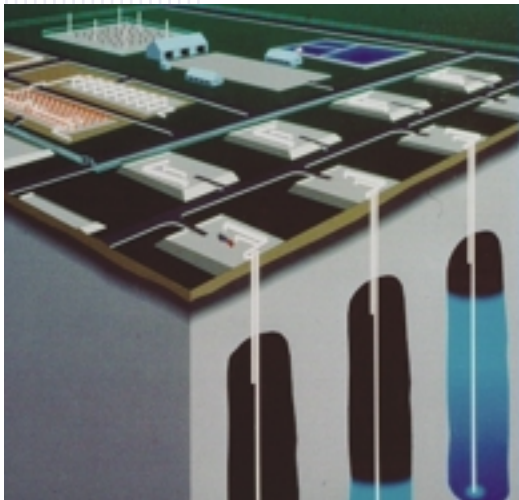


ENERGY: SIGNIFICANT PERFORMANCE RELATED TO INVESTING IN AMERICA'S ENERGY FUTURE

Energy Strategic Goal: To protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy.



Strategic Petroleum Reserve 3-D Illustration of Salt Dome Storage Site.

GENERAL GOAL 4 - ENERGY SECURITY: Improve energy security by developing technologies that foster a diverse supply of reliable, affordable and environmentally sound energy, by providing for reliable delivery of energy, guarding against energy emergencies, exploring advanced technologies that make a fundamental improvement in our mix of energy options, and improving energy efficiency.

When the Bush Administration took office, our dependence on energy imports had reached record levels. Our greatest vulnerability was in the area of petroleum imports, which accounted for 89 percent of total energy imports in Fiscal Year 2000. Upon taking office, President Bush directed that the Strategic Petroleum Reserve be filled to its maximum capacity of 700 million barrels. Since then, the Department has taken careful steps to minimize impacts on energy markets.

In addressing our vulnerability in the future, Secretary Abraham recently declared that the Department has “an ambitious, long-term vision of a zero-emission future, free of reliance on imported energy.” As we look to the carbon-free emissions generation of electricity and hydrogen, it is clear that we must call upon science, technology and the research talents in our national laboratories, universities, and industry to help us improve and move beyond today’s energy choices in ways that meet consumer and public needs.

The Department of Energy’s technologies draw on all our available resources: oil, natural gas, coal, nuclear energy, hydropower, renewable energy, and reductions in demand through conservation and energy efficiency. The Administration believes it is not the role of the Federal government to choose the energy sources for the country. Instead, the role of the Federal government is to develop technologies capable of providing a diverse supply of energy, and to allow the market to decide how much of each energy source is actually used. Diversity of energy sources can help provide stability and guard against price spikes.

To tackle our immediate need for oil and gas, the Department continues to develop and promote technologies that can lower the costs of oil and natural gas exploration and development and maximize the efficiency and stability of America’s oil and gas production and supply.



Coal miners are protected by Thyssen roof supports. The canopy extensions are hydraulically operated. The shield supports weigh 17.5 tons and measure 16.5 feet in length.

The Department plans—together with our private sector partners—to develop coal technologies and processes that will allow us to continue to take full advantage of this affordable, plentiful domestic energy resource, which supplies more than half of our electricity needs today. This emphasis on developing advanced technologies will allow coal to serve as a valuable—and ultimately an emissions-free—contributor to our energy mix for decades to come. President Bush and Secretary Abraham have announced the FutureGen program, a cost-shared \$1 billion international initiative that will design, build, and operate a nearly emissions-free, coal-fired power plant.

As part of the Administration's climate change initiative, the Department is focusing its efforts on carbon sequestration—the capture and permanent storage of carbon dioxide produced from combustion of fossil fuels. Carbon sequestration potentially offers the world a new option for managing the risks of climate change—an option that will enable the United States and other countries with extensive coal resources to take advantage of their abundant and low-cost energy resources.

Another clean power technology that can play an increasingly important role in meeting growing national energy needs is nuclear energy. The Department is committed to developing advanced nuclear energy technologies to assure diversity in the U.S. energy supply, and to developing renewable energy technologies.

With coal and nuclear energy, the United States possesses enormous domestic supplies of clean renewable energy: solar, wind, hydropower, geothermal and biomass energy. Developing these resources enhances the Nation's energy security and environment, principal goals of the National Energy Policy and the Department's Strategic Plan. Hydrogen and biomass energy reduce reliance on imported oil, while solar, geothermal and wind power improve the reliability of our electricity system; thereby reducing the Nation's dependence on fuels-based central power generation and increasing the diversity of our energy sources.

The Department is also taking steps to reduce our energy consumption and improve energy efficiency. These energy efficiency programs place a premium on vehicle technologies, designed to not only provide energy efficiency improvements to current vehicles, but also encourage development of alternative fuel vehicles. The Department is also developing technologies to improve the energy efficiency of buildings,



Truck unloads wood chips to be used as fuel for the Tracy Biomass Plant, Tracy, California. The Tracy Biomass Plant, providing the San Francisco Bay area with baseload capacity, uses wood residues discarded from agricultural and industrial operations that otherwise would be disposed of in a landfill or burned in an open field.

appliances, and energy-intensive industries. Department conservation programs also extend beyond technology development. The Department operates a vital Weatherization Assistance Program, which delivers cost-effective, energy efficiency improvements in the housing of low-income families. According to the National Research Council's 2001 report entitled "Energy Research at DOE, Was It Worth It?" the Department's research and development efforts to improve the efficiency of our buildings, our industrial complex and our cars and trucks have benefited the Nation by at least \$30 billion in energy saved, pollution avoided, and improved national security.

The Department is also developing technologies to assure the reliability of energy delivery. Some of the Department's programs will develop technologies that can upgrade America's aging electricity infrastructure, relieve congestion on transmission and distribution systems, and develop superconducting materials that will improve the reliability of transmission system components.

The long-term solution to meeting our energy supply and environmental challenges is to transform our energy system to provide clean, reliable, and diverse energy supplies for a growing United States economy. For that reason, the President has launched two bold programs. The first is tackling a major hurdle on the long, tentative path aimed at ultimately releasing the poten-



President Bush examining the Air Products, Inc. hydrogen fueling dispenser.

tial of fusion to produce electricity—and hydrogen—in a safe, economical, and environmentally benign manner. The second is our focus on the limitless potential of hydrogen to power our economy with virtually no adverse environmental effects.

FREEDOMCAR AND HYDROGEN FUEL

As projected by the Energy Information Administration, the consumption of petroleum products, primarily used in transportation, will remain the largest share of the consumption of fuels and the leading source of carbon dioxide emissions. The Department has programs to develop more energy efficient hybrid and clean diesel vehicles capable of reducing emissions of air pollutants and the Nation's dependence on foreign oil. The Administration's FreedomCAR and Hydrogen Fuel Initiative programs offer the potential to virtually eliminate the use of petroleum for transportation through development and deployment of a new hydrogen-based transportation infrastructure over the next several decades.



Secretary of Energy Abraham examining a hydrogen powered vehicle at the "Clean Energy for the 21st Century" exhibit. General Motor's Hy-Wire is a combination of hydrogen propulsion and drive-by-wire controls. Vehicles that run on hydrogen fuel produce only water, not exhaust fumes, thereby reducing pollution and reliance on fuel from other countries.

Hydrogen holds the promise of an ultra-clean and secure energy option for America's future. Hydrogen can fuel ultra-clean internal combustion engines, which would reduce auto emissions by more than 99 percent. The President's Hydrogen Fuel Initiative and FreedomCAR partnership are focused on development

of a hydrogen fuel cell and hydrogen production and infrastructure technologies for vehicles. Since most of our imported oil is used for transportation, these programs have the potential to substantially reduce, if not eliminate, our dependence on imported oil. Hydrogen can be produced from diverse domestic sources including coal, nuclear power, and renewable resources (e.g., wind and solar). Moreover, if fusion development is successful, it could be the most cost effective, long-term source of hydrogen, with almost no environmental impacts.



Strategic Petroleum Reserve West Hackberry Heat Exchangers.

FUSION

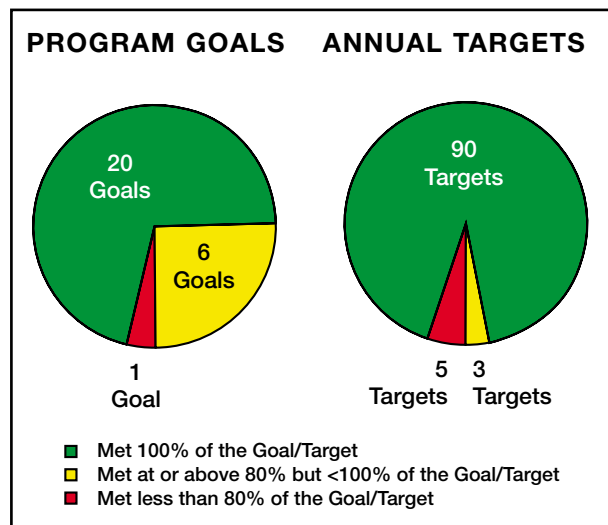
The long-term solution is to transform our energy foundation and, therefore, our future. For that reason, the President has launched another bold program to release the potential of fusion to produce electricity. Fusion, the physical process that powers the sun, is an energy source of the future that could transform the way we produce electricity. By reproducing the sun's process for transforming matter into energy, we can create a new energy source for the benefit of mankind. This would be an energy source that would produce no greenhouse gases or other polluting emissions, would produce no high-level nuclear waste, would be extraordinarily safe to operate, and could have a prominent role in the production of hydrogen later in the century. Fusion's potential is too great to ignore, and for that reason the Administration has joined the international fusion energy research and development project designed to take a significant step in fusion development.

EXTERNAL FACTORS

By establishing and accomplishing challenging targets, the Department is able to achieve these energy goals. Three factors outside the Department's control may impact our ability to meet these goals. These external factors include:

- **Technology:** Technological development is inherently unpredictable. Our efforts to develop zero-emission fossil generation technology, hydrogen, renewables, advanced nuclear power and fusion may be more or less successful than predicted, with a correspondingly positive or negative impact on our efforts.
- **Market Forces:** Whether new technology is deployed depends to a large extent on whether that technology is competitive, considering relevant policies (e.g., tax incentives for the purchase of fuel-cell vehicles).
- **Consumer Choice:** Improved energy efficiency is largely the result of millions of decisions by individual consumers. The Department can help develop improved technology, but whether this technology is deployed depends on consumer decisions and relevant policies that may affect those decisions. In addition, the deployment of the Department's suite of technologies depends to a large extent on the decisions by business, industry and individual consumers.

FY 2003 PERFORMANCE AT A GLANCE



COSTS AT A GLANCE

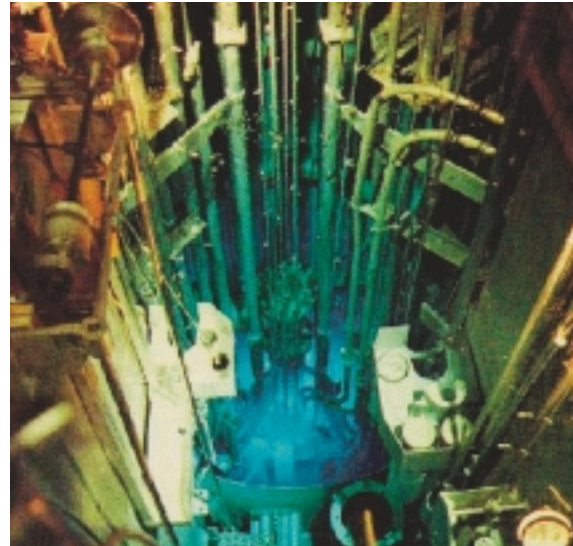
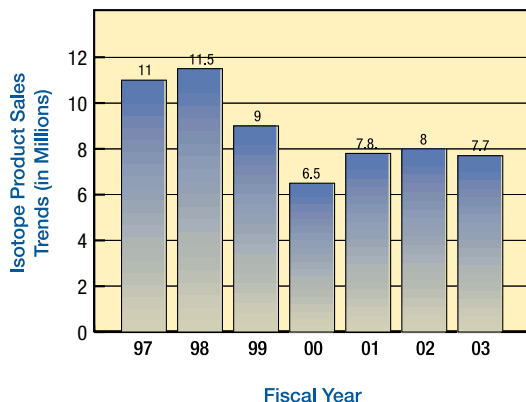
ENERGY STRATEGIC GOAL COSTS (IN MILLIONS)		
GPRA PROGRAM ACTIVITIES	FY 2003 Costs	FY 2002 Costs
General Goal 4 - Energy Security	\$1,609	\$2,041
TOTAL COSTS	\$1,609	\$2,041

HOW WE SERVE THE PUBLIC

The Department achieved a number of significant milestones in Fiscal Year 2003 that directly benefit the Public:

- The Department's isotope program continues a 50-year program of providing isotope products for medical, research, and industry applications where private sector capacity cannot meet demand. Starting in Fiscal Year 2003, all isotope products were priced to recover production costs.
- The Department completed the construction of the Los Alamos 100 Million Electron Volt Isotope Production Facility. Commissioning and startup activities will enable isotope production of short-lived medical and scientific isotopes to begin in Fiscal Year 2004.
- Preliminary United States nuclear power generation data for 2002 indicates a new record high utilization factor of 90.8 percent, a one-percent increase above the 2001 record. This is the fourth straight year that the industry has improved nuclear generation. This increase represents nearly one-half billion dollars

SALES TREND



View inside the core of a nuclear reactor.

per year of additional electricity, or 4.5 million tons of coal. In Fiscal Year 2003, the Department continued to invest nearly five million dollars in research and development programs designed to generate these improvements.

- In January 2003, the Department issued its report to Congress on the Advanced Fuel Cycle Initiative, "The Future Path for Advanced Spent Fuel Treatment and Transmutation Research." The report, required by the Conference Report accompanying the Energy and Water Appropriations Act of 2002 (House Report 107-258), responds to the recommendation of the May 2002 National Energy Policy to "consider technologies...to develop reprocessing and fuel treatment technologies that are cleaner, more efficient, less waste-intensive, and more proliferation-resistant." A successful Advanced Fuel Cycle Initiative program could help address the Nation's spent fuel challenge by reducing the volume and toxicity of spent fuel, eliminating plutonium and other long-lived materials from nuclear waste, and recovering the significant quantities of energy that are trapped in spent nuclear fuel.
- The Department and the Republic of Korea Ministry of Science and Technology in collaboration under the International Nuclear Energy Research Initiative, have awarded five research grants, totaling approximately \$4 million, to five joint teams of U.S./Korean researchers for research in the develop-

ment of advanced nuclear reactor technology in the areas of 1) next generation reactor and fuel cycle technology, 2) innovative nuclear plant design, and 3) advanced nuclear fuels and materials.

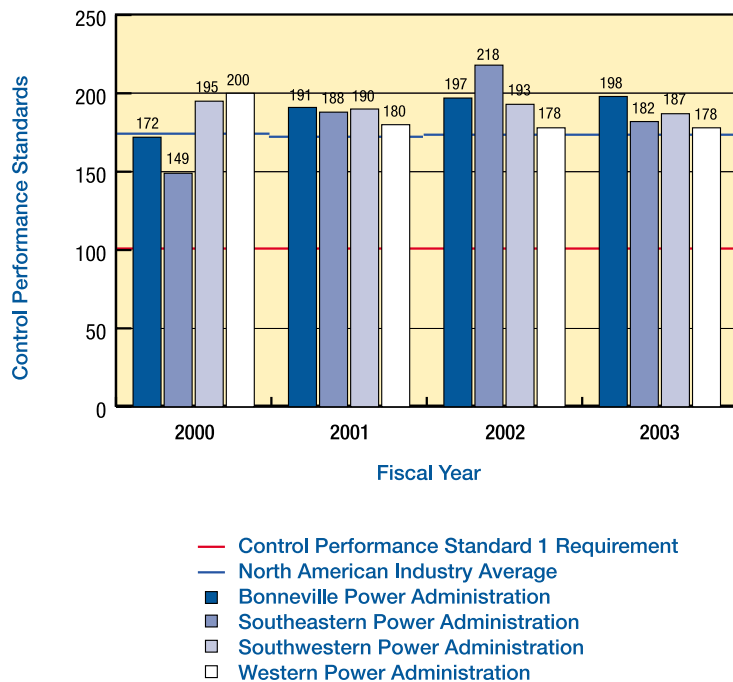
- The Department continues to support the development of advanced concepts and scientific knowledge in nuclear fission and reactor technology that will keep the United States in a competitive position by both completing and continuing research and development projects awarded in Fiscal Years 2000, 2001 and 2002. Though focused on long-range goals, the program is already producing results. In one project, a group of national and international organizations has completed critical feasibility studies for a new light-water reactor design, and are in the process of developing the preliminary design.
- The Department continues to support the education and training infrastructure at universities needed to train the next generation of scientists and engineers in the nuclear sciences. In Fiscal Year 2003, the Department funded refueling, upgrades and improvements at 20 university reactors and supported the sharing of the 28 university research reactors. In addition, grants, matching grants, and fellowships were increased to help further attract and keep outstanding students pursuing nuclear engineering degrees.

Power Marketing Administrations – Setting the Example as Reliable Power Providers.

The North American Electric Reliability Council establishes Control Area Performance Standards that measure the ability of control areas to balance generation and load. The Power Marketing Administrations evaluate their system reliability using Control Area Performance Standards 1 and 2. Compliance with these standards supports system reliability in the interconnected systems of North America. The Power Marketing Administrations have continued to exceed

these requirements even though the regulatory changes in the electric utility industry have resulted in an increase in the number of complex transactions, significant market changes, and changing hydrological conditions. An example of the Power Marketing Administrations’ success in this area is illustrated in the graph below.

**Control Performance Standard 1:
Statistical measure of area control error variability
and its relationship to frequency error per year**



As can be seen from the figure, the Power Marketing Administrations have maintained consistently high reliability figures and exceeded the North American Industry average in meeting the Control Performance Standard 1 requirement. Similar results for Control Performance Standard 2 have also been experienced.

PERFORMANCE RESULTS

The following pages contain a summary of our performance for our most significant Energy goals and targets in Fiscal Year 2003. These performance results are displayed in five categories of programmatic activities: fossil energy, energy efficiency, nuclear energy, energy information and power marketing.

Though most goals were met, the Continuing Resolution that delayed funding until midway through the year did cause less than a handful of milestones to be missed. For example, the Office of Fossil Energy's two milestones for completing initial laboratory tests to determine performance capabilities of sorbents, sieves, and membranes for removing mercury, sulfur, nitrogen, and carbon dioxide from gas streams had to be moved to the fourth quarter.



The Healy Power Plant, host for the Healy Clean Coal Project, is located in the Denali National Park and Reserve, an environmentally sensitive area in Alaska.

Deferring deliveries into the Strategic Petroleum Reserve in response to higher crude oil prices caused the program to miss milestones that required the reserve to be filled to 628 million barrels by the end of the year. The deferral did result in a benefit of 2.9 million barrels extra to be added to the government's emergency stockpile.



Miner is inspecting double ranging drum shearer.

All hydrogen and fuel cell related programs were on target in Fiscal Year 2003, which put the Department in a good position to start the Hydrogen Fuel Initiative announced midway through the Fiscal Year.

FOSSIL ENERGY

Program Goal ER 4-1: Support the President's Clear Skies Initiative by completing in 2005 initial demonstration tests of technologies with potential to reduce: mercury by 50-70 percent; nitrous oxide to <0.15 lb/mmBtu at cost of Selective Catalytic Reduction; particulate matter 2.5 by 99.9 percent; and acid gases by 95 percent. By 2010, test technologies for advanced cooling, mercury reduction by 90 percent and 66 percent increase in byproducts utilization by power plants.

Target ER 4-1b: Initiate developmental testing of Selective Catalytic Reduction catalysts for reducing nitrous oxide emissions from alternatively fueled boilers.

Assessment and Commentary: The target was achieved. Slipstream testing was initiated for Selective Catalytic Reduction catalyst evaluation, including long-term testing for catalyst performance and deactivation over a six-month time period and testing for performance on alternatively fueled boilers, which supports the long-term goal for development of fuel flexible, zero-emissions technologies.

Target ER 4-1c: Complete fine particulate monitoring in the Upper Ohio River Valley region; complete field testing of alternative particulate matter collection technologies representing at least two approaches for achieving 99.99 percent removal; initiate research of particulate matter 2.5 and mercury transport and deposition.

Assessment and Commentary: This target was achieved. Alternative technologies for flue gas conditioning and for electrocore treatment were studied in field trials directed at assessing potential of the technologies for achieving the near-term particulate control objective; work was initiated to examine fine particulate and mercury transport and deposition in the Ohio River Valley; and fine particulate monitoring in the Upper Ohio River Valley Region were completed.

Program Goal ER 4-2: By Fiscal Year 2008, complete development of an advanced coal power system capable of achieving 50 percent thermal efficiency at a capital cost of \$1,000/kilowatt or less.

Target ER 4-2b: Complete initial laboratory-scale performance testing of hydrogen separation membranes using simulated gas streams.

Assessment and Commentary: Initial laboratory-scale performance testing of hydrogen separation membranes was completed. A variety of systems for development of hydrogen separation membrane, which would contribute to achieving the mid-term efficiency and cost goals, were subjected to initial laboratory tests. Testing included initial examinations of the performance potential of membranes in achieving production rates considered to be desirable in commercial applications, and of structural characteristics and fabrication techniques needed for hydrogen separation membrane operations. One alternative membrane production milestone has been delayed but this did not affect the completion of the annual target.

Target ER 4-2c: Complete initial laboratory tests to determine performance capabilities of sorbents, sieves, and membranes for removing mercury, sulfur, nitrogen, and carbon dioxide from gas streams.

Assessment and Commentary: Initial laboratory and bench-scale testing of sorbents and other systems were completed. These tests identify approaches for achieving levels of sulfur, mercury, fine solid particles, nitrogen (as ammonia), and multi-contaminant (including carbon dioxide) removal, which might be viable candidate approaches leading to a zero emissions plant, and for establishing facilities and capabilities to further test sorbent performance. One milestone, which offered an alternate method of removing solids, was not met but it did not impact overall achievement of the annual target.

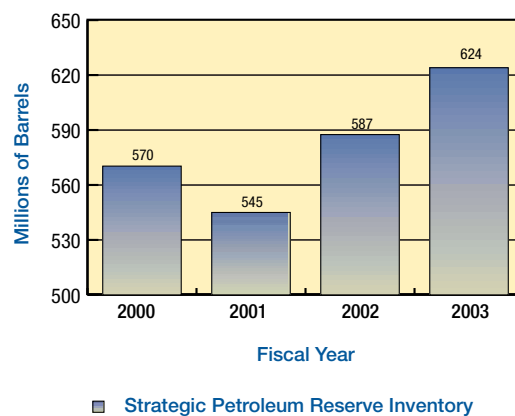
Program Goal ER 5-1: By Fiscal Year 2008, develop advanced technologies and employ scientifically-based policy options to increase the Nation's economically recoverable resources by 15 trillion cubic feet for natural gas and 140 million barrels for oil; and reduce future costs of exploration and production by \$10 billion.

Target ER 5-1b: Conduct two field tests of improved drilling technology that will improve the productivity of gas reservoirs and reduce drilling costs and two field tests of technologies to improve natural fracture detection to increase the percentage of economically producing wells of all wells drilled.

Assessment and Commentary: All planned milestones were met. The Intellipipe offers 200,000 times more data transfer than current systems and will significantly reduce drilling costs by providing valuable downhole data to drillers. The short-radius composite drill pipe is making shallow targets more economical by increasing the life expectancy of the drill pipe and thereby reducing overall drilling costs. The test well in the Anadarko basin is verifying the geomechanical approach for fracture prediction and could improve the success of drilling economical wells. The arctic platform will reduce environmental impacts in Alaska and reduce drilling costs by making drilling viable year-round.

Program Goal ER 6-1: Maintain operational readiness of the Strategic Petroleum Reserve to draw down at a sustained rate of 4.4 million barrels per day for 90 days, within 15 days notice by the President, and fill the Strategic Petroleum Reserve to its current capacity of 700 million barrels by Fiscal Year 2005.

Target ER 6-1b: Add 39.8 million barrels (cumulative from April 2002). End-of-year crude oil inventory will equal 628 million barrels.



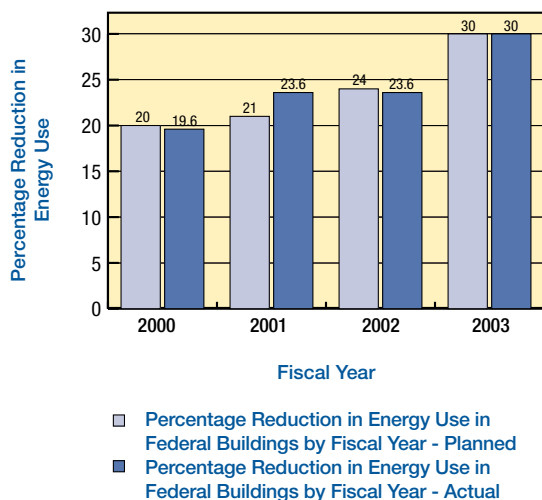
Assessment and Commentary: The crude oil inventory of the Strategic Petroleum Reserve at the end of

September was 624.4 million barrels versus our target of 628 million barrels. The variance was caused by deferral of nearly 20 million barrels in oil receipts during the Venezuela oil crisis. For this deferral, we will receive an additional 2.9 million barrels premium.

ENERGY EFFICIENCY

Program Goal ER 1-1: (1) By Fiscal Year 2005, Federal Energy Management Program activities will support Federal agency efforts to decrease energy intensity in standard Federal facilities by 30 percent and, by 2010, 35 percent, relative to the 1985 statutory baseline levels of 139,143 British thermal units per gross square foot; (2) by 2005, the costs to the Department for energy and utilities will decline by 10 percent or \$30 million annually at expected purchased energy prices; (3) Departmental Energy Management Program Team activities will decrease the energy consumption intensity in Departmental facilities by 45 percent by 2005, relative to the 1985 baseline levels of 441,776 British thermal units per square foot.

Target ER 1-1a: Provide technical and design assistance for more than 40 energy efficiency, renewable energy, and water conservation projects; ten will be large-scale distributed energy resources and combined heat and power projects. Report results achieved through the end of Fiscal Year 2001.



Assessment and Commentary: The Fiscal Year 2003 technical and design assistance goal of more than 40 projects was exceeded, whereby assistance was provided

to 56 projects, mostly to the Department of Defense, General Services Administration, and National Park Service. These projects include ten large scale distributed energy resources and combined heat and power projects. These projects were evenly distributed throughout the six regions.

Target ER 1-1e: Train 4,000 Federal energy personnel in best practices supporting National Energy Policy education goals.



Wind power plant located in Altamont Pass near Livermore, California (photo courtesy of U.S. Windpower).

Assessment and Commentary: We exceeded target by training 6,270 Federal employees in workshops for the year. Workshops were held for Super Energy Savings Performance contracts. Renewable Energy, Design Strategies for Buildings, Operations and Maintenance, Water Resource Management, and Laboratory Design. The Federal Energy Management Program conducted over 30 workshops including one web-based course and three telecourses.

Program Goal ER 1-2: Between 1991 and 2010, contribute to a 25 percent decrease in energy intensity (as compared to 1991) by the energy-intensive industries of the future (a potential savings of 4.5 quads).

Target ER 1-2b: 6,200 energy intensive United States plants will apply Office of Energy Efficiency and Renewable Energy technologies and services achieving up to a 15 percent improvement in energy productivity per plant.

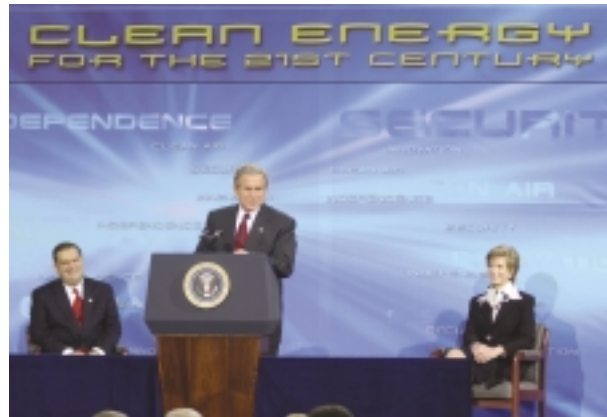
Assessment and Commentary: The target of 6,200 plants was met for Fiscal Year 2003, and it is expected that, as plants contacted within the fourth quarter of Fiscal Year 2003 continue to be added to the database, the goal will be exceeded.

Program Goal ER 1-3: By 2010, Hybrid and Electric Propulsion research and development activities will reduce the production cost of a high power 25 kilowatt battery for use in light vehicles from \$3,000 in 1998 to \$500, with an intermediate goal of \$750 in 2006 enabling cost competitive market entry of hybrid vehicles.

Target ER 1-3a: Reduce high power 25 kilowatt estimated battery cost to \$1,180 per battery system.

Assessment and Commentary: The target was met. A cost analysis for a battery that will deliver 25 kilowatt pulses and meet other FreedomCAR goals related to weight, volume, cycle life, and calendar life predicts that complete battery systems would cost less than \$1,180 in production quantities of 100,000 batteries per year. The prediction was based upon the cost of currently available technology developed under a contract with the United States Advanced Battery Consortium. This consortium functions as a prime contractor to the Department under a cooperative agreement. The cost prediction was provided as part of a final design review held during the third quarter of Fiscal Year 2003.

Program Goal ER 2-1: (1) The Hydrogen Technology subprogram will develop and demonstrate hydrogen generation technology that will reduce the cost of producing hydrogen from natural gas from (untaxed) \$5.00 per gallon of gasoline equivalent in 2000, when produced in large quantities, to (untaxed) \$1.50 per gallon of gasoline equivalent in 2010; (2) Fuel Cell research and development activities will reduce the production cost of the hydrogen or gasoline fueled 50 kilowatt vehicle fuel cell power system (including hydrogen storage) from \$275/kilowatt in 2002 to \$45/kilowatt in 2010 at



President George W. Bush at the podium with Secretary of Energy Abraham and Environmental Protection Agency Administrator Christie Todd Whitman. As part of the FreedomCAR (cooperative automotive research) and fuel initiative, the "Clean Energy for the 21st Century" exhibit in Washington, D.C. at the National Building Museum showed examples of industry partnering with government to develop efficient hydrogen fuel cells. The exhibit included vehicles, cell phones, laptop computers and cameras that can be powered by hydrogen fuel cells.

production levels of 500,000 units per year (projected cost); (3) Stationary Fuel Cell research and development activities will increase the efficiency of natural gas or propane fueled 50 kilowatt stationary fuel cell systems from 35 percent in 2002 to 50 percent in 2010.

Target ER 2-1a2: Complete design of the 5,000 pounds per square inch cryogenic-gas tank and 10,000 pounds per square inch compressed gas tank to achieve 1.3 kilowatt hour/kilogram and 1.0 kilowatt hour/liter.

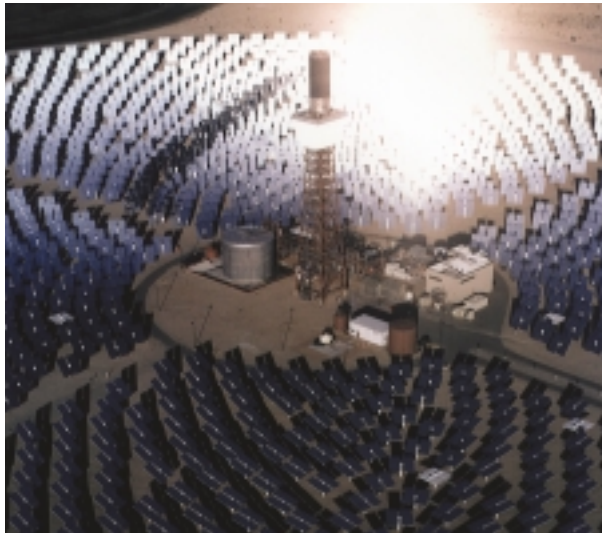


President Bush and Secretary Abraham being briefed on the ECD Ovonics scooter that runs on solid hydrogen fuel.

Assessment and Commentary: All quarterly milestones were met and the annual target was achieved. The Department completed the preliminary solid-state system design, the safety analysis for the solid-state system and a prototype 1-kilogram solid-state system.

Target ER 2-1b1: Achieve \$225/kilowatt for a 50 kilowatt fuel cell power system.

Assessment and Commentary: This target was met. Full-size bipolar plates, manufactured by high rate processes in fuel cell stacks that meet physical and performance standards, have been demonstrated with replicable results. Systems analysis modeling incorporation of accomplished milestones demonstrates achievement of the cost goal of \$225/kilowatt.

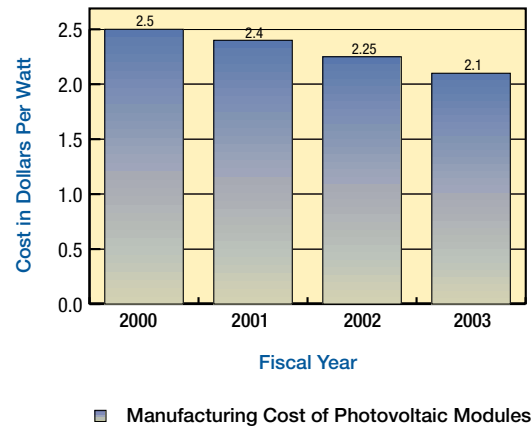


Solar Two is the most advanced solar thermal, central receiver power plant in the world. It is a modification of Solar One, reusing the 91 meter tower, turbine, generator and a field of 1800 motorized mirrors or heliostats.

Program Goal ER 2-4: (1) By Fiscal Year 2006, reduce the cost of grid-tied (battery free) photovoltaic systems to the end user (including operation and maintenance costs) to \$4.50 per watt, from a median value of \$6.25 per watt in 2000, which requires a reduction in the cost of the photovoltaic module itself to \$1.75 per watt, compared with a current cost of \$2.50 per watt, and would reduce the average cost of electricity generated by photovoltaic systems from a current \$0.25/kilowatt hour to \$0.19/ kilowatt hour; and (2) by 2005, reduce the cost of solar water heating from \$0.08/ kilowatt hour in 2001 to \$0.04/ kilowatt hour.

Target ER 2-4a: Reduce manufacturing cost of photovoltaic modules to \$2.10 per watt (equivalent to \$0.19 to \$0.24 per kilowatt hour price of electricity from an installed solar system).

Assessment and Commentary: This target was met. The Solar Energy Technology Program performs an annual survey of photovoltaic module manufacturing costs. Analysis of the results of the survey, which was conducted during the third quarter of Fiscal Year 2003, showed that photovoltaic manufacturing costs have



been reduced to the target level of \$2.10 per watt. The survey data are provided by industry members on a voluntary basis.

Program Goal ER 3-1: (1) From 2003 to 2011, complete weatherization upgrades for a total of 1.2 million low income households; (2) By 2007, work with Clean

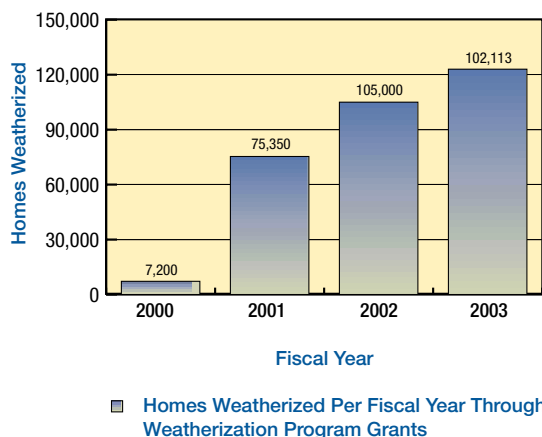


ENERGYSTAR® house, Prairie Crossing Environmental Community, near Libertyville, Illinois. Houses like this use 50 percent less energy for heating and cooling than comparable conventional homes. ENERGYSTAR® is a joint project of the Department and the Environmental Protection Agency.

Cities coalitions to increase the number of alternative fuel vehicles from 110,000 in 2001, to 250,000 in 2007, and 400,000 in 2010, leveraging an outcome of 1,000,000 alternative fueled vehicles, consuming one billion gallons of alternative fuel by 2010.

Target ER 3-1a: Award \$223 million in Fiscal Year 2003 funds through 53 Weatherization program grants, including all 50 states, to enable the direct weatherization of at least 93,000 homes. This will bring the cumulative number of homes weatherized to over 5.2 million.

Assessment and Commentary: The annual target was exceeded. The Weatherization Assistance Program awarded \$233 million in Fiscal Year 2003 funds. We estimate the actual number of homes was 102,113 homes bringing the cumulative number of homes to over 5.2 million.



Target ER 3-1c: Achieve a total of 135,000 Alternative Fuel Vehicles in operation in Clean Cities, which will displace 180 million gallons of gasoline and diesel fuel a year.

Assessment and Commentary: This target was exceeded. In Fiscal Year 2002, Clean Cities coalitions added over 9,700 light duty Alternative Fuel Vehicles and over 7,400 heavy duty Alternative Fuel Vehicles to their regions, bringing the total number of Alternative Fuel Vehicles to 151,228 and displaced an estimated 200+ million gallons of fuel. The steady increase in heavy duty vehicles is significant since oil displacement is so much greater with these vehicles. In addition, coalitions added almost 270 new public and over

300 new private alternative fuel stations in 2002. In Fiscal Year 2003, Clean Cities provided \$200,000 to stimulate an investment of over \$3,000,000 from U.S. Agency for International Development to support future vehicle and infrastructure purchases by building capacity with training and information exchange. Selected and awarded over \$5 million in SEP grants in September 2003 to build the alternative fuel vehicle infrastructure.

NUCLEAR ENERGY

Program Goal ER 7-1: Deploy new nuclear generation to meet energy and climate goals by enabling an industry decision to deploy at least one new advanced nuclear power plant in the United States by 2010 to support the President's goal of reducing greenhouse gas intensity by 18 percent by 2012; completing design of an economic, commercial-scale hydrogen production system using nuclear energy by 2015; and developing a next-generation nuclear system for deployment after 2010, but before 2030, that provides significant improvements in proliferation and terrorism resistance, sustainability, safety and reliability, and economics.

Target ER 7-1a: Under the cooperative agreements with United States power generation companies, support the preparation and submittal of at least two Early Site Permit applications for commercial sites to the Nuclear Regulatory Commission.

Assessment and Commentary: The target was achieved when two utilities have completed and submitted their Early Site Permit applications to the Nuclear Regulatory Commission in spite of difficulties with new seismic qualification requirements. In addition, the third utility submitted its Early Site Permit application to the Nuclear Regulatory Commission on October 21, 2003.

Submittal of the Early Site Permit applications to the Nuclear Regulatory Commission is a major step toward demonstration of new and otherwise untested Nuclear Regulatory Commission regulations. The untested Nuclear Regulatory Commission licensing processes have been identified by the nuclear industry as some of the major impediments to deployment of new nuclear power plants in the United States. Successful demon-

stration of the Early Site Permit process supports the Department's Program Strategic Performance Goal ER7-1.

Target ER 7-1b: Following a competitive process, award at least one industry cost-shared cooperative agreement for technology development and regulatory demonstration activities.

Assessment and Commentary: The annual performance target was not achieved. Achievement of this target and the associated procurement activities have been delayed into Fiscal Year 2004 pending the outcome of the Energy legislation currently under consideration in Congress. The outcome of this legislation could impact the work scope of the pending solicitation. In addition, potential nuclear industry respondents to the solicitation are awaiting the outcome of the Energy legislation before preparing proposals for submittal to the Department.

Target ER 7-1d: Develop preliminary functional requirements for the Generation IV Very-High-Temperature Reactor.

Assessment and Commentary: Preliminary functional requirements for the Very-High Temperature Reactor have been established and documented in the report Next Generation Nuclear Plant - High Level Functions and Requirements. This report was prepared by the Idaho National Engineering and Environmental Laboratory and provided to the Department on September 25, 2003. This report establishes the high level requirements that will provide a critical input for meeting this target.

Program Goal ER 7-2: Maximize energy from nuclear fuel by enabling a decision by 2010 to forego the technical need for a second repository, while still supporting expanded nuclear power in the United States, and develop the technology to reduce commercial high-level waste by a factor of four by 2015; and commercializing technology to reduce long-term radiotoxicity and heat load of spent fuel by 2030.

Target ER 7-2b: Demonstrate a laboratory scale extraction of plutonium and neptunium as well as cesium and strontium from other actinides and fission

products to support the development of advanced fuel cycles for enhanced repository performance.

Assessment and Commentary: This target was exceeded. Two laboratory scale demonstrations of the extraction of plutonium and neptunium from spent nuclear fuel were successfully completed during July and early August at Oak Ridge National Laboratory. Additional hot tests were completed during the fourth quarter at both Oak Ridge National Laboratory and Argonne National Laboratory. These separations results have demonstrated that the basic experimental flowsheets are sound, and have contributed to meeting this target.

Program Goal ER 7-4: Maintain and enhance national nuclear capabilities by producing highly-trained nuclear scientists and engineers to meet the Nation's energy, environmental, health care, and national security needs; preserving critical user facilities in a safe, secure, environmentally-compliant, and cost-effective manner to support national priorities; replenishing Federal technical and management staff with emphasis on obtaining high-caliber junior professionals with diverse backgrounds; and delivering isotope products and services for commercial, medical, and research applications where there is no private sector capability or sufficient capacity does not exist to meet United States needs such that by December 2004, deliveries continue to be made to customers as needed.

Target ER 7-4a: Protect national nuclear research assets by funding four regional reactor centers; providing fuel to University Research Reactors; funding 20 to 25 Department of Energy/Industry Matching Grants, 18 equipment and instrumentation upgrades, and 37 Nuclear Engineering Education Research grants; and providing 18 fellowships and 40 scholarships.

Assessment and Commentary: The successful completion of both the quarterly measures and annual target permitted the program to meet this target. The issuance of funding for reactor sharing, award of research and educational grants, continuation of support for four Innovations in Nuclear Infrastructure and Education grants, and the award of two additional Innovations in Nuclear Infrastructure and Education grants enabled universities to maintain support of oper-

ations and retain their physical infrastructure to educate and train the next generation of nuclear scientists and engineers.

Target ER 7-4d: Demonstrate the operational capability of radioisotope power systems infrastructure by fabricating flight quality products at each of the major facilities (i.e., at least eight iridium clad vent sets at Oak Ridge National Laboratory and at least eight encapsulated Plutonium-238 fuel pellets at Los Alamos National Laboratory), and by processing at least two kilograms of scrap Plutonium-238 at Los Alamos National Laboratory.

Assessment and Commentary: The fabrication of the two remaining iridium clad vent sets was completed at the Oak Ridge National Laboratory meeting the target and bringing the total for the year to eight iridium clad vent sets. Additionally, 2.9 kilograms of Plutonium - 238 were processed at the Los Alamos National Laboratory. This accomplishment meets the Fiscal Year 2003 performance target.

ENERGY INFORMATION

Program Goal ER 8-1: Provide national and international energy data, analyses, information, and forecasts to meet the needs of energy decision-makers and the public in order to promote sound policymaking, efficient energy markets, and public understanding.

Assessment and Commentary: Goal Met. The Energy Information Administration continues to experience significant year after year percentage increases in both media outlet use of Energy Information Administration products as well as user sessions at the Energy Information Administration website, exceeding targets. The quality of Energy Information Administration products and services was best described by Time Magazine when they listed the Energy Information Administration website as one of its "Best Web sites for Business" at the end of Fiscal Year 2002 saying: "For free research on a crucial industry, try this website from the Department of Energy, which forecasts future prices and trends for oil, gas, and other petroleum products. In addition to statistical tables, the Energy Information Administration produces clearly written reports that spell out in plain

English what the numbers mean. It also features profiles of the energy sector in various countries and regions."

POWER MARKETING

Targets ER 9-1a/9-2a/9-3a and 9-4a: Ensure that the power system control area operated by all the Department's Power Administrations (Bonneville, Southwestern, Southeastern, and Western Area Power) receives Control Compliance Ratings of "Pass" on both of the North American Electric Reliability Council's reliability performance standards in every month.

Assessment and Commentary: Bonneville attained "pass" ratings for each of the 12 months for both of the North American Electric Reliability Council Control Performance Standards used, which measure the balance between power generation and load: One standard measure generation/load balance and support-system frequency in one-minute intervals; the other standard limits any imbalance magnitude to acceptable levels. System reliability has received much attention due to the Northeast blackout of August. Bonneville's system has performed reliably, although it is recognized that significant investment in the infrastructure is needed in the near future to maintain this level of reliability. Funds have been budgeted for improvements to critical infrastructure, and third-party financing is being investigated.

After four quarters, Southwestern Power Administration has a "Pass" on 24 out of 24 control compliance ratings. Ratings for the year are 187.24 for Control Performance Standard 1 and 99.47 for Control Performance Standard 2.

Southeastern exceeded the North American Electric Reliability Council control compliance standards of balancing generation to load. Although lower than the 12 month period, the fourth quarter results are consistent with the industry average and reflect Southwestern efforts to operate the power system efficiently with less wear on equipment, while maintaining reliability. Southwestern uses the North American Electric Reliability Council data to gauge how well the power system is performing and to determine if operational adjustments need to be made. Southwestern's perform-

ance is important to the overall reliability of the Eastern Interconnection electrical operations.

All Western Control Areas "passed" for all months in Fiscal Year 2003, exceeding the minimum requirements.

This measure is used to gauge power system performance using the instantaneous difference between loads and generation. A control Compliance Rating of "Pass" is achieved when a power system receives, for each month of the Fiscal Year, a Control Performance Standard 1 performance level of 100 percent minimum and a Control Performance Standard 2 performance level of 90 percent minimum.

	South- Western	South- eastern	South- western	Bonneville
CONTROL PERFORMANCE STANDARD 1 (MIN. 100)	>100	>100	197	186
CONTROL PERFORMANCE STANDARD 2 (MIN. 90)	>90	>90	99	97

Targets ER 9-1b/9-2b/9-3b and 9-4b: The Bonneville, Southwestern, Southeastern, Western Area Power Administrations will meet planned repayment of principal on power investment.

Assessment and Commentary: These targets were achieved by three of the Department's Power Marketing Administration (Bonneville, Southeastern and Western Area Power Administration). The Southwestern Power Marketing Administration did not meet its target as described below. Bonneville's actual Fiscal Year 2003 principal-amortization payment to the U.S. Treasury of \$543.7 million was \$327.9 million higher than the scheduled payment. The discretionary amounts included \$12.7 million associated with facilities that Bonneville sold during the Fiscal Year and \$315.2 million of advanced amortization done to optimize Bonneville's entire portfolio of Federal and non-Federal debt. Total advanced amortization of Federal debt now stands at \$800 million. Bonneville's Fiscal Year 2003 performance was accomplished in a very

challenging business environment that included slow economic activity and below-normal streamflows in the hydroelectric generation system. Bonneville cut operating costs drastically and instituted a two-percent rate increase to close a forecasted financial gap.

Southwestern planned to repay \$28.1 million on the Federal investment in Fiscal Year 2003. The actual repayment was \$22.7 million. Southwestern Power Administration will perform annual repayment studies in Fiscal Year 2004 to determine whether rates are sufficient to repay the Federal investment. If a rate adjustment is necessary, Southwestern Power Administration will file new rates with the Federal Energy Regulatory Commission to recover all costs.

Planned repayment is based on annual average water conditions. In Fiscal Year 2003, Southwestern experienced below average water conditions, particularly in the fourth quarter, and consequently did not meet its planned repayment. Repayment on the Federal investment is made over a 50-year period. In Fiscal Year 2003, the Federal investment that is due was paid on time. Through Fiscal Year 2003, Southwestern has repaid an estimated 48 percent of the cumulative Federal investment.

Southeastern Power Administration met 175 percent of its annual planned repayment of Federal principal at the end of Fiscal Year 2003. Above average water conditions, revised repayment plans and reformulated rates in two major hydropower systems enabled Southeastern Power Administration to exceed its repayment plan target.

Collective data for all Western Power Administration projects through the fourth quarter of Fiscal Year 2003 indicates that the planned repayment of principal on Federal power investment forecasted for Fiscal Year 2003 was met - exceeding the measure standard by 5 percent.

Targets ER 9-1c/9-2c/9-3c and 9-4c: The Bonneville, Southwestern, Southeastern, and Western Area Power Administrations will achieve a safety performance of a 3.3 recordable accident frequency rate for recordable injuries per 200,000 hours worked or the Bureau of Labor Statistics' industry rate, whichever is lower. (Safety performance is measured using the recordable

accident frequency rate for recordable injuries per 200,000 hours worked).

Assessment and Commentary: Bonneville's overall recordable accident frequency rate for the year of 2.6 per 200,000 hours worked is below both the 3.3 frequency rate and the Bureau of Labor's most recent rate of 5.0. Bonneville's safety performance for the year revealed a slight increase in the accident rate from prior years, after several years of steady decreases. This appears to be the result of our aging workforce. Nevertheless, Bonneville continues to be well below the benchmark. Safety-promoting efforts are being directed at Supervisors' safety responsibilities through training and performance standards.

annual target accident frequency rates for the Southeastern and Western Area Power Administrations were met.



Construction of Taft-bell towers. The Bonneville Power Administration is the Federal agency created by Congress in 1937 to sell and deliver power from the Bonneville and Grand Coulee dams.

For Southwestern Power Administration actual recordable accident frequency rate is 1.3. Southwestern incurred two recordable accidents in the first quarter and none for the remainder of the Fiscal Year. In Fiscal Year 2003, Southwestern implemented a Plan of Action to improve its safety record. As a result, employees are more aware of hazards connected with their jobs and ways to avoid accidents. Southwestern has an excellent safety record compared to the Bureau of Labor Statistics' electric utility industry average of 4.8, thereby, contributing to the safety of employees and the reliability of the interconnected transmission system. The