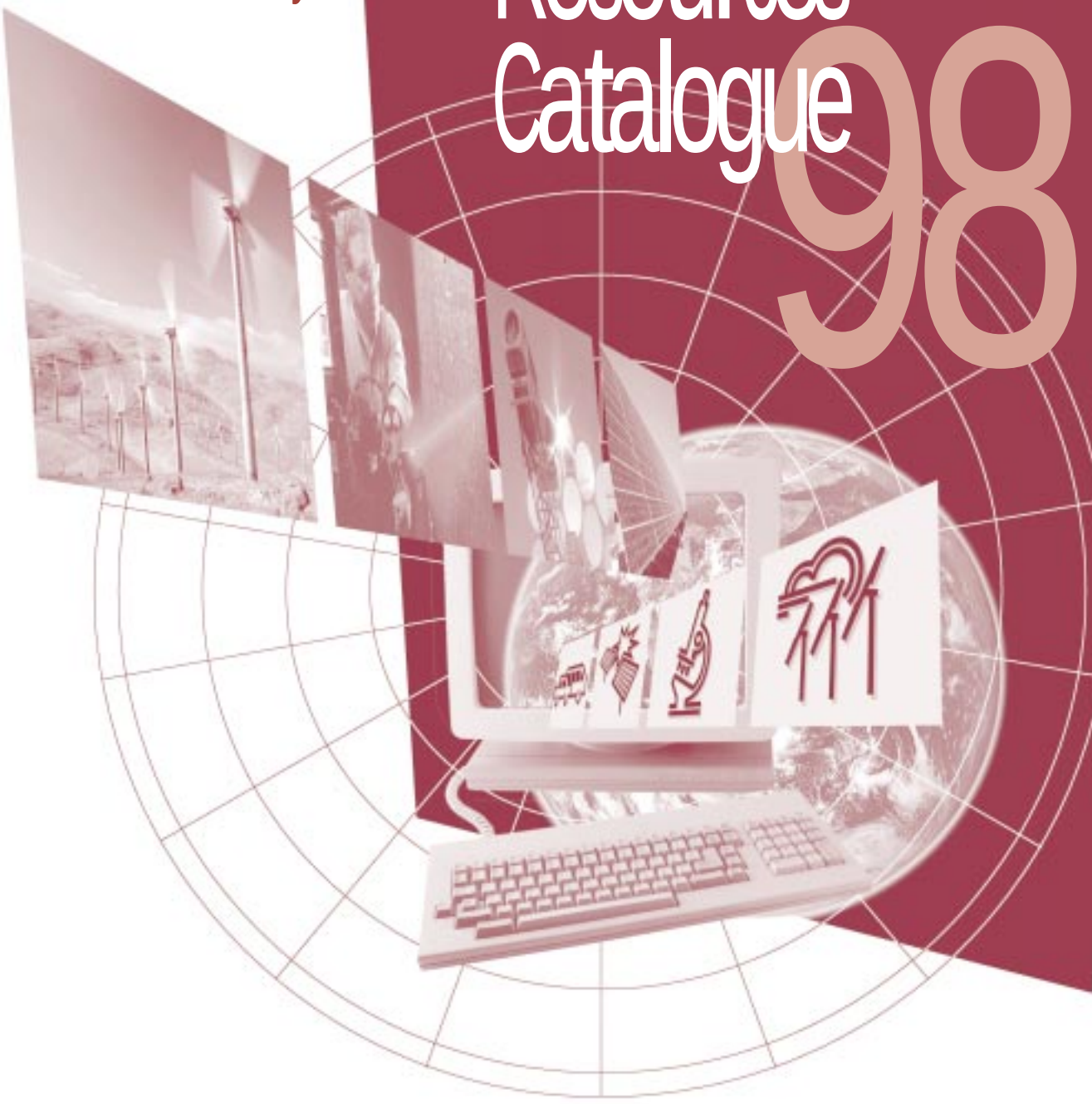
NREL

National Renewable Energy Laboratory

# Information Resources Catalogue 98



# About the Catalogue

Our fifth annual *Information Resources Catalogue* describes recent National Renewable Energy Laboratory (NREL) publications that can keep you up to date on energy efficiency and renewable energy. To make the catalogue easy to use, we have grouped entries according to subject area.

The catalogue is separated into five main sections. The first section lists Web sites designed and/or maintained by NREL. The General Interest Publications—accompanied by concise descriptions that highlight the latest advances in energy efficiency and renewable energy technologies—make up the second section of the catalogue. The third section lists Technical Reports, which update the research community on the latest innovations from NREL's labs. Conference Papers, Journal Articles, and Book Chapters can be found in the fourth section. Patents is the fifth and final section of the catalogue.

The publications listed in the catalogue, as well as bibliographic information on documents published in previous years, may be accessed on-line via the NREL Home Page at http://www.nrel.gov. Our Web sites—including exciting new offerings such as the National Center for Photovoltaics and Energy Savers—are being continually updated and improved. Be sure to visit our various sites for the latest information on technical breakthroughs in renewable energy and energy efficiency technologies.

Our project team has enjoyed putting together this fifth issue of the catalogue. We hope you find it helpful and informative.

# About the National Renewable Energy Laboratory

NREL is the U.S. Department of Energy's premier laboratory for renewable energy and energy efficiency research, development, and deployment. The Laboratory is a national resource committed to leadership, excellence, and innovation in renewable energy and related technologies.

NREL conducts research in photovoltaics, wind energy, advanced vehicle technologies, biofuels, biomass electric, municipal solid waste, hydrogen, geothermal power, and superconductivity. Advances made in these research areas enable the private sector to make informed choices from a number of energy options.

Key to NREL's mission is facilitating the transfer of these technologies to private industry for commercialization. We do this by cooperating with industry through cost-shared agreements, collaborating with universities and other researchers, and making facilities available for experiments, analyses, and proprietary studies.

NREL is managed for DOE by Midwest Research Institute, Battelle, and Bechtel.

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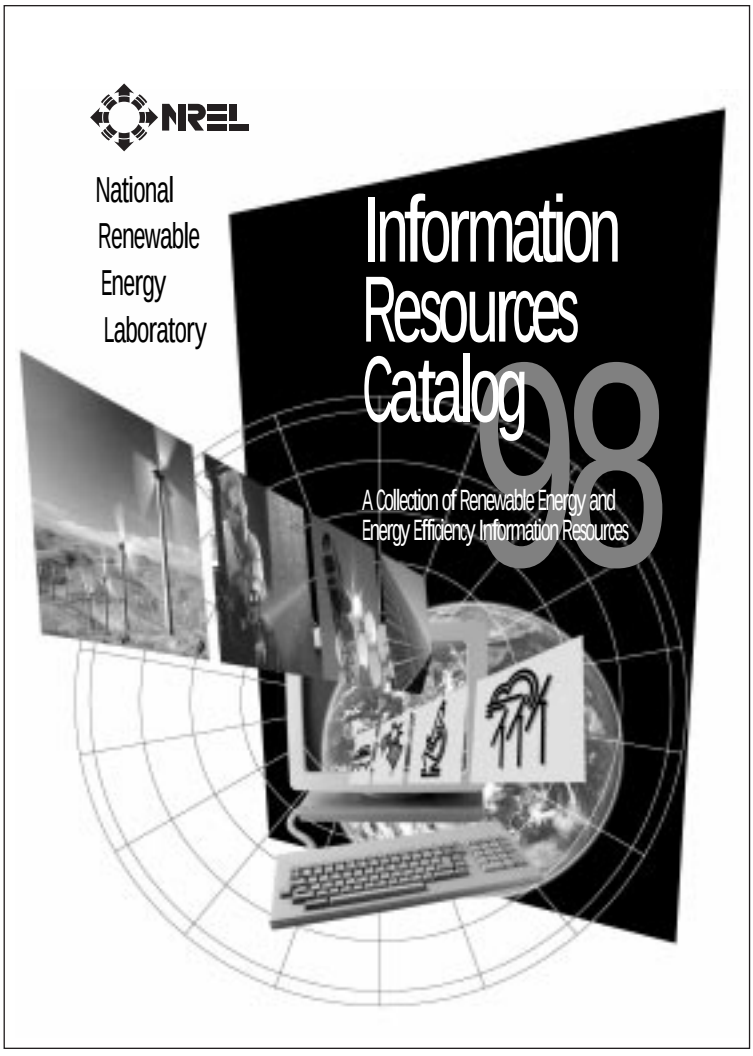
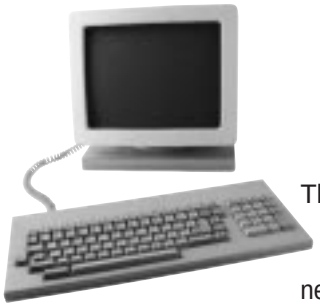


# Internet Resources



The sites listed below provide information on many energy efficiency and renewable energy technologies. New Internet sites are created regularly, so be sure to visit these home pages often for new and updated information.

National Renewable Energy Laboratory (http://www.nrel.gov)

Since its inception in 1977, NREL's mission has been to develop energy efficiency and renewable energy technologies and transfer these technologies to the private sector. The Web site provides information about NREL's technologies, online resources, and programs.

Research and Technology—NREL's research activities and expertise help reduce the cost and increase the use of renewable energy and energy efficiency technologies.

- Basic Sciences and Materials—http://www.nrel.gov/st-bsm.html
- Buildings and Thermal Systems—http://www.nrel.gov/st-bt.html
- Electricity Technologies—http://www.nrel.gov/st-et.html
- Fuels and Chemicals—http://www.nrel.gov/st-fc.html
- Industrial Technologies—http://www.nrel.gov/st-it.html
- Measurements and Testing—http://www.nrel.gov/st-mt.html
- Photovoltaics—http://www.nrel.gov/ncpv/
- Renewable Energy Resources—http://www.nrel.gov/energy_resources/
- Transportation—http://www.nrel.gov/st-trans.html
- Wind Energy—http://www.nrel.gov/wind/

Online Resources—NREL's databases provide documents and digital photographs of renewable energy and energy efficiency technologies.

- NREL Publications—http://www.nrel.gov/cgi-bin/pubspage.cgi
- PIX—Online Photographic Library—http://www.nrel.gov/data/pix/pix.html

Partnerships—NREL creates and coordinates partnerships for market and technology development. NREL programs also help teachers instruct tomorrow's workforce about science, math, and clean energy solutions.

- International Programs—http://www.nrel.gov/business/international/intl_graphics.html
- Technology Transfer—http://www.nrel.gov/technologytransfer
- Education Programs—http://www.nrel.gov/business/education.html

## Energy Efficiency and Renewable Energy Network (EREN) http://www.eren.doe.gov/

EREN is the official Web site for the U.S. Department of Energy's (DOE's) Office of Energy Efficiency and Renewable Energy. EREN contains documents from DOE programs and maintains links to other government, education, industry association, and international organization Web sites. EREN offers a robust search capability and resources for specific audiences.

### Technologies

Alternative Fuels—http://www.eren.doe.gov/RE/fuels.html

Buildings—http://www.eren.doe.gov/EE/buildings.html

Geothermal—http://www.eren.doe.gov/RE/geothermal.html

Hydropower—http://www.eren.doe.gov/RE/hydropower.html

Industry—http://www.eren.doe.gov/EE/industrial.html

Ocean—http://www.eren.doe.gov/RE/ocean.html

Solar—http://www.eren.doe.gov/RE/solar.html

Transportation—http://www.eren.doe.gov/EE/transportation.html

Utilities—http://www.eren.doe.gov/EE/utilities.html

Wind—http://www.eren.doe.gov/RE/wind.html

### Specialized Resources

Consumers—http://www.eren.doe.gov/consumerinfo/

Education—http://www.eren.doe.gov/education/

Environment—http://www.eren.doe.gov/environment/

Kids—http://www.eren.doe.gov/kids.html

News—http://www.eren.doe.gov/events/

Small Business—http://www.eren.doe.gov/energytips/

### Related Information

DOE Headquarters—http://www.doe.gov/

DOE Office of Energy Efficiency and Renewable Energy—http://www.eren.doe.gov/ee.html

DOE Regional Support Offices—http://www.eren.doe.gov/rso.html

DOE Golden Field Office—http://www.eren.doe.gov/golden/

DOE OSTI*—Energy Science and Technology Database—
http://www.doe.gov/html/eren/eren.html

*Office of Scientific and Technical Information

# General Interest Publications

The following publications are grouped according to subject matter for your convenience. The information contained in these documents is generally nontechnical in nature and is intended for a wide audience. Unless otherwise noted, NREL general interest publications are available in limited quantities from NREL's Document Distribution Service at (303) 275-4363 (phone), (303) 275-4053 (fax), or Sally_Evans@nrel.gov (e-mail).

## Alternative Fuels

Bioethanol from the Corn Industry: From Corn to Cellulose—Building a Bridge to Bioethanol Production (Fact sheet). May 1998; 2 pp. With our increased dependence on foreign sources of oil for transportation and legislation that requires both compliance with environmental standards and the use of oxygenated fuels, the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) is seeking ways to economically increase the yield of ethanol from biomass such as corn fiber. Read this fact sheet to learn how NREL's researchers are working to meet this goal. Order no. DOE/GO-10097-577.

Biofuels: 1996-1997 Project Summaries (Online document). February 1998; 151 pp. Biofuels such as ethanol and biodiesel—liquid and gaseous fuels made from renewable domestic crops—may provide the solution to the nation's overdependence on petroleum-based energy sources. Each summary sheet in this volume provides information on the project funding, objectives, approach, accomplishments, status, and publications of the DOE-funded biofuels projects for 1996-97. Also available online at: *http://www.esd.ornl.gov/bfdp/doeofd/96_97summaries/bioprogram.html* Order no. DOE/GO-10098-521.

Biofuels News—Summer 1998 (Newsletter). September 1998; 1(3): 6 pp. There is overwhelming evidence to indicate that U.S. farmers could use a great deal of land for energy crops, without using land that supports natural ecosystems and endangered wildlife. This edition of the DOE Office of Transportation Technologies newsletter focuses on our need to make responsible decisions regarding some of the fundamental energy issues facing our nation today: Which energy solutions best meet our needs given environmental and economic realities? What are our real needs? What kinds of technologies can we use?
Order no. DOE/GO-10098-581.

Biofuels News—Spring 1998 (Newsletter). May 1998; 1(2): 6 pp. Articles focus on corn stover, which is a rich source of potential energy once its cellulose is converted to ethanol; efforts on the federal legislative front to rescue a provision for an ethanol tax incentive; and several new publications on biofuels, including the National Renewable Energy Laboratory's *The Ethanol Heavy-Duty Truck Fleet Demonstration Project.* Order no. DOE/GO-10098-571.

Biofuels News—Winter 1998 (Newsletter). January 1998; 1(1): 4 pp. This is the debut of another innovative NREL publication, whose mission is to advance the development and commercialization of alternative fuels, this time on behalf of DOE's Office of Fuels Development (a division of the Office of Transportation Technologies). NREL is one of two federal laboratories (Oak Ridge National Laboratory is the other) whose R&D successes have helped to promote ethanol as a cost-competitive alternative to gasoline. Ethanol use is also seen as part of an effective solution to the greenhouse gas problem. Available online at: *http://afdc3vh5.nrel.gov/biofuelnews/winter98_1-1/* or *http://afdc3vh5.nrel.gov/biofuelnews/winter98_1-1/vol1iss1.pdf* Order no. DOE/GO-10098-529.

Biofuels Update: Report on U.S. Department of Energy Biofuels Technology—Fall 1997 (Newsletter). November 1997; 5(4): 4 pp. Highlights of this edition include stories on California's potential for providing feedstocks for ethanol production, the Senate Finance Committee's extension of ethanol tax incentives in its reauthorization of new highway legislation, and the big impact U.S. farmers may have in reducing carbon emissions by using low-input farming techniques and by growing switchgrass or woody biomass that can be used to produce ethanol and other biofuels. Order no. BR-580-23449.

## Biomass Power

Biopower Project Updates (Fact sheets). September 1998; 2 pp. These fact sheets, produced by DOE's Biomass Power Program, show the progress of the program's demonstration projects. One of these demonstrations is a low-pressure biomass gasifier located in Burlington, Vermont. The other projects are part of DOE's Biomass Power for Rural Development Initiative that is cosponsored by the U.S. Department of Agriculture. The rural development projects involve developing energy crops for power systems: one in New York

cofiring willow with coal in utility power plants, one in Iowa cofiring switchgrass with coal, and one in Minnesota using alfalfa stems as fuel for an integrated gasifier combined-cycle gas turbine facility.

Gasifier Kindles Biopower Potential
Order no. DOE/GO-10098-659.

Project Update: Chariton Valley
Order no. DOE/GO-10098-661.

Project Update: Minnesota AgriPower
Order no. DOE/GO-10098-663.

Project Update: Salix Consortium
Order no. DOE/GO-10098-664.

Project Update: Vermont Gasifier
Order no. DOE/GO-10098-662.

## Buildings

Building America Program Overview (Online fact sheet). April 1998; 2 pp. Building America is accelerating home-building innovations using systems-engineering approaches that increase the quality and energy efficiency of homes while reducing cost and environmental impacts. By reading this fact sheet, you can find summary program information, learn about the overall objectives of the program, meet the Industry Consortia, and see the locations of our building sites. Available online at: *http://www.eren.doe.gov/buildings/building_america/over.html*

Buildings for the 21st Century (Online document). October 1997; 7 pp. In order to speed the adoption of new technologies and design know-how, Buildings for the 21st Century, part of DOE's Office of Building Technologies, State and Community Programs, is taking a nontraditional, whole-building, systems integration approach. This booklet provides information about Building America and Exemplary Buildings, two programs that use this energy-saving collaborative strategy. Available online only at: *http://www.nrel.gov/buildings/exemplary/b21c.pdf*

Commercial Heat Pump Water Heaters. Federal Energy Management Program (FEMP): Federal Technology Alert (Online document). February 1997. This Alert provides information on heat pump water heater (HPWH) technologies: where they have been installed, how they work, and who is producing them, as well as information to help a facility manager evaluate applications where HPWHs could be cost effectively installed. Available online only at: *http://www.eren.doe.gov/femp/10_comm.html*

Energy Efficiency Solution for the Chet Holifield Federal Building. Federal Energy Management Program (FEMP): Utility Services Case Study (Fact sheet). April 1998; 2 pp. In November 1993, the General Services Administration (GSA) and Southern California Edison (SCE) agreed to review the potential benefits of an integrated energy efficiency solution for the Chet Holifield Federal Building in Laguna Niguel, California. As a result of the recommendations that were implemented from the GSA-SCE feasibility study, estimated annual energy savings amounted to $640,000 (even greater than initially projected).
Order no. DOE/GO-10098-437.

Energy Savers: Tips on Saving Energy and Money at Home (Booklet). September 1997; 36 pp. The U.S. Department of Energy works to ensure secure, reliable, and affordable energy supplies that support a growing economy and protect the environment and public health. The energy efficiency improvements and tips in this booklet are easy ways that you can do your part for the nation's energy security—while saving on your energy bills. To obtain copies, please contact the Energy Efficiency and Renewable Energy Clearinghouse (EREC) at 1-800-DOE-EREC (1-800-363-3732). Also available online at: *http://www.eren.doe.gov/consumerinfo/energy_savers/* or *http://www.eren.doe.gov/consumerinfo/energy_savers/web-EnergySavers.qxd.pdf*
Order no. DOE/GO-10097-431.

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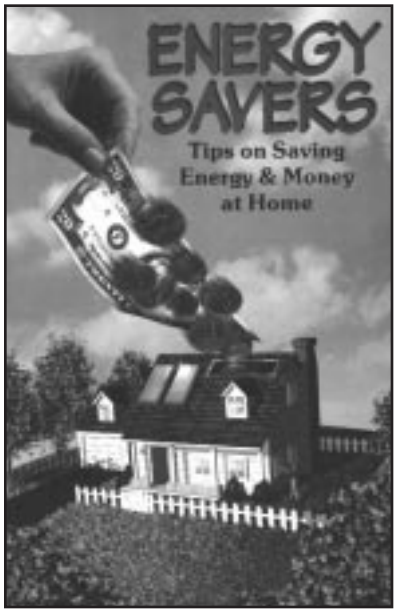



Federal Participation in Million Solar Roofs. What's New in Federal Energy Management: Program Overview (Fact sheet). March 1998; 2 pp. The President's commitment to place 20,000 solar energy systems on federal buildings by the year 2010 will require the development of a sustainable federal market for cost-effective solar technologies. As this fact sheet explains, DOE's Federal Energy Management Program is focusing on technologies that include solar hot water for buildings and swimming pools, and solar space heating.
Order no. DOE/GO-10098-516.

FEMP Training Program. What's New in Federal Energy Management: Program Overview (Fact sheet). November 1997; 2 pp. The U.S. Department of Energy's Federal Energy Management Program (FEMP) has developed a training program to qualify federal energy managers (both technical and procurement specialists) in each of the following areas: basics of building energy systems; building energy codes and applicable professional standards; energy accounting and analysis; life-cycle cost methodology; fuel supply and pricing; and instrumentation for energy surveys and audits. The fact sheet describes course offerings—which are being revised and improved each fiscal year—in these and other areas. Also available online at: *http://www.eren.doe.gov/femp/resources/train_overview.html*
Order no. DOE/GO-10097-442.

Innovative Utility Partnership at Fort Lewis, Washington. Federal Energy Management Program (FEMP): Utility Services Case Study (Fact sheet). December 1997; 2 pp. In addition to lighting and motor retrofits that will save the 4200-building facility more than 27 million kilowatt-hours (about $700,000) per year, the arrangement between the utility and Fort Lewis will improve administrative efficiencies and reduce administrative costs. Read this fact sheet and find out how. Also available online at: *http://www.eren.doe.gov/femp/financing/97.440.html*
Order no. DOE/GO-10097-440.

Parabolic-Trough Solar Water Heating. Federal Energy Management Program (FEMP): Federal Technology Alert (Report). April 1998; 44 pp. This Alert, part of a series on new energy efficiency and renewable energy technologies, describes the technology of parabolic-trough solar water heating and absorption-cooling systems, the situations in which they are likely to be cost effective, and considerations in designing and selecting a system.
Order no. DOE/GO-10098-485.

Photovoltaics in the Built Environment: A Design Guide for Architects and Engineers (Handbook). September 1997; 264 pp. This handbook provides an overview of the issues that architects and engineers must consider when designing PV systems for buildings. These issues include how to size the system, system components, integrating the system with the building envelope and systems, codes and standards, utility rate structures and incentives, and others.
Order no. DOE/GO-10097-436.

Renewable Energy at Channel Islands National Park. Federal Energy Management Program: Technical Assistance Case Study (Fact sheet). November 1997; 2 pp. In September 1995, a grant from DOE's FEMP allowed the National Park Service to implement a hybrid wind/photovoltaic energy project that will help to protect the Channel Islands' pristine resources. This case study describes the energy systems installed on Santa Rosa, San Miguel, Anacapa, and Santa Barbara Islands, and the environmental and economic benefits that will accrue. Also available online at: *http://www.eren.doe.gov/femp/techassist/275.html*
Order no. DOE/GO-10097-275.

Saving Energy with Electric Resistance Heating. Energy Efficiency and Renewable Energy Clearinghouse (EREC) (Brochure). October 1997; 8 pp. Electricity is a versatile but precious energy source that we need to use wisely and conserve whenever possible. This publication provides an introduction to the different types of electric heating that you can use in your home today to help you save money and minimize your energy consumption. To obtain copies, please contact the Energy Efficiency and Renewable Energy Clearinghouse (EREC) at 1-800-DOE-EREC (1-800-363-3732). Also available online at: *http://www.eren.doe.gov/erec/factsheets/elecheat.html* or *http://www.eren.doe.gov/erec/factsheets/elecheat.pdf*
Order no. DOE/GO-10097-381.

Solar Buildings Overview: The Solar Buildings Program (Brochure). April 1998; 4 pp. As the brochure explains, solar buildings technologies offer several advantages when compared to competing sources of power. First, by developing solar technology, we diversify our energy supply and reduce our susceptibility to fluctuations in the availability and price of imported fossil fuels. Next, a mature solar manufacturing and service industry promotes job creation and local economic development. Third, recent surveys and consumer choice utility programs demonstrate customer preference for clean sources of energy. Finally, the brochure explains that each solar water heating system reduces carbon emissions by an amount equivalent to the emissions from an automobile.
Order no. DOE/GO-10098-552.

(see photo top of column 3)

Solar Water Heating. Federal Energy Management Program (FEMP): Federal Technology Alert (Revised booklet). April 1998; 44 pp. Solar water heating is a well-proven and readily available technology that directly substitutes renewable energy for conventional water heating. This FEMP Federal Technology Alert, one of a series on new energy-efficient and renewable energy technologies, describes the various types of solar water heating systems, the situations in which solar water heating is likely to be effective, considerations in designing and selecting a system, and basic steps for installation.
Order no. DOE/GO-10098-570.

Thermal Energy Storage at a Federal Facility. Federal Energy Management Program (FEMP): Utility Services Case Study (Fact sheet). May 1998; 2 pp. This FEMP fact sheet explains the unique partnership between the Veteran's Administration (VA) Medical Center in Dallas, Texas, and Texas Utilities Electric Company. The energy savings resulting from the installation of thermal storage technology will allow the VA to recoup its investment within seven years, as well as to balance the energy demands of the facility during peak periods.
Order no. DOE/GO-10098-439.

Total-Solutions Approach at White Sands Missile Range. Federal Energy Management Program: Utility Services Case Study (Fact sheet). December 1997; 2 pp. The White Sands Missile Range, located 40 miles north of El Paso, Texas, occupies an area about the size of Delaware and Rhode Island combined. This FEMP fact sheet describes how the state-of-the-art research and test facility (a missile proving grounds in the mid-1940s) will benefit from a FEMP project that will save the base more than $2 million per year in energy costs. Also available online at: *http://www.eren.doe.gov/femp/financing/97-441.html*
Order no. DOE/GO-10097-441.

Water Conservation Program. What's New in Federal Energy Management: Program Overview (Fact sheet). October 1997; 2 pp. Estimates indicate that federal-sector water and sewer expenditures are approaching $1 billion annually, and that the federal government could save as much as $240 million per year by installing water conservation measures. This fact sheet explains how FEMP is working with federal agencies to help achieve this goal.
Order no. DOE/GO-10097-421.

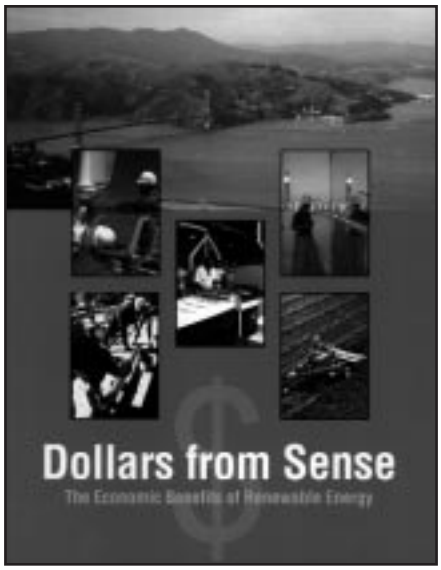
WhiteCap™ Roof Spray Cooling System. Federal Energy Management Program: Technology Installation Review (Online document). January 1998; 16 pp. This document reviews the theory, operation and development, and past installations of this highly effective technology, which has estimated potential annual savings of 585 million kilowatt-hours in the low-rise commercial-building market. Available online only at: *http://www.eren.doe.gov/femp/prodtech/whitecap.html*

## Energy Efficiency and Renewable Energy

Value of Renewables...with a Short Guide to Renewable Energy Technologies (Report). October 1997; 44 pp. This comprehensive report examines some of the major issues that consumers should consider when making energy choices, including the environmental and health impacts, global climate change, energy security and subsidies, global markets and international competition, and jobs.
Order no. BK-330-23419.

## Energy Policy and Analysis

Dollars from Sense: The Economic Benefits of Renewable Energy (Report). September 1997; 24 pp. Domestic renewable energy sources—biomass, wind power, photovoltaics, solar thermal electricity, and geothermal energy—represent a secure and stable source of energy for our nation and a potential source of jobs and economic development. This document illustrates the direct economic benefits of investing in these promising and vital energy technologies. Available online at: *http://www.eren.doe.gov/utilities/pdfs/dollars.pdf*
Order no. DOE/GO-10097-261.




## Geothermal Energy

Geothermal Energy...Power from the Depths. Energy Efficiency and Renewable Energy Clearinghouse (Fact sheet). December 1997; 8 pp. U.S. geothermal power plants, including the steam plant at The Geysers in California, have a total generating capacity of 2700 megawatts, enough to provide electricity for 3.7 million people. This fact sheet explains the basics behind this power—what geothermal energy is and what forms it takes, how it can be tapped, and what economic and environmental benefits can accrue to you and your community by utilizing this exciting energy resource. To obtain copies of EREC fact sheets, please contact EREC at 1-800-DOE-EREC (1-800-363-3732). Also available online at: *http://www.eren.doe.gov/erec/factsheets/factsheets.html*
Order no. DOE/GO-10097-518.

Geothermal Technologies Today and Tomorrow (Folder). March 1998; 4 pp. Geothermal energy will be used to heat and cool more than 400,000 homes and commercial buildings by the turn of the century. Read the illustrated brochure (Order no. DOE/GO-10098-424) and following six fact sheets to find out how DOE's Office of Geothermal Technologies is leading the way in promoting research to improve geothermal heat pumps, exploration and drilling technology, reservoir engineering and energy conversion techniques, and direct use of geothermal energy.

Geothermal Technologies Today and Tomorrow: Direct Use of Geothermal Energy
Order no. DOE/GO-10098-536.

Geothermal Technologies Today and Tomorrow: Drilling
Order no. DOE/GO-10098-533.

Geothermal Technologies Today and Tomorrow: Energy Conversion
Order no. DOE/GO-10098-537.

Geothermal Technologies Today and Tomorrow: Exploration
Order no. DOE/GO-10098-534.

Geothermal Technologies Today and Tomorrow: Geothermal Heat Pumps
Order no. DOE/GO-10098-538.

Geothermal Technologies Today and Tomorrow: Reservoir Engineering
Order no. DOE/GO-10098-535.

Strategic Plan for the Geothermal Energy Program (Booklet). June 1998; 28 pp. DOE's Office of Geothermal Technologies has identified five strategic goals that will help establish geothermal energy as a sustainable, environmentally sound, economically competitive contributor to the nation's energy supply. This document relates how DOE, together with industry, plans to accomplish these goals.
Order no. DOE/GO-10098-572.

U.S. Department of Energy Geothermal Technologies—February 1998 (Newsletter). February 1998; 3(1); 8 pp. Geothermal heat pumps (GHPs) offer residential and commercial building owners a space-heating, cooling, and water-heating option that can reduce energy consumption by 25%-50% while significantly reducing energy costs. Read about GHPs and other exciting advances in the geothermal industry in this latest edition of the newsletter. Also available online at: *http://www.eren.doe.gov/geothermal/GRC/feb98_geotech.html*
Order no. BR-23958.

GEOTHERMAL TECHNOLOGIES

## Hybrid Electric Vehicles

Battery Thermal Analysis and Testing: Providing Industry with World Class Solutions (Brochure). September 1998; 4 pp. As this brochure explains, NREL's state-of-the-art facilities and years of experience combine to offer companies integrated solutions to enhancing battery performance and extending the life of battery systems for electric and hybrid electric vehicles.
Order no. BR-540-24160.

## Industry

Inventions and Innovations: Helping Bring Your Energy Ideas to Market (Brochure). July 1998; 6 pp. Do you have a plan to develop a company based on your energy-saving invention or innovation? Have you been searching for financial or technical support to bring your ideas to market? The U.S. Department of Energy's Inventions and Innovations Program can help.
Order no. DOE/GO-10098-596.

NICE$^3$: National Industrial Competitiveness through Energy, Environment, Economics (Brochure). March 1998; 2 pp. Wouldn't it be NICE if your company could gain financial support (awardees receive a one-time grant from DOE of as much as $400,000 for a proposed project) to participate in an innovative cost-sharing program designed to promote energy efficiency, prevent pollution, and encourage economic competitiveness in industry? Order this informative brochure to find out how your organization can sign on.
Order no. DOE/GO-10098-526.

Office of Industrial Technologies Fact Sheets. Innovative processes that save energy and reduce waste in the steel and aluminum industries are covered in this collection of fact sheets from the NICE$^3$ and Inventions and Innovations Programs through DOE's Office of Industrial Technologies. NICE$^3$ is a program that provides funding to state and industry partnerships for projects demonstrating energy-efficient, clean production technologies. The Inventions and Innovations Program provides financial assistance for establishing technical performance and conducting early development of inventions and ideas with significant energy savings impact potential.

Energy-Efficient Process for Hot-Dip Batch Galvanizing: NICE$^3$ Steel Project Fact Sheet. April 1998; 2 pp.
Order no. DOE/GO-10098-561.

Indirect-Fired, Controlled Atmosphere Decoating of Aluminum Scrap: NICE$^3$ Aluminum Project Fact Sheet. June 1998; 2 pp.
Order no. DOE/GO-10098-575.

Power Line Damage, Electrical Outages Reduced in the "Sleet Belt": Inventions and Innovations Steel Project Fact Sheet. April 1998; 2 pp.
Order no. DOE/GO-10098-559.

Processing Electric Arc Furnace Dust into Saleable Chemical Products: NICE$^3$ Steel Project Fact Sheet. April 1998; 2 pp.
Order no. DOE/GO-10098-560.

Steel Reheating for Further Processing: NICE$^3$ Steel Project Fact Sheet. April 1998; 2 pp.
Order no. DOE/GO-10098-548.

Office of Industrial Technologies Information Resources Catalog: Turning Industry Visions into Reality (Booklet). May 1998; 88 pp. This premier issue of the DOE Office of Industrial Technologies (OIT) catalog describes publications, videos, software, and other information products and services that your company can use to improve industrial energy efficiency and prevent waste and pollution.
Order no. DOE/GO-10098-423.

Plant/Crop-Based Renewable Resources 2020: A Vision to Enhance U.S. Economic Security Through Renewable Plant/Crop-Based Resource Use (Booklet). January 1998; 28 pp. This vision document—which resulted from a collaborative effort among U.S. companies, nonprofit groups, trade associations, and academic institutions—is a broad outline of the potential reaches of this homegrown feedstocks industry into the core manufacturing capabilities of this nation. The document starts off by defining plant/crop-based resources, then proceeds to examine the current status of these resources and evaluate future opportunities and priority areas for research and development through a process of matrix analysis.
Order no. DOE/GO-10098-385.

Regional Resource Centers for Innovation (Brochure). July 1998; 2 pp. This brochure provides details regarding these centers, which were established by the Inventions and Innovations Program in the Office of Industrial Technologies at DOE. The program works with inventors and innovators in the

Industries of the Future to fund research and development of energy-saving inventions and innovations.
Order no. DOE/GO-10098-574.

Turning Point—September 1998 (Motor Challenge Newsletter). September 1998; 8 pp. By optimizing the performance of just one of its steam turbines, Bethlehem Steel Corporation's Burns Harbor facility was able to save nearly $3.3 million a year and improve turbine efficiency and output. The technology used by Bethlehem could be applied to almost any industrial setting where steam turbines are used for shaft power, or to generate electricity on site. Read this and other articles to learn the many ways that your company can take the Motor Challenge.
Order no. DOE/GO-10098-585.

Turning Point—July 1998 (Motor Challenge Newsletter). July 1998; 8 pp. This issue's cover story provides details of Bethlehem Steel Corporation's successful Motor Challenge project, which reduced energy costs while improving overall steel-making system performance. Also featured are articles on the Steam Challenge, a voluntary partnership among DOE, the Alliance to Save Energy, and more than 50 industry leaders, which is designed to help industry adopt the systems approach in designing, purchasing, installing, and managing boilers, distribution systems, and steam applications; Motor Challenge's highly successful live satellite teleconference, which shared valuable information on improving motor system efficiency, process control, and productivity; and the Guest Column, which discusses the evolution of predictive maintenance for electric motors.
Order no. DOE/GO-10098-418.

Turning Point—May 1998 (Motor Challenge Newsletter). May 1998; 8 pp. By analyzing its system for batch cooling beer, Stroh's Brewing Company was able to improve energy efficiency and system performance. Read this spring issue to find out what else is brewing in DOE's Office of Industrial Technologies' Motor Challenge program.
Order no. DOE/GO-10098-417.

Turning Point—January 1998 (Motor Challenge Newsletter). January 1998; 8 pp. By making mechanical and electrical modifications to five of its oil wells under a Motor Challenge Showcase Demonstration project, OXY USA (a subsidiary of Occidental Petroleum Corporation) reduced energy consumption by more than 12% and achieved total annual savings of $5,362. Other stories in the newsletter focus on the Compressed Air Challenge, a national initiative to promote efficient and effective industrial compressed-air systems; a detailed discussion of what to believe—and what not to believe—about the efficiency numbers stamped on electric motor nameplates; and increasing international interest in establishing programs similar to Motor Challenge.
Order no. DOE/GO-10098-415.

Turning Point—November 1997 (Motor Challenge Newsletter). November 1997; 8 pp. This issue of the DOE Office of Industrial Technologies' quarterly newsletter has articles on the town of Turnbull, Connecticut, which used a Motor Challenge Showcase Demonstration project to drastically reduce the operational costs of its sewage-pumping system; the Technical Association of the Pulp and Paper Industry, which recently became a Motor Challenge Allied Partner; and various Allied Partner training, workshops, and other programs designed to educate utilities and other stakeholders on the advantages of using MotorMaster software and ASDs (adjustable speed drives).
Order no. DOE/GO-10097-420.

## National Renewable Energy Laboratory

Advanced Direct-Contact Condensers. NREL Business Ventures (Fact sheet). October 1997; 2 pp. In contrast to more simple, conventional direct-contact condensers, NREL's ADCC technology uses sophisticated, geometric shapes to provide optimal surface area for condensing spent steam in an electric power plant or industrial process. As this fact sheet explains, there is a potentially huge global market for this technology, which can significantly improve a plant's power production efficiency and generating capacity.
Order no. FS-280-23205.

National Renewable Energy Laboratory Information Resources Catalogue—1997: A Collection of Renewable Energy and Energy Efficiency Information Resources. December 1997; 86 pp. Our fourth annual *Information Resources Catalogue* describes recent NREL publications and services that will keep you up to date on the latest advances in renewable energy and energy efficiency.
Order no. BK-330-23593.

National Renewable Energy Laboratory Public Affairs Online Fact Sheets. From biofuels to windpower, from buildings to photovoltaics, these fact sheets provide easy-to-read summaries of the principal technologies being advanced through research, development, and deployment activities at the National Renewable Energy Laboratory.

Biofuels Research: Developing a Clean, Domestic Transportation Fuel. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/biofuels.html* or *http://www.nrel.gov/lab/ pao/biofuels.pdf*

Biomass Energy: Converting Biomass into Useful Energy. June 1998; 3 pp. Available online only at: *http://www.nrel.gov/lab/pao/biomass_energy.html*

Biomass Power Research: Making Electricity from Trash and Other Biomass Resources. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/*

*biomass_power.html* or *http://www.nrel.gov/lab/pao/biomass_power.pdf*

Building a Better Trombe Wall. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/trombe_wall.html* or *http://www.nrel.gov/lab/pao/trombe_wall.pdf*

Buildings Research: Developing Energy Efficiency and Renewable Energy Technologies for Buildings. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/building_energy.html* or *http://www.nrel.gov/ lab/pao/building_energy.pdf*

Geothermal Energy: Extracting Thermal Energy from Deep Within the Earth. June 1998; 3 pp. Available online only at: *http://www.nrel.gov/lab/pao/geothermal_energy.html*

Hydroelectric Power: Turning Water's Mechanical Energy into Electricity. June 1998; 3 pp. Available online only at: *http://www.nrel.gov/lab/pao/hydroelectric.html*

Hydrogen Research: Developing Sustainable Technologies for the 21st Century. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/hydrogen.html* or *http://www.nrel.gov/lab/pao hydrogen.pdf*

NREL's Alternative Fuels User Facility: Developing Cleaner Fuels for Vehicles. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/afuf.html* or *http://www.nrel.gov/lab/pao/afuf.pdf*

NREL's Field Test Laboratory Building: Making Fuels, Power, and Chemicals. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/ftlb.html* or *http://www.nrel.gov/lab/pao/ftlb.pdf*

NREL's Hybrid Electric Vehicle Research. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/hev.html* or *http://www.nrel.gov/lab/pao/hev.pdf*

NREL's National Wind Technology Center: Harnessing the Wind. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/wind.html* or *http://www.nrel.gov/lab/pao/wind.pdf*

NREL's Outdoor Test Facility: Advancing Photovoltaic Technology. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/otf.html* or *http://www.nrel.gov/lab/pao/otf.pdf*

NREL's Solar Energy Research Facility. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/serf.html* or *http://www.nrel.gov/lab/pao/serf.pdf*

NREL's Thermal Test Facility: Developing Technologies to Reduce Energy Use in Buildings. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/ttf.html* or *http://www.nrel.gov/lab/pao/ttf.pdf*

NREL's Visitors Center: Making a Statement with Intelligent Building Design. August 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/visitors_center.html* or *http://www.nrel.gov/lab/pao/visitors_center.pdf*

NREL FACTS

NREL's Visitors Center

Photovoltaic Research: Creating Electricity from An Unlimited Resource—Sunlight. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/pv_research.html* or *http://www.nrel.gov/lab/pao/pv_research.pdf*

Solar Energy: Tapping into Earth's Largest Energy Resource. June 1998; 3 pp. Available online only at: *http://www.nrel.gov/lab/pao/solar_energy.html*

Solar Thermal Electric Research: Using the Sun's Heat to Generate Electricity. July 1998; 2 pp. Available online only at: *http://www.nrel.gov/lab/pao/solar_thermal.html* or *http://www.nrel.gov/lab/pao/solar_thermal.pdf*

Wind Energy: Low-Cost Electricity from a Clean, Reliable Resource. June 1998; 3 pp. Available online only at: *http://www.nrel.gov/lab/pao/wind_energy.html*

NREL's Research Participant Program (Brochure). March 1998; 6 pp. Through its research participant program, NREL—the nation's leading laboratory for the research and development of renewable energy and energy efficiency technologies—enables those with fresh ideas and talents to contribute to research at the Laboratory. The brochure describes the five categories of participants, and how the latter can go forth to use their newly developed expertise at their home institutions or in their future career pursuits. To obtain copies, contact NREL's Human Resources Office at (303) 384-7588.

Photoelectrochromic "Smart" Windows. NREL Business Ventures (Fact sheet). January 1998; 2 pp. The National Renewable Energy Laboratory is looking for partners to help develop and commercialize photoelectrochromic technology for self-powered, "smart," sunblocking windows. This brief explains the advantages of using this exciting new technology.
Order no. FS-450-23531.

## Solar Energy—General

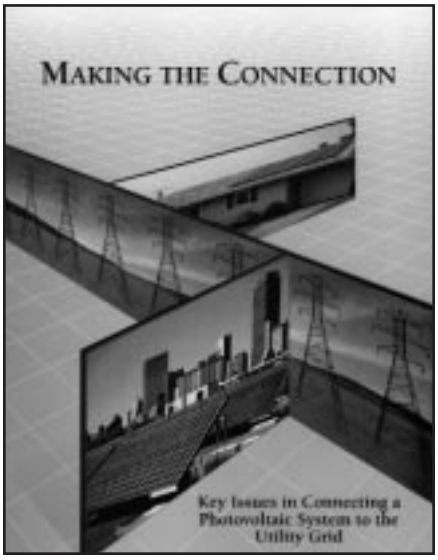
Save with Solar—Summer 1998. Federal Energy Management Program (FEMP) Quarterly Technical Bulletin. July 1998; 1(2): 8 pp. The lead story in this issue discusses what is being done to support the commitment made by the President on June 26, 1997, to install 20,000 solar systems on federal buildings by 2010. Other articles focus on the Pentagon's Federal Energy Saver Showcase, which not only provided improvements in energy efficiency and water conservation, but demonstrated an impressive new hybrid Solar Dish/Stirling Power System; the General Services Administration's new Solar Supply Schedule, which can significantly reduce your procurement lead time and simplify your purchases of renewable energy equipment; and the Sacramento Municipal Utility District (SMUD), the nation's fifth largest public utility, which has installed the world's largest utility-owned distributed PV system.
Order no. DOE/GO-10098-584.

Save with Solar—Spring 1998. Federal Energy Management Program (FEMP) Quarterly Technical Bulletin. April 1998; 1(1): 8 pp. This new quarterly bulletin is being produced under the U.S. Department of Energy's Federal Energy Management Program (FEMP) in support of FEMP's renewable energy program and the President's Million Solar Roofs Initiative. It contains information about today's renewable energy technologies, policies, procurements, and incentives.
Order no. DOE/GO-10098-551.

## Solar Energy—Photovoltaics

Creating Sustainable Markets for Solar Home Systems (Market Analysis Brief). February 1998; 4 pp. Based on 20 years of lessons learned in countries of the developing world, NREL analysts offer strategies, considerations, and recommendations for establishing viable markets for solar home systems.
Order no. BR-520-23433.

Making the Connection: Key Issues in Connecting a Photovoltaic System to the Utility Grid (Brochure). June 1998; 6 pp. As detailed in this brochure, connecting residential or small commercial photovoltaic (PV) systems to an existing utility grid has come a long way in recent years, with the resolution of many formerly critical problems. Read about how some of the key issues—building/electrical codes and local covenants, power quality and safety, and metering agreements—are being resolved.
Order no. DOE/GO-10098-523.




Million Solar Roofs (Flyer). October 1997; 2 pp. On June 26, 1997, President Clinton announced the Million Solar Roofs Initiative. The goal is to install one million solar energy systems on buildings across the United States by the year 2010. The flyer explains the importance of the initiative, how it will work, and the types of solar technologies (including NREL's advanced thin-film PV technologies) that will be utilized in this collaborative effort.
Order no. DOE/GO-10097-504.

New Policies Jump-Start Solar Markets (Brochure). March 1998; 4 pp. This PV brochure outlines how a new wave of policy incentives can boost economics and markets for grid-connected photovoltaics and other solar technologies. Conclusions are based on a study of five top cities—Hilo and Honolulu, Hawaii; San Jose and Los Angeles, California; and Long Beach, New York—for a mix of market-based policies, including net metering, rebates, and low-interest loans. Also discussed are system benefits charges, renewables portfolio standard, tax and production incentives, and green pricing. Available online at: *http://www.nrel.gov/ncpv/pdfs/jump_start.pdf*
Order no. DOE/GO-10098-520.

NREL PV Working with Industry—Second Quarter 1998 (Newsletter). September 1998; 12 pp. Read this edition of the newsletter to learn about the Thin Film PV Partnership's strategy to advance the technologies based on the three materials considered front runners for enabling PV to become competitive in large energy markets: amorphous silicon (a-Si), cadmium telluride, and copper indium diselenide. Other articles focus on the activities of the national PV teams, each of which must find a way to successfully address technical issues, surmount challenges, and reach its long-term goals, and the prospects for the early favorite among the thin-film PV technologies—a-Si.
Order no. BR-210-24692.

NREL PV Working with Industry—First Quarter 1998 (Newsletter). March 1998; 12 pp. Read this edition of the newsletter to learn about the recommendations of a recent White House-appointed panel regarding the need to boost the level of funding for development of large-volume, low-cost PV production, and to support R&D on systems integration and on balance-of-systems components such as inverters. Another story features NREL's exciting efforts to build a "virtual laboratory" through real-time data sharing with its customers: more than 50 companies currently use the Internet to receive PV cell measurement and analysis results from NREL's Measurements and Characterization Center.
Order no. BR-210-23996.

NREL PV Working with Industry—Fall 1997 (Newsletter). October 1997; 12 pp. This issue looks at the outdoor test capabilities of NREL's National Center for Photovoltaics—capabilities that are the result of more than 20 years of testing PV devices and optical materials for the solar energy industry. Other articles focus on the 26th IEEE Photovoltaic Specialists Conference and an inside look at the Million Solar Roofs Initiative, which aims to install solar energy systems on

one million U.S. buildings by 2010. Also available online at *http://www.nrel.gov/ncpv/pdfs/pvwwi17.pdf*
Order no. BR-210-23790.

Photovoltaic Energy Program Contract Summary, Fiscal Year 1997 (Booklet). May 1998; 162 pp. The National Photovoltaics Program comprises three principal elements: Research and Development activities, which generate new ideas, test the latest scientific theories, and push the limits of PV efficiencies in laboratory and prototype materials and devices; Technology Development Activities, which apply laboratory innovations to products to improve PV technology and the manufacturing techniques used to produce PV systems for the market; and Systems Engineering and Applications, which help to improve PV systems and validate the improvements through tests, measurements, and deployment of prototypes. This comprehensive document summarizes FY 1997 contract projects that supported these efforts.
Order no. DOE/GO-10098-556.

Photovoltaic Energy Program Overview, Fiscal Year 1997 (Booklet). February 1998; 28 pp. The National Photovoltaics Program, a joint effort of DOE, the national laboratories, and the U.S. PV industry, had exciting advances and significant accomplishments in fiscal year 1997. The booklet provides details of new products introduced, manufacturing processes improved, capacity expanded, and new materials explored. The Million Solar Roofs Initiative will build on the solid foundation of steady research progress in laboratories and universities,

industry investment in new technology and capacity, and the burgeoning solar power market both here and abroad. Available online at: *http://www.eren.doe.gov/pv/PVenrgyPOfy97.pdf*
Order no. DOE/GO-10098-539.

Photovoltaics and Commercial Buildings—A Natural Match (Brochure). September 1998; 4 pp. This study highlights strategic opportunities and locations for using photovoltaics to power businesses. Building-integrated photovoltaics, for example, has been applied with great success in niche markets such as Hawaii. Available online at: *http://www.nrel.gov/ncpv/pdfs/pv_com_bldgs.pdf*
Order no. DOE/GO-10098-657.

Photovoltaics Promise...The Federal Role: National Center for Photovoltaics PV FAQs (Fact sheet). June 1998; 2 pp. Welcome to the inaugural edition of PV FAQs! This new publication of the National Center for Photovoltaics (a joint effort of NREL and Sandia National Laboratories) will bring you the latest news of advances in PV technology research, development, and demonstration.
Order no. FS-520-24588.

## Solar Energy—Radiation

RReDC: An On-line Reference Library of Renewable Energy Resources (Resource Assessment Brief). September 1997; 2 pp. This fact sheet provides information about our on-line data to specialists in energy research and data modeling as well as to educators, students, solar architects and engineers, analysts, and others. The document explains that, in addition to the solar radiation data on the RReDC (Renewable Resources Data Center), there are also many links to other national and international solar databases and to data on wind energy and biomass resources in the United States.
Order no. FS-560-23153.

## Solar Energy—Thermal

Concentrating Solar Power Program Fact Sheets. The U.S. Department of Energy's Concentrating Solar Power (CSP) Program—formerly the Solar Thermal Electric Program—develops technologies that convert sunlight into electricity efficiently and with minimum effect on the environment. Check out the following nine fact sheets for details of these exciting new CSP technologies.

Concentrating Solar Power Program Overview. April 1998; 4 pp.
Order no. DOE/GO-10098-567.

Markets for Concentrating Solar Power. April 1998; 2 pp.
Order no. DOE/GO-10098-563.

Solar Dish/Engine Systems. April 1998; 2 pp.
Order no. DOE/GO-10097-407.

Solar Power Towers. April 1998; 2 pp.
Order no. DOE/GO-10097-406.

Solar Trough Systems. April 1998; 2 pp.
Order no. DOE/GO-10097-395.

Solar Two. April 1998; 2 pp.
Order no. DOE/GO-10098-562.

SolMaT—The Solar Thermal Manufacturing Technology Initiative. April 1998; 2 pp.
Order no. DOE/GO-10098-566.

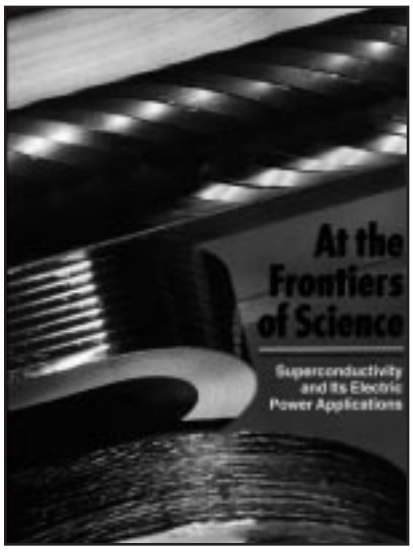
SunLab—Advancing Concentrating Solar Power Technology. April 1998; 2 pp. Order no. DOE/GO-10098-565.

SunLab Test Facilities. April 1998; 2 pp. Order no. DOE/GO-10098-564.

Concentrating Solar Power Strategic Plan Summary (Brochure). May 1998; 4 pp. Over the past two decades, the U.S. Department of Energy—together with industry—has pursued a focused program of research, development, and demonstration in order to position concentrating solar power (CSP) technologies closer to commercialization. Read about the CSP Program's continuing efforts to reduce costs and improve reliablity while also addressing the many economic and political barriers faced by any emerging technology.
Order no. DOE/GO-10098-542.

## Superconductivity

At the Frontiers of Science: Superconductivity and Its Electric Power Applications (Booklet). July 1998; 20 pp. As this informative new publication explains, we are moving ever closer to seeing practical electric power devices and energy systems based on high-temperature superconducting (HTS) technology. Indeed, the next decade may witness the perfection of a variety of superconducting manufacturing techniques and the introduction of products incorporating HTS technology.
Order no. DOE/GO-10098-434.




## Transportation

Alternative Fuel News: Official Publication of the U.S. Department of Energy's Clean Cities Network and the Alternative Fuels Data Center (Newsletter). July 1998; 2(3): 16 pp. This issue of the official publication of the Clean Cities Network and the AFDC features stories ranging from President Clinton's proclamation of May 31-June 6 as National Alternative Fuels Week, thus spreading the alternative fuels message to more and more people across the country; the Clean Cities Talk Show featuring John McLaughlin of "McLaughlin Group" fame; the five new partners that recently entered the Clean Cities Hall of Fame; and a detailed listing of 1998 Clean Cities Coalition Award Winners. Available online at: *http://www.afdc.doe.gov/AltFuelNews/AFNewsV2-3.pdf*
Order no. BR-540-25020.

Alternative Fuel News: Official Publication of the U.S. Department of Energy's Clean Cities Network and the Alternative Fuels Data Center (Newsletter). May 1998; 2(2): 16 pp. The great debate is on! With the transportation industry currently so dependent on petroleum (and the serious energy security and economic implications that this situation presents), should we mandate certain vehicle owners to use alternative fuels, or should we propose incentives instead? Find out the details of this growing debate—as well as the other hot developments in the alternative fuels community—in this issue of *Alternative Fuel News.* Available online at: *http://www.afdc.doe.gov/AltFuelNews/AFNewsV2-2.pdf*
Order no. BR-540-24481.

Alternative Fuel News: Official Publication of the U.S. Department of Energy's Clean Cities Network and the Alternative Fuels Data Center (Newsletter). March 1998; 2(1): 16 pp. This issue features stories on the opportunities presented by the Kyoto Protocol to produce cleaner transportation technologies; the plans to build new ethanol (E85—85% ethanol, 15% gasoline) infrastructures, which should significantly reduce tailpipe emissions that cause ozone and carbon dioxide emissions that contribute to global warming; and the major automakers' display of their commitment to advanced automotive technologies at the Los Angeles and Detroit Auto Shows, including Ford's future E85 "muscle car," the Mustang Super Stallion. Available online at: *http://www.afdc.doe.gov/AltFuelNews/AFNewsV2-1.pdf*
Order no. BR-540-23471.

Alternative Fuel News: Official Publication of the U.S. Department of Energy's Clean Cities Network and the Alternative Fuels Data Center (Newsletter). December 1997; 1(2): 16 pp. The major automakers have really stepped up their alternative fuel vehicle (AFV) offerings for the 1998 model year. In the second issue of *Alternative Fuel News,* check out the AFVs that will be gracing the showrooms of Ford, Chrysler, General Motors, and American Honda, as well as a list of upcoming vehicles for the 1999 model year and beyond. Available online at: *http://www.afdc.doe.gov/AltFuelNews/AFNewsV1-2.pdf*
Order no. BR-425-23470.

Alternative Fuel News: Official Publication of the U.S. Department of Energy's Clean Cities Network and the Alternative Fuels Data Center (Newsletter). September 1997; 1(1): 16 pp. This exciting first issue of *Alternative Fuel News* is loaded with information and fresh perspectives on the important issues that affect the alternative fuels industry. The cover story reviews DOE's Third National Clean Cities Conference, followed by an interview with former Energy Secretary Federico Peña and many familiar features from previous newsletters (*Clean Cities Drive* and *AFDC Update*)

such as Hot off the Press, Coordinator's Corner, and At the Pump. And, because we'll be bringing all this information to you every two months instead of quarterly, the information will be more timely than ever. Available online at: *http://www.afdc.doe.gov/AltFuelNews/AFNewsV1-1.pdf*
Order no. BR-425-22786.

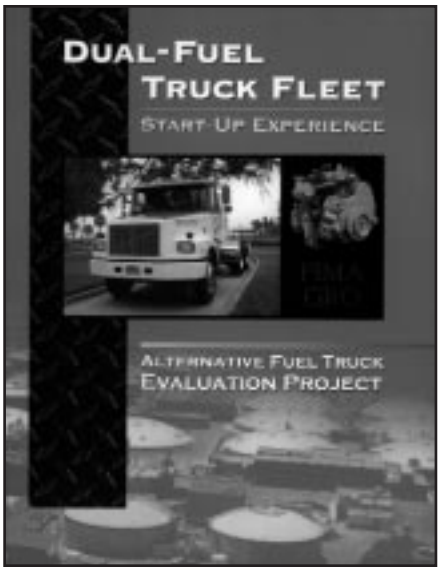
Alternative Fuels and Vehicles Information Resources (Brochure). May 1998; 2 pp. The U.S. Department of Energy's Office of Transportation Technologies (OTT) has many programs designed to help our nation become less dependent on foreign oil and our vehicles more fuel efficient. As this informative new brochure explains, these programs include the Clean Cities Web site and Hotline, the *Alternative Fuel Vehicle Fleet Buyer's Guide* and Alternative Fuels Data Center, and the AFDC Hotline and OTT Web site.
Order no. DOE/GO-10098-578.

Alternative Fuels in Trucking—June 1998 (Newsletter). June 1998; 6(4): 8 pp. The lead story in this issue discusses Cummins' heavy-duty propane engine, the B.59LPG (liquefied petroleum gas), which recently became the first dedicated heavy-duty propane gas engine to receive certification to the 1999 EPA Clean Fuel Fleet Vehicle Low Emissions Vehicle standard. Additional stories look at Gasalarm Systems' new Series GS2000 gas monitor, which should help advance alternative fuel use in the trucking industry, and the lessons learned from experiences at the liquefied and compressed natural gas station in Ontario, California.
Order no. BR-540-23965.

Alternative Fuels in Trucking—March 1998 (Newsletter). March 1998; 6(3): 8 pp. Although ethanol, a renewable energy fuel produced from feedstock crops, has more desirable emissions characteristics than conventional automotive fuels, it has rarely been tested in heavy-duty vehicles in high-percentage blends. However, an NREL/DOE study of three snowplow and road maintenance trucks (two fueled with E95—a 95%/5% blend of ethanol— and one with gasoline) in Minneapolis concluded that, with some refinements in maintenance and repair and a likely reduction in prices, the use of ethanol in heavy-duty vehicles (HDVs) could be a commercial success. For more details on this and other major developments in alternative fuels for HDVs, order your copy today.
Order no. BR-540-23718.

Alternative Fuels in Trucking—October 1997 (Newsletter). October 1997; 6(2) 8 pp. The lead story in this issue discusses the future of fuels for heavy-duty trucks. Other articles look at tax relief for liquefied natural gas (LNG) (giving LNG a tax advantage over its chief rival, diesel), the status of the Federal Clean Fuel Fleet Program, and the recent success of the Cummins Engine Company's B5.9G engine in receiving double certification on emissions requirements from both EPA and the California Air Resources Board.
Order no. BR-540-23440.

Dual-Fuel Truck Fleet: Start-Up Experience. Alternative Fuel Truck Evaluation Project (Brochure). September 1998; 8 pp. Although dual-fuel engine technology has been around for several years, it has only recently moved toward full-scale operational capability for heavy-duty truck applications. NREL's Alternative Fuel Truck Evaluation Project has evaluated the merits of the technology and the costs of implementation for various fleets. The brochure provides a handy bibliography for those wishing to learn more.
Order no. BR-540-25118.




Guide to the Emissions Certification Procedures for Alternative Fuel Aftermarket Conversions (Report). January 1998; 68 pp. This first-of-its-kind document, produced for DOE's Office of Transportation Technologies, guides the reader through the complex regulations for certifying the emissions of converted alternative fuel vehicles. The publication will be available through the Alternative Fuels Data Center home page on the World Wide Web *(http://www.afdc.doe.gov)*, and will also be distributed through the Alternative Fuels Hotline at 1-800-423-1DOE.
Order no. TP-540-22757.

Perspectives on AFVs: 1996 Federal Fleet Driver Survey (Booklet). September 1997; 70 pp. At the behest of the U.S. Department of Energy, the National Renewable Energy Laboratory has undertaken several projects to evaluate the performance and acceptability of light-duty alternative fuel vehicles (AFVs) compared to similar gasoline vehicles. The results of our detailed survey of federal fleet drivers were pretty good: about 80% of drivers surveyed indicated that they were very satisfied or leaning toward being satisfied overall with their AFVs. Order your copy of *Perspectives on AFVs* to get the complete, detailed picture of this wide-ranging, in-depth survey. To obtain copies of this publication, please contact the Alternative Fuels Data Center at 1-800-423-1DOE.
Order no. BK-540-22721.

Raley's LNG Truck Fleet Start-Up Experience: Alternative Fuel Truck Evaluation Project (Brochure). October 1997; 8 pp. NREL is conducting this project to compare the operational, maintenance, and emissions performance of alternative fuel and diesel fuel trucks. This brochure highlights the start-up experience of Raley's Distribution Center in Sacramento, California, the first demonstration site of the project.
Order no. BR-540-23402.

Using CNG Trucks in National Parks (Booklet). May 1998; 8 pp. This new publication describes lessons learned from the National Park Service's experience with a demonstration of a compressed natural gas refuse hauler.
Order no. BR-540-24744.

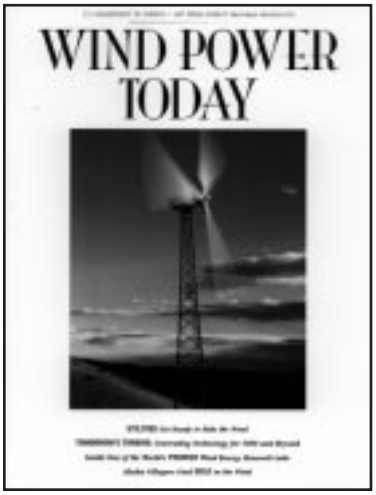
## Utilities

State Renewable Energy News (Newsletter). 1998. This newsletter is a compilation of utility-oriented renewable energy activities in the states. It is prepared by the NARUC (National Association of Regulatory Utility Commissioners) Subcommittee on Renewable Energy, and is issued three times a year. Available online only at: *http://www.nrel.gov/analysis/emaa/projects/sren*

## Wind Energy

International Energy Agency (IEA) Wind Energy Newsletter, January 1998 (Online document). January 1998. This newsletter presents a complete list of recent and ongoing collaborative projects, or Tasks, undertaken for the Wind Energy R&D Implementing Agreement, as well as 16 country reports providing details of recent developments affecting wind energy in these countries. Available online only at: *http://www.eren.doe.gov/ieawind*

Wind Power Today: U.S. Department of Energy 1997 Wind Energy Program Highlights (Booklet). April 1998; 36 pp. This document describes how the federal wind program is helping utilities across the country use wind to generate electricity, developing wind technology to compete in the global market, and enabling remote villages in Alaska to harness wind energy for use in the harsh arctic climate. Order no. DOE/GO-10098-550.



# Technical Reports

NREL Technical Reports provide technical information on research and analysis projects performed by NREL staff and subcontractors. They are intended for technical professionals. Unless otherwise noted, NREL technical reports are available in limited quantities from NREL's Document Distribution Service at (303) 275-4363 (phone), (303) 275-4053 (fax), or Sally_Evans @nrel.gov (e-mail).

## Alternative Fuels

Lusk, P. Methane Recovery from Animal Manures: The Current Opportunities Casebook. September 1998; 155 pp. Work performed by Resource Development Associates, Washington, D.C.
Order no. SR-580-25145.

Rooney, T. Lignocellulosic Feedstock Resource Assessment. September 1998; 123 pp. Work performed by NEOS Corporation, Lakewood, Colorado.
Order no. SR-580-24189.

Sheehan, J.; Camobreco, V.; Duffield, J.; Graboski, M.; Shapouri, H. Overview of Biodiesel and Petroleum Diesel Life Cycles. May 1998; 60 pp.
Order no. TP-580-24772.

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# Patents

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NREL is a U.S. Department of Energy National Laboratory
Operated by Midwest Research Institute • Battelle • Bechtel

NREL/BK-330-24946
December 1998

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Printed in the United States of America

Available to DOE and DOE contractors from:
Office of Scientific and Technical Information (OSTI)
P.O. Box 62
Oak Ridge, TN 37831
Prices available by calling (423) 576-8401

Available from:
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