section 3161 of the Defense Authorization Act of 1993, work force restructuring plans are being developed to assure that workers displaced because of curtailed Defense Program mission responsibilities are provided assistance. The objective of these plans is to minimize the impacts on displaced workers by addressing: retirement incentives; retraining; preference in hiring at other DOE facilities; and relocation assistance. In addition, the Department may provide impact assistance for community economic adjustments. The plans will be developed in consultation with other national, and state and local government and non-government groups, including unions and community associations.

New Production Reactors

The construction of a tritium production facility to support the Nation's Nuclear Weapon Stockpile has been postponed. This is possible due to the recent strategic nuclear arms treaties (START) and agreements with the Commonwealth of Independent States (CIS). The New Production Reactor account is shown with the Materials Support and Other Defense Programs appropriation. The FY 1993 program supports the feasibility studies for the Accelerator Production of Tritium alternative. Consistent with the termination of the Nuclear Energy Advanced Reactor R&D program, the plutonium burning program has been terminated. As a result, $100 million in carry-over balances will be used as an offset to FY 1994 budget authority requirements.

Naval Reactors

The Naval Nuclear Propulsion program is carried out jointly by the Departments of Energy and Navy. The program's objectives are twofold: to provide the Navy with safe and militarily effective nuclear propulsion plants and to ensure their safe and reliable operation. The DOE component's, Naval Reactors, budget request consists of two elements: Naval Reactors Development and Enriched Materials. In FY 1994, Naval Reactors will continue to develop advanced nuclear reactor plant components/systems intended for the new attack submarine (SSN) class required by the Navy to maintain a visible SSN force, improve operating reactors and plant components, and provide funding for the shutdown of the highly enriched uranium production facility at Portsmouth, Ohio.

Management and Other Activities

The DOE missions identified in the Policy Overview do not account for all of the Department's funding request. Other Departmental functions include energy information, regulation, and management and administration.

Management and Other Activities	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Energy Information Administration		
Energy Information Administration	$82.3	$89.4
Less: Transfer from Energy Security Reserve	-49.0	—
Total, Energy Information Administration	33.3	89.4
Administering Energy Laws and Regulations	20.0	15.2
Departmental Management	130.5	237.3
Total, Management and Other Activities	$183.8	$341.9

Energy Information Administration

The goal of the Energy Information Administration (EIA) is to produce and provide relevant, timely, and accurate energy information. This information provides a statistical basis for understanding the energy situation and projecting energy futures, and is used by DOE offices, the Executive branch, Congress, State governments, and the public as an aid to decisionmakers in all sectors of society. To accomplish its mission, EIA collects, processes, and interprets energy data and exercises independent judgment in the gathering, analysis and dissemination of information. The FY 1994 budget request of $89.4 million represents an increase of 9 percent over FY 1993. This increase supports new requirements in the Energy Policy Act of 1992. This level of funding will allow EIA to continue its basic energy information programs, respond to increased demands for energy information and analysis, and maintain its position as the Nation's authoritative source of energy information.

Administering Energy Laws and Regulations

The Department includes a number of organizations which administer energy laws and regulations. The Economic Regulatory administration and the Office of Hearings and Appeals are involved primarily in completing the disposition of cases dating from the period of petroleum price controls.

Administering Energy Laws and Regulations	Budget Authority (in millions) FY 1993 Estimate	FY 1994 Request
Fossil Energy Fuels Program	$3.1	$3.0
Economic Regulatory Administration	7.9	6.4
Office of Hearings and Appeals	6.5	6.6
Federal Energy Regulatory Commission		
Federal Energy Regulatory Commission (gross)	158.6	162.1
Payments to States	2.5	2.5
Less: Offsetting Collections	–158.6	–165.4
Total, Federal Energy Regulatory Commission	2.5	–0.8
Total, Administering Energy Laws and Regulations	$20.0	$15.2

Fossil Energy Fuels Program

The goal of the Office of Fuels Programs is to provide American consumers with supplemental supplies of reliable, competitively priced, and environmentally acceptable natural gas and electricity, and to encourage the development of a North American energy market. Programs include issuing authorizations for the import and export of natural gas; the export of electricity; the construction and operation of transmission facilities for exchanges of electricity across international borders; accepting certificates of compliance with the requirement that utilities be constructed with alternate fuel capability, and issuing exemptions from the provisions of the Powerplant and Industrial Fuel Use Act.

Economic Regulatory Administration

The goal of the Economic Regulatory Administration (ERA) is to pursue the successful completion of those cases involving pricing violations of the Emergency Petroleum Allocation Act of 1973, while winding down the enforcement program in a responsible manner. The FY 1994 budget provides for litigation of approximately 50 remaining cases. All cases are now before administrative or judicial tribunals; however, when consistent with the public interest, ERA will continue to seek the resolution of cases through negotiated settlements. Budget authority of $6.4 million is requested for FY 1994.

Office of Hearings and Appeals

The Office of Hearings and Appeals adjudicates compliance cases and enforcement matters brought by the Economic Regulatory Administration; administers refund proceedings and distributes to injured parties monies obtained from petroleum enforcement and settlement actions; hears appeals from adverse determinations regarding Freedom of Information Act and Privacy Act requests; issues initial agency decisions on "whistleblower" complaints under the DOE Contractor Employee Protection program, and conducts personnel security administrative review hearings; and is responsible for all of the Department's remaining adjudicatory matters except those administered by the Federal Energy Regulatory Commission or the Board of Contract Appeals. The two major priorities of the Office are to complete and close remaining compliance matters, and to process as expeditiously as possible the oil overcharge refund proceedings and applications that will be filed in FY 1993 and FY 1994. Budget authority of $6.6 million is requested for FY 1994.

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission is responsible for regulating the operations of natural gas and oil pipeline companies, electric utilities, and licensing, relicensing, and inspecting hydroelectric projects. Its primary mission is to ensure that consumers receive adequate, reliable supplies of energy at the lowest possible cost while also providing energy suppliers and transporters a just and reasonable return on capital investment and the opportunity to adjust to rapidly changing market conditions. In FY 1994, the Commission will continue to place greater reliance on market forces for both the natural gas and electric power industries, continue the processing of the large number of relicensing applications received in FY 1992 in the hydropower program, enhance automation capabilities with regard to electronic filings and electronic data interchange (EDI) with industry, meet the time-sensitive requirements of increasingly competitive energy markets, and perform the required increased environmental work in both the hydroelectric and natural gas pipeline programs. Budget authority of $162.1 million is requested for FY 1994.

Departmental Management

This category includes general management and support activities benefiting all elements of the Department of Energy, including the four DOE Field Offices (Chicago, San Francisco, Idaho and Oak Ridge) which are not managed directly by the Department's Defense or Environmental Management offices. Included in this are a wide array of policy development and analysis activities, institutional and public liaison functions, and other program support requirements necessary to ensure effective Departmental

operation and management. The FY 1994 budget request for Departmental Management activities is distributed in the following manner:

	Budget Authority (in millions)	
Departmental Management	FY 1993 Estimate	FY 1994 Request
Departmental Administration		
Headquarters Support	$261.8	$288.4
Field Office Support	102.5	112.6
Cost of Work for Others	180.4	61.6
Subtotal, Departmental Administration (gross)	544.7	462.6
Use of Prior Year Balances and Other Adjustments	-12.5	-47.9
Subtotal, Departmental Administration (gross)	532.2	414.7
Revenues	-448.5	-239.2
Total, Departmental Administration (net)	83.7	175.5
Inspector General	30.4	31.8
Scientific and Engineering Recruitment, Training, and Development	5.0	5.0
Environmental Analysis	12.3	25.0
Subtotal, Departmental Management	131.4	237.3
Use of Prior Year Balances and Other Adjustments	-0.9	—
Total, Departmental Management	$130.5	$237.3

Headquarters Support

The Headquarters Support budget supports a staffing level of 1,744 full-time equivalents (FTEs); contractual services funding for all headquarters administrative, financial, and procurement support and oversight; and capital equipment. A description of some of the organizations included in this budget category follows.

The Office of the Secretary is responsible for assuring the formulation, implementation, and articulation of energy policies, regulations, and legislation. The Board of Contract Appeals adjudicates disputes arising out of the Department's contracts and financial assistance programs, including grants, cooperative agreements, guaranteed loans, and loan agreements. The General Counsel provides legal opinions, advice, and legislative drafting services to all Departmental programs, with the exception of the Federal Energy Regulatory Commission, and conducts both administrative and judicial litigation.

The Office of Contractor Employee Protection, which became operational April 2, 1992, is charged with responsibility for protecting employees of the Department's contractors and subcontractors who allege that they have been retaliated against for disclosing information evidencing a violation of law, rule, or regulation relating to environment, safety, or health; or evidencing waste, fraud or abuse.

The Offices of Administration and Management, Chief Financial Officer, and Procurement, Assistance, and Program Management provide centralized oversight, policy direction, and management in such areas as personnel, training and development, administrative services, information technology, staffing, budget and accounting, procurement, program and project management, and contractor oversight.

The Office of Small and Disadvantaged Business Utilization manages DOE programs for the development and execution of policies and programs for ensuring that an equitable portion of the total contracts and subcontracts for DOE supplies and services are placed with small and disadvantaged businesses, women-owned business enterprises, and labor surplus areas.

The Office of Minority Economic Impact advises the Secretary on the effect of the Department's policies, regulations, and actions on minorities and minority business enterprises; conducts an ongoing research program; and provides management and technical assistance to minority businesses, educational institutions, and financial institutions.

The Office of Domestic and International Energy Policy reports to the Office of the Secretary and is the principle advisor for national and international energy policy and for evaluation of consistency between policy and program implementation. The office identifies and analyzes issues that bear on national energy policy and develops and analyzes legislative and regulatory proposals. The major FY 1994 goals are to monitor and implement the Energy Policy Act of 1992 and to develop a biennial National Energy Policy Plan; to intervene in Federal regulatory processes that impact energy production transportation and use; to evaluate energy impacts of proposed legislation; to manage bilateral and multilateral relations with other nations and international organizations; to develop and implement DOE's strategic planning process; and to manage DOE's Environmental function including analytical negotiation support for international treaties that address energy-related to global environmental issues.

The Office of Congressional, Intergovernmental, and Public Liaison develops, manages and ensures coordination of the Department's relations with the Congress as well as with business and industry. The Office of Public Affairs is responsible for managing and ensuring coordination of Departmental policies and programs for conducting relations with the news media and the general public. The Office also reviews and approves the Department's publications, exhibits, and audiovisual products for general distribution.

Field Office Support

The budget provides Field Office Support at a staffing level of 1,118 FTEs, contractual services funding for administrative, financial, procurement support and oversight, and capital equipment.

Cost of Work for Others

Cost of Work for Others represents the full cost of products and services provided by the Department to qualified non-DOE users. The Department collects revenues as offsets to the Cost of Work for Others program and in payment for other products and services provided.

Inspector General

The Office of Inspector General undertakes audits, inspections, and investigations of DOE programs and operations to ensure compliance with applicable laws and regulations and to guard against possible waste, fraud, and mismanagement.

Scientific and Engineering Recruitment, Training, and Development

The budget request of $5.0 million and 30 FTEs provides support for activities associated with the implementation of a Five Year Plan addressing all aspects of recruitment, training, and professional development of technically trained professionals to staff and manage the Department's technical programs and facilities.

Environmental Analysis

The request of $25.0 million supports the continuation of analytical activities associated with environmental policy ($11.3 million); implementation of the Energy Policy Act ($3.3 million); and for the Assisting the Deployment of Energy Practices and Technologies (ADEPT) program ($10.4 million). The ADEPT program was initiated in FY 1992 and utilizes extensive long-term technology and practices development and adaptation capabilities of DOE and its multiprogram national laboratories to assist developing countries in the implementation of technology-related actions designed to improve environmental and ecological conditions locally and globally.

Appendix

Budget by Appropriation

Department of Energy

FY 1994 Budget

(Budget Authority in Thousands of Dollars)
Programs Funded by Energy and
Water Development Appropriations

Energy Supply Research and Development

	FY 1993 Comp	FY 1994 Request
Solar Energy		
Solar Buildings Technology Research	$3,000	$5,007
Photovoltaic Energy Systems	65,500	78,045
Solar Thermal Energy Systems	27,000	32,700
Biofuels Energy Systems	48,350	58,157
Wind Energy Systems	24,000	30,353
Ocean Energy Systems	1,000	—
International Solar Energy Program	2,000	5,754
Solar Technology Transfer	2,000	16,404
National Renewable Energy Laboratory	6,555	5,933
Resource Assessment	1,200	2,403
Solar Program Support	948	5,400
Program Direction - Other Solar Energy	5,872	8,200
Total, Solar Energy	187,425	248,356
Geothermal	23,400	23,972
Hydropower	1,050	1,081
Electric Energy Systems	32,300	38,580
Energy Storage Systems	10,300	11,324
Policy and Management - CE	2,859	3,878
Total, Solar and Renewable Energy	257,334	327,191
Nuclear R&D Activities		
Light Water Reactor	58,700	57,789
Advanced Reactor R&D	60,039	15,000
Space Reactor Power Systems	30,000	5,000
Advanced Radioisotope Power System	54,499	48,100
Facilities	94,065	6,900
Program Direction	13,950	10,463
Policy and Management - NE	34,100	12,612
Hot Cells	—	1,400
Oak Ridge Landlord	—	24,900
Total, Nuclear Energy R&D	345,353	182,164
Termination Costs	—	84,700
Uranium Enrichment Residual Activities	—	17,092
Total, Nuclear Activities	345,353	283,956

Energy Supply Research and Development (Continued)

	FY 1993 Comp	FY 1994 Request
Civilian Waste R&D	4,700	687
Environment, Safety and Health	159,670	174,846
Nuclear Safety Policy	—	15,000
Liquified Gaseous Spill Test Facility	1,000	979
Energy Research		
Biological and Environmental Research	385,200	416,060
Fusion Energy	339,710	347,595
Supporting Research and Technical Analysis:		
Basic Energy Science	860,700	801,965
Advanced Neutron Source	—	39,000
Energy Research Analyses	4,020	4,020
University & Science Education Program	55,690	58,000
ER Laboratory Technology Transfer	57,041	39,353
Advisory and Oversight	10,812	13,800
Multi-Program Energy Laboratories	26,700	41,588
Total, Supporting Research & Technical Analysis	1,014,963	997,726
Policy and Management - ER	1,913	3,233
Total, Energy Research	1,741,786	1,764,614
Energy Applications		
Technical Information Management Program	15,000	14,938
In-House Energy Management	21,889	26,145
Total, Energy Applications	36,889	41,083
Environmental Restoration & Waste Mgmt (Non-Def.)		
Corrective Activities (ESR&D)	19,200	710,078
Environmental Restoration (ESR&D)	403,841	—
Waste Management (ESR&D)	286,653	—
Total, Environmental Restoration & Waste Mgmt	709,694	710,078
Subtotal, Energy Supply Research & Development	3,256,426	3,318,434
Prior Year Balances & Other Adjustments	-211,539	-163,900
Total, Energy Supply Research & Development	$3,044,887	$3,154,534

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(Budget Authority in Thousands of Dollars)

Programs Funded by Energy and
Water Development Appropriations

Uranium Supply and Enrichment Activities

	FY 1993 Comp	FY 1994 Request
Uranium Enrichment Activities	$1,121,572	$160,000
Uranium Program Direction	9,840	—
Subtotal, Uranium Enrichment	1,131,412	160,000
Corrective Activities	41,147	—
Environmental Restoration	155,700	—
Waste Management	45,511	—
Subtotal, Uranium Enrichment	1,373,770	160,000
Revenues	-1,462,000	—
Use of Prior Year Balances	-87,450	—
Total, Uranium Supply and Enrichment Activities	-$175,680	$160,000

Uranium Enrichment Decontamination and Decommissioning Fund

Decontamination and decommissioning fund	—	$286,320

General Science and Research

High Energy Physics	$613,384	$627,769
Nuclear Physics	309,100	322,345
General Science Program Direction	8,300	9,000
Superconducting Super Collider		
SSC Project	517,000	635,000
SSC Laboratory Research and Operations	—	5,000
Total, Superconducting Super Collider	517,000	640,000
Subtotal, General Science	1,447,784	1,599,114
Use of Prior Year Balances	-30,000	—
Total, General Science and Research	$1,417,784	$1,599,114

Isotope Production and Distribution Fund

Isotope Production	$3,500	$3,910
Isotope Production - New Product Initiative	1,500	—
Total, Isotope Production & Distribution Fund	$5,000	$3,910

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Weapons Activities

	FY 1993 Comp	FY 1994 Request
Research, Development and Testing	$1,955,410	$1,784,505
Stockpile Support	2,350,686	1,892,516
Program Direction	182,779	284,085
Complex Reconfiguration	173,060	163,500
Subtotal, Weapons Activities	4,661,935	4,124,606
Use of Prior Year Balances	-91,557	-353,641
Total, Weapons Activities	$4,570,378	$3,770,965

Defense Environmental Restoration and Waste Mgmt

Corrective Activities	$41,318	$5,515,877
Environmental Restoration	1,448,427	—
Waste Management	3,049,749	—
Technology Development	336,900	—
Transportation Management	19,800	—
Program Direction	50,800	—
Facility Transition & Management	17,861	—
Subtotal, Defense Environment Rest. & Waste Mgmt.	4,964,855	5,515,877
Use of Prior Year Balances	-161,808	-50,000
Total, Def. Environmental Restoration & Waste Mgmt.	$4,803,047	$5,465,877

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Materials Support & Other Defense Programs

	FY 1993 Comp	FY 1994 Request
Materials Support	$1,602,414	$1,137,205
Other National Security Programs		
Verification and Control Technology	342,496	368,829
Nuclear Safeguards and Security	83,140	90,347
Security Investigations	57,289	53,335
Security Evaluation	15,150	14,961
Office of Nuclear Safety	25,540	24,909
Worker Training and Adjustment	—	100,000
New Production Reactor	184,028	—
Total, Other National Security Programs	707,643	652,381
Naval Reactors	807,000	767,731
Subtotal, Materials Support & Other Defense Prog.	3,117,057	2,557,317
Savannah River Pension Refund	-400,000	-100,000
Education Program (MP)	52,400	58,000
Use of Prior Year Balances and Other Adjustments	-150,000	-351,132
Total, Materials Support & Other Defense Programs	$2,619,457	$2,164,185

Defense Nuclear Waste Disposal

Defense Nuclear Waste Disposal	$100,000	$120,000

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Programs Funded by Energy and
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Departmental Administration

	FY 1993 Comp	FY 1994 Request
Office of the Secretary	$2,886	$2,856
Board of Contract Appeals	477	712
General Counsel	12,626	14,124
Administration & Human Resource Management	162,290	175,857
Office of Chief Financial Officer	20,800	25,160
Procurement & Assistance Management	31,701	35,119
Office of Small & Disadvantaged Business Utilization	725	809
Field Offices	102,575	112,659
Minority Economic Impact	4,576	4,662
Policy Planning and Analysis	4,351	—
Congressional & Intergovernmental Affairs	5,078	5,333
Public Affairs	2,367	3,670
International Affairs	1,260	—
Domestic and International Energy Policy	11,511	18,789
Contractor Employee Protection	1,227	1,248
Cost of Work for Others	180,382	61,626
Subtotal, Departmental Administration (Gross)	544,832	462,624
Prior Year Balances & Other Adjustments	-12,527	-47,927
Subtotal, Departmental Administration (Gross)	532,305	414,697
Revenues	-448,544	-239,209
Total, Departmental Administration (Net)	$83,761	$175,488

Office of Inspector General

Inspector General	$30,362	$31,757

Department of Energy
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(Budget Authority in Thousands of Dollars)

Programs Funded by Energy and
Water Development Appropriations

Power Marketing Administrations

	FY 1993 Comp	FY 1994 Request
Alaska Power Administration	$3,777	$4,010
Bonneville Power Administration	371,597	18,200
Southeastern Power Administration	34,411	34,705
Southwestern Power Administration	36,094	34,351
Western Area Power	351,951	352,956
Subtotal, Power Marketing Administrations	797,830	444,222
Transfer of Permanent Authority from DOI	6,563	7,168
Use of Prior Year Balances & Other Adjustments	-41,704	-5,727
Total, Power Marketing Administrations	$762,689	$445,663

Federal Energy Regulatory Commission

Natural Gas and Oil Regulation	—	$62,631
Pipeline and Producer Regulation	158,639	—
Hydropower Regulation	—	61,026
Electric Power Regulation	—	38,429
Subtotal, Federal Energy Regulatory Commission	158,639	162,086
Revenues	-158,639	-165,375
Total, Federal Energy Regulatory Commission	—	-$3,289

Nuclear Waste Disposal Fund

Nuclear Waste Disposal Fund	$275,071	$260,000

Total, Programs Fund by Energy and Water Development Appropriations	$17,536,756	$17,634,524

Department of Energy

FY 1994 Budget

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Programs Funded by Interior and
Related Agencies Appropriations

Fossil Energy Research and Development

	FY 1993 Comp	FY 1994 Request
Coal		
Control Technology & Coal Preparation	$42,574	$38,381
Advanced Research & Technology Development	26,520	26,496
Coal Liquefaction	37,357	15,960
Combustion Systems	36,676	43,784
Heat Engines	4,330	—
Magnetohydrodynamics	30,325	4,822
Surface Coal Gasification	10,871	11,850
Total, Coal	188,653	141,293
Petroleum		
Advanced Extraction and Process Technology	10,874	7,715
Enhanced Oil Recovery	46,001	73,212
Oil Shale	5,571	—
Total, Petroleum	62,446	80,927
Gas		
Natural Gas Research	29,412	51,674
Fuel Cells	51,128	49,278
Total, Gas	80,540	100,952
Program Direction and Management Support		
Headquarters Program Direction	12,350	12,965
ETC Program Direction	58,313	49,716
Total, Program Direction & Management Support	70,663	62,681
Plant and Capital Equipment		
Capital Equipment	793	1,982
Construction	3,723	771
Total, Plant and Capital Equipment	4,516	2,753
Fossil Energy Environmental Restoration	12,358	13,018
Cooperative R&D	9,886	4,822
Fuels Conversion, Natural Gas & Elect.	3,064	2,989
Subtotal, Fossil Energy Research & Development	432,126	409,435
Use of Prior Year Balances & Other Adjustments	-13,773	-10,993
Total, Fossil Energy Research and Development	$418,353	$398,442

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Programs Funded by Interior and
Related Agencies Appropriations

Clean Coal Technology

	FY 1993 Comp	FY 1994 Request
Advance Appropriation - Round 4	$250,000	$100,000
Advance Appropriation - Round 5	275,000	150,000
Appropriation	-525,000	—
Total, Clean Coal Technology	—	$250,000

Naval Petroleum & Oil Shale Reserves

Naval Petroleum Reserves	$235,475	$230,616
Naval Oil Shale Reserves	595	600
Total, Naval Petroleum & Oil Shale Reserves	$236,070	$231,216

Energy Conservation

Transportation Sector	$167,929	$184,723
Industrial	112,756	137,080
Buildings Sector	59,570	98,384
Tech. & Financial Assistance (non-grants)	35,318	45,910
Policy and Management	3,617	4,929
Utility Sector	4,957	6,795
Subtotal, Energy Conservation R&D	384,147	477,821
Technical & Financial Assistance (grants)	295,534	300,618
Subtotal, Energy Conservation	679,681	778,439
Use of Nonappropriated Escrow Funds (PODRA) in SLAP	-15,413	-15,829
Total, Energy Conservation	$563,490	$762,610

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Programs Funded by Interior and
Related Agencies Appropriations

Economic Regulation

	FY 1993 Comp	FY 1994 Request
Compliance	$7,881	$6,391
Office of Hearings and Appeals	6,560	6,603
Total, Economic Regulation	$14,441	$12,994

Emergency Preparedness

Emergency Preparedness	$9,168	$8,901

Strategic Petroleum Reserve

Storage Facilities Development	$37,015	$157,335
Management	14,227	15,775
Subtotal, Strategic Petroleum Reserve	51,242	173,110
Use of FY 1991 Test Sale Receipts	125,625	—
Total, Strategic Petroleum Reserve	$176,867	$173,110

SPR Petroleum Account

1991 Test Sale and Drawdown Receipts (Mandatory)	-$125,625	—
Defense SPR Petroleum Account (Transfer from DOD)	124,925	—
Total, SPR Petroleum Account	-700	—

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Programs Funded by Interior and Related Agencies Appropriations

Energy Information Administration

	FY 1993	FY 1994
Oil and Gas	$14,901	$14,789
Coal, Nuclear, Electric and Alternate	4,695	5,309
Energy Markets and End Use	5,800	10,949
Integrated Analysis and Forecasting	5,719	5,621
Automated Data Process	9,132	8,416
Energy Information Center	499	484
Statistical Standards	1,055	1,016
Program Direction	40,540	42,789
Subtotal, Energy Information Administration	82,341	89,373
Transfer From Energy Security Reserve	-49,000	—
Total, Energy Information Administration	$33,341	$89,373
Total, Programs Funded by Interior and Related Agencies Appropriations	$1,451,030	$1,926,646

Payments to States

Payments to States	$2,523	$2,523

Total Department of Energy

Total, Department of Energy	$18,990,309	$19,563,693

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