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Issue Brief for Congress

Energy Efficiency: Budget, Oil Conservation, and Electricity Conservation Issues

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Energy Efficiency: Budget, Climate Change, and Electricity Restructuring Issues

SUMMARY

Energy security, a major driver of federal energy efficiency programs in the past, came back into play as oil and gas prices rose late in the year 2000. Also, the 2001 electricity shortages in California brought a renewed emphasis on energy efficiency and energy conservation to dampen electricity demand.

Also, worldwide emphasis on environmental problems of air and water pollution and global climate change, and the related development of clean energy technologies in western Europe and Japan may remain important influences on energy efficiency policymaking. Concern about technology competitiveness may also remain a factor in debate.

In the 107th Congress, debate over energy efficiency programs has focused on budget, oil and electricity conservation, and provisions in the omnibus energy policy bill, H.R. 4..

The Administration's FY2003 budget request for DOE's Energy Efficiency Program seeks $904.3 million, an $11.2 million (1%) overall decrease relative to the FY2002 appropriation. Proposed increases include $47.1 million for Weatherization, $8.1 million for Fuel Cell Vehicles, $4.6 million for the Federal Energy Management Program, and $3.2 million for Energy Star. However, Transportation programs would be cut by $30.1 million and Industry programs would fall by $10.6 million. Under Buildings programs, Research and Standards would drop by $9.8 million and State Energy Grants would be cut by $6.2 million.

The House version of H.R. 4 (Securing America's Future Energy Act) passed the House August 2, 2001. It contains many energy efficiency provisions from the Administration's *National Energy Policy* report. It includes funding authorizations, grants; tax incentives for appliances, home improvements, energy-efficient buildings, and certain vehicles; programs for federal facilities; and an increased fuel economy standard for light trucks.

In response, the Senate version of H.R. 4 (Energy Policy Act, S.Amdt. 2917 to S. 517) passed the Senate as a substitute for S. 1766. It also has provisions such as R&D funding, grants funding, and fuel economy. However, it also differs by including – for example – a higher standard for central air conditioners, different provisions for efficiency in housing, and programs for exports and international technology deployment.

The Job Creation and Worker Assistance Act of 2002 (P.L. 107-147, H.R. 3090) was enacted on March 9, 2002. Section 602 extends a tax credit for electric vehicles and Section 606 extends a tax deduction for clean fuel vehicle property.

MOST RECENT DEVELOPMENTS

On May 1, 2002, the Senate appointed conferees for the omnibus energy bill, H.R. 4. On April 25, 2002, the Senate incorporated S. 517 (S.Amdt. 2917) into H.R. 4 (Energy Policy Act of 2002) as an amendment in the nature of a substitute. The Senate version of H.R. 4 responds to the omnibus House energy bill (H.R. 4, Securing America's Future Energy Act), which passed the House on August 2, 2001. Both bills have provisions for R&D funding and grant programs, but have major differences in their coverage of these and some other energy efficiency policy areas. (A side-by-side comparison of provision in the two versions of H.R. 4 appear in CRS Report RL31427, Omnibus Energy Legislation.)

On May 1, 2002, Assistant Secretary David Garman began a major re-organization of the DOE Office of Energy Efficiency and Renewable Energy that will be completed by October 2002. The number of deputy assistant secretaries is reduced from five to two, the number of offices shrinks from 19 to 14 (11 program and 3 business) and includes new offices for FreedomCAR and Vehicle Technologies and Hydrogen and Infrastructure, and the number of programs is reduced from 31 to 11.

On March 9, 2002, the Job Creation and Worker Assistance Act of 2002 (P.L. 107-147, H.R. 3090) was enacted. Section 602 extends a tax credit for electric vehicles and Section 606 extends a tax deduction for clean fuel vehicle property.

On February 28, the House Appropriations Committee's Subcommittee on Interior Appropriations held a hearing on the FY2003 budget request for the DOE Energy Efficiency Program. On February 4, the Administration issued its budget request for FY2003. For DOE's Energy Efficiency Program, the Administration seeks $904.3 million, an $11.2 million (1%) overall decrease relative to the FY2002 appropriation. Proposed increases include $47.1 million for Weatherization, $8.1 million for Fuel Cell Vehicles, $4.6 million for the Federal Energy Management Program (FEMP), and $3.2 million for Energy Star. However, Transportation programs would be cut by $30.1 million and Industry programs would fall by $10.6 million. Under Buildings programs, Research and Standards would drop by $9.8 million and State Energy Grants would be cut by $6.2 million.

(The DOE FY2003 Budget Request is available on the DOE web site [http://www.mbe.doe.gov/budget/03budget/]; The EPA FY2003 Annual Performance Plan and Congressional Justification is available on the EPA web site [http://www.epa.gov/ocfo/budget/2003/g06final.pdf].)

BACKGROUND AND ANALYSIS

Energy Efficiency Concept

Energy efficiency is increased when an energy conversion device, such as a household appliance, automobile engine, or steam turbine, undergoes a technical change that enables it to provide the same service (lighting, heating, motor drive) while using less energy. The

energy-saving result of the efficiency improvement is often called "energy conservation." The energy efficiency of buildings can be improved through the use of certain materials such as attic insulation, components such as insulated windows, and design aspects such as solar orientation and shade tree landscaping. Further, the energy efficiency of communities and cities can be improved through architectural design, transportation system design, and land use planning. Thus, energy efficiency involves all aspects of energy production, distribution, and end-use.

These ideas of "efficiency" and "conservation" contrast with energy curtailment, which involves a decrease in output (e.g., turning down the thermostat) or services (e.g., driving less) to curb energy use. That is, energy curtailment occurs when saving energy causes a reduction in services or sacrifice of comfort. Curtailment is often employed as an emergency measure.

Energy efficiency is often viewed as a resource option like coal, oil or natural gas. In contrast to supply options, however, energy efficiency puts downward pressure on energy prices by curbing demand instead of by increasing supply. As a result, energy efficiency can reduce resource use and effects on the environment.

History

From 1974 through 1992, Congress established several complementary programs, primarily at the Department of Energy (DOE), to implement energy saving measures in virtually every sector of societal activity. These energy efficiency and energy conservation programs were created originally in response to national oil import security and economic stability concerns. In the early 1980s, states and utilities took an active role in promoting energy efficiency as a cost-saving "demand-side management" tool for avoiding expensive powerplant construction. Since 1988, national interest in energy efficiency has focused increasingly on energy efficiency as a tool for mitigating environmental problems such as air pollution and global climate change. This aspect spawned new programs at DOE and at several other agencies including the EPA, the Agency for International Development (AID), and the World Bank's Global Environment Facility (GEF). Energy efficiency is increasingly viewed as a critical element of sustainable development and economic growth.

The DOE energy efficiency program includes R&D funding, grants to state and local governments, and a regulatory framework of appliance efficiency standards and voluntary guidelines for energy-efficient design in buildings. In addition, its budget supports regulatory programs for energy efficiency goals in federal agencies and standards for consumer products. (Detailed descriptions of DOE programs appear in DOE's *FY2001 Congressional Budget Request,* DOE/ME-0007, v. 5, February 2002; which appears at [http://www.cfo.doe.gov/budget/03budget/index.htm])

From FY1973 through FY1998, DOE spent about $8.5 billion in 2002 constant dollars for energy efficiency R&D, which amounts to about 10% of the total federal spending for energy supply R&D during that period. In 2002 constant dollars, energy efficiency R&D funding declined from $795 million in FY1979 to $227 million in FY1988 and then climbed to $556 million in FY1994. For FY2001, $633 million was appropriated, which is $77 million, or 14%, above the FY1994 mark in 2002 constant (real) dollars. Also, in 2002

constant dollars, since FY1973, DOE has spent about $7.4 billion on grants for state and local conservation programs.

This spending history can be viewed within the context of DOE spending for the three major energy supply R&D programs: nuclear, fossil, and renewable energy R&D. From FY1948 through FY1972, in 2002 constant dollars, the federal government spent about $23.9 billion for nuclear (fission and fusion) energy R&D and about $5.4 billion for fossil energy R&D. From FY1973 through FY1998, the federal government spent $46.1 billion for nuclear (fission and fusion), $22.5 billion for fossil, $12.5 billion for renewables, and $8.5 billion for energy efficiency. Total energy R&D spending from FY1948-FY1998, in 2002 constant dollars, reached $119.0 billion, including $70.4 billion, or 59%, for nuclear, $27.7 billion, or 23%, for fossil, $12.8 billion, or 11%, for renewables, and $8.5 billion, or 7%, for energy efficiency.

Since 1985, national energy use has climbed about 20 Q (quads — quadrillion Btus, British thermal units), reaching a record high of 99 Q in 2000. DOE's 1995 report *Energy Conservation Trends* finds that energy efficiency and conservation activities from 1973 through 1991 curbed the pre-1973 growth trend in primary energy use by about 18 Q, an 18% reduction. In 1992, this was saving the economy about $150 billion annually in total U.S. energy expenditures, a one-fourth reduction from the previous trend. Further, assuming fossil and other fuels were displaced in proportion to their actual use in 1992, then energy efficiency and conservation were providing about 300 million metric tons of carbon (MMTC) emission reductions that year.

DOE's Strategic and Performance Goals

In May 2002, the Office of Energy Efficiency and Renewable Energy began a major re-organization that reduces the number of deputy assistant secretaries, offices, and programs and restructures their relationships. It is due to be completed by October 2002. The new management strategy is put forth by Assistant Secretary David Garman in *Focused on Results: A New Government Business Model*, available at [http://www.eren.doe.gov/eere/pdfs/eere_reorg.pdf] The reorganization is based on the 2001 *report, EERE Program Management Initiative.* ([http://www.eren.doe.gov/pmi/about.html])

A National Research Council report, *Energy Research at DOE: Was it Worth It?,* found that from 1978 to 2000 an investment of about $8 billion in DOE's Energy Efficiency Programs produced an economic return of at least $30 billion. Areas found short of expected benefits lacked incentives needed for private sector adoption.

The President's Management Agenda set out the Bush Administration's framework for performance management based on human capital, competitive sourcing, financial performance, electronic government, and integration of budget with performance. The Government Performance and Results Act (GPRA, P.L. 103-62) requires each federal agency to produce and update a strategic plan linked to annual performance plans.

In DOE's *Strategic Plan of September 2000*, energy efficiency objectives and strategies appear under strategic goal #1, "Energy Resources." In the *DOE Annual Performance Plan for FY2003*, energy efficiency is addressed under the Energy Resources goal by three

strategic objectives: ER1, Management of Energy Intensity; ER3, Weatherization of Low Income Homes; and ER4 Energy Efficiency. From 2000 to 2020, ER1 seeks to reduce the oil intensity of the U.S. economy by 2% over a baseline of 23%, reduce energy intensity by 4% over a baseline of 28%; and reduce the need for new electricity generating capacity by 10% from the baseline projection. From 2003 through 2005, ER3 seeks to weatherize at least 123,000 households per year. ER4 aims to achieve zero emission power plants by 2015 and reach 60% efficiency in coal power plants and 75% in natural gas power plants.

Energy Efficiency Provisions in Omnibus Energy Bills

Much of the legislative action on energy efficiency is focused on the House and Senate versions of the omnibus energy policy bill, H.R. 4. The House version (Securing America's Future Energy Act) includes energy efficiency provisions that are derived primarily from H.R. 2436, H.R. 2460, H.R. 24511, and H.R. 2587 and contain many recommendations from the Administration's *National Energy Policy* report. The Senate version of H.R. 4 (Energy Policy Act) incorporates S.Amdt. 2917 to S. 517 which, in turn, replaces S. 1766. As with the House version, many energy efficiency provision of the Senate version are derived primarily from S. 388, S. 389, S. 596, and S. 597. Both versions of H.R. 4 have provisions that authorize funding for energy efficiency R&D and grant programs, create a lighting technology initiative, propose efficiency measures for standby power in appliances, and set goals for efficiency in federal buildings. However, there are major differences. For example, the House version would allow federal agencies to form energy saving performance contracts with utilities and provide statutory authority for a DOE distributed power hybrid systems program; while the Senate version would set a higher standard for efficiency in central air conditioners, propose greater incentives for housing programs, and authorize new export and international deployment programs.. (A side-by-side comparison of provision in the two versions of H.R. 4 appear in CRS Report RL31427, *Omnibus Energy Legislation*.)

(Provisions of the House version of H.R. 4 are described in CRS Report RL31153. Provisions of S. 1766 are described in CRS Report RL31276. A comprehensive list of bills appears in CRS Report RL31127, *Energy Efficiency and Energy Conservation Legislation in the 107th Congress*.)

Air Conditioner Efficiency Standard

The House version of H.R. 4 (§124) and the Senate version (§927) differ over a new efficiency standard for central air conditioners and heat pumps. The efficiency of this equipment is measured in terms of the Seasonal Energy Efficiency Ratio or "SEER." A higher SEER value indicates higher efficiency. A SEER value of 10 took effect in 1992. The House would raise it to 12, while the Senate would set it at 13.

The Bush Administration stopped a DOE rule by the Clinton Administration, that would have raised the SEER from 10 to 13, by the year 2005. In July 2001, the Bush Administration proposed a new rule with a SEER of 12. On May 23, 2002, DOE published a final rule for the SEER of 12 that would take effect in January 2006. A group of five states (California, Connecticut, Maine, New York, and Vermont) and several environmental and low-income advocacy groups have challenged DOE's proposed SEER 12 in federal court.

DOE estimates that SEER 12 would save 3 Q over 25 years [2206-2030]. This would displace 30 powerplants at 400 megawatts each, reduce CO2 emissions by 24 million metric tons of carbon, and save $2 billion dollars. For a consumer, SEER 12 would add $213 dollars to the initial price of equipment that would cost $2,000 to $5,000 dollars. In contrast, DOE says SEER 13 would increase energy and emission savings by an additional 40 percent over that for SEER 12. Also, it would add $122 dollars more (for a total of $335) to the initial price of equipment in the $2,000 to $5,000 dollar cost range.

On one hand, the Administration and supporters of SEER 12 in the House version say the added $122 dollars for the initial price with a SEER 13 creates a burden for consumers, especially for low-income persons. Also, they note that the payback would grow from 10 years to 11. On the other hand, at the October 2001 DOE hearing on the new rule, the Consumer Federation of America and environmental groups counter-argued that a SEER 13 is unlikely to burden low income households. Instead, the National Consumer Law Center noted that most low income persons "do not make [central air conditioner] purchases, but they do benefit from savings on their energy bills."

Efficiency Goals for Federal Buildings

The purpose of federal efficiency goals is to lead-by-example in saving energy, reducing costs, and helping transform markets for new equipment. The House version (§121) and Senate version (§911) differ over federal building goals, measured in energy use per square foot (sf). The past goal called for a 20% reduction from 1985 to 2000. Relative to 1985, Executive Order 13123 directs agencies to achieve another 15% reduction (to 35%) by 2010. Relative to 2000, EO13123's 35% reduction goal equates to a reduction of 18.8% by 2010. The House version adopts this goal for 2010 and directs a further 10% drop (from 35% to 45%) relative to the 1985 baseline for 2020. The Senate version would make 2000 the new baseline year, and calls for an 18% reduction by 2010 (equivalent to 33.6% relative to 1985) and a 20% reduction by 2011 (or 37.3% relative to 1985). DOE says that moving the baseline year from 1985 to 2000 offers analytical and administrative advantages, because agencies are more electricity intensive and the composition of buildings has changed due to certain agency and military base closings. P.L. 100-615 had updated the baseline year from 1975 to 1985.

Also, the House version (§128) and Senate version (§919) have provisions for congressional buildings, which the record shows have had less focus on energy goals than those in the executive branch. The House version calls for a study of the potential for energy efficiency and renewables to increase reliability during a power outage. The Senate version calls for implementation of a plan for congressional buildings to meet the goals for federal agencies noted above. It also calls for use of efficiency and renewables in the new Capitol Visitor Center.

Tax Incentives

The Senate version, which incorporated S. 1979 (Energy Tax Incentives Act, Title III; S. Rept. 107-140), has more than $2 billion in energy efficiency and conservation tax incentives for the residential and commercial sectors. The House version (Division C, Title I) has a similar structure of incentives. The bills have somewhat different provisions for new homes, existing homes, appliances, and energy management devices. The bills have

identical, or nearly identical provisions for residential solar equipment, business fuel cells, and CHP. Also, both bills have tax incentives for alternative fuel vehicles and equipment.

FY2003 DOE Budget

On February 28, 2002, the House Appropriations Committee's Subcommittee on Interior Appropriations held a hearing on the FY2003 request for the DOE Energy Efficiency Program. Most questions focused on funding for transportation programs and the need to reduce national oil dependence. For example, DOE explained that the new Freedom Car Program builds on results from the Partnership for a New Generation of Vehicles (PNGV) and has a goal to accelerate the development of fuel cell technology, expecting that it would lead to commercial vehicles during the period from 2010 to 2020. A concern was raised that this time frame would not help reduce oil use in the shorter term. Also, a concern was expressed about the Administration's proposed spending cuts for the Hybrid Vehicle and Electric Vehicle programs. DOE said it expects that hybrid cars will enter the commercial market in 2003 and, thus, that the need for support is shifting away from research and development and toward tax credits and market incentives.

The FY2003 request for DOE's Energy Efficiency Program notes that "energy efficiency programs produce substantial benefits for the Nation," according to the Budget Appendix to the U.S. Government's FY2002 Budget (p. 403). However, the Administration also stresses that the FY2003 budget proposes shifts that reflect findings of the *National Energy Policy Report* and the *President's Management Agenda*. Specifically, the request states that the "Energy Efficiency [Office] will terminate projects that provide insufficient public benefit, redirect activities to better provide public benefits, place certain activities on a watch list to ensure they advance effectively, and expand several programs that could achieve significantly increased benefits with additional funding," according to the Budget Highlights of the DOE request (p. 103).

Thus, DOE proposes to decrease funding under DOE's Office of Energy Efficiency and Renewable Energy (EERE) from $915.4 million in FY2002 to $904.3 million in FY2003, a reduction of $11.2 million (1%) below the FY2002 level. This nearly flat total budget request includes some significant program funding changes. While grants would increase by $40.9 million, R&D would fall by $52.1 million.

The largest proposed increases include $47.1 million for Weatherization grants, $8.1 million for Fuel Cell vehicles, $4.6 million for FEMP, and $3.2 million for Energy Star. However, Transportation would be cut by $30 million, including decreases of $10.5 million for Materials, $8.4 million for Combustion Engines, $7.4 million for Fuels Utilization, $4.0 million for Hybrid Vehicles, and $3.5 million for Electric Vehicles. Industry funding would fall $10.6 million, including cuts of $2.8 million for Petroleum Industry, $2.8 million for Combustion Technology, and $2.0 million for Inventions. Under Buildings, cuts include $9.8 million for Research and Standards and $6.2 million for State Energy Grants.

For further information on the *Energy Conservation Budget*, see the web site at [http://www.mbe.doe.gov/budget/03budget/]. For further information on *Energy Conservation Programs*, see the Web site at [http://www.eren.doe.gov/].

EPA Budget, FY2003

The Administration proposes to decrease funding for EPA's Climate Protection Energy Efficiency Programs (CPP) from $115.5 million in FY2002 to $108.1 million in FY2003, a reduction of $7.4 million (6%) below the FY2002 level. For specific programs, the request includes $9.3 million less for Transportation, $0.3 million less for Industry, and $1.2 million more for Buildings and $0.1 million more for International Capacity Building.

Table 1. EPA Funding for Climate Protection Energy Efficiency Programs

($ millions current)

	FY1999 Apprn.	FY2000 Apprn.	FY2001 Apprn.	FY2002 Apprn.	FY2003 Request	FY2003 -FY2002
CPP Buildings	38.8	42.6	52.5	48.6	49.8	1.2
CPP Transportation	31.8	29.6	29.4	30.8	21.6	-9.3
CPP Industry	22.1	22.0	31.9	25.4	25.7	-0.3
CPP Carbon Removal	0.0	1.0	1.0	1.5	1.6	0.0
CPP State & Local	5.0	2.5	2.5	2.2	2.3	0.0
CPP International Capacity	5.6	5.6	5.5	7.0	7.1	0.1
CPP Int'l Partnerships	0.4	0.4	0.0	0.0	0.0	0.0
CPP Int'l Tech. Cooperation	0.0	0.0	0.8	0.0	0.0	0.0
CPP, SUBTOTAL	103.7	103.7	123.6	115.5	108.1	-7.4
Climate Change Research	16.0	20.6	22.6	21.4	21.7	0.3
CPP Research	10.0	0.0	0.0	0.0	0.0	0.0
TOTAL	129.7	124.3	146.2	136.9	129.8	-7.1

Source: EPA FY2003 Congressional Justification, p. VI-21 and VI-2 to VI-8.

EPA conducts its CPP programs under the Office of Environmental Programs and Management (EPM) and the Office of Science and Technology (S&T). EPA's CPP programs are focused primarily on deploying energy-efficient technologies. These programs include Green Lights, Energy Star Buildings, Energy Star Products, Climate Wise, and Transportation Partners. They involve public-private partnerships that promote energy-efficient lighting, buildings, and office equipment. Efforts also include information dissemination and other activities to overcome market barriers.

Energy Security

The terrorist attacks of September 11, 2001, have focused national attention on developing a strategy to address the vulnerabilities of energy systems and other essential services. An Executive Order on *The Office of Homeland Security (OHS) and the Homeland Security Council* outlines a strategy with six elements. The "protection" element calls on OHS to "... strengthen measures for protecting energy production, transmission, and distribution services and critical facilities ..." This may include power plants, transmission lines, oil refineries, oil storage tanks, oil and natural gas pipelines, and other energy infrastructure. By reducing the demand for fuels and electricity, energy efficiency measures

may contribute to energy security by slowing growth in the number of energy facilities and amount of other energy infrastructure.

Further, the development of small, modular "distributed energy" systems (also referred to as distributed generation and distributed power) under DOE's program may help reduce the security risk by decentralizing energy facilities and establishing some facilities off-grid. Also, the "response and recovery" element calls on OHS to "... ensure rapid restoration of transportation systems, energy production, transmission, and distribution systems. ..." The deployment of smaller, highly mobile distributed energy equipment may be able to help address this aspect of energy security. Several bills, including H.R. 4 and S. 1766, have provisions for distributed energy. (For more on distributed energy see the DOE web site at [http://www.eren.doe.gov/EE/power_distributed_generation.html] and at [http://www.eren.doe.gov/distributedpower/])

Oil Conservation

Energy efficiency measures to curb oil demand, and other oil conservation measures, may help address economic issues such as high gasoline prices and oil import dependence and environmental issues such as air pollution, climate change, and the proposal to develop oil in the Arctic National Wildlife Refuge (ANWR).

For the ANWR issue, technology-driven improvements to the fuel economy of cars and light trucks – without any change to the Corporate Average Fuel Economy (CAFE) standard – might save more fuel than would likely be produced by oil drilling in ANWR. The Energy Information Administration (EIA) says that a technology-driven projection for cars and light trucks could increase fuel economy by 3.6 mpg by 2020. Through the first 20 years, this increase would generate oil savings equivalent to four times the low case and three-fourths of the high case projected for ANWR oil production. Extended through 50 years, the fuel economy savings would range from 10 times the low case to more than double the high case for ANWR. (For more information on this issue, see CRS Report RL31033, *Energy Efficiency and Renewable Energy Fuel Equivalents to Potential Oil Production from the Arctic National Wildlife Refuge*).

A debate has emerged over a provision in H.R. 4 (Division A, Section 201) that proposes to increase CAFE for new light trucks by an amount necessary to save five billion gallons of gasoline by 2010. This fuel-saving goal would likely require fuel economy to rise from the current standard of 20.5 miles per gallon (mpg) to at least 23.5 mpg, an increase of at least three mpg. CAFE is a key federal regulatory policy aimed at a gradual ramp-up of fuel efficiency for newly manufactured cars and light trucks. The national fleet fuel economy for cars declined from 21.6 mpg in 1998 to 21.4 mpg in 1999 and that for light trucks declined from 17.4 in 1993 to 17.1 in 1999. The present CAFE standard for new cars is 27.5 mpg. (For more on CAFE standards, see CRS Issue Brief IB90122, *Automobile and Light Truck Fuel Economy: Is CAFE up to Standards?*)

In early 2002, the Bush Administration launched the Freedom Cooperative Automobile Research (CAR) Program, to replace the Clinton Administration's Partnership for a New Generation of Vehicles (PNGV). Freedom CAR creates a partnership with the auto industry to develop a fuel-cell-powered vehicle that would attain commercial use during 2010 to

2020. This program is funded primarily by DOE's Energy Efficiency Program for Transportation (see Table 4), but includes some funding from several other agencies. (For more details on PNGV see CRS Report RS20852, *The Partnership for a New Generation of Vehicles: Status and Issues*).

Oil use for gasoline, home heating, and other applications makes it important to the nation's transportation and production sectors of the economy. Thus, fluctuating oil prices and dependence on imported sources can create economic vulnerabilities. Also, oil use has important environmental impacts. Its extraction and transport can lead to spills that pollute land and water. Further, oil-based fuels, such as gasoline, generate sulphur dioxide and other air pollutants as well as large amounts of carbon dioxide that contribute to climate change.

U.S. oil use accounts for about 23% (1998) of the world's oil consumption and about 39% (2000) of total U.S. energy use. The nation uses about 17.2 million barrels of oil per day (mb/d), of which about 11.5 mb/d is used for transportation, including 3.8 mb/d for cars and 2.5 mb/d for light trucks (which include pickups, minivans, and sport utility vehicles).

Oil use in transportation can also be reduced through short-term conservation measures such as increased use of public transit, carpooling and ridesharing, and telecommuting; and through curtailment (e.g. driving less) and substitution of alternative fuels. Other measures can help reduce non-transportation oil uses. For example, home improvement measures such as insulation, energy-efficient windows, and weatherization measures can reduce the use of home heating oil.

Climate Change: Energy Efficiency's Role

Energy efficiency is seen as a key means to reduce fossil fuel-induced carbon dioxide (CO2) emissions that contribute to global climate change. Thus, the current debate over the U.S. role in the Kyoto Protocol and related international negotiations to curb global emissions of greenhouse gases tends to be reflected in deliberations over federal funding and incentives for energy efficiency.

In early 2002, the Bush Administration issued a climate policy that aims to reduce energy intensity 18% over 10 years and seeks voluntary emission reductions to control greenhouse gas emissions. This is consistent with the Administration's policy that it would not support the Kyoto Protocol, citing concerns that U.S. participation could raise energy prices and slow economic growth. Further, the policy states the Administration's intent to support funding for energy efficiency and renewable energy programs at DOE and at the Global Environment Facility.

The 2001 *White House Initial Review on Climate Change* cites an existing array of energy efficiency and other programs that support goals of the United Nations Framework Convention on Climate Change (UNFCCC) and refers to the National Energy Policy (NEP) report's provisions for CHP, CAFE, Energy Star, and other energy efficiency policies as part of the foundation for its strategy to curb greenhouse gas emissions. (For more about the NEP, see the above section on "National Energy Policy Legislation.")

The Kyoto Protocol had called for the United States to cut greenhouse gas (GHG) emissions to 7% below the 1990 level during the period from 2008 to 2012. At COP-6 in 2000, the United States was accused of avoiding real efforts to reduce emissions, through energy efficiency and other means, in order to address the Kyoto Protocol.

DOE's 2000 report *Scenarios for a Clean Energy Future*, shows the potential for advanced energy efficiency and other measures to cut two-thirds of the projected U.S. carbon emissions growth by 2010 and to cut emissions to the 1990 level by 2020. Assuming no major future policy actions, the reference case scenario in the EIA's December 2000 Annual Energy Outlook 2001 projects 2010 emissions will be 34% higher than that for 1990.

DOE's 1995 report, *Energy Conservation Trends*, shows that energy efficiency has reduced long-term rates of fossil energy use and thereby curbed emissions of CO2 significantly. A 1997 DOE report by five national laboratories entitled *Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy Technologies by 2010 and Beyond*, also known as the *Five-Lab Study*, projected that emissions would grow by 29% in 2010 and that energy efficiency would be the single largest contributor, accounting for 50% to 90% of the projected emissions reduction. However, in a 1998 report, *Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity*, EIA found problems with some key assumptions in the *Five-Lab Study* about the use of new energy-efficient technologies.

(For more details about the potential for energy efficiency to reduce CO2 emissions, see CRS Report RL30414, *Global Climate Change: The Role for Energy Efficiency*.)

Electric Industry Restructuring and Conservation

The electricity problems in California, combined with the prospect of similar problems in other western states and the northeast, raised the issue of whether a federal role is needed to encourage demand-side energy efficiency and load management measures. Some bills in the 107th Congress would increase the energy efficiency of buildings, appliances, or other equipment that would reduce electric power demand or otherwise conserve electricity.

In the 106th Congress, debate focused on whether there should be a federal role in restructuring generally and in creating incentives to ensure a continuing role for energy efficiency specifically. To address energy efficiency, some bills included a public benefits fund (PBF), incentives for home energy efficiency, and/or an information disclosure requirement that identified the sources of power for consumers.

In the 1980s, many states and electric utility companies created demand-side management (DSM) programs to promote energy efficiency and other activities as a less costly alternative to new supply. DSM became a significant part of the nation's energy efficiency effort. Utility DSM spending peaked in 1994 at $2.7 billion and DSM energy savings peaked in 1996 at 61 billion kilowatt-hours (which is equivalent to the output from 12 one-gigawatt powerplants).

After California issued its 1994 proposal for electric industry restructuring, many states and utilities reduced DSM efforts. By 1998, utility DSM spending had fallen to about $1.4 billion. In response, some states, such as California, include provisions for energy efficiency

and conservation in their restructuring legislation. For example, California's law (A.B. 1890, Article 7) placed a charge on all electricity bills from 1998 through 2001 that provides $872 million for "cost effective" energy efficiency and conservation programs. Other states, such as Pennsylvania, have few if any provisions for energy efficiency.

(For a discussion of broader electricity restructuring issues, see CRS Electronic Briefing Book on *Electricity Restructuring* at [http://www.congress.gov/brbk/html/ebele1.html] and CRS Issue Brief IB10006, *Electricity: The Road Toward Restructuring*.)

LEGISLATION

P.L. 107-63, H.R. 2217

Department of the Interior and Related Agencies Appropriations Bill, 2002. Makes appropriations for DOE Energy Efficiency Program. Reported (H.Rept. 107-103) June 19, 2001. Passed House, June 21. In Senate, reported (S.Rept. 107-36) June 29. Passed Senate, July 12. Conference Committee reported (H.Rept. 107-234) October 11. Signed into law November 5, 2001.

P.L. 107-73, H.R. 2620/S. 1216

Department of Veterans, Department of Housing and Urban Development, and Related Agencies Appropriations Bill, 2002. Makes $123.0 in appropriations for EPA's Climate Protection Energy Efficiency Programs. House bill reported (H.Rept. 107-159) July 17, 2001. Passed House, July 30. Senate bill reported (S.Rept. 107-43) July 20. Passed Senate August 2. Conference reported (H.Rept. 107-272) November 6. Signed into law November 26, 2001.

P.L. 107-115, H.R. 2506

Foreign Operations, Export Financing, and Related Programs Appropriations Bill, FY2002. Appropriates funding for renewable energy and energy efficiency under programs of the Global Environment Facility (GEF), U.S. Agency for International Development (AID), Overseas Private Investment Council (OPIC), and other bilateral and multilateral programs. House Appropriations Committee reported (H. Rept. 107-142) July 17, 2001. Passed House July 24. Senate Appropriations Committee reported (S. Rept. 107-58) September 4, 2001. Conference held November 14. Conference reported (H. Rept. 107-345) December 19, 2001. Signed into law January 10, 2002.

P.L. 107-147, H.R. 3090

Job Creation and Worker Assistance Act of 2002. Section 602 extends a credit for electric vehicles and Section 606 extends a deduction for clean fuel vehicle property. House Committee on Ways and Means reported (H.Rept. 107-251) bill on October 17, 2001, with two-year extension of renewables production tax credit. Passed House October 24. Senate Finance Committee reported (Committee Print 107-49) an amendment in the nature of a substitute with an amendment to the title on November 9. Section 404 of the Senate version proposed one-year extension of renewables production tax credit. Brought to the floor November 13. Amended in Senate (S.Amdt. 2896) and passed Senate Feb.14, 2002. House approved agreement with Senate Amendment March 7, 2002. Signed into law March 9, 2002.

H.R. 4 (House Version)

Securing America's Future Energy (SAFE) Act of 2001. The provisions for energy efficiency include funding authorizations, goals, tax incentives, grants, and programs that cover federal facilities, equipment (consumer products, distributed power, lighting), and buildings. The bill incorporates H.R. 2436, Energy Security Act; H.R. 2460, Comprehensive Energy Research and Technology Act; H. R. 2511, Energy Tax Policy Act; and H.R. 2587, Energy Advancement and Conservation Act. Introduced July 27, 2001; referred to Committee on Energy and Commerce, and to the Committees on Science, Ways and Means, Resources, Education and the Workforce, Transportation and Infrastructure, the Budget, and Financial Services. Passed House, amended, August 2.

H.R. 4 (Senate Version)

Energy Policy Act of 2002. There are several energy efficiency provisions in this bill. S. 1766 was replaced by S. 517 which, in turn, was incorporated into the Senate version of H.R. 4 as an amendment in the nature of a substitute and passed the Senate April 25, 2002

H.R. 2436 (Hansen)

Energy Security Act. Section 701 directs the Department of Interior to implement energy conservation measures at its facilities. Introduced July 10; referred to Committee on Committee on Resources and to the Committee on Energy and Commerce. Committee on Resources reported (H.Rept. 107-160, Part I) July 25. Incorporated in H.R. 4.

H.R. 2460 (Boehlert)

Comprehensive Energy Research and Technology Act of 2001. Title I authorizes appropriations for energy efficiency R&D, energy conservation grants, and distributed energy resources programs. Introduced July 11; referred to Committee on Science. Reported, amended (H.Rept. 107-177) July 31. Incorporated into H.R. 4.

H.R. 2511 (McCrery)

Energy Tax Policy Act of 2001. Amends IRS tax code to create tax incentives. Title I creates tax incentives for fuel cells, home improvements, appliances, and energy-efficient buildings. Introduced July 17, 2001; referred to Committee on Ways and Means. Reported (H.Rept. 107-157) July 24. Incorporated into H.R. 4.

H.R. 2587 (Tauzin)

Energy Advancement and Conservation Act. Creates energy conservation and other energy policy measures. Title I includes provisions to reauthorize funding for energy efficiency programs at federal facilities and energy conservation grant programs. It also creates energy efficiency programs for consumer products and vehicles. Title II increases fuel economy standards for certain highway vehicles. Introduced July 23, 2001; referred to Committee on Energy and Commerce and many other committees. Reported (H.Rept. 107-162, Part I) July 25. Incorporated into H.R. 4.

S. 1766 (Daschle-Bingaman)

Energy Policy Act of 2002. There are many provisions for energy efficiency throughout the bill. The provisions of S. 1766 were incorporated in S. Amdt. 2917, as proposed for consideration in the Senate. S. Amdt. 2917 was amended on the floor and agreed to as a substitute amendment to S. 517, formerly the National Laboratories Partnership Improvement

Act. S. 517, the Energy Policy Act, as amended, was subsequently incorporated in H.R. 4 and H.R. 4 passed the Senate in lieu of S. 517.

S. 1979 (Baucus)

Energy Tax Incentives Act of 2001. Creates several energy efficiency tax credits and incentives. Reported (S. Rept. 107-140) March 1, 2002. S. Amdt 3286 incorporated this bill into S. 517 (S. Amdt 2917) April 23, 2002.

CONGRESSIONAL HEARINGS, REPORTS, AND DOCUMENTS

U.S. Congress. House. Committee on Energy and Commerce. Subcommittee on Energy and Air Quality. National Energy Policy: Conservation and Energy Efficiency. Hearing held June 22, 2001.

U.S. Congress. House. Committee on Science. The Nation's Energy Future: Role of Renewable Energy and Energy Efficiency. Hearing held February 28, 2001.

(An extensive list of hearings on energy efficiency in the 107th Congress appear on a DOE web site at [http://www.eren.doe.gov/eere/testimony.html])

FOR ADDITIONAL READING

American Council for an Energy-Efficient Economy. *Proceedings from the ACEEE 2000 Summer Study on Energy Efficiency in Buildings.* Washington, August 2000. (10 v.)

—— *Green Guide to Cars and Trucks: Model Year 2002.* 2001. 120 p.

Electric Power Research Institute (EPRI). *Selling Customers on Energy Efficiency*. EPRI Journal, v. 23, November/December 1998. p. 8-17.

General Accounting Office (GAO). *Cooperative Research: Results of U.S. - Industry Partnership to Develop a New Generation of Vehicles.* (GAO/RCED -00-81) March 2000. 50 p.

International Energy Program Evaluation Conference. *Evaluation: Providing Answers to Tough Questions.* Conference Proceedings. August 2001. 748 p.

National Research Council. *Energy Research at DOE: Was It Worth It? [Energy Efficiency and Fossil Energy Research 1978 to 2000]* Prepub. Manuscript. July 2001. 401 p. [http://www.nap.edu/books/0309074487/html/]

------- *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards.* Prepublication Unedited Proof. July 2001.

U.S. Department of Energy. Interlaboratory Working Group. *Scenarios for a Clean Energy Future.* (ORNL/CON-476) November 2000. 350 p. [http://www.ornl.gov/ORNL/Energy_Eff/CEF.htm]

—— Energy Information Administration. *Measuring Energy Efficiency in the United States' Economy: A Beginning*. (DOE/EIA-0555[95]/2) October 1995. 91 p. [http://www.eia.doe.gov/emeu/efficiency/contents.html]

—— *U.S. Electric Utility Demand-side Management 1996.* (DOE/EIA-0589[96]) December 1997. 102 p. More recent data for 1997 and 1998 available at [http://www.eia.doe.gov/cneaf/electricity/dsm/dsm_sum.html]

U.S. Environmental Protection Agency. *Energy Star and Related Programs 1997 Annual Report.* March 1998. (430-R-98-002) 37 p.

U.S. Executive Office of the President. President's Committee of Advisors on Science and Technology. *Powerful Partnerships: The Federal Role in International Cooperation on Energy Innovation.* June 1999.

CRS Reports

CRS Report RL31427. *Omnibus Energy Legislation: H.R. 4 Side-by- side Comparison*, by Mark Holt and Carol Glover.

CRS Report RL31127. *Energy Efficiency and Energy Conservation Legislation of the 107th Congress*, by Fred Sissine.

CRS Report RL31153. *Securing America's Future Energy Act of 2001: Summary of H.R. 4 as Passed by the House*, by Mark Holt and Carol Glover.

CRS Report RL31096. *Bush Energy Policy: Overview of Major Proposals and Legislative Action*, by Robert L. Bamberger and Mark E. Holt.

CRS Report RL30452. *Climate Change: Federal Research, Technology, and Related Programs*, by Michael M. Simpson.

CRS Report RL30414. *Global Climate Change: The Role for Energy Efficiency*, by Fred Sissine.

CRS Report RS20852. *The Partnership for a New Generation of Vehicles (PNGV): Status and Issues*, by Brent Yacobucci.

Web Sites

American Council for an Energy-Efficient Economy (ACEEE). Extensive listing of web sites on energy efficiency. [http://www.aceee.org/]

CRS electronic briefing book on Electricity Restructuring. [http://www.congress.gov/brbk/html/ebele1.html]

CRS electronic briefing book on Global Climate Change. [http://www.congress.gov/brbk/html/ebgcc1.html]

National Association of State Energy Offices. [http://www.naseo.org/]

U.S. Council for Automotive Research (USCAR). Partnership for a New Generation of Vehicles. [http://www.uscar.org/pngv/index.htm]

U.S. Department of Energy. Energy Efficiency and Renewable Energy Network. [http://www.eren.doe.gov/]

U.S. Department of Energy. FY2003 Congressional Budget Request. [http://www.mbe.doe.gov/budget/03budget/]

U.S. Lawrence Berkeley Laboratory. Center for Building Science. [http://eetd.lbl.gov/]

U.S. Environmental Protection Agency. FY2003 Budget Justification (Goal 6, Climate Change, p. VI-21). [http://www.epa.gov/ocfo/budget/2003/g06final.pdf]

U.S. Environmental Protection Agency. Energy Star Programs.[http://www.energystar.gov/]

Table 4. DOE Energy Efficiency Budget for FY2001-FY2003

(selected programs, $ millions)

	FY2001 Apprn.	FY2002 Apprn.	FY2003 Request	Request - FY2002	Pct. Diff.
BUILDINGS	293.3	380.3	408.8	28.5	8%
Research & Stnds	62.9	62.4	52.6	-9.8	-16%
Equipment	39.7	38.5	31.7	-6.8	-18%
Weatherization	152.7	230.0	277.1	47.1	20%
State Energy Grant	37.9	45.0	38.8	-6.2	-14%
Mgt & Planning	14.1	15.1	14.1	-1.0	-7%
FED. ENG. MGMT.	25.7	23.3	27.9	4.6	20%
INDUSTRY	146.0	148.9	138.3	-10.6	-7%
Forest & Paper	11.8	11.8	11.8	0.0	0%
Aluminum	10.9	8.1	8.1	0.0	0%
Chemicals	12.1	14.5	14.5	0.0	0%
Petroleum	2.6	2.8	0.0	-2.8	-100%
Crosscutting	59.7	60.9	57.1	-3.8	-6%
Industrial Materials	11.7	13.7	12.7	-1.0	-7%
Combustion	14.4	18.4	15.6	-2.8	-15%
Inventions	4.8	4.4	2.4	-2.0	-46%
Ind. Tech. Assistance	15.0	14.9	15.9	1.0	7%
POWER TECH.	47.3	63.8	63.9	0.1	0%
TRANSPORTATION	251.5	252.7	222.7	-30.1	-12%
Vehicle Tech.	157.1	155.1	149.3	-5.8	-4%
Hybrid Systems	49.0	46.6	42.6	-4.0	-9%
Fuel Cell	40.7	41.9	50.0	8.1	19%
Adv. Com. Engine	52.2	49.1	40.7	-8.4	-17%
Electric Vehicle	8.8	7.0	3.5	-3.5	-50%
Fuels Utilization	23.1	25.9	18.5	-7.4	-29%
Materials Tech.	41.5	40.3	29.8	-10.5	-26%
Tech. Deployment	14.8	15.2	15.0	-0.2	-1%
Mgt & Planning	9.2	10.2	10.1	-0.1	-1%
POLICY & MGMT.	46.0	46.4	42.7	-3.7	-8%
R&D SUBTOTAL	619.3	640.4	588.4	-52.1	-8%
GRANTS SUBTOTAL	190.6	275.0	315.9	40.9	15%
GROSS TOTAL	809.8	915.4	904.3	-11.2	-1%
Biomass Dev. Fund	-2.0	-----		-----	-----
ADJUSTED TOTAL	807.8	915.4	904.3	-11.2	-1%

Sources: DOE FY2003 Cong. Bud. Request, v. 7, February 2002.