

# Clean ENERGY

— for the —  
*21st Century*



U.S. DEPARTMENT OF ENERGY  
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY





As we enter a new millennium, one of the U.S. Department of Energy's ongoing missions will be advancing clean energy technologies. These technologies will play an increasingly important role in our future and allow us to use less energy overall, while making greater use of the non-polluting energy sources that we have here at home.

Clean energy technologies can help us tackle the problem of global climate change, improve air quality, provide additional options in competitive electricity markets and increase our energy security.

Clean energy technologies will also play an important role in the global economy. Over the next four decades, developing countries alone will require five million megawatts of new electrical capacity. This is 60 percent more than the total installed generating capacity in the world today and is potentially worth trillions of dollars in new energy projects for U.S. companies. U.S. clean energy technologies can help those countries develop existing energy resources and use energy more efficiently while generating jobs here at home.

This comprehensive clean energy approach is central to the Clinton Administration's firm belief that we can grow the economy while improving the environment.

Bill Richardson  
Secretary of Energy

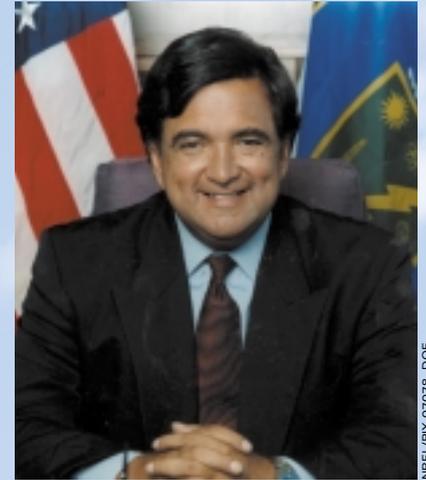
In the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), we're meeting the challenges of the new century—using less energy to power industries, vehicles, and buildings; and producing more power from clean energy sources such as renewable energy and natural gas.

For more than 20 years, we have played a leading role in developing and advancing clean energy technologies. Through a wide variety of activities, we are advancing research, development and deployment of these technologies—along with supportive policies and markets—throughout the United States and the world.

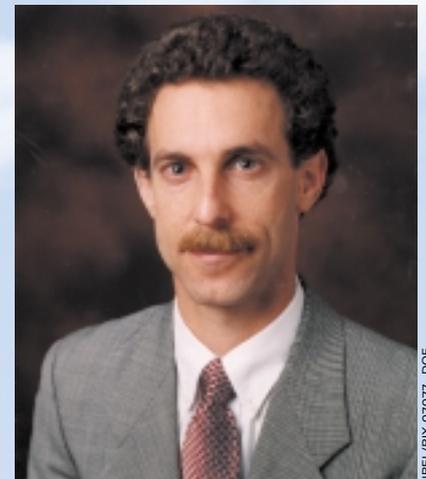
An increased emphasis on energy efficiency and renewable energy will help save money for energy consumers, make America's businesses more competitive, reduce the nation's reliance on imported oil, cut pollution and greenhouse gas emissions, and improve public health.

While the promise of clean energy technologies is clear, an increased commitment by both the public and private sectors is needed to realize the full benefits of our investment. We will redouble our efforts with Congress, industry, state and local governments, tribal nations, and the public to move the nation toward our goal of Clean Energy for the 21st Century.

Dan W. Reicher  
Assistant Secretary of Energy  
Office of Energy Efficiency and Renewable Energy



NREL/PIX 07078, DOE



NREL/PIX 07077, DOE

## The Federal

# Focal Point

FOR CLEAN ENERGY

*This school bus in San Antonio, Texas, runs quietly and efficiently on domestically available natural gas, while producing lower harmful emissions.*



NREL/PIX 04192, JOHN KUBESH



NREL/PIX 06457, KISS & CATHCART, ARCHITECTS

*Above: EERE's State Energy Program funded an analysis of energy efficiency options for the 4 Times Square building, seen here under construction in New York City. The building incorporates daylighting, fuel cells, photovoltaic panels, and other energy innovations.*

*Right: EERE and the U.S. Environmental Protection Agency work together on the ENERGY STAR® program, which labels energy-efficient products and buildings.*



**T**he U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) develops and deploys clean energy technologies that save energy and cut pollution. The combined work of EERE and the DOE Offices of Fossil Energy and Nuclear Energy is helping prepare our country for the energy challenges of the next century and beyond.

Clean energy technologies include energy-efficient products and practices, which use less energy, and renewable energy sources and natural gas, which produce power and heat more cleanly than many conventional sources. Renewable energy comprises domestic, readily-available energy sources such as biomass, wind, solar and geothermal energy, and hydro-power. In advancing these clean energy technologies, EERE helps to protect the environment, support U.S. economic competitiveness, and enhance our nation's energy security. EERE achieves these goals through a strong and balanced program of research, development, and deployment of advanced energy technologies, along with support for critical policies and markets.

These activities are conducted in partnership with the private sector, state energy offices, universities, and other research organizations. EERE's reliance on partnerships stimulates private investments and gets more mileage out of federal investments. These partnerships also help ensure that we develop technologies that private industry is interested in carrying forward to the marketplace.

Because many of EERE's programs overlap with the goals of other federal agencies, the office works cooperatively with these agencies on several activities. For example, the same technologies that reduce energy use also reduce air pollution and energy costs, so EERE works jointly with the National Park Service on initiatives such as Green Energy Parks, a program to increase the use of energy efficient and renewable energy technologies in our National Parks.

EERE is divided into five programs that focus their efforts on specific sectors of the energy economy: buildings, transportation, industry, power, and the federal government as an energy user. To support these programs, EERE works closely with states through the State Energy Program, providing grants for clean energy technologies. EERE also manages the Weatherization Assistance Program, which improves the energy efficiency of low-income housing throughout the nation.

The Golden Field Office, located in Golden, Colorado, serves as the primary field agent for EERE, developing partnerships between EERE, DOE national laboratories, universities, and the private sector.

Golden also administers the contract for the National Renewable Energy Laboratory (NREL). NREL is one of eight DOE national laboratories—including Argonne, Idaho, Lawrence Berkeley, Lawrence Livermore, Oak Ridge, Pacific Northwest, and Sandia National Laboratories—that support EERE through research, development, and deployment activities.

Six DOE Regional Offices serve as regional liaisons, providing project management and technology deployment for EERE programs. The six offices—in Atlanta, Boston, Chicago, Denver, Philadelphia, and Seattle—allow EERE to develop regional relationships with key federal, state and local government organizations, industries, and others. The Regional Offices provide feedback on local energy issues, concerns, and opportunities, serving as a link between EERE programs and the end-users of EERE's services.

# Meeting the Challenges of the 21st Century

## WITH INNOVATIVE TECHNOLOGIES

### Maintaining a Clean and Healthy Environment

Energy and the environment are strongly linked—the use of energy is the largest source of air pollution in this country. Vehicles and power plants are the largest contributors to problems like ground-level ozone, acid rain, and particulates. Energy use as a whole also generates most of the greenhouse gas emissions in the U.S.

What price should we pay for clean air and preventing climate change? Some people say that we will have to make tradeoffs and sacrifices, and that we must accept pollution in our lives. But that doesn't have to be the case. The innovative technologies DOE is developing will help achieve a clean environment and a healthy economy. For example, clean energy technologies can help low-income communities capitalize on energy-saving opportunities. The money saved can then be reinvested to help achieve other priorities such as improved air quality, which helps create more livable communities.

### Ensuring U.S. Energy Security

The energy crisis of the 1970s raised concerns throughout the United States about our energy security. Our dependence on other countries for more than one-third of our oil was a cause of great concern. Yet we now import fully 50% of the oil used in this country, and projections show imports increasing to 65% by 2020.

We pay an economic cost for importing oil. Every barrel of oil imported means another \$10 to \$20 is sent overseas. We could keep more of those dollars at home to fuel the U.S. economy, generate new jobs and increase local tax revenues. Energy efficiency and clean, domestic sources of energy are key to making this happen.

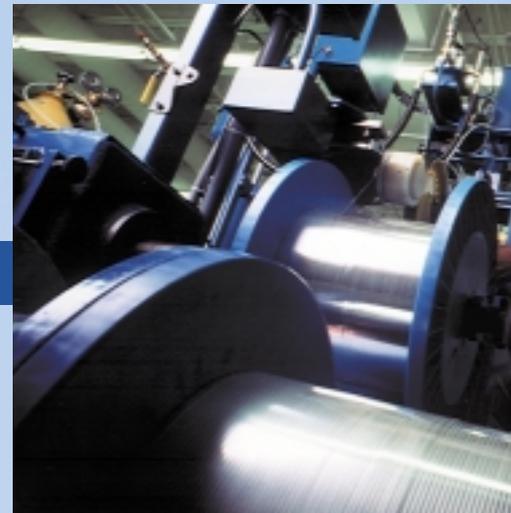
### Preparing for a Competitive and Global Energy Economy

The introduction of competition to the electric industry presents challenges and opportunities to clean energy technologies. Although market pressures could decrease investments in these technologies, competition and electric industry restructuring also provide new opportunities for the support and marketing of clean energy. DOE is working with utilities, industry, states, and consumers to ensure that the policies and market structures in the restructured electric industry take into consideration the benefits of clean energy technologies.

Although uncertainties persist in domestic energy markets, the international markets for clean energy technologies are booming. In the next 30 to 40 years, developing countries are expected to spend up to \$10 trillion on electrical power alone. Clean energy technologies may capture much of the future energy market. With this in mind, countries such as Japan, Germany, and Denmark have aggressive research programs in clean energy technologies and are in tight competition with the United States. Continued development and enhancement of clean energy technologies is essential to maintaining U.S. global competitiveness.

*"There is clearly a limit to fossil fuel. [Fossil fuel] resources and supplies are likely to peak around 2030 before declining slowly. Far more important will be the contribution of alternative, renewable energy supplies."*

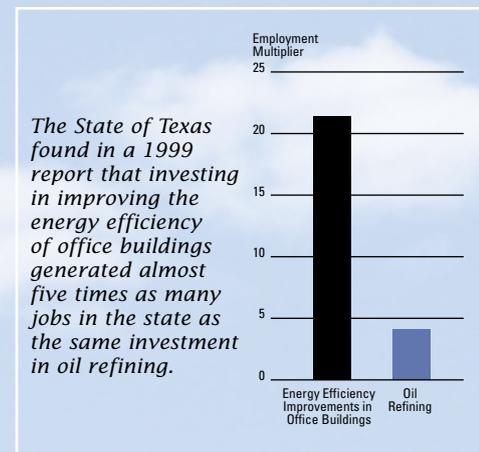
**CHRIS FAY, CHAIRMAN AND CEO,  
SHELL UK LTD., OCTOBER 1995**



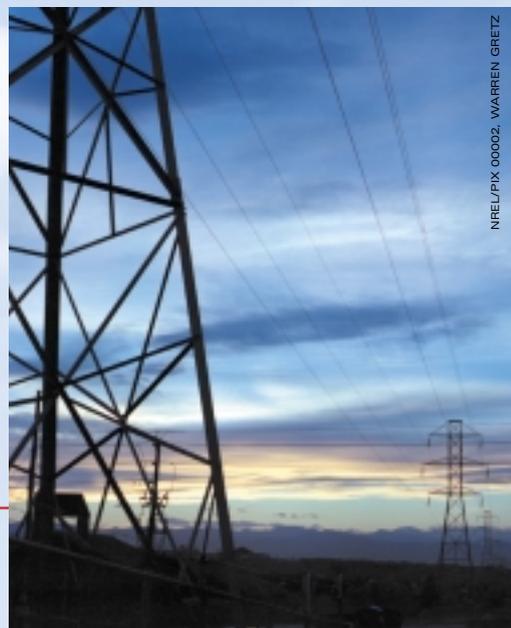
High-temperature superconducting cables transmit electricity with greater energy efficiency than copper cables and can carry three times as much current.

### Savings for Consumers

A 1997 report from the President's Committee of Advisors on Science and Technology found that research and development investments in energy efficiency have contributed to efficiency improvements that now save U.S. consumers \$170 billion a year.



Competition and electric industry restructuring provide new opportunities for increased use of clean energy.





NREL/PIX 03584, AMERICAN SUPERCONDUCTOR CORP.



Clean power technologies, such as this wind turbine, create jobs, increase local tax revenues, and keep our energy dollars at home.

*“Renewable energy will capture a significant share of the world energy market over the next 20 years.”*

**KENNETH L. LAY,  
CHAIRMAN AND CHIEF EXECUTIVE OFFICER,  
ENRON CORPORATION,  
JANUARY 1997**

*Left: Many compact fluorescent light bulbs now carry the ENERGY STAR® label. These bulbs last up to 10,000 hours and save \$25–\$45 over the life of the bulb.*



NREL/PIX 07737, D&R INTL. LTD.

*Below: Students from a science camp learn about solar energy at NREL's Outdoor Test Facility.*



NREL/PIX 06305, DAVID PARSONS

*“...DOE has a proven record of helping to turn engineering concepts into viable energy efficiency technologies. DOE has documented savings of \$27.5 billion from just five measures it helped develop during the 1970s and 80s.”*

**HOWARD GELLER, EXECUTIVE DIRECTOR,  
AMERICAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY,  
APRIL 1999**

### **Clean Energy Sources Create Jobs While Improving Our Energy Security**

EERE advances clean energy sources such as renewable energy and natural gas. Natural gas is a clean-burning fuel that can be used to heat and cool, power vehicles, and generate electricity using turbines or fuel cells.

Renewable energy draws on many energy sources for a wide variety of applications. Solar energy, for instance, can heat water, produce electricity, heat homes and other buildings, and provide process heat for industrial processes. Wind turbines capture the energy of the wind to generate electricity, just as hydro-electric power captures the energy of flowing water. Geothermal energy—the heat of the earth—can also be used for power production as well as heating or cooling buildings, or used directly as a source of process heat. And bioenergy uses organic materials—often called biomass—to produce electricity, fuels, or chemicals. Sources of biomass include trees and plants grown as energy crops, agricultural and forestry residues, and the organic component of municipal and industrial wastes.

Renewable energy sources produce little or no pollution, and they will never run out. As our country uses more renewable energy to displace conventional energy sources, our air will become cleaner, our contributions to climate change will decrease, and our energy security will increase. By developing and commercializing these technologies, we are also building new U.S. industries and generating new export markets for U.S. energy products.

Using renewable energy in the U.S. also creates jobs. For example, in a study by the Wisconsin Energy Bureau, three times as many jobs would be

generated in Wisconsin by investing in renewable energy rather than in fossil-fuel energy sources.

### **Energy Efficiency Pays for Itself While Cutting Energy Use and Pollution**

A wide range of technologies can improve the way we use energy in all aspects of our lives. For the homeowner and business owner, efficient appliances and lighting, superwindows, geothermal heat pumps, and other technologies offer energy-efficient options. For industry, energy efficiency includes not only more efficient equipment, but also entirely new processes that use less energy. For the automotive industry, higher mileage cars, using such technologies as fuel cells and hybrid power systems—combinations of electric motors and gasoline or diesel engines—provide energy-efficient alternatives. And for the electric power industry, energy efficiency involves generating and transmitting electricity with minimal energy losses. This is achievable through the use of advances such as high-temperature superconductors and combined heat and power systems, which boost the efficiency of power generation by using waste heat to supply thermal energy to buildings or industries.

Our country has benefitted from improved energy efficiency for the past 30 years. Until 1970, U.S. energy use was directly related to the gross national product. The assumption was that as the economy grew, energy use would also grow. But since then, energy use has grown more slowly than the economy as the country has shifted to more energy-efficient technologies. In fact, in 1998, U.S. energy use actually dropped slightly while the economy grew by 3.9%. This drop in energy use was due in part to the increased use of technologies developed by DOE and its partners.

## Developing Clean Energy

# Solutions

FOR OUR COUNTRY'S NEEDS

### For Industry

EERE helps the nine most energy-intensive industries—the pulp and paper, agricultural, chemical, petroleum, glass, mining, aluminum, steel, and metalcasting industries—reduce their energy use and cut pollution. These nine industries account for 75% of the energy used and 90% of the pollution produced by U.S. industry. EERE is helping to develop new processes and equipment to reduce energy use, increase output for the same energy use, or convert wastes into energy to reduce each industry's net energy consumption.

EERE also helps improve the efficiency of equipment and systems used throughout industry, such as industrial motors, steam and compressed air systems, and combustion technologies. To help industries save energy, 30 Industrial Assessment Centers, located at universities around the country, conduct no-cost energy assessments. To date, more than 8,000 assessments have been performed, resulting in energy efficiency projects that are saving an average of \$55,000 per year for each participant.

### For Transportation

Vehicles consume most of the petroleum used in the United States and contribute significantly to air quality problems in metropolitan areas. To address these issues, DOE and six other federal agencies are working with the major U.S.-based auto makers in the Partnership for a New Generation of Vehicles (PNGV), which has the goal of creating a full-size car that achieves 80 miles per gallon by 2004, without sacrificing safety, affordability, or other features we expect in an American car.

EERE is the government's primary technical organization in the PNGV program and leads the development of fuel-cell and hybrid electric vehicles, advancing technologies such as compression-ignition

direct-injection engines, high-efficiency electric motors, high-power batteries, and lightweight materials. EERE participates with industry on the application of these and other technologies to the development of cleaner, more fuel-efficient trucks.

EERE is also helping to expand the use of alternative fuel vehicles (AFVs), which use such fuels as ethanol, natural gas, methanol, or electricity. EERE's Clean Cities program encourages both the use of AFVs and the development of a refueling station infrastructure throughout the nation. More than 3,000 organizations are now participating in the program through more than 75 Clean Cities Coalitions nationwide.

### For the Power Industry

To meet the clean energy needs of the power industry, EERE is advancing technologies for generating electricity from biomass, wind, solar and geothermal energy, hydropower, and natural gas.

Wind energy is the fastest growing renewable electricity source, in part because the cost of electricity from wind has decreased to about five cents per kilowatt-hour. Current EERE research is aimed at cutting those energy costs in half by 2002, making wind energy competitive with other generation technologies.

The solar (photovoltaic) electricity industry is also experiencing rapid growth, increasing by 10% to 30% each year since 1990. EERE administers a number of programs to advance solar-cell efficiency, improve manufacturing processes, and encourage the use of photovoltaic systems in our country.

In addition to electrical generation technologies, EERE is developing the technologies needed for a more efficient operation of the power industry, including the use of high-temperature superconducting cables and transformers,



NREL/PIX 04824, NATIONAL PARK SERVICE

Above: The Federal Energy Management Program provided technical assistance to help Pinnacles National Monument in California implement a 9.6-kilowatt photovoltaic system. The system provides power for three employee residences, a ranger station, visitor center, campground, comfort station, well pump and two wastewater effluent pumps. It eliminates a \$20,000 annual fuel bill for a diesel generator that produced 143 tons of carbon dioxide each year.

*"Broad promotion of the DOE/EPA ENERGY STAR® label will make it easier for consumers to recognize and buy energy-efficient homes, products, technologies, and services that benefit their pocketbooks and the planet—especially as Earth Day 2000 shines the spotlight on the multiple problems created by inefficient energy and the benefits of clean and efficient energy."*

**DAVID M. NEMTOW, PRESIDENT,  
ALLIANCE TO SAVE ENERGY,  
SEPTEMBER 1999**



FORD MOTOR COMPANY

NREL/PIX 00426, WARREN GRETZ



*"...We strongly believe in the merits of research conducted under collaborative, government-industry programs such as PNGV [Partnership for a New Generation of Vehicles], and we are committed to maintaining a meaningful level of effort and resources."*

**WILLIAM F. POWERS, VICE PRESIDENT—RESEARCH,  
FORD MOTOR COMPANY, JULY 1997**



*Below: This prototype house in the Civano Development in Tucson, Arizona, was constructed and tested under the Building America Program and incorporates energy-efficient building techniques.*



INRE/PIX 0715, SARA FARRAR



BUS2064, COREIS

*EERE's Industries of the Future program helps the most energy-intensive industries reduce their energy use and cut pollution.*

*Left top: Advanced automotive technologies, such as this lightweight Ford P2000 concept car, will help reduce our dependence on foreign oil imports while improving the air quality in our cities.*



19020019, WESTSTOCK

*EERE's Weatherization Assistance program performs energy audits and adds efficiency improvements for low-income Americans, helping to slash home energy costs.*

*Left bottom: Geothermal energy is a reliable source of electricity that produces minimal air emissions.*

advanced energy storage technologies, and technologies to produce hydrogen, store it, and generate electricity from it.

### **For Buildings**

Americans spend more than \$240 billion each year on energy for our homes and other buildings. It's possible today to build homes and commercial buildings that are much more energy-efficient than most buildings currently being constructed, cutting energy costs significantly, often without adding to the building's price tag.

The Building America program forms teams of professionals from different segments of the home building industry to develop new approaches to constructing energy-efficient homes. For commercial buildings and multifamily residential buildings, the Rebuild America program creates community partnerships to retrofit older buildings with the latest technologies, usually saving about 20% to 30% on energy bills.

EERE sets enhanced efficiency standards for appliances and other building equipment, and helps implement building energy codes by providing compliance tools for builders, designers, and inspectors. Appliance standards developed by DOE and its industry partners will save American consumers nearly \$50 billion through 2010. EERE also works in cooperation with the U.S. Environmental Protection Agency to manage the ENERGY STAR® program and label for efficient appliances, office equipment, windows, light bulbs, and even entire buildings.

EERE also provides assistance to low-income Americans through the Weatherization Assistance Program. The program, implemented at the state level, performs energy audits and efficiency improvements to help these households cut their energy bills. Nationwide, the program has

weatherized more than 4.7 million homes since its inception in 1976.

### **For the Federal Government**

The federal government is the nation's largest single energy user, spending roughly \$8 billion each year on energy. The Federal Energy Management Program (FEMP) works to cut that energy use and encourage the use of renewable energy at federal facilities throughout the country. In June 1999, President Clinton signed an executive order establishing tighter energy goals, including cutting the energy use in most federal buildings by 35% by 2010, relative to 1985 levels.

Federal agencies often have insufficient funds to invest in efficiency improvements. To remove this roadblock, FEMP advances a process called energy savings performance contracting, in which an energy service company makes the initial investment in the energy-efficient equipment and fixtures, and the agency pays the company back through a portion of the energy savings. Renewable technologies can also be rolled into the contract, allowing some of the energy savings to pay for the cost of the renewable installation. FEMP also helps federal agencies contract directly with their local utility for energy services. In addition, FEMP provides training and technical assistance to federal agencies, and helps these agencies identify and purchase energy efficient products and construct sustainable buildings.

*"Energy-efficiency improvements have helped to reduce our production costs. And this has led to greater market and business growth."*

**JOHN LESSARD, PRESIDENT,  
FOX RIVER MILLS, OSAGE, IOWA,  
MARCH 1994**

## Establishing Initiatives that

# Advance

## THE U.S. ECONOMY

### Bioenergy Initiative

This initiative coordinates government efforts and partners with industry to develop an integrated bioenergy industry to produce power, fuels, and chemicals. An executive order signed by President Clinton in August 1999 established a Cabinet-level council on bioenergy, led by DOE and the U.S. Department of Agriculture. The President also established a goal of tripling the use of bioenergy by 2010.

### Brightfields Initiative

This solar energy initiative helps make use of contaminated, unused factory sites, often referred to as brownfields. The Brightfields Initiative will help communities throughout the country redevelop brownfields by bringing pollution-free solar energy and high-tech solar manufacturing jobs to these sites.

### Combined Heat and Power Challenge

Conventional electric power generation is inherently inefficient, converting only about one-third of a fuel source's energy into electricity—the rest is waste heat. But the efficiency of power generation can be boosted to 85% if the waste heat is reclaimed to supply thermal energy to buildings or industries. The goal of the Combined Heat and Power Challenge is to double the capacity for electricity generation from combined heat and power facilities by 2010.

### Distributed Power and Transmission Reliability

The Distributed Power Initiative is advancing on-site power generation as an alternative to traditional centralized power generation. The Transmission Reliability Initiative is developing technologies (including distributed power) and techniques to improve power grid reliability under a restructured electric utility environment.

### EnergySmart Schools

EnergySmart Schools is a DOE-led partnership that brings together public- and private-sector resources to reduce energy bills in our nation's schools and redirect the savings to our children and their education. The initiative works to improve the learning environment through smart energy improvements and increases the energy awareness of students, teachers, and local communities.

### International Programs

EERE's International Programs help developing countries leap-frog conventional approaches to energy production and instead make the best use of clean energy technologies. The program currently provides technical assistance to more than 60 countries, helping to build new markets for renewable energy and energy efficiency technologies while creating new opportunities for U.S. clean energy industries.

### Million Solar Roofs

Announced by President Clinton in June 1997, this EERE-led initiative is supporting the installation of one million solar energy systems on U.S. buildings by 2010. Working through more than 40 state and local partnerships joined with solar industries, electric service providers, government agencies and other organizations, the initiative eliminates barriers to solar energy use and assists in developing market demand.

### Wind Powering America

Wind Powering America establishes partnerships between public and private organizations to encourage the increased use of wind energy. This initiative has set a goal of providing 5% of the nation's electricity from wind by 2020, with the federal government setting the example by obtaining 5% of its electricity from wind energy by 2010.

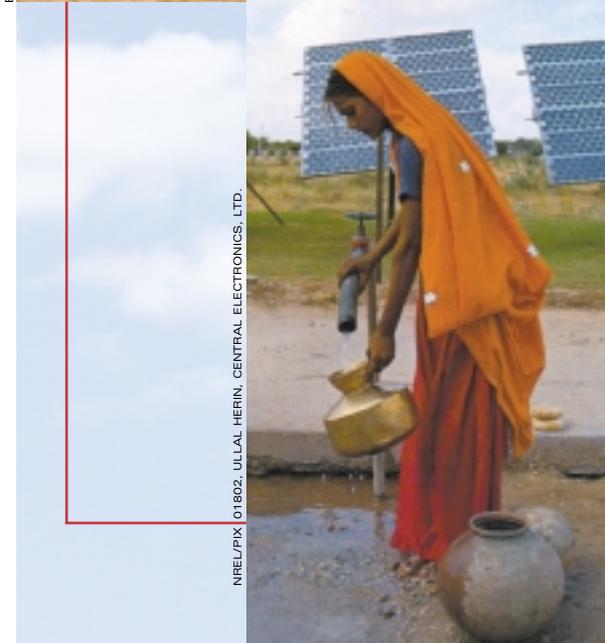


*"Not only U.S. interests but also basic human values—respect for human dignity and human rights, belief in equity and opportunity, commitment to assistance for the least fortunate and to stewardship for future generations and for the environment—dictate U.S. leadership in international cooperation in energy innovation."*

**PRESIDENT'S COMMITTEE OF ADVISORS  
ON SCIENCE AND TECHNOLOGY,  
JUNE 1999**



BLUFFSVIEW ELEMENTARY SCHOOL

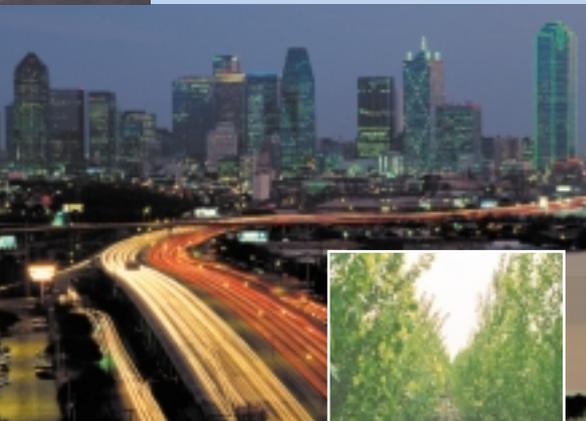


NREL/PIX 01802, ULLAL HERIN, CENTRAL ELECTRONICS, LTD.



NREL/PIX 08130, CAPSTONE TURBINE CORP.

Microturbines are small engines attached to high-speed electrical generators which can be powered by natural gas or biofuels. They provide a reliable source of electricity and heat for commercial businesses and industries.



AA007488, PHOTODISC; INSET: OAK RIDGE NATIONAL LABORATORY

Biomass resources such as these poplar trees (inset) can be used to produce clean and affordable transportation fuels, power, and chemicals. EERE's Bioenergy Initiative facilitates the technological advances that will foster an integrated bioenergy industry to increase the manufacture and use of these products.

Left: These students are getting hands-on experience in renewable energy from a solar photovoltaic system added to their school in Bluffsvew, Ohio.

Below: Fatigue testing of a Zond Z-48 wind turbine blade.



Left: Clean energy technologies help developing countries minimize their energy use, while making a real difference in the lives of their citizens.

*"...individual consumers in growing numbers will make known their desire for environmentally clean power and for energy conservation opportunities. They may even choose custom-built fuel cells, rooftop solar systems or microturbines to provide their electricity."*

**EUGENE W. ZELTMANN, PRESIDENT AND CHIEF OPERATING OFFICER,  
NEW YORK POWER AUTHORITY, JUNE 1999**

### How EERE Advances Clean Energy Technologies

EERE plays an essential role in the development of clean energy technologies, from basic and applied research through demonstration and deployment. EERE is there at every step to help advance the technologies.

EERE supports research now underway in DOE national laboratories, industries, universities, and other research organizations. These endeavors run the gamut from basic research—for instance, studying the electronic properties of materials—to product-specific projects, such as studying different materials for use in geothermal power plant condensers. EERE also supports the Inventions and Innovation Program, which provides seed funding for inventors of potential energy-saving devices and concepts.

EERE partners with industry to develop these concepts into commercially viable technologies. These partnerships can take the form of cost-shared research, as is now being performed to create the next generation of vehicles, or they can become a more formal technology transfer process, such as the licensing of a technology to a company. For example, Zond Energy Systems, Inc., a subsidiary of Enron Wind Corporation, holds the license to an NREL-designed wind turbine airfoil that improves the capture of wind energy, particularly at lower wind speeds.

An essential aspect of EERE's work is the support it provides to existing industries. For instance, technical assistance to Bethlehem Steel Corporation's Burns Harbor facility in northwest Indiana resulted in energy efficiency improvements that cut energy use nearly 50%, saving the company more than \$620,000 annually. EERE also works with the building industry and manufacturers to institute new codes and

standards for buildings, appliances, and other building equipment.

EERE steps in where necessary to help stimulate markets and encourage the use of energy efficiency and renewable energy technologies. For example, EERE programs such as ENERGY STAR,<sup>®</sup> Building America, Rebuild America, and the Weatherization Assistance Program are all designed to encourage the use of energy efficiency technologies in homes and buildings. EERE also helps develop policies that support clean energy in such arenas as the restructuring of the U.S. electricity industry, revisions to the tax code, and innovative financing.

Through this multi-pronged approach, EERE has been able to advance a wide range of technologies to the commercial stage, and then has encouraged their actual use throughout the country. This is an ongoing program, as researchers continue to examine new materials for photovoltaic cells, new lighting technologies, and new building design methodologies—a whole range of approaches that will help keep the U.S. clean energy industry on the competitive edge in global energy markets.

*"Our desire is to provide high quality, environmentally friendly products that will benefit both consumers and the agricultural community. Research to produce fuels and chemicals from plants and agricultural residues offers farmers some much-needed hope. An initiative that will expand uses of the crops we grow has strong support from the Farm Bureau."*

**DEAN KLECKNER, PRESIDENT,  
AMERICAN FARM BUREAU FEDERATION,  
MAY 1999**

# Envisioning

## OUR CLEAN ENERGY FUTURE

**A**s we begin the new millennium, we are also beginning a new age of cleaner, more efficient energy use. The changes are already apparent in the prevalence of ENERGY STAR®-labeled lights, appliances, computers, and even homes and other buildings; in the increasing availability of “green power”—electricity from renewable energy sources—in many parts of the country; and the emergence of alternative-fueled vehicles and hybrid vehicles.

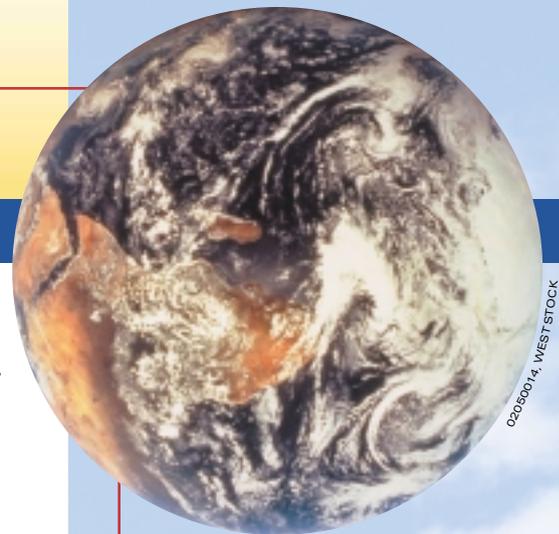
EERE will redouble its efforts to bring even more energy choices to consumers, businesses, and industry. To focus these efforts, EERE has set aggressive but achievable goals:

- By 2002, develop a light truck that will be 35% more fuel efficient than current models, without sacrificing safety, comfort, performance, or cost.
- By 2004, develop a prototype family car that achieves 80 miles per gallon.
- By 2010, reduce federal energy use by 35% from 1985 levels, while using the power of federal purchasing to stimulate markets for energy efficiency and renewable energy technologies.
- By 2010, help the most energy-intensive industries reduce their energy use per unit output by one-fourth.
- By 2010, triple the production of electricity from non-hydroelectric renewable energy sources.
- By 2010, lead the way to the installation of one million solar energy systems on U.S. buildings.
- By 2010, triple the use of bioenergy for the production of electricity, fuels, and chemicals.
- By 2010, help to double the installed generating capacity of combined heat and power systems.
- By 2010, help cut energy use by 50% in new homes and commercial buildings, by 30% in 15 million existing homes, and by 20% in existing commercial buildings.

- By 2010, reduce annual energy expenditures in K-12 schools by 25%, realizing potential savings of \$1.5 billion per year.
- By 2020, help to provide 5% of the country's electricity from wind energy.

The changes we plan to help achieve will have a real impact on the lives of all Americans. We'll see less smog in our cities as cars, industries, and power plants become cleaner and more efficient. We'll see farmers and rural America profiting from new markets for energy crops. We'll see reduced oil imports as we produce more of our own energy. Many people will even generate their own electricity at home.

Meanwhile, our economy will grow, with new energy industries springing up to meet the demands both here and abroad. We'll all spend less money on energy, freeing up cash for other uses. And we'll move steadily towards a more sustainable energy future—using Clean Energy for the 21st Century.



02050014, WESTSTOCK

*“The fate of people on Earth depends on whether we can employ efficient and renewable energies. We need to lay big plans for small technologies”*

**DAVID FREEMAN, GENERAL MANAGER,  
LOS ANGELES DEPARTMENT OF WATER  
AND POWER, JUNE 1996**

*“The department's work with industry and non-governmental organizations will continue to deliver the critical advanced technologies needed to reach our goals today and tomorrow.”*

**SECRETARY OF ENERGY  
BILL RICHARDSON,  
OCTOBER 1998**



34290083, WESTSTOCK

**For More**

# Information

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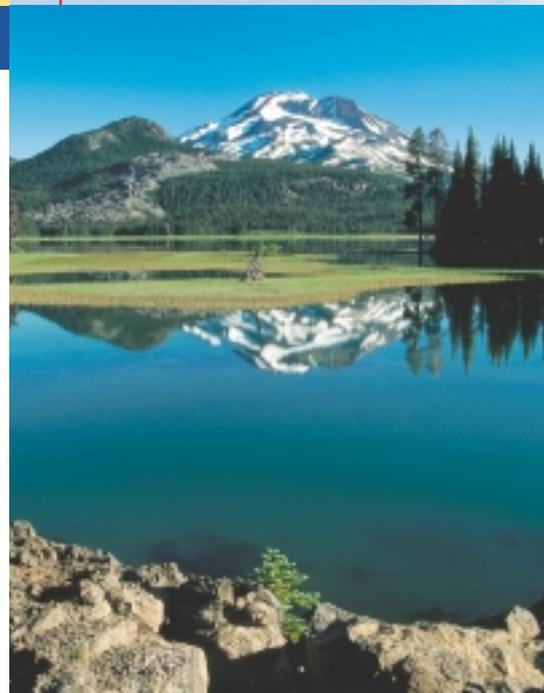
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*"It's hard to think of a greater  
gift we could give at the turn  
of the century ... than a clean  
energy future."*

**PRESIDENT BILL CLINTON,  
AUGUST 1999**