15. ENERGY

Table 15–1. FEDERAL RESOURCES IN SUPPORT OF ENERGY
(In millions of dollars)

Function 270	1997 Actual	Estimate					
		1998	1999	2000	2001	2002	2003
Spending:							
Discretionary Budget Authority	4,222	2,823	3,500	3,164	3,111	3,015	3,009
Mandatory Outlays:							
Existing law	–3,431	–2,830	–4,569	–3,280	–3,337	–3,347	–3,268
Credit Activity:							
Direct loan disbursements	1,029	1,992	1,562	1,401	1,337	1,255	1,451
Tax Expenditures:							
Existing law	1,960	1,965	1,990	2,070	2,045	2,040	1,880
Proposed legislation	.....	–10	411	563	556	776	1,183

Federal energy programs contribute not just to energy security, but to economic prosperity and environmental protection. Funded mainly through the Energy Department (DOE), they range from protecting against disruptions in petroleum supplies, to conducting research on renewable energy sources, to developing advanced semiconductors. The Administration proposes to spend $3.5 billion for these programs. In addition, the Federal Government allocates about $2 billion a year in tax breaks mainly to encourage development of traditional and alternative energy sources.

The Federal Government has a longstanding and evolving role in energy. Most Federal energy programs and agencies have no State or private counterparts and clearly involve the national interest. The federally-owned Strategic Petroleum Reserve, for instance, protects against supply disruptions and the resulting consumer price shocks, while Federal regulators protect public health and safety and the environment and ensure fair, efficient energy rates. DOE's applied research and development (R&D) programs in fossil, nuclear, and solar/renewable energy and energy conservation speed the development of technologies, usually through cost-shared partnerships with industry, that provide social benefits that industry would not undertake alone. The programs not only open new opportunities for American industry, but reach beyond what the marketplace demands today, putting the Nation in a better position to meet the demands of tomorrow.

Corporate Management

Because DOE spends over 90 percent of its budget through management and operating (M&O) contracts, it is working hard to improve its management practices and achieve more for less cost. DOE is undertaking important, Department-wide management improvement initiatives in two areas—contract reform and information technology management:

- In 1999, to improve contracting practices, DOE will increase competition and convert all M&O contracts as they are extended or completed and half of its service contracts to performance-based contracts; and
- In 1999, to improve its management of information technology systems, DOE will eliminate year 2000 computer problems for all mission critical systems and integrate information technology investment and management decisions under its Chief Information Officer.

DOE corporate management also ensures that its work is done with a concern for the environment, safety, and health (ES&H) of its workers and the public. DOE is shifting from a reactive approach to ES&H matters to one that stresses prevention and integrates sound ES&H management practices into DOE's day-to-day work.

- In 1999, DOE will implement integrated safety management systems at 10 priority facilities and in all major M&O contracts.
- In 1999, DOE will conduct self-assessments at all DOE sites to identify ES&H deficiencies and vulnerabilities, and develop and pursue corrective action plans.

Energy Resources

DOE maintains the Strategic Petroleum Reserve (SPR) and operates various R&D investments to protect against petroleum supply disruptions and reduce the environmental impacts of energy production and use. Created in 1975, the SPR now has 563 million barrels of crude oil in underground salt caverns at four Gulf Coast sites. The SPR helps protect the economy and provide flexibility for the Nation's foreign policy in case of a severe energy supply disruption. As the United States entered the Persian Gulf War in 1991, for instance, President Bush announced an energy emergency, prompting a SPR draw-down that—along with the Allied nations' early, overwhelming military success—caused oil prices to drop by $10 per barrel (or, by about a third of their price).

- In 1999, DOE will maintain its capability to reach its SPR drawdown rate of about four million barrels a day within 15 days and to maintain this rate for at least 90 days.

DOE's energy R&D investments cover a broad array of resources and technologies to make the production and use of all forms of energy—including solar and renewables, fossil, and nuclear—more efficient and less environmentally damaging. As the President's Committee of Advisors on Science and Technology has noted, Federal R&D support can help develop these technologies that benefit society by cutting emission rates of greenhouse gases, acid rain precursors, and air pollutants. These investments not only lay the foundation for a more sustainable energy future but also open major international markets for manufacturers of advanced U.S. technology.

Energy conservation programs, for which the budget proposes $809 million, are designed to improve the fuel economy of various transportation modes, increase the productivity of our most energy-intensive industries, and improve the energy efficiency of buildings and appliances. They also include grants to States to fund energy-efficiency programs, low-income home weatherization, and the administration of minimum energy-efficiency standards for many major home appliances. Each of these activities benefits our economy and reduces emissions of carbon dioxide and other greenhouse gases. Many of the programs rely on partnerships with the private sector to leverage Federal spending with industry cost-sharing and to increase the likelihood that the technologies will be used commercially. Energy-efficiency technologies that have already come to market include heat-reflecting windows, high-efficiency lights, geothermal heat pumps, high-efficiency electric motors and compressors, and software for designing energy-efficient buildings. Meanwhile, five other technologies available for at least five years have generated over $11 billion in total consumer and business energy savings to date.

In 1999, DOE's Energy Conservation program will:

- Expand the Clean Cities program to create continuous corridors of alternative transportation fuel availability in and between 10 major urban centers;
- Bring together over 600 utility partners in a Climate Challenge forum in which the utilities exchange lessons-learned on voluntary efforts to reduce greenhouse gas emissions; and
- Weatherize 77,000 low-income homes.

Solar and renewable energy programs, for which the budget proposes $372 million, focus on technologies that will help the Nation use its abundant renewable resources such as wind, solar, and biomass to produce low-cost, clean energy that contributes no net carbon dioxide to the atmosphere. The United

States is the world's technology leader in wind energy, with a growing export market and production costs that have fallen below five cents per kilowatt-hour. In addition, photovoltaics are becoming more useful in remote power applications, and construction is beginning on the first large-scale facilities to produce ethanol from cellulosic agricultural waste. DOE also is coordinating the President's Million Solar Roofs initiative, and States, cities, and Federal agencies to date have pledged 470,000 solar roof installations (a mixture of solar heat/hot water and photovoltaics) over the next 10 years.

In 1999, DOE's Solar and Renewable Energy program will:

- Support the President's Million Solar Roofs initiative through partnerships and technical assistance so that at least 7,000 solar roofs will be installed in 1999;
- Complete five commercial-scale demonstrations of the use of biofuels in powerplants by co-firing coal with at least five percent biomass fuel; and
- Install 20 manufacturing prototype and four advanced prototype 25-kW dish/engine solar thermal systems at utility/field sites through the Utility-Scale Joint Venture Program.

Both the energy-efficiency and renewable energy (EERE) programs have established goals to ensure that their research programs are cost-effective and high quality.

Performance measures include:

- Continued use of cost-sharing as a major program criterion in cooperative agreements and industry partnerships. In 1999, DOE/EERE will maintain an industry cost-share level of over 40 percent, when averaged across all work with industry.
- Every EERE program will develop progress milestones and estimates of energy-related program benefits annually. At least 25 percent of the milestones and estimated benefits will undergo external peer review each year, with a goal of having all milestones and estimated benefits peer-reviewed at least once every four years.
- Cumulative consumer economic savings from past and current EERE programs will exceed $11 billion in 1999.

DOE's energy efficiency and renewable energy programs form a major part of the Administration's Climate Change Technology Initiative, which aims to find ways to reduce emissions of carbon dioxide and other greenhouse gases in ways that benefit our economy rather than constrain it. (For more details, see Chapter 6, "Promoting Research.") For most of this century, America's comparative advantage in international competition has been technology, and DOE's research and development programs are designed to maintain that advantage into the next century.

Fossil fuel energy R&D programs, for which the budget proposes $383.4 million, help industry develop advanced technologies to produce and use coal, oil, and gas resources more efficiently and cleanly. Federally-funded development of clean, highly-efficient gas-fired and coal-fired generating systems aim to reduce greenhouse gas emission rates, while reducing electricity costs compared to currently available technologies. The programs also help boost the domestic production of oil and natural gas by funding R&D projects with industry to cut exploration, development, and production costs.

In 1999, DOE will:

- Demonstrate four advanced drilling and completion technology systems that could ultimately add six trillion cubic feet (TCF) of domestic gas reserves, including one TCF through 1999;
- Demonstrate four advanced production enhancement technologies that could ultimately add 190 million barrels of domestic oil reserves, including 30 million barrels during 1999; and
- Complete full-scale component testing of two advanced, utility-scale turbines with over 60 percent efficiency when used in combined cycles and with ultra-low nitrogen oxides emissions.

Nuclear fission power is a widely used technology, with the potential for further growth, particularly in Asia. Fission technology provides over 20 percent of the electric

power consumed in the United States and about 17 percent worldwide without generating greenhouse gases. If fossil plants were used to produce the amount of electricity generated by these nuclear plants, more than 300 million additional metric tons of carbon would be emitted each year. Since World War II, the United States has been the international leader in all nuclear energy matters. World leadership in nuclear technologies and the underlying science is vital to the United States from the perspectives of national security, international influence, and global stability. R&D will help determine whether nuclear fission can fulfill its potential as a contributor to the goal of reducing greenhouse gas emissions. In 1999, DOE will:

- Work with its laboratories, universities and industry to develop a competitive R&D program to address problems that may prevent continued operation of current nuclear plants and fund the initiative at $10 million a year, to be matched by industry.
- Establish a peer-reviewed Nuclear Energy Research Initiative, initially funded at $25 million a year, for investigator-initiated ideas to address the difficult issues of waste, safety, proliferation, and cost.
- Complete a demonstration of electrometallurgical methods to permanently immobilize spent nuclear fuel from the shutdown Experimental Breeder Reactor-II and evaluate whether the technology is a cost-effective means of processing DOE spent nuclear fuels.

Environmental Quality

DOE manages the Nation's most complex environmental cleanup program, the result of over four decades of research and production of nuclear energy technology and materials at both Federal and private sector locations. (For information on DOE's Defense Environmental Management program, see Chapter 12, "National Defense.") The Department must also develop a long-term solution to the problem that the Nation's commercial spent nuclear fuel poses.

In the area of Environmental Management, the budget proposes $934 million to reduce environmental risk and manage the waste at: (1) sites run by DOE's predecessor agencies that involved researching and producing uranium and thorium; (2) sites contaminated with uranium production from the 1950s to the 1970s; and (3) DOE's uranium processing plants that the United States Enrichment Corporation runs. In recent years, the cleanup and safe disposal of radioactive and hazardous wastes and materials has progressed substantially.

In 1999, DOE will:

- Have over 60 percent of the contaminated sites associated with 11 large facilities cleaned up, allowing these sites and facilities to return to productive use;
- Make ready for disposal about 70 percent of the high-level waste at its West Valley, New York site; and
- Complete surface remediation of the eight remaining Uranium Mill Tailings Remedial Action (UMTRA) sites to complete this part of the UMTRA project.

DOE's Civilian Radioactive Waste Management Program oversees the management and disposal of spent nuclear fuel from commercial nuclear reactors and high-level radioactive waste from Federal cleanup sites. With the completion of the viability assessment for Yucca Mountain in 1998, DOE expects to emphasize data syntheses and analysis and engineering and design in 1999.

In particular, in 1999, DOE will:

- Complete a draft Environmental Impact Statement for the Yucca Mountain site for public review and comment, develop a more complete design for a mined geologic disposal system at Yucca Mountain, and complete independent expert reviews of overall repository system performance models—further crucial steps in the long process that eventually will produce a DOE site recommendation to the President and a DOE license application to the Nuclear Regulatory Commission.

Energy Production and Power Marketing

The Federal Government is reshaping programs that produce, distribute, and finance oil, gas, and electric power. The Naval Petroleum Reserve, commonly known as Elk Hills, is a federally-owned oil and gas field located in California. Set aside early this century to provide an oil reserve for Navy ships, Elk Hills is no longer needed for that purpose, and Congress voted in 1996 to require its sale. In October 1997, DOE opened private-sector bids for Elk Hills and identified Occidental Petroleum's offer of $3.7 billion as the high offer. Following notification of Congress, the sale should be completed by February 1998, marking the largest privatization in U.S. history. It will allow DOE to maximize the productivity of Federal oil fields, one of its 1998 performance objectives.

The five Federal Power Marketing Administrations, or PMAs, (Alaska, Bonneville, Southeastern, Southwestern, and Western) market electricity generated at 129 multi-purpose Federal dams over 33,000 miles of federally-owned transmission lines, in 35 States. The PMAs sell about six percent of the Nation's electricity, primarily to preferred customers such as counties, cities, and publicly-owned utilities and power authorities. The PMAs face growing challenges as the electricity industry moves toward open, competitive markets. Concerns focus on fundamental changes that may be required to integrate the PMAs into a deregulated industry. As authorized by Congress, the sale of the Alaska Power Administration to current customers and the State of Alaska will be completed in 1998.

- In 1999, each PMA will operate its transmission system to ensure that service is continuous and reliable (that is, that the system achieves a "pass" rating each month under North American Reliability Council performance standards).

The Tennessee Valley Authority (TVA) is a Federal Government corporation and the Nation's single largest electric power generator. It generates four percent of the electric power in the country and transmits that power over its 15,000 mile transmission network to 159 municipal utilities and rural electric cooperatives that serve some eight million customers in seven States.

- The budget reflects specific cost-cutting measures that TVA is taking to implement its 10-Year Business Plan and improve its ability to supply power at competitive prices. For example, TVA will cut costs by reducing its outstanding debt by $2 billion by the end of 1999. It will cut its $28 billion debt in half by 2007.
- TVA is working closely with regional stakeholders to develop and recommend to DOE reform proposals to include in the Administration's legislation to restructure the Nation's electric power industry. The proposals will redefine TVA's role, while preserving the value of the Government's investment in TVA.

(For information on TVA's non-power activities, see Chapter 20, "Community and Regional Development.")

In 1999, the Agriculture Department's Rural Utilities Service (RUS) will make $1.7 billion in direct loans to nonprofit associations, rural electric cooperatives, public bodies, and other utilities in rural areas for generating, transmitting, and distributing electricity. Its main goal is to provide modern, affordable electric service to rural communities.

In 1999, the RUS will:

- Ensure that RUS borrowers continue to provide service in 523 of the 540 poorest counties in rural America and 655 of 700 counties suffering the most from population out-migration;
- Upgrade 116 rural electric systems, benefitting over 1.6 million customers and generating about 21,000 jobs; and
- Continue to cut the high cost of electric service to rural customers that results from low customer density in rural areas by charging interest at or below Treasury rates for debt of comparable maturity.

Energy Regulation

The Federal Government's regulation of energy industries is designed to protect public health and safety and promote fair and efficient interstate energy markets. For example, DOE seeks to improve the Nation's use of energy resources through its appliance energy efficiency program. Federal regulations

specify minimum levels of energy efficiency for all major home appliances, such as water heaters, air conditioners, and refrigerators.

The Federal Energy Regulatory Commission (FERC), an independent agency within DOE, regulates the transmission and wholesale prices of electric power, including non-Federal hydro-electric power, and the transportation of oil and natural gas by pipeline in interstate commerce. Over the long run, FERC seeks to increase economic efficiency by promoting competition in the natural gas industry and in wholesale electric power markets. FERC's recent reforms give consumers competitive choices in services and suppliers that were not available just a few years ago. Its actions will cut consumer energy bills by $3 billion to $5 billion a year.

In 1999, to evaluate the success of its initiative to restructure interstate natural gas and electricity markets, FERC will measure:

- Increases in the number of new products and range of suppliers customers may choose from in both the natural gas and electric industries;
- The extent to which natural gas and electricity prices more clearly and quickly reflect changing supply and demand conditions;
- The extent to which natural gas prices within each trading region will tend to converge, except where there are demonstrable transportation constraints or costs; and
- The reduction in wholesale electricity price differences among regions.

The Nuclear Regulatory Commission (NRC), an independent agency, regulates the Nation's civilian nuclear reactors, the medical and industrial use of nuclear materials, and the transport and disposal of nuclear waste to ensure public health and safety and to protect the environment. Safety performance reflects the collective efforts of the NRC and the regulated nuclear community.

The NRC has the following 1999 goals for safety performance:

- No civilian nuclear reactor accidents, and no deaths due to radiation or radioactivity releases from civilian nuclear reactors;
- No radiation-related deaths due to civilian use of source, byproduct, and special nuclear materials, no increase in significant radiation exposures due to the loss of such materials, and no increase in misadministration events causing significant radiation exposure;
- No significant accidental releases of radioactive material from storage and transportation of nuclear waste, and no offsite release of radioactivity beyond regulatory limits from low-level waste disposal sites;
- The establishment of the regulatory framework for high-level waste disposal consistent with current national policy;
- No loss or theft of special nuclear materials; and
- No offsite releases from operating facilities of radioactive material that may adversely impact the environment, and no release of sites until satisfactorily remediated in accordance with NRC criteria.

Tax Incentives

Federal tax incentives are mainly designed to encourage the domestic production or use of fossil and other fuels, and to promote the vitality of our energy industries and diversification of our domestic energy supplies. The largest incentive lets certain fuel producers cut their taxable income as their fuel resources are depleted. An income tax credit helps promote the development of certain non-conventional fuels. It applies to oil produced from shale and tar sands, gas produced from a number of unconventional sources (including coal seams), some fuels processed from wood, and steam produced from solid agricultural byproducts. Another tax provision provides a credit to producers who make alcohol fuels—mainly ethanol—from biomass materials. The law also allows a partial exemption from Federal gasoline taxes for gasolines blended with ethanol. The Climate Change Technology Initiative proposes $3.6 billion in new tax incentives over five years to help reduce greenhouse gases (see Table S–6 in "Summary Tables.")