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105th CONGRESS, 1st SESSION / SENATE DOCUMENT 105-10

Resolved: that the Federal Government should establish a policy to substantially increase renewable energy use in the United States

NATIONAL DEBATE TOPIC FOR HIGH SCHOOLS, 1997-98
Pursuant to 44 United States Code, Section 1333

Compiled by the Congressional Research Service
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U.S. Government Printing Office
Washington DC 1997

Printed on recyled paper

44 U.S. CODE SECTION 1333

(a) The Librarian of Congress shall prepare compilations of pertinent excerpts, bibliographical references, and other appropriate materials relating to:

(1) the subject selected annually by the National University Extension Association as the national high school debate topics and

(2) the subject selected annually by the American Speech Association as the national college debate topic.

In preparing the compilations the Librarian shall include materials which in his judgment are representative of, and give equal emphasis to, the opposing points of view on the respective topics.

(b) The compilations on the high school debate topics shall be printed as Senate documents and the compilations on the college debate topics shall be printed as House of Representative documents, the cost of which shall be charged to the congressional allotment for printing and binding. Additional copies of such documents may be printed in the quantities and distributed in the manner as the Joint Committee on Printing directs.

(Pub. L. 90-620, Oct. 22, 1968, 82 Stat. 1270.)

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FOREWORD

The 1997-1998 high school debate topic is "Resolved: that the Federal Government should establish a policy to substantially increase renewable energy use in the United States."

In compliance with 44 U.S. Code 1333, the Congressional Research Service of the Library of Congress prepared this compilation of materials and bibliographic references to assist high school debaters in researching the topic. In selecting items for this manual, the Congressional Research Service (CRS) has sampled the wide spectrum of opinions reflected in current literature on these questions. No preference for any policy is indicated by the selection or positioning of articles cited, nor is CRS disapproval of any policy or article to be inferred from its omission.

The annotated bibliography covers such topics as renewable energy and alternative fuel sources.

The Library of Congress cannot distribute copies of any of the publications listed in this bibliography. Debaters are encouraged to use the resources of their high school, public and research libraries.

The bibliography was prepared by Stephanie Jefferson and Sherry B. Shapiro, Bibliographers in the Library Services Division. C. Lee Burwasser produced the bibliography.

Good luck to each debater in researching, preparing, and presenting arguments on this year's topic.

Daniel P. Mulhollan, Director
Congressional Research Service

INTRODUCTION

RENEWABLE ENERGY: How can the United States best reduce its fossil fuel consumption?

This bibliography contains annotated citations to recent journal articles, books and government documents on the topic of renewable energy and how the U.S. can best reduce its dependence on fossil fuels. It includes an overview section on general issues related to environmental quality and specific sections on various alternative energy resources and fuels.

The majority of the citations were obtained from the computerized bibliographic databases created and maintained by the Congressional Research Service's Library Services Division. Other materials were selected from the collections of the Library of Congress and the Congressional Research Service.

This bibliography is not intended to serve as a comprehensive list of all resources in the field of renewable energy sources. It does however present a wide array of materials covering different aspects and points of view on this debate topic. Many of the cited items themselves contain footnotes or their own bibliographies; these can be effective tools for finding supplementary material.

RENEWABLE ENERGY: How can the United States best reduce its fossil fuel consumption?

An Annotated Bibliography on the
1997-1998 College Debate Topic

Sherry Shapiro
Stephanie Jefferson
Information Resource Specialists
Library Services Division

with the assistance of
Lee Burwasser, Bibliographic Assistant

August 1997

OVERVIEW

Beamish, Richard.
Getting the word out in the fight to save the Earth. Baltimore, Johns Hopkins University Press, c1995. 181 p.

Defending Mother Earth: Native American perspectives on environmental justice. Edited by Jace Weaver. Maryknoll, N.Y., Orbis Books, 1996. 205 p.

Environment and jobs: the employment of Federal environmental investments. Washington, National Commission for Employment Policy, 1995. 33 p.
"Measures the economic impact of the environmental industry and particular environmental policies in the short term." Finds that "Federal environmental policies currently produce between 68,000 and 80,000 jobs. They also contribute between $3.5 and $3.7 billion to the Gross Domestic Product."

Environmental acronyms. Edited by Julie Hong. Rockville, Md., Government Institutes, 1995. 117 p.

Environmental policy tools: a user's guide. Washington, Office of Technology Assessment, Congress, G.P.O., [1995] 217 p.

Goodstein, Eban.
Jobs or the environment? no trade-off. Challenge, v. 38, Jan.-Feb. 1995: 41-45.
In a 1990 Wall Street Journal poll, respondents showed "broad acceptance of at least one of two major trade-offs between jobs and the environment: Trade-off 1 is that environmental regulation is a significant cause of the nation's high unemployment rate. Trade-off 2 is that, even if environmental protection measures have not cost the economy jobs overall, they have nevertheless generated widespread plant shutdowns and relocations and have led to massive layoffs. Based on evidence presented in a recent Economic Policy Institute Report (see Jobs and the Environment: The Myth of a National Trade-off in For Further Reading), both of these propositions are myths."

Goudie, Andrew.
The human impact reader: readings and case studies. Cambridge, MA, Blackwell Publishers, 1997. (Blackwell readers on the natural environment)
This work will be available later in 1997.

Goulder, Lawrence H.
Environmental taxation and the "double dividend:" a reader's guide. Cambridge, Mass., National Bureau of Economic Research, 1994. 36, 3 p. (NBER working paper no. 4896)
"There has been great interest in the possibility of substituting environmentally motivated or 'green' taxes for ordinary income taxes. Some have suggested that such revenue-neutral reforms might offer a 'double dividend:' not only (1) improve the environment but also (2) reduce certain costs of the tax system. This paper articulates different notions of 'double dividend' and examines the theoretical and empirical evidence for each. In addition it draws connections between the double dividend issue and principles of optimal environmental taxation in a second-best setting."

Guide to environmental issues. Project manager and editor, Julie Klaas Pangman. Washington, U.S. Environmental Protection Agency, Solid Waste and Emergency Response [1994]. 84 p.
"This ... was based in concept and format on Citizens' Guide for Environmental Issues - A Handbook for Cultivating Dialogue by the National Institute for Chemical Studies and U.S. EPA, 1989 and 1990."

Hollender, Jeffrey. Catling, Linda.
How to make the world a better place: 116 ways you can make a difference. Rev. and expanded ed. New York, W.W. Norton, c1995. 284 p.

Hornig, James F.
Training the next generation. Environment, v. 38, June 1996: 28-30.
Reviews the title: "Environmental Studies 2000: an overview of undergraduate interdisciplinary environmental programs and the careers of their graduates." Produced by the staff of the Environmental Careers Organization of Boston, it is "the

first comprehensive study relating environmental education to career outcomes." The reviewer recommends "Environmental Studies 2000 to faculty and administrators who are wrestling with the complex issues of environmental education, as well as to students who are looking for employment in the general area of the environment."

Kahn, Jeremy.
Business and the environment: common sense policy-making. Financial times, July 27, 1994: 14 (2 p.)
The Common Sense Initiative advocates regulating pollution on an industry-sector basis, rather than targeting specific pollutants. Under the initiative, "the EPA may eventually be reorganised along industry lines with divisions representing, say, oil and gas refining or automobiles. The EPA chose six sectors for the pilot programme of Common Sense: iron and steel, electronics and computers, metal plating and finishing, automobiles, printing and oil refining."

Kriz, Margaret.
A new shade of green. National journal, v. 27, Mar. 18, 1995: 661-665.
"Radical theories for controlling pollution and protecting the environment are gaining support among the new breed of conservative Republicans in Congress who are pushing for dramatic changes in the way the federal government operates. But is the nation really ready for such a revolution?"

Not-so-silent spring. National journal, v. 28, Mar. 9, 1996: 522-526.
"Environmentalists have held back the conservative Republican tide that threatened to wash out 25 years of legislative success. But the fight isn't over, and the debate may yet get a lot noisier."

Slinging earth. National journal, v. 28, Apr. 27, 1996: 958.
"The environment has emerged as a heavy weapon in this year's congressional and presidential campaigns....Neither political party has a monopoly on wisdom when it comes to safeguarding the environment. Protecting the environment is an evolutionary process that demands a bipartisan synergy that is conspicuously absent from today's debate."

McKibben, Bill.
Hope, human and wild : true stories of living lightly on the Earth. St. Paul, Minn., Hungry Mind Press, 1997. 237 p.

Meiners, Roger. Yandle, Bruce.
Get the government out of environmental control. USA today (magazine), v. 124, May 1996: 70-73.
"The environment is protected better by individuals seeking to preserve their rights, than by standards determined by legislators and regulators."

The National Environmental Policy Act: a study of its effectiveness after twenty-five years. [Washington] Council on Environmental Quality, Executive Office of the President, [1997] 49 p.

Ochsner, Michele. Chess, Caron.
Pollution prevention's promise, limits, and relevance to planners. Journal of planning literature, v. 11, Aug. 1996: 5-16.
The promise and limits of pollution prevention efforts to date in the context of federal and state pollution prevent programs and data on industry prevention initiatives are examined. Knowledge of pollution prevention strategies is imperative for leaders concerned with economic development's impact on the environment.

Ritter, Don.
How clean is clean?. Environment, v. 37, Mar. 1995: 10-15, 32-34.
"A growing number of scientists, engineers, and policy analysts are questioning the strict environmental standards in current law. The solution to the problem may lie in more careful analysis, more regulatory flexibility, and awareness of the tradeoffs involved."

Romm, Joseph J. Ervin, Christine A.
How energy policies affect public health. Public Health Reports, v. 111, Sept. 19, 1996: 390.
Examines an initiative by the U.S. Dept. of Energy's Office of Efficiency and Renewable Energy and the Environmental Protection Agency to improve public health by developing technologies to prevent pollution.

Roper Organization.
Environmental attitudes and behaviors of American youth: with an emphasis on youth from disadvantaged areas. [Washington?] Roper Starch Worldwide, 1994. 169 p.
Commissioned by the National Environmental Education and Training Foundation, this report is based on a survey of students from disadvantaged areas only. "Chapter One looks at perceptions of the natural environment in the context of other societal issues and the concerns young people have about specific environmental problems . . . . Chapter Two explores environmental education, from overall knowledge today to the issues young people would like to know more about. Chapter Three examines the environment in the day-to-day lives of students today, looking at conditions in local neighborhoods as well as at actions taken by young people to benefit the natural environment. Finally, Chapter Four tests the appeal of various approaches that might expand the environmental horizons of young people, assessing the sources of information, as well as their interest and actual participation in groups that work for the environment."

Environmental attitudes and behaviors of youth from disadvantaged areas: executive summary. Washington, The National Environmental Education & Training Foundation, Inc., 1994. 58 p.
"This summary presents the highlights of Phase II and Phase III of the survey. Phase II investigates young people's attitudes toward the environment nationwide and Phase III focuses only on students in disadvantaged areas . . . . The objective of this research is to gain an understanding of environmental knowledge, behavior and attitudes among youth in general across the nation but with an emphasis on youth from disadvantaged neighborhoods."

Sagoff, Mark.
Do we consume too much? Atlantic monthly, June 1997: 80-83, 86-96.
"Discussions of the future of the planet are dominated by those who believe that an expanding world economy will use up natural resources and those who see no reasons, environmental or otherwise, to limit economic growth. Neither side has it right."

Tomikel, John.
Our natural resources: environmental science - conservation. Corry, PA, Allegheny Press, c1995. 160 p.

U.S. Congress. Senate. Committee on Governmental Affairs.
U.S. Department of the Interior: environmental problems and issues: report. Washington, G.P.O., 1993. 28 p. (S. prt.; 103-47)
At head of title: 103d Congress, 1st session. Committee print.

Warren, Andrew.
Energy--the price is wrong. New statesman & society, v. 9, Mar. 15, 1996: 35-36.
Far from free markets encouraging energy efficiency, the scramble for market share means that utilities concentrate on price alone, at the long-term expense of the customer and the environment. Energy savings is discussed.

Wasik, John F.
The green supermarket shopping guide. New York, Warner Books, c1993. 348 p.

Weidenbaum, Murray.
Environmental regulations vs. economic health. USA today (magazine), v. 123, Nov. 1994: 28-29.
"The nation's future depends on both a strong economy and a healthy environment. It will require serious compromises--from both sides--to achieve a reasonable balance. Overstating ecological or economic threats provides no contribution to this difficult balancing task."

Whitman, Sylvia.
This land is your land: the American conservation movement. Minneapolis, Lerner Publications, c1994. 88 p.

26th environmental quality index: "it's the ecosystem, stupid!" National wildlife, v. 32 Feb.-Mar. 1994: 38-45.
For 1993, assesses the progress and setbacks of the Clinton Administration in dealing with environment issues. Gives a general assessment of the state of the environment focusing on wildlife conservation, air quality, water quality, soil conservation, energy conservation, forest conservation, and quality of life.

27th environmental quality review: a year of gridlock. National wildlife, v. 33, Feb.-Mar. 1995: 34-41.
"By almost any measure, 1994 was a disappointing year for those Americans who looked to federal lawmakers for strong leadership on environmental and conservation matters . . . . Several important measures remained stalled at year's end, including bills designed to give Cabinet status to the Environmental Protection Agency and to create a Biological Survey in the Interior Department. The lawmakers also failed to protect public lands from mining and grazing abuses and to pass revised versions of the Clean Water and Endangered Species acts."

ALTERNATIVE ENERGY SOURCES

The 50-watt dog and other household truths: conserving energy. Economist, v. 328, Sept. 4, 1993: 81.

Abelson, Philip H.
Renewable liquid fuels. Science, v. 268, May 19, 1995: 955(1).
More research and development on alternative liquid fuels is needed in the US to lower dependence on oil imports and to help reduce greenhouse gases. Current research on the production, costs, efficient use and environmental effects of ethyl alcohol and bio diesel fuels are discussed.

Acker, Richard H. Kammen, Daniel M.
The Quiet (energy) revolution: analysing the dissemination of photovoltaic power systems in Kenya. Energy policy, v. 24, Jan. 1996: 81-111.
Examines the technical, economic and political factors that shaped the Kenyan PV market. "Over the past decade, some 20,000 to 40,000 small PV systems, essentially all privately financed, have been installed in Kenya. Many valuable lessons for renewable energy research can be found here. The Kenyan case richly illustrates the dramatic role that actors on every scale, from grassroots to international, can have in accelerating--or when mismanaged, impeding--technology transfer and the elevation of renewable energy systems from niche applications to a prominent role in household empowerment, and decentralized and sustainable development initiatives."

Agres, Ted.
Paving the way for alternative-fuel cars. R&D, v. 38, Mar. 1996: 40-41.
General Motors, Ford and Chrysler recently convinced California regulators to delay for five years a mandate requiring a specified percentage of all new cars to run on electricity. The emergence of a dominant low-polluting fuel in the transportation sector will have significant implications for automobile manufacturers, utilities and fuel producers, government regulators and the driving public.

Algeo, David.
Renewable energy takes center stage at Denver gathering. Denver post, June 18, 1996, sec. C: 3.
Energy Secretary Hazel O'Leary was the keynote speaker at the opening session of the World Renewable Energy Congress IV in Denver on June 17, 1996. More than 600 renewable-energy experts from 80 nations met to discuss solar and wind energy, biofuels, the greenhouse effect, economic development and other issues.

Allen, Scott.
Biodiesel fuel maker gets boost from EPA. Boston globe, Nov. 21, 1996, sec. B: 1.
Twin Rivers technologies official entered the race to clean up America's smelly public buses on Nov. 20, 1996 after federal regulators approved its "biodiesel" bus fuel made from soy beans and other vegetable oils.

Weld orders state agencies to purchase vehicles that run on alternative fuels. Boston globe, May 3, 1996: 83.
Gov. William Weld, hoping to boost sales of low-polluting cars in Massachusetts, on May 2, 1996 ordered state agencies to buy 500 cars a year that run on batteries, natural gas or other alternative fuels by 2001. He also called for millions of dollars in tax breaks for individual drivers who follow the state's lead.

Allinger, Nancy.
Green dreams. Environmental magazine, v. 7, Sept. 1996: 44-45.
Allinger found that building an ecologically sound home involves the balancing of ideals with realities. Information about Allinger's experiences building her off-the-grid eco-home is presented.

An Alternative energy showplace. Mother Earth news, no. 147, Dec. 1993-Jan. 1994: 12(1).
Hopland Solar Living Center in Ukiah, California.

Alternative fuels in future vehicles. Automotive engineering, v. 104, Jan. 1996: 39-43.

The infrastructure for nonpetroleum automotive energy sources will have to be developed in the next few years to meet a growing need for hybrid drives, fuel cells and other alternatives to gasoline. Progress toward meeting the goals of the industry-government Partnership for a New Generation of Vehicles (PNGV) is examined.

Arrandale, Tom.

The numbered days of the gasoline pump. Governing, v. 8, Jan. 1995: 40-43.

"To meet clean-air goals, governments are converting their car and truck fleets to run on natural gas and other alternative fuels. The ultimate goal: to get gasoline-powered vehicles off the road altogether. But weaning motorists from the fuels they're used to won't be easy."

Atkins, R. S.

Generating power with waste wood. Power engineering, v. 99, Feb. 1995: 38-41.

Among the biomass renewables, waste wood has great potential with environmental and economic benefits highlighting its resume. The topics of this article include alternate waste wood fuel streams; combustion benefits; waste wood comparisons; waste wood ash; pilot scale tests; full-scale test data; permitting difficulties; and future needs.

Awerbuch, Shimon.

The problem of valuing new energy technologies. Energy policy, v. 24, Feb. 1996: 127-128.

A brief editorial outlines the concepts and challenges facing the valuation of modular, renewable energy technologies which are covered in a special issues of "Energy Policy." The main problem is the narrowness of the traditional discounted cash flow analysis for valuing such projects when some of the benefits (e.g. flexibility, financial risk, reduction in overhead and indirect costs) are not fully recognized at the outset.

Bai, Hsunling. Wei, Jong-Hourm.

The CO2 mitigation options for the electric sector: a case study of Taiwan. Energy policy, v. 24, spring 1996: 221-228.

In this paper, a multiobjective linear programming model is proposed to assist in evaluating the cost impacts of several possible CO2 mitigation options for the electric sector as well as the associated CO2 emission reductions. With the base year of 1990, this model is applied to study the best short-term (to the year 2000) solution for Taiwan's electric sector in order to accomplish maximum possible CO2 reduction with minimum cost. The CO2 emission data are presented as per capita emissions."

Barlow, Jim.

Mass is critical to green power. Houston chronicle, Dec. 31, 1996: C1.

Discusses green power, the generation of electricity through nonpolluting renewable sources, focusing on its cost and concluding that it will continue to be a limited niche product for a long time unless consumers demand that utility companies invest the necessary money up front.

Batsell, Jake.

Grease is the word: new smell of diesel fumes has a hint of french fries. Chicago tribune, Nov. 17, 1996, sec. 4C: 9.

Chicago is the site for a Dept. of Energy-sponsored project that will test a form of diesel fuel made from leftover grease at restaurants. Columbus Foods in Chicago is hoping that the idea of converting grease to gas catches on, since the company is putting finishing touches on the first Midwestern plant able to convert waste animal fats, cooking grease and other gunk into a replacement for diesel fuel.

The Battle for world power. Economist, v. 337, Oct. 7, 1995: 23(3).

Alternative energy is becoming cheaper to produce and may challenge the hold that fossil fuel energy producers have on the world in the 21st century. Fossil fuel will not run out anytime soon but falling prices and concern for the environment may boost renewable energy industries.

Beardsley, Tim.

Turning green: Shell International projects a renewable energy future. Scientific American, v. 271, Sept. 1994: 96(2).

Becker, Julie.
Harnessing alternatives. Buzzworm: the environmental journal, v. 6, Nov.-Dec. 1993: 52(1).

Bedard, Patrick.
Didja hear the one about running your car on water? Car & driver, v. 42, Oct. 1996: 20.
Bedard refutes the claim that Rudolf Gunnerman's A-21, an alternative fuel comprised of 55% water and 45% naphtha, is a safe and clean alterative to gasoline for use in almost any combustion engine.

Belsie, Laurent.
Are there fuel cells in your future? Christian Science monitor, July 18, 1995: 12.
Fuel-cell technology is discussed. The battery-like devices promise cleaner, renewable power that is quiet and twice as efficient as auto engines, and laboratories around the world are trying to find the design that will make fuel cell technology a commercial success.

The time has come for geothermal heat pumps. Christian Science monitor, July 30, 1996: 14.
Heat pumps operate in much the same fashion as air conditioners and refrigerators, and geothermal heat pumps utilize tubing buried underground. Initially, operating and installation costs made heat pumps impractical, but recent technological advances now give heat pumps a distinct edge over conventional heating and air-conditioning systems.

Bergquist, Lee.
Green power cost irks environmental groups: activists want Wisconsin Electric to seek in-state sources. Milwaukee journal sentinal, June 25, 1996: 1.
Discusses public reaction to a Wisconsin Electric Power Co. plan which would require consumers to pay more for electricity obtained from renewable sources.

Bishop, Jerry E.
A bottle rekindles scientific debate about the possibility of cold fusion. Wall Street journal, Jan. 29, 1996: 7A.
A bottle no bigger than a man's fist is stirring up the debate again over cold fusion. The little bottle known as a Patterson Power Cell, named for its inventor, James A. Patterson, is the basis for a new technology start-up, Clean Energy Technologies, Inc. Despite skeptics, CETI has demonstrated the Patterson cell at three technical conferences in the last nine months, including the Dec. 1995 annual gathering of generating-equipment manufacturers in Anaheim CA.

Bowen, David.
The search for a technological fix. World press review, v. 43, Dec. 1996: 9(3).
The information superhighway can help to reduce traffic and hence pollution by making certain trips unnecessary. Electric and alternative-fuel automobiles will also mitigate environmental impacts, but they currently face a number of practical obstacles.

Bower, Carolyn.
Landfill to turn up the heat at school. St. Louis post-dispatch, June 26, 1996, sec. B: 1.
Pattonville High School in northwest St. Louis County MO soon could become perhaps the first high school in the country to be heated with landfill gas.

A Breakthrough in wringing liquid fuel from coal. Business week, no. 3389, Sept. 12, 1994: 78.

Brennan, B. V.
"Green" energy technology: a smart way to branch out. Fortnightly, v. 133, Feb. 1, 1995: 41-42.
Noting the growing global demand for new sources of energy, Congress tailored the Energy Policy Act of 1992 (EPAct) to make U.S. public utility holding companies more competitive abroad. First, it eased Securities and Exchange Commission review of U.S. investment in foreign energy facilities. Second, it sought to expand U.S. participation in foreign energy-related projects to include U.S. technology as well as

investment dollars. In that regard, Congress structured EPAct to offer financial assistance for "design, construction, testing, and operation" of projects in foreign countries that use renewable, environmental, and clean-coal technologies manufactured in the United States. These environmental energy technology programs are intended to foster a new industry and help it compete globally.

Bolson, Jessica.
Gasoline of the future? Mother Earth news, no. 155, Apr. 1996: 15.

Brown, Lester R.
We can build a sustainable economy. The Futurist, v. 30, July-Aug. 1996: 8(5).
Building a sustainable world economy means stabilizing the world population and protecting the environment. Population growth must be curbed if the food supply of future generations is to be assured and less polluting and less wasteful means of producing energy must be implemented.

Brown, M. H.
Changing a historical perspective. Independent energy, v. 24, Sept. 1994: 64-68.
It is well known that risks profiles shape the cost of capital for energy projects. Equity and lending institutions that invest in independent power believe renewable energy projects generally carry greater risks than conventional gas, oil, or coal-fired facilities. Consequently, developers of renewable energy--including wind, geothermal, hydropower, solar, or biomass--often pay premium prices for development capital and face contractual restrictions that developers of the more conventional resources do not encounter. Earlier this year, a focus group was conducted in conjunction with a series of interviews with investors, lenders, and investment bankers which revealed that unfavorable institutional memories and a lack of good information led to this restricted, higher cost financing.

Brown, Linda R.
Renewable energy. Resource, v. 3, Aug. 1996: 9-10.
U.S. researchers are developing advanced technologies for converting energy crops, agricultural waste and other biomass resources into products that benefit the economy at both the local and national level.

Brown, Paul.
Power company gambles on green premium, Guardian, Nov. 9, 1996, sec. 1: 24.
Green Electron Co., a new electricity supplier, is gambling on environmental consumers being prepared to pay premium prices for power from renewable sources. Repeated surveys show up to one in five Britons are prepared to subsidize environmentally benign forms of energy, so the firm is setting up a plan to provide it.

Brown, Warren.
Chrysler unveils an alternative energy car; automaker says use of hydrogen to fuel electric cells is an important step to cleaner air. Washington post, Jan. 7, 1997: C1.
In terms of the future of the automobile in the U.S., Chrysler Corp's experimental hydrogen fuel cell car may be the most important exhibit at the 1997 North American International Auto Show. Called the Chrysler LHX, the super-sleek passenger sedan is designed to be powered by electric fuel cells that use hydrogen extracted from gasoline.

Cairns, Christopher. Jardine, David.
Opposition to alternative energy plans. The Scotsman, Nov. 30, 1995: 10.
Discusses reasons for increased local opposition in the United Kingdom to alternative energy proposals.

Cairns, Stephanie.
New budget begins to reduce tax disadvantages for energy efficiency and renewable energy production. Alternatives, v. 22, July 1996: 17.
Steps toward a reorientation of energy policy from a traditional focus on supply to an increased emphasis on efficiency, alternative and renewable energy sources, the environment and sustainable development were taken in Canada's 1996 budget. However, subsidies and tax incentives continue overwhelmingly to favor conventional energy supply sources over more environmentally desirable energy efficiency initiative and renewable energy production.

Cameron, Kevin.
Air power. Cycle world, v. 35, Apr. 1996: 16.
It would be nice if the marketplace could help influence the development of an alternative energy source before shocking increases in fuel prices arrive. Cameron discusses the history of the development of engines for carrier aircraft and how it relates to modern day attempts to develop new engines.

Candler, Julie.
The mandate for alternative fuels. Nation's business, v. 82, June 1994: 49(3).

Capturing sun-rays, reaping the wind. UN chronicle, v. 31, June 1994: 63(1).
U.N. Sec. Gen. report on concerns over decreased use of renewable energy sources.

Carrier, Jim.
The case for renewable energy. Denver post, June 30, 1996, sec. MAG: 6.
Highlights some expert responses to the case for renewable energy. In June 1996, Public Service Co. of Colorado turned on the state's largest photovoltaic cell at Cherry Creek State Park, which will produce 22 kilowatts, enough to power 48 RV campsites.

Casey, John.
Here comes the sun. Civil engineering, v. 65, Oct. 1995: 54-57.
Research continues around the country toward alternative energy sources, despite the fact that there are still abundant fossil fuels. Researchers are working on making wind, solar, biomass and hydrogen power cost-competitive with traditional energy sources.

Cavanaugh, Herbert A.
Will customers pay for renewables? PSC launches 'green-power' program. Electrical world, v. 207, Oct. 1993: 19(2).
Renewable energy at electric power plants, Public Service Company of Colorado.

Chandler, David L.
Hybrid cars are making a go of it. Boston globe, May 20, 1996: 45.
Hybrid electric cars, which use both batteries and fuel-burning engines to provide their power, are discussed. The vehicles have existed since 1905, but the concept in 1996 may be on the verge of enormous resurgence.

Chandler, Gary.
Alternative energy sources. New York, Twenty-First Century Books, 1996. 64 p.

Charles, M. A. Kiser, J. V. L.
Waste-to-energy: benefits beyond waste disposal. Solid waste technologies, v. 8, 1995: 12-14.
More than 125 waste-to-energy plants operate in North America, providing dependable waste disposal for thousands of communities. But the benefits of waste-to-energy plants go beyond getting rid of the garbage. Here's a look at some of the economic, environmental , and societal benefits that waste-to-energy projects have brought to their communities. The reasons vary considerably as to why communities have selected waste-to-energy as a part of their waste management systems. Common on the lists in many communities are a variety of benefits beyond dependable waste disposal. A look at experiences in four communities reveals environmental, economic, energy, and societal benefits that the projects provide to the communities they serve.

Clarke, Arthur C.
Space drive: a fantasy that could become reality. Ad Astra, v. 6, Nov.-Dec. 1994: 38(1).

Clean profits: renewable energy. Economist, v. 6, Sept. 25, 1993: 81(1).

Connell, Kathy.
This dream home is energy efficient, too. Countryside & small stock journal, v. 79, Mar.-Apr. 1995: 69(3).
A homesteader's dream house is built of formed concrete and is partially underground. Large pane windows bring in passive heat, as does an attached greenhouse. Water is pumped in and cooking is done on a wood stove. The cost of the house, not including solar panels, is estimated at $12,000.

Cowen, Robert C.
Reaching 2,000 m.p.h.--with a little water. Christian Science monitor, Apr. 1, 1996: 14.
Discusses father and son physicists Peter and Neal Graneau, who believe they have found a way to tap the energy associated with the forces that bind water molecules together in their liquid form.

Coy, Peter.
As the world turns, free energy? Business week, no. 3439, Aug. 28, 1995: 77.
A handful of retired engineers and physicists have designed a machine that taps into the enormous energy of the Earth's rotation. Run on so-called Gyropower, it is essentially a gyroscope connected to a generator. The main problem yet to be worked out is that the working model consumes more energy than it produces.

Crabtree, Susan.
Ready to make abundant fuel out of water. Insight, v. 11, Oct. 2, 1995: 62(2).
This author believes energy from controlled nuclear fusion by 2040 has been sidetracked because of cuts by Congress, but energy from water is an alternative that is being studied. The hydrogen in water molecules would be used as fuel. Just as candlemakers lost out to light bulbs, automakers can also expect change.

Daly, Jim.
Fuels of the future. Motor boating & sailing, v. 174, Dec. 1994: 34(2).
Includes related information on Detroit Diesel and MTU engines.

Day, Janet.
Colorado's Raton Basin yields powerful resource. Denver post, Apr. 30, 1995, sec. H: 1.
The development of the methane gas locked up in the coal seams that criss-cross Raton Basin in Colorado is discussed. In 1995, four Denver area companies, Amoco Production., Evergreen Resources, Meridian Oil, K N Energy, and Houston-based Pennzoil Inc. are exploring, developing and producing in the region.

Once lethal gas now a gold mine. Denver post, Apr. 30, 1995, sec. H: 4.
The development of coalbed methane resources across the U.S. is discussed. Following the energy crisis of the 1970s, new technology and lower costs have prodded interest in coalbed methane.

Donlan, Thomas G.
Whiskey rebellion; it's time to squeeze corn interests out of national affairs. Barron's national business and financial weekly, v. 74, May 23, 1994: 63(1).
Gasoline production mandate backed by ethanol producers.

Durgin, Hillary.
Going nationwide. Houston chronicle, July 10, 1995, sec. B: 1.
American Natural Gas Power, a small Houston company, is seeking to take its expertise in the compressed natural gas arena nationwide. The company was formed to take advantage of new rules under the 1990 Clean Air Act that require certain fleet vehicles to run on alternatives to conventional gasoline and diesel fuels. The company is profiled.

Power Strategies adopts a hard-smell campaign. Houston chronicle, Jan. 13, 1996, sec. C; 1.
Power Strategies, a small Houston-based firm, won a significant contract to turn noxious gases from garbage into electricity at 22 sites operating by Sanifill, the Houston landfill owner and operator.

Eber, Kevin.
For some ratepayers, it's easy being green. Electrical world, v. 209, Sept. 1995: 58(2).
Advances in renewable energy electricity generation technologies have made such systems more cost-efficient, but utilities still need customers to subsidize costs. Utilities have developed green pricing schemes to give customers the option to pay higher bills for renewable energy projects.

Einhorn, Cheryl Strauss.
Gas explosion: prices are rising by default. Barron's national business and financial weekly, v. 76, June 24, 1996: MW12(1).
No fuel can compete with natural gas at this time making stocks in this industry look attractive. Hydroelectric power will be down in 1996 because of drought. Low capacity nuclear plants and a decease in the production of fuel oil leaves the future trading in natural gas looking strong.

Eleri, Ewah Otu.
The Energy sector in southern Africa: a preliminary survey of post-apartheid challenges. Energy policy, v. 24, 0101: 113-123.
"The energy sector in SADC countries has been beset by several decades of crises. The decline in regional tensions is providing a conducive climate for broadening political, economic and environmental reform programmes. This paper reassesses the new environment for energy policy making and the nature of the crisis in the provision of energy services for sustainable development. It goes on to review the forces shaping new developments in the sector and the challenges ahead for stakeholders."

Elliott, D.
Renewable energy policy in the UK: problems and opportunities. Renewable energy, v. 9, Dec. 1996: 1-4.

Ellis, Jane.
Why promote renewable energy? OECD observer, no. 201, Aug. 1996: 17-20.
All the member countries of the International Energy Agency promote renewable energy in some form or other. However, variation is seen in its relative importance, the type of energy targeted and the strength of promotion.

Emissions with butane/propane blends. Automotive engineering, v. 104, Nov. 1996: 49-54.
Butane and butane/propane blends have received attention recently as possible useful alternative fuels. The various aspects of exhaust emissions from a light-duty car converted to operate on butane and butane/propane blends and equipped with an electrically heated catalyst are discussed.

Energy and environment. Scientific American, v. 273, Sept. 1995: 168-186, 188.
Contents.--Solar energy.--Fusion.--Disposing of nuclear waste.--The industrial ecology of the 21st century.--Technology for sustainable agriculture.--Outline for an ecological economy.

Energy snapshot: describing current and potential markets for alternative-fuel vehicles. Monthly energy review, Mar. 1996: ii-xiii.
The Energy Policy Act of 1992 included provisions to increase the number of less polluting alternative-fuel vehicles. A look at total vehicle stock, consumer preferences for fuel, and fleets of alternative fuel providers is presented.

Energy sources face strong competition in US. OPEC bulletin, v. 27, Mar. 1996: 16.

Environmental impact of non-conventional energy sources, by S. A. Abbasi, et. al. Journal of scientific and industrial research, v. 54, May-June 1995: 285-293.
Whereas the global attention has always been focused on the adverse environmental impacts of conventional energy sources, only a few studies have been conducted on the clean environment image of the non-conventional energy sources, particularly the renewable ones. The question of whether the non-conventional sources are really as benign as they are made out to be is addressed in the present paper in the background of a classical paradigm developed by Lovin which had postulated the hard (malignant) and soft (benign) energy concepts in the first place. It then assesses the likely environmental impacts of several major non-conventional energy sources and comes up with the note of caution that in many cases the adverse impacts may not be insubstantial; indeed in some cases they can be as strongly negative as the impacts of the conventional energy sources.

Farhar, Barbara C.
The polls - poll trends: public opinion about energy. Public opinion quarterly. v. 58, winter 1994: 603(30).

Feder, Barnaby J.
Small home markets for wind and sun. New York times, June 5, 1996, sec. D: 20.
Although it is in overseas markets that the U.S.' alternative energy companies are thriving, there is at least a small constituency for their products at home. The largest windmill yet erected in the U.S. began generating power in May 1996 for Traverse City Light & Power, based just west of Traverse City MI.

Flavin, Christopher
Harnessing the sun & wind. USA today (magazine), v. 124, Nov. 1995: 70-73.
Improvements in technology are making wind power and solar power effective and economical alternatives to reliance on fossil fuel energy. Both power sources are abundant, but some environmental and practical obstacles must be overcome before they become widely available.

Flavin, C. Lenssen, N.
Powering the future toward a sustainable electricity industry. Solar today, v. 8, Sept.-Oct. 1994: 26-28.
Electricity is indispensable to today's economics and lifestyles. Along with electricity, however, the power industry generates some of the world's most serious environmental problems. The industry is the leading consumer of fossil fuels, particularly coal, the dirtiest of those fuels. Consequently, power generation accounts for nearly one-third of global emissions of carbon dioxide, the principal greenhouse gas, and produces nearly two-thirds of the sulfur dioxide that is a major culprit in both local and long-distance air pollution. In recent decades, the power industry has been implicated in a series of additional environmental problems, ranging from emission of heavy metals to toxic ash, land degradation from strip mining and the buildup of radioactive waste. Several virtually inexhaustible resources that produce little or no pollution have recently emerged as economically competitive means of generating electricity. Among them are wind and solar energy, which could one day, together with other renewable energy sources, provide most if not all of the world's electricity. This article describes wind and solar power technologies and predicts their future market worldwide for electric power generation.

For a submarine's power plant, what better fuel than H2O? Business week, no. 3356, Jan. 31, 1994: 75(1).
Econo-Tech Corp. developing submarine engine that uses oxygen from water molecules.

Freedman, Allan.
Rejecting Clinton's flood plan, panel approves energy bill. Congressional quarterly weekly report, v. 53, June 24, 1995: 1833-1835.
In the $18.7 billion fiscal 1996 spending bill (HR. 1905) for energy and water development, "House appropriations are taking the lead in rejecting a Clinton administration proposal to shift responsibility for many flood control projects to state and local governments, upholding the tradition of funding local water projects and other public works." With many accounts hard-hit, the bill would provide $14.8 billion for the Energy Department. Although "the Appropriations Committee did vote to restore some funding for solar and renewable research, increasing money for research into hydrogen as an alternative fuel . . . the overall account for energy research and development still slid by $718 million, or 22 percent."

The Future of electricity. Wired, v. 4, Oct. 1996: 80.
Four experts--Christopher Flavin, Amory Lovins, Gary Simon, and Carl Weinberg--offer their perspectives on the future of electricity. They discuss prospects for generating power from renewable sources.

The Future of electricity: the battle for world power. Economist, v. 337, Oct. 7, 1995: 23-26.
Coal, gas and oil will not be the three kings of the energy world forever. It is no longer folly to look up to the sun and wind and down to the sea's waves for the future of energy.

The Future of energy. Economist, October 7, 1995, p. 23-24, 26.
"Coal, gas and oil will not be the three kings of the energy world for ever. It is no longer folly to look up to the sun and wind, down into the sea's waves."

Gay, C. F.

Energy and the environment: creating new industries. Solar today, v. 10, May-June 1996: 16-19.

During the past 20 years, the USA has enacted some of the world's most comprehensive legislation for protecting and preserving its environmental heritage. Arguments continue as to whether these laws impose too heavy a burden on American companies, putting them at a global disadvantage or whether they are prudent, conservative management of the natural resources upon which our industries are built. Respected industry analysists are, however, convinced that renewable energy technologies--including photovoltaics, wind and biomass-derived ethanol--will be a firm part of a growing 'green' economic base. A recent report predicts that by 2050 renewable energy resources may contribute almost as much to global energy demand as coal, oil, natural gas and nuclear combines. This article discusses the ramifications of the new industries to the U.S. and its industrial economy.

Gelbspan, Ross.

A global warning. American prospect, no. 31, Mar.-Apr. 1997: 37-41.

"Global warming is now accepted by reputable scientists as a genuine and severe threat . . . . Global warming need not require a reduction of living standards, but it does demand a rapid shift in patterns of fuel consumption--reduced use of oil, coal, and the lighter-carboned natural gas--to an economy more reliant on solar energy, fuel cells, hydrogen gas, wind, biomass and other renewable energy sources. It is doubtful that market forces can bring about this shift, since the market price of fossil fuels does not incorporate their environmental costs."

Ghioto, Gary.

Ethanol plant planned for Alexandria site. Boston globe, Mar. 3, 1996, sec. NH: 1.

The proposal for a $100 million ethanol facility in Alexandria NH producing millions of gallons of the alternative fuel from a distilling process using wood chips and municipal waste is detailed, focusing on its impact on the anxious wood chip industry in the state.

Glaser, Peter E.

Space power systems: the driver for space activities. Ad Astra, v. 8, Nov. 1996: 28-32.

The feasibility of using space power systems (SPS) as potential global energy supply options for use on Earth in the 21st century is discussed. The SPS can provide the impetus to engage in supportable human space exploration activities.

Gottschalk, Arthur.

Command approach to energy is assailed: gas producers blast solar mandates. Journal of commerce, Aug. 26, 1997: 12A.

"New mandates for solar power and other alternative energy sources could work against the benefits of deregulation and competition in the electricity industry, according to advocates for the cleaner-burning fossil fuel."

Green, B.

The jobs connection: energy use and local economic development. Solar today, v. 9, May-June 1995: 22-25.

Investments in energy efficiency and alternative energy technologies can improve the economic health of American communities. This article uses examples of U.S. communities to illustrate such investments. Among the topic areas covered are the following: the flow of energy dollars; the lost potential of energy dollars; the economic multiplier: what your dollars do; how energy dollars impact the local economy; and so forth.

Green, J. H.

Trends and outlook for biomass energy. Energy engineering, v. 91, 1994: 18-28.

Among renewable energy resources, biomass is one of the most promising, with the potential for providing electricity through combustion, gasification, and biochemical processes as well as supplying gaseous and liquid fuels that can compete with conventional energy sources in large-scale application. The production of biomass for energy purposes can also offer environmental benefits. The most notable is the potential for providing energy with little or no net buildup of carbon dioxide in the atmosphere if the biomass is produced renewably. Biomass also has the potential to help revitalize the rural sector of the economy. A domestic natural resource, biomass can be grown and harvested, which requires labor. The biomass power industry can therefore create jobs in harvesting and transporting biomass and in the related

industries of fertilizers, pesticides, and agricultural equipment. In the future, biomass facilities will be larger and more efficient and, as such, an important alternative for energy generators. This article summarizes the factors relating to the use of biomass as a fuel source, the technology options for power generation, and examines the trends and outlook for biomass energy generation in the United States.

Griffin, Rodman D.
The issues. CQ Researcher, v. 2, July 10, 1992: 575(5).
Alternative energy has become a widely discussed subject in the 1990s with the strides made by technology and the decreasing costs of harnessing such technology. Among the important issues are the possibility of alternative fuels being overemphasized at the expense of coventional energy sources, government subsidy of alternative energy, and the benefits and costs of alternative energy sources.

Hall, D. O. House, J.
Biomass: an environmentally acceptable fuel for the future. Journal of power and energy, v. 209, 1995: 201-213.
Biomass fuels currently supply around 15 per cent of the world's energy. Much of this is in the form of traditional fuelwood, plant residues and dung, which are often inefficiently used and can be environmentally detrimental. There is great potential for the modernization of biomass fuels to produce convenient energy carriers, such as electricity, gases and transportation fuels, while continuing to provide for traditional uses of biomass; this is already happening in many countries. When produced in an efficient and sustainable manner, biomass energy has numerous environmental and social benefits compared with fossil fuels. These include waste control, nutrient recycling, job creation, use of surplus agricultural land in industrialized countries, provision of modern energy carrier to rural communities of developing countries, improved land management, and a reduction of CO2 levels. Using biomass to substitute for fossil fuels is a far more effective use of available land than simply growing trees as a carbon store. Biomass fuels can form part of a matrix of renewable fuel sources that increases the energy available for economic development in developing countries. In OECD Europe it is calculated that a potential of 9.0-13.5 EJ could be produced in 2050 on available land, which represents 17-30 per cent of projected total energy requirements.

Hall, D. O. Rosillo-Calle, F. Woods, J.
Biomass utilization in households and industry: energy use and development. Chemosphere, v. 29, Sept. 1994: 1099-1119.
The historical importance of biomass energy use and biomass-related carbon releases through anthropogenic activities is increasingly recognized. Unfortunately there is as yet insufficient data to substantiate many assumptions made concerning both its importance as a primary energy source and its long-term role as a source/sink of greenhouse gases. However, given the fundamental role that biomass has played throughout human history, biomass-related activities are bound to have caused important environmental effects, at both micro and macro levels. The extent of such effects presently remains unclear. This paper re-examines the role of biomass energy use (past and present) including its relationship to population and environment, and potential carbon releases from biomass due to anthropogenic activities with particular attention to land use changes, biomass burning, and industrial uses.

Halper, Stefan.
Alternative energy now. Christian Science monitor, Oct. 18, 1996: 18.
Stefan Halper laments that despite certain knowledge that America's crippling reliance on foreign oil will again take a toll in American blood and treasure, partisan squabbling in Congress and the administration's election focus have brought cuts in alternative energy programs that should instead be sharply increased.

Halpert, Julie Edelson.
U.S. solar industry in export boom. New York times, June 5, 1996, sec. D: 1.
Solar panels made in the U.S. are sprouting up by thousands in less developed countries, where connections to conventional power grids are nonexistent. All this means big business at last for the dozens of small and mid-sized U.S. companies that make solar equipment, including Astro Power Inc. and Solarex, a joint venture of Amoco Corp. and Enron Corp.

Hammad, M.
Photovoltaic, wind and diesel: a cost comparative study of water pumping options in Jordan. Energy policy, v. 23, Aug. 1995: 723-726.
"In the present study, the economics of water pumping by different methods are discussed. The methods investigated are the diesel generation system (DGS), the photovoltaic generation system (PVGS), the mechanical wind pumping system (MWPS) and the electrical wind pumping system (EWPS). The results from the sites studied revealed lower costs for both the photovoltaic and mechanical wind pumping systems than diesel generation, while higher costs were noted for the electrical wind pumping system. The results of this study also showed that at low capacities it is more economical to use PVGS than other methods."

Hart, Anne.
Earth's heat helps lower energy bills. Atlanta constitution, Feb. 1, 1996, sec. XJM: 5.
Some homeowners in the north end of Coweta County GA have stayed snug, and out of debt, in the 1995-96 winter with geothermal heating/cooling pumps and cellulose insulation. Geothermal pumps use the Earth's temperature to heat or cool the house.

Heat from the Earth. Family handyman, v. 46, Oct. 1996: 81.
Ground-source heat pumps tap into the Earth's tremendous storehouse of energy by removing the heat stored within the Earth and transferring it into houses. Information on how geothermal systems work is presented.

Hendricks, Gary.
Ford touts natural gas vehicles. Atlanta constitution, Feb. 1, 1996, sec. XJI: 2.
Ford Motor Co. showed off its array of vehicles powered by compressed natural gas to about 60 government and corporate fleet managers from metro Atlanta. The demonstration in Riverdale GA was the first stop on a seven-city national tour in Ford's attempt to demonstrate its leadership in producing alternative fuel autos.

A shift in alternative-fuel goals: glitch moves focus away from police cars. Atlanta constitution, Jan. 30, 1997, sec. XJI: 2.
A glitch in the alternative-fuel program for Clayton County government vehicles has forced officials to shift priorities but has not lessened their commitment to converting cars and trucks away from fossil fuels. "The Clean Air Act is not joke," said Lou Hisel, head of the alternative-fuel program for the county. "There may even be a mandate for nongasoline vehicles coming out of Washington." Reaffirming the county's commitment to alternative fuels, the County Commission voted last week to accept a $50,000 state grant. The money will help make up the difference in the cost of alternative-fuel vehicles, which run about $4,000 more per vehicle than gasoline-powered vehicles.

Henry, Ed.
Cars that don't need gas. Kiplinger's personal finance magazine, v. 50, Dec. 1996: 83.
Car makers are ready to offer consumers the biggest choice of mass-produced alternative fuel vehicle ever. Henry compares three electric vehicles and four that run on methanol or natural gas.

Hill, Lawrence J. Hadley, Stanton W.
Federal tax effects on the financial attractiveness of renewable versus conventional power plants. Energy policy, v. 23, July 1995: 593-597.
Examines the effects of federal tax laws on the financial attractiveness of renewable energy ventures.

Hillier, Mark.
New electric avenues. Barron's national business and financial weekly, v. 77, Feb. 17, 1997: 41.
Iceland is seeking to attract power-intensive industries to exploit the island country's excess supplies of renewable energy. Iceland consumes only 10% of the 500,000 GWhs it produces. Iceland has successfully attracted many aluminum, ferrosilicon, and magnesium companies.

Hines, Daniel.
Energy crops as a source of power. St. Louis post-dispatch, June 7, 1996: B7.
Discusses the acceptance of energy from agriculture and notes that some people continue to oppose moves that would make the technology readily available.

Ho, Rodney.
Ford promoting natural-gas vehicles. Atlanta constitution, Feb. 2, 1996, sec. S: 4.
Tom Artshuin, the Ford Co.'s marketing manager for alternative fuels, in Jan. 1996 showed off a number of natural-gas vehicles for 60 potential government and corporate customers at Atlanta Gas Light's natural-gas vehicle technology center in Riverdale. The main selling points were natural gas is less polluting and it's cheaper than oil; however, there are still drawbacks.

Hoagland, Jim.
The oil we need now. Washington post, July 3, 1996: A25.
Jim Hoagland, in light of the bombing in Dhahran Saudi Arabia that killed 19 U.S. airmen, states that the U.S. needs to remove the national dependence on imported oil that helped put those airmen in harm's way. He continues that it is time for Americans to get serious about alternatives to cheap Middle Eastern oil and depending on high-visibility, high-vulnerability military bases on inhospitable soil.

Hoffman, Carl
Energy futures; biomass: it's cleaner than coal, safer than nukes, more reliable than solar.... Audubon, v. 95, Sept.-Oct. 1993: 112(5).
Use of dead shrubs, trees and plants as alternative energy sources.

Hohenstein, W. G.
Biomass energy production in the United States: an overview. Biomass and bioenergy, v. 6, 1994: 161-173.
This paper summarizes reports prepared for the U.S. Environmental Protection Agency (EPA) by researchers at the U.S. Department of Energy's (DOE) Oak Ridge National Laboratory (ORNL). It also presents conclusions from a Biomass Energy Strategies Workshop conducted at ORNL. The Biofuels Feedstock Development Program (BFDP) has largely concentrated on the development of dedicated biomass feedstocks, referred to as energy crops. Two general types of energy crops have received the most attention--short-rotation woody crops (SRWC) and herbaceous energy crops (HEC). These cropping systems use traditional food production technologies as a means of maximizing the production of biomass per unit of land. Research focuses on the development of new crops and cropping technologies. The reports prepared for EPA and summarized by this article include discussions of crop production technologies, available land, economic considerations and environmental trade-offs. The discussion of other sources of biomass occurs only in the context of the workshop on biomass energy strategies.

Holmes, Hannah
Unplugged. Sierra Club bulletin, v. 78, Sept.-Oct. 1993: 23(2).
Living without electricity generated by utilities.

Howe, Peter J.
Ready to roll: electric car hits sales floor. Boston globe, Dec. 5, 1996, sec. C: 1.
The long quest to turn electric cars from an environmentalist's dream into a commuter's option cleared a major milestone on Dec. 4, 1996 as Mirak Chevrolet in Arlington MA became the first car dealership east of Arizona to offer electric cars on its sales floor.

Hunt, R. T. Hunt, J. M.
Developable resources. Independent energy, v. 25, Jan. 1995: 62-64.
In the United States, it has become the conventional wisdom that all developable conventional hydropower resources have been exhausted. Studies by the U.S. Department of Energy (DOE) and other agencies find differently. The root of disagreement may lie in the definition of what is developable. Environmental special interest groups now define developable hydropower sites as those having zero effect on the environment. As a result they conclude there are no additional developable hydropower sites. By contrast, the definition used by DOE and others is broader as it balances economic, technical, and environmental factors in accordance with the Federal Power Act.

Iannotta, Ben.
Batteries not included. New scientist, v. 153, Jan. 11, 1997: 30-33.
Two small American companies are developing flywheels that might one day store and provide enough energy to power satellites and even the space station for 20 years or more in orbit. NASA engineers say flywheels have the potential to be lighter and

less complex than today's battery stacks, they can store more energy and they do not need any of the toxic chemicals that batteries rely on.

International Energy Agency.
Energy policies of the Russian Federation. Paris, Organisation for Economic Co-operation and Development, 1995. 323 p.
"This comprehensive, independent review of the major energy policy issues that Russia faces in reforming its economy was conducted by the IEA with the assistance of the Russian Government. It provides detailed descriptions and supporting data for all energy subsectors. It also covers issues related to energy supply and demand, energy efficiency, environmental impacts of energy use and production, and nuclear safety. Analysis of these issues is followed by recommendations for priority action . . . . Also included is the text of the Energy Strategy co-ordinated by the Russian Ministry of Fuel and Energy and confirmed by Presidential Decree."

International update of the Renewable Energy Design Assistance Center, by B. Richards, et al. Solar industry journal, v. 5, 1994: 35-40.
Ever since the U.S. DOE created Sandia's Design Assistance Center (DAC) in 1984, its mission has been to accelerate the acceptance and appropriate use of renewable energy technologies, thereby expanding markets for U.S. industry. The DAC strives to remove obstacles that impede the use of the technologies, such as a lack of awareness of appropriate applications, misperceptions of cost, lack of information on commercially available products, doubts about performance, and uncertainties in how to specify or procure a system. To ensure successful projects, the DAC tailors its approach to best meet the needs of each project and/or organization. Over the years, the DAC has built up a considerable experience base in what is required for a renewable energy project to be successful and replicable in a less-developed country or area. Although sound, reliable, proven technology is essential, equal attention must also be given to end-user education; establishment of a local maintenance and repair capability, usually accomplished through training; and a spare-parts supply. Access to some form of financing is also frequently necessary to offset the relatively high up-front costs associated with renewable energy systems. This article describes a few of the DAC's most recent international activities.

James, Sharpe.
Working together to solve the garbage crisis. American city & county, v. 108, July 1993: S6(1).
Municipal waste management. Solid Waste/Resource Recovery Supplement.

Jefferson, M.
Global prospects for renewable energy. Renewable energy, v. 5, Aug. 1994: 5-11.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
Global prospects for renewable energy are bright, but for a number of reasons the pace and scale of development will be slower than some assume.

Johnson, Robert.
With oil prices down, who needs alternative energy? Wall Street journal, Jan. 26, 1994: B1.
Electric utility's research and development budgets not growing.

Jost, Kevin.
Alternative energy storage. Automotive engineering, v. 104, Nov. 1996: 35-37.
The Partnership for a New Generation of Vehicles has made some progress in the development of energy storage technologies for automobiles. Information about some of these new technologies, including lithium-ion batteries and flywheels, is presented.

Kanamine, Linda.
"Pretty cool" idea will heat Missouri school. USA today (newspaper), Dec. 26, 1996: A3.
Pattonville High School in Maryland Heights MO will be the nation's first public school to mine a landfill's methane gas for heat. With a high school now tapping in, and new rules forcing more landfills to capture methane, dumps could fuel the next alternative-energy boom.

Kaplan, D.
DOE examines taxing issue in new report. Energy daily, v. 22, Jan. 13, 1994: 3.
Contrary to conventional wisdom, the federal tax code generally serves as an incentive for renewable energy production, not a barrier, the Department of Energy

concluded in a report released Monday. Largely because depreciation schedules are shorter for renewable projects than for conventional plants--about five years compared to 20--federal taxes and credits are a boon for the renewable projects of both investor-owned utilities (IOUs) and nonutility generators (NUGs). But a renewable energy leader dubbed the report "idiotic" for not examining the full fuel cycle. Such an examination would show that federal policy actually favored fossil fuels over renewables. Nonetheless, in what it termed a "surprising" finding, DOE said only federal income taxes on hydro and waste biomass IOU projects acted as barriers to renewable energy development. All seven renewables examined in the report benefitted from federal tax treatment of NUGs. However, when all local, state and federal taxes were included for IOUs, the report said five of the seven renewables faced barriers greater than conventional technologies. For NUGs though, renewables still have an advantage when all taxes are considered.

Keas, J. T.

Rio to REIA. Solar industry journal, v. 5, 1994: 25-31.

Energy policy is an integral component of economic development, social equity, and environmental stewardship. Each nation requires access to energy resources and reliable energy services to sustain and enhance its economic productivity, to improve the quality of life for its citizens, and to engage in trade and commerce with other nations. As a result, energy policy has become one of the prominent issues guiding international relations and development philosophy. In particular, the relationship between international energy policy and "global sustainability" is helping to establish the context for post-cold war relations between the developing world and the industrialized world. The Renewable Energy in the Americas (REIA) Initiative, seeks to realize the goals of the Rio Accords through the expanded use of renewable energy and energy efficiency technologies. The REIA Initiative, developed in partnership with government, industry, and development interests, is an Americas-wide development strategy to mobilize international support for renewable energy and energy efficiency projects and programs in the Western Hemisphere for the years to come. The fundamental objective of the REIA Initiative is to promote systemic change in the patterns of energy production, energy service distribution, resource allocation, and energy use throughout the Americas.

Kelly, Frank S. Brannon, James I.

Another subsidy for alternative fuels. Transportation quarterly, v. 50, spring 1996: 7-15.

Individual states may limit fuel tax payments to the Highway Trust Fund by encouraging the use of alternative fuels, which have much lower federal excise taxes. The current funding system makes little sense, given that alternative fuels like ethanol are of dubious value environmentally and of absolutely no value economically.

Kelly, Madelon.

Living off the grid. Country journal, v. 22, Nov. 1995: 45-48.

For Madelon Kelly, self-reliant conservation means living free of power companies, poles, nuclear plants and monthly electric bills.

Ketting, N. G.

Towards a sustainable energy future. Energy policy, v. 23, July 1995: 637-638.

Reviews the report "Towards a Fossil-free Energy Future," Greenpeace's scenario for energy supply in the 21st century. The author suggests simultaneous work in three areas: energy efficiency improvement, sustainable technology, and technology transfer; he disagrees with Greenpeace's proposal for a very rapid reduction in the consumption of fossil fuels and for banning hydropower and nuclear energy at the same time, feeling that "it would make us overdependent on technological break-throughs in the (otherwise desirable) development of renewable energy options."

Klann, Susan.

Fuel cells catching on. Denver post, Sept. 2, 1996: F2.

Susan Klann comments on the use of fuel cells as an alternative energy source, noting that the National Renewable Energy Laboratory in Golden CO, along with New Mexico's Sandia and Los Alamos labs, are supporting the Dept. of Energy's fuel cell research and development.

Photovoltaic remains costly energy game. Denver post, Oct. 21, 1996: E2.

Susan Klann discusses the prospect that photovoltaic technology, which involves the generation of electricity from the sun, may be used on a wider basis.

Klass, Donald L.

Biomass energy in North American policies. Energy policy, v. 23, Dec. 1995: 1035-1048.

"The purpose of this paper is to examine the role of biomass energy in the federal government policies of Canada, Mexico and the USA on the development and utilization of biomass energy . . . . One of the main driving forces dispiacing fossil fuels today is environmental issues. But there are still major barriers that are affected by government policies and that must be overcome to facilitate the displacement of large amounts of fossil fuels by biomass. Among these are development of large-scale systems that can supply sustainable amounts of biomass energy and biofuels at competitive prices, and nationwide distribution system that simplify consumer access."

Knott, Michelle.

Sky-high tower of power may ride the waves. New scientist, v. 149, Jan. 13, 1996: 23.

Researchers believe that a 7 km structure called MegaPower in the North Sea could one day be a major source of pollution-free energy. The tower would use a cycle similar to that of a hydroelectric power station.

Koppen, C. W. J. van.

Tell it on the mountains: the renewable energy debate. Renewable energy, v. 5, Aug. 1994: 1379-1381.

Reading, World Renewable Energy Congress, Sept. 11-16, 1994.

The forces opposing the implementation of renewable energy are strong and numerous. Some of them are inherent to the process of change that goes with the implementation. Others, however, would fade away if the policymakers and the general public were more aware of the advantages of a renewable energy supply system. A more extrovert publication activity on all levels based on high quality implementation studies is mandatory. The WREN might promote this.

Kozloff, Keith Lee.

Rethinking development assistance for renewable electricity sources. Environment, v. 37, Nov. 1995: 6-15, 32-37.

Development assistance projects for renewably generated electricity fail to compete fairly with other technologies due to lack of financing and mismanagement. Donors and lenders to these projects need to change their strategies and increase the involvement of the private sector to ensure future success.

Renewable energy technology: an urgent need, a hard sell. Environment, v. 36, Nov. 1994: 4-9, 25-31.

"As the electricity industry redefines how it will feed the appetites of power-hungry customers, sustainable, environmentally friendly technologies must be part of the industry's metamorphosis. Because competition is the biggest hurdle for the advancement of renewable energy, the need for a national strategy to promote such alternative technologies is clear."

Kraul, Chris.

Quick, dirty end to 'clean' energy? Los Angeles times, Aug. 29, 1996: D1.

The expected passage in late Aug. 1996 of the historic deregulation bill AB 1890 in California will strip so-called renewable energy producers of most of the economic incentives and protections that have allowed them to carve out an 11% share of the state's power capacity.

A surge of cash. Los Angeles times, Nov. 6, 1996: D2.

California's new electricity deregulation law will cut alternative energy producers loose in 2002, but will give them about $540 million in cash to help them become competitive in the free market. The effects of the deregulation bill are examined.

Kreucher, Walter M.
In the alternative: new reasons for old fuels. Chemistry and industry, no. 15, Aug. 7, 1995: 601.
Discusses various types of alternative fuels and the fuels which they are replacing. Examines the utility of the various types of fuels.

Lamarre, L.
Electricity from whole trees. EPRI journal, v. 19, Jan.-Feb. 1994: 16-24.
Experimental plantations of fast-growing hybrid poplar trees in the Midwest may one day fuel a new type of electricity generator. Called Whole-Tree-Energy technology, this system would produce electricity by burning sections of whole trees that have been dried in an air-supported fiberglass dome. Although it is still under development, Whole-Tree-Energy technology appears to be a cost-competitive alternative to coal-fired power production. The technology offers relatively low emissions of sulfur dioxide, nitrogen oxides, and particulates, and when fueled by a renewable tree crop, it releases no net carbon dioxide into the atmosphere. Two midwestern utilities have joined EPRI in a study of the feasibility of establishing the world's first Whole-Tree-Energy power plant.

The Landmower's tale: new fuel. Economist, v. 334, Mar. 11, 1995: 79(2).
Topsoe, a Danish company, is researching ways to use cleaner burning Dimethyl ether as a substitute for diesel fuel. Experiments have proven that it can power a lawnmower. A joint project with Amoco is furthering the research.

The Latest alternative energy technology: wood! Countryside & small stock journal, v. 78, Mar.-Apr. 1994: 70(1).

Laughlin, James.
Geothermal plants contract Geyser refill; Lake County CA to recycle treated wastewater effluent through the S.E. Geysers geothermic steamfiled. Power engineering, v. 100, Dec. 1996: 10.
"Lake County, Calif., Sanitation District will recycle its treated wastewater effluent through the S.E. Geysers geoghermal steamfield in what is said to be the world's first wastewater to electricity system. The Geysers is a geothermal region located about 100 miles northeast of San Francisco. Geothermal power plants in the area have produced about 7 percent of California's electricity since the 1970s, but the plants have been using more steam than the steamfield can produce."

Leading US oil and gas industry associations have begged Congress to repeal federal mandates for alternative fuel vehicles and alternative fulels. OPEC bulletin, v. 26, Sept. 1995: 42.

Leary, Warren E.
Use of hydrogen as fuel is moving closer to reality. New York times, Apr. 16, 1995, sec. 1: 15.
Buoyed by renewed political interest and technological promise, efforts are being stepped up to make hydrogen an important source of energy in the U.S. For decades, advocates of hydrogen have promoted it as the fuel of the future. Rep. Robert S. Walker (R-PA) is sponsoring a bill to increase the DOE's $10 million annual budget for hydrogen research by $100 million over three years. Some of the research into hydrogen as fuel is discussed.

Lee, Patrick.
Ford unveils natural gas passenger car. Los Angeles times, Jan. 31, 1996: D2.
Joining the rush by Detroit to mass-produce alternative-fuel vehicles, Ford Motor Co. on Jan. 30, 1996 unveiled the first all-natural-gas-powered passenger car to be manufactured by a major auto maker.

Lee, Sunggyu.
Alternative fuels. Washington, Taylor & Francis, 1996. 485 p. (Applied energy technology series)

Lenssen, Nicholas. Flavin, Christopher.
Sustainable energy for tomorrow's worlds; the case for an optimistic view of the future. Energy policy, v. 24, Sept. 1996: 769-781.
Pushed by the need to stabilize the Earth's climate, the world's economies are beginning to move more rapidly toward more efficient, de-centralized and cleaner

energy strategies. Some of the changes expected include a new generation of lightweight, super efficient electric cars that can be refuelled at home.

Lewis, Shwan D.
Cop cruiser rolls onto auto show on natural gas. Detroit news, Jan. 5, 1996: C5.
Prominently displayed along with the shiny minivans and high tech cars of the future at the 1996 North American International Auto Show in Detroit will be a cop cruiser from the Wixom MI Police Dept. Wixom is the first police agency in the state to have patrol cars powered by an alternative fuel, natural gas.

Linden, Eugene.
A sunny forecast: always cleaner than fossil fuels, renewable power sources may soon be just as cheap. Time, v. 144, Nov. 7, 1994: 66(2).
Some experts predict that renewable energy sources, such as solar, geothermal and wind, will be the dominate energy sources by 2050. Wind turbines and geothermal systems are already cost effective, and a design breakthrough in solar pv cells could reduce prices by 80%

Lipton, Eric.
Natural-gas school buses fuel concern in 3 districts. Washington post, Oct. 8, 1995: B1.
An experiment with clean-burning, natural-gas school buses by Fairfax County VA, Montgomery County MD and Washington DC has turned out to be anything but trouble free, with the buses suffering frequent breakdowns and, according to an audit, critical design flaws in their fuel systems.

Lowering energy expenses. New York times, v. 143, Dec. 26, 1993: R3.
Freeing the home from conventional energy sources.

Lyons-Johnson, Dawn.
New alfalfa powers cows and houses. Agricultural research, v. 44, Oct. 1996: 18-19.
Researchers are trying to develop a new alfalfa variety to be used as a high-protein feed source for dairy cattle and as an environmentally friendly energy source to generate electricity.

MacKenzie, James J.
Heading off the permanent oil crisis. Issues in science and technology, v. 12, summer 1996: 48-54.
"The 1996 spike in gasoline prices was not a signal of any fundamental worldwide shortage of crude oil. But based on a review of many studies of recoverable crude oil that have been published since the 1950s, it looks as though such a shortfall is now within sight. With world demand for oil growing at 2 percent per year, global production is likely to peak between the years 2007 and 2014. As this time approaches, we can expect prices to rise--markedly and, most likely, permanently." Two decades is precious little time for making the needed policy changes to ease the transition to highpriced oil. "The time to formulate policies that encourage more efficient oil use and a switch to alternative energy sources is now."

MacLeod, Alexander.
Oceans: wave of the future for renewable energy" Christian Science monitor, Aug. 15, 1995: 13.
The Ocean Swell Powered Renewable Energy project, of Osprey, is discussed. Osprey 1 is a shovel-shaped submersible structure which will be positioned on the seabed off the northern coast of Scotland, and is expected to generate 2 megawatts of electricity, enough to power 2,000 homes.

Marshall, Thom.
Utilities tripping the light fantastic. Houston chronicle, Aug. 16, 1996: A39.
Thom Marshall comments on the U.S.'s dependence on electric power, asserting that it seems odd that we have almost reached the end of this amazing century and still haven't come up with a cheap, easy-to-use, efficient and environmentally friendly device to power our houses.

Meanwhile.... Economist, v. 331, June 18, 1994: E5(1).
Energy usage by countries of the Organization for Economic Cooperation and Development.

Miller, Ken.
Water-based fuel: clean, cheap, around the corner. USA today (newspaper), Feb. 12, 1996: A3.
A breakthrough fuel that is 55% water and 45% naphtha, a liquid byproduct of petroleum, could power many of the nation's vehicles and gas-powered aircraft by 2000. The A-21 was developed by Rudolf Gunnerman of Reno NV and is being pushed through the federal regulators by Gunnerman and Caterpillar Inc.

Miller, Warren H.
Environmental tech's booming new market. Industry week, v. 244, Nov. 20, 1995: 51(3).
Manufacturers of renewable energy generation equipment and other eco-technology businesses are finding that their offerings are in demand in India, Mexico, and other developing nations. Advice for US-based environmental firms on how to export their products and services is provided.

Mitchell, Catherine.
The renewable NFFO: a review. Energy policy, v. 23, Dec. 1995: 1077-1091.
Renewable energy generation is "supported by a market enablement programme, as compared to research and development funding, for the first time in the UK as a result of privatization of the electricity supply industry (ESI). Renewable energy projects" are "able to obtain a premium price per kilowatt hour of generation if they were successful in their application for a contract under the Non-Fossil Fuel Obligation (NFFO). The NFFO requires the public electricity suppliers," known as RECs (regional electricity companies), "to buy a certain amount of nuclear and renewable electricity." This paper explains the creation of the NFFO, application procedures for its Orders, and contract status for each Order; it concludes by discussing the key lessons to be learned in setting up such a support mechanism.

Moore, Taylor.
Harvesting the benefits of biomass. EPRI journal, v. 21, May 1996: 16-25.
More than half a dozen electric utilities are involved in ongoing efforts to evaluate and develop the potential for biomass feedstocks as a renewable energy resource for power generation. The growing interest in biomass stems from its promise for addressing emerging concerns on several fronts.

Morris, G. P.
The current state of the California biomass energy industry. Biologue and the Regional Biomass Energy Program reports, v. 12, 1994: 4-8.
During the 1980s, the California biomass energy industry grew from a few isolated facilities located mostly at pulp mills into the largest biomass energy industry in the world. The rise and possible fall of the California biomass energy industry has important lessons for other regions that are interested in the development of their biomass energy potential. This article examines the California situation in terms of the following topics: the seeds of development: 1980-1985; the crisis of success: 1986-1990; equilibrium, uncertainty: 1991-1995; and lessons learned, future shock.

Moussavi, Massoum.
Alternative fuels [microform] [Lincoln, Neb.] University of Nebraska--Lincoln, Center for Infrastructure Research, [1993] 198 p.

Myerson, Allen R.
U.S. to push alternative fuel program. New York times, Feb. 22, 1995: D1.
The Clinton administration, declaring that rising oil imports threaten national security, intends to force a sharp increase in the number of cars and trucks that run on fuels besides gasoline, a senior DOE official said on Feb. 21, 1995. Under a plan that it will formally announce on Feb. 22, energy companies and utilities will be required to buy hundreds of thousands more cars, vans and light trucks that use alternative fuels.

Nakarado, G. L.
A marketing orientation is the key to a sustainable energy future. Energy policy, v. 24, Feb. 1996: 187-193.
This paper presents a sampling of recent research indicating a customer preference (demand) for renewable energy as a unique "variety" of "brand" of power. Market oriented industry growth tightly coupled to segmented end-use consumer

preferences will ultimately be more robust and sustainable. Examples of emerging alternative models for renewable energy development are given in the conclusion.

National Renewable Energy Laboratory. U.S. Dept. of Energy.
Learning about renewable energy [for young scholars]
DOE/GO-10095-042, FS 189, Oct. 1995. 12 p.
Topical overview and glossary of terms.

Natural gas grabs the lead in the clean-air stakes. Business week, no. 3383, Aug. 1, 1994: 54(1).
Government-industry test shows that compressed natural gas produces less emissions than any other fossil fuel.

Nauss, Donald W.
The cutting edge: H 2 Go; in 10 years, your new car could be running on hydrogen. Los Angeles times, Jan. 6, 1997: D1.
The hydrogen fuel cell is getting a fresh look as possibly the most promising replacement for the internal combustion engine in the early part of the 21st century. Chrysler claims it has come up with a practical solution that could move the timetable to as early as 2007.

GM pursues new regions, technologies; Autos: firm is undertaking its biggest international expansion ever and boosting alternative-fuel study. Los Angeles times, Jan. 9, 1997: D3.
General Motors Chairman John F. Smith said on Jan. 8, 1997 that the auto maker is undertaking its biggest international expansion in history while stepping up research into a wide variety of advanced-technology vehicles.

Honda to sell natural gas Civic. Los Angeles times, Nov. 8, 1996: D2.
Honda Motor Co. said on Nov. 7, 1996 that it will begin selling a natural-gas-powered small car in California in the fall of 1997 that emits the lowest level of pollutants of any vehicle equipped with an internal combustion engine.

Nesmith, Jeff.
Fueling a revolution. Atlanta journal constitution, Apr. 13, 1996: F1.
The use of fuel cells as replacements for the internal combustion automobile engine is explored. Fuel cells have been used by NASA to power Gemini and Apollo spacecraft.

Newman, P.
DOE plants seed of sustainable energy future. Energy daily, v. 22, Aug. 30, 1994: 1, 4.
The Electric Power Research Institute and USDOE estimate that between 50,000 MW and 100,000 MW of power can be generated from crops grown on idle or underused cropland nationwide. This article describes demonstration projects, budgeting for sustainable energy, and biological and economic advantages.

Nicholson, Kieran. Booth, Michael.
Alternative fuels list grows by 5. Denver post, Oct. 19, 1996: A1.
On Oct. 18, 1996, the Air Quality Control Commission added five alternative fuels to a list that fleet vehicle operators much choose from beginning late 1997 in order to reduce pollution in Front Range cities in Colorado.

O'Connor, C.
A short haul down the rails. Waste age, v. 27, Aug. 1996: 97-101.
Montgomery County, Md., located outside of Washington, D.C., is an interesting case study in the struggle of municipalities to implement a solid waste program that makes both economic and political sense. Ogden Martin runs a waste-to-energy (WTE) facility in rural Dickerson, Md., nearly 20 miles down the road from Rockville, the county seat and the most populated city in the county. The facility is one of the company's 27 similar operations nationwide and has been open since May 1995. It is built to handle, burn, and transform a maximum of 1,800 tons of waste per day into electricity. The county produces an average of 1,200 tpd, all of which is sent to the facility 24 hours a day. The company, though, needs to receive the waste before it can do its job, and location is perhaps the biggest obstacle. The Potomac Electric Power Co. (PEPCO, Washington, D.C.) purchases the energy to serve the equivalent of 30,000

homes. After combustion, the remaining ash is backhauled in the intermodal containers the next morning and trucked 8 miles from the transfer station via conventional transfer trailer to the Oaks Landfill in Laytonsville, MD.

O'Connor, J. P.
Building a truly integrated waste management system. Solid waste technologies, v. 8, July-Aug. 1994: S2-S10.
Union County, New Jersey, has built a new, 44-MW generating plant that burns wastes at a competitive cost with landfilling. The county's solid waste authority sends enough waste to the plant to keep it operating at full capacity while complying with a state law that mandated 60 percent recycling by 1996. The waste-to-energy plant burns 1,440 tons of refuse per day and generates enough electricity to supply 35,000 residencies. Converting wastes to energy has dovetailed neatly with recycling in Union County's solid waste management program.

Okrasinski, Thomas A. Onori, Craig C. Morabito, Jospeh M.
Energy management and the environment. AT&T technical journal, v. 74, Nov. 1995: 44-53.
Efforts to ensure adequate power for AT&T facilities from both conventional generating sources and on-site generation, and on using renewable energy sources where possible to power AT&T's products, are examined. AT&T is reducing energy use to protect the environment and reduce costs.

O'Leary, Hazel R.
Energy secretary pledges new power to the people. Insight, v. 11, Oct. 2, 1995: 63(1).
With the backing of the Clinton administration, industry employs new technologies to develop clean fuel and renewable fuels. Well thought out policy-making can ensure that the U.S. enters the 21st century with industries still capable of supplying ample, clean fuels.

The Other energy crisis. Guardian, Sept. 18, 1996, sec. 1: 16.
An editorial notes that 40% of the world's population lives at a basic subsistence level without any form of electricity and says meeting this energy deficit with fossil fuels will only add to pollution, so an answer should be found in solar energy. The editorial relates the Sept. 1996 U.N. World Solar Summit.

Overend, R. P.
Bioenergy in transition. Journal of energy engineering, v. 122, Dec. 1996: 78-92.
Biomass is a versatile, abundant, and renewable energy resource used widely throughout the world. It is perhaps the most common energy resource in developing countries, used primarily for cooking and heating. While industrialized and newly developing nations have turned to fossil fuels to support economic growth, some are returning to biomass as a means of preserving their depleting natural resources, reducing dependence on imported fossil fuels, strengthening agricultural industries, or reducing environmental pollution. A number of technological advancements, particularly in converting biomass into electricity or alcohol transportation fuels, have triggered this reassessment of biomass as a significant energy resource. The writers report on research and development taking place worldwide, with a focus on work being done in Hawaii. They also assess the technical and economic feasibility of adapting bioenergy technology elsewhere, with particular attention directed at the potential of alcohol fuels for transportation applications and the need to develop bioenergy crops as a precursor to expanded alcohol fuel use and renewable electricity generation.

Palmer, Thomas C., Jr.
New fuels drive Logan fleet. Boston globe, June 29, 1996: 19.
A coalition of state agencies and private firms is looking to make Logan Airport a proving ground for the use of alternative fuels. In the summer of 1996, the 39 Massachusetts Port Authority vehicles at Logan Airport that use alternative fuels are to be joined by seven private-fleet vehicles.

Parikh, Jyoti K.
Gender issues in energy policy. Energy policy, v. 23, Sept. 1995: 745-754.
"Women's needs for energy vary depending on whether they are in urban or rural areas, their stage of economic development and whether they are economically active. This article emphasizes the need for better understanding of these issues for women engaged in different sectors, whether agriculture, transport, industries, household and

the energy sector itself (i.e. charcoal making, fuel gathering and fuel marketing). Deeper enquiries, analysis and action for gender issues are needed through surveys, laboratory experiments, macro policy modelling and analysis, and technology development and production. This article makes a plea to include gender issues in macro level energy policies such as energy investment, imports and pricing."

Pearce, Fred.
Trouble bubbles for hydropower. New scientist, v. 150, May 4, 1996: 28-31.
Pearce investigates whether new hydroelectric schemes will help cut emissions of greenhouse gases. When waterlogged vegetation starts to rot, a hydroelectric reservoir can be more pollution than a coal-fired power station.

Pearce, Jeremy.
Customers fund solar experiment. Detroit news, Aug. 27, 1996: C1.
For a $6.59 monthly "green rate," some Detroit Edison customers are helping pay for the utility's experiments to turn the sun's light into power. In 1996, Detroit Edison installed 120 solar panels in Washtenaw County MI's Scio Township at a cost of $250,000. With that price tag, the company couldn't fund the experiment on its own. Federal grants covered about $116,000; the rest is being paid through green rates and the utility's money.

Pellet stoves: wood energy for all. Mother Earth news, no. 152, Oct.-Nov. 1995: 30(7).
One alternative energy source is wood pellets, which are made from wood waste products that are ground, dried, and compressed. Pellets are easy and inexpensive to transport, but pellet stoves are expensive. However, the stoves are efficient, and the pellets produce only a small amount of ashes.

Perez-Pena, Richard.
Diesel buses to be replaced in big anti-pollution switch; transit officials bow to pressure to use cleaner fuels. New York times, v. 145, Sept. 12, 1996: B3.

Quiet boomlet in vehicles using compressed natural gas as fuel. New York times, July 15, 1996: B1.
The growing use in New York City of vehicles that run on compressed natural gas is discussed. There are 2,300 compressed natural gas cars, trucks and vans in the city, up from a few dozen in the late 1980s.

Phillips, Dave.
Alternative fuel vehicles fire up Toyota. Detroit news, Jan. 15, 1997: B3.
Toyota Motor Corp.'s plan to pour about $800 million a year into research for alternative fuel vehicles was largely driven by U.S. regulations, a top executive said Jan. 14, 1997.

Pierre-Pierre, Gary.
Busers using natural gas do well in pilot program. New York times, Jan. 16, 1996: B3.
As the New York City Transit Authority is starting to convert the city's bus fleet to run on cleaner-burning fuels, several state legislators say the efforts fall far short of what is needed. They are urging the Metropolitan Transportation Authority, the Transit Authority's parent agency, to convert all 3,600 city buses to alternative fuels like natural gas, methanol, ethanol and electricity.

Plitch, L. W.
Retail wheeling: a paradigm shift for waste-to-energy and other renewable energy facilities. Natural resources and environment, v. 9, fall 1994: 27-29, 49.
Retail wheeling is the process whereby the retail customers of an electric utility would be allowed to select the generating plant from which to purchase electric power. By issuing a Notice of Inquiry/Notice of Rulemaking (NOI/R) into the fledgling area of retail wheeling, the California Public Utilities Commission (CPUC) announced it was fully intent on providing its electric customers with direct access to the competitive choices available in the generation segment of the electricity business. While many critics of retail wheeling have focused on the impact such a development might have on the shareholders of investor owned electric utilities, we must consider the consequences of such a paradigm shift on the future health of the renewable energy business, including the growing waste-to-energy industry. This article discusses the economic implications and the appropriate steps which should be taken in this area of the electric industry.

Policy forum: energy futures. Washington quarterly, v. 19, autumn 1996: 73-99.
Between 1990 and 2010, world energy consumption is projected to increase 1.6 percent annually, "lower than the 2.6 percent annual growth rate of the previous two decades (1970-1990), reflecting the adoption of more energy-efficient technologies worldwide. More than one-third of the total increase of 125 quadrillion Btu is expected to be provided by oil, mainly because of rapid expansion of the transportation sectors in developing countries . . . . Natural gas and renewal energy sources (hydroelectricity, geothermal, solar, wind, and other renewable resources) are expected to be the fastest growing energy sources over the projection period, at 2.0 and 2.3 percent per year respectively."

Polson, Sheila.
Geothermal pumps tap energy of the Earth year-round. Christian Science monitor, May 28, 1996: 11.
The popularity of geothermal heat pumps is on the rise, although they have been around since the 1930s. Rising fuel costs and an upsurge of interest in environmental building have contributed to an increase in sales of the pumps.

Pool, Bob.
New fuel idea goes up in smoke. Los Angeles times, Apr. 23, 1996: B3.
As a class project, Harvey Mudd College students in Claremont CA set out to develop an alternative fuel supply for peasants who live in a Guatemalan village where firewood is scarce. The students' idea for a manure-based replacement for firewood did not pan out.

Pospisil, Ray.
Hydro pacts revamp operations and market strategies. Electrical world, v. 210, Jan. 1996: 42-44.
Power companies are looking to reap the benefits from existing hydro powerplants as competition accelerates. Most hydro facilities of investor-owned utilities, however, are due for relicensing, which could dampen a project's market advantage.

Purdy, Penelope.
Oil dependency is a crude addiction. Denver post, Jan. 21, 1996: E3.
Penelope Purdy contends that the 1991 Persian Gulf War was the result of U.S. dependence upon imported crude oil, a circumstance that could place our armed forces in jeopardy and that must be remedied through a newfound usage of other fossil fuels and other energy sources.

Raabe, Steve.
Better fate for trash: fuel additive. Denver post, Jan. 20, 1996: E1.
Pure Vision Technology Inc. of Boulder CO holds a license and several patents for a process that uses enzymes to convert solid waste to liquids. The liquid waste than can be converted to ethanol, a fuel additive more typically made from corn and other agricultural products.

Radford, Tim.
How to stop the clock. World press review, v. 43, Apr. 1996: 47.
Global warming must be slowed. Governments can help slow greenhouse effects by looking for alternative energy sources and being more efficient with the presently available sources.

Read, Real. Legault, Richard.
Fired up about coupling wind and water. Electrical world, v. 209, Mar. 1995: 50(2).

Regan, Mary Beth.
The sun shines brighter on alternative energy; nonfossil sources of power are back - and getting more efficient. Business week, no. 3344, Nov. 8, 1993: 94(2).

Renewable energy sources discussed. U.N. chronicle, v. 31, June 1994: 62(1).
First meeting of the reorganized U.N. Committee on New and Renewable Sources of Energy and on Energy for Development, Feb 7-18, 1994.

Renewable energy: economic and environmental issues, by D. Pimentel, et. al. Bioscience, v. 44, Sept. 1994: 536-547.
This article analyzes the potential of various renewable or solar energy technologies to supply the United States with its future energy needs. Diverse

renewable technologies are assessed in terms of their land requirements, environmental benefits and risks, economic costs, and a comparison of their advantages. In addition a projection of the amount of energy that could be supplied by solar energy is made. Topics covered include: assessment of renewable energy technologies; biomass energy systems; liquid fuels; ethanol; methanol; hydrogen; hydroelectric systems; wind power; photovoltaics; solar thermal conversion systems; passive heating and cooling of buildings; comparing solar power to coal and nuclear power; transition to solar energy and other alternatives.

Renewing our energy future. Washington, Office of Technology Assessment, for sale by the Supt. of Docs., G.P.O., 1995. 269 p.

"OTA-ETI-614, September 1995"

"This study evaluates the potential for cost-effective renewable energy" technologies (RETs) "in the coming decades and the actions that have to be taken to achieve the potential." It "reviews the lessons learned in the last 20 years of renewable technology development. In addition, it describes recent advances in RETs and how they might contribute to key U.S. energy policy goals, including economic vitality, environmental quality, and national security. Finally, the report also charts alternative technology and policy paths for developing and commercializing RETs."

Rethinking development assistance for renewable electricity sources. Environment, v. 37, Nov. 1995: 6-15, 32-37.

"In assessing funding priorities for energy development, multilateral agencies need to take a new look at the vast potential of renewable energy technologies."

Richardson, Julia. Nordhaus, Robert.

The National Energy Act of 1978. Natural resources & environment, v. 10, summer 1995: 62-68, 87-88.

The centerpiece of President "Carter's energy policy was a multipronged series of legislative and administrative proposals--113 specific proposals, to be exact--contained in the National Energy Plan (NEP). Congress responded by ultimately passing five pieces of legislation, collectively known as the National Energy Act of 1978 (NEA):" the Natural Gas Policy Act; the Public Utility Regulatory Policies Act; the Energy Tax Act; the Powerplant and Industrial Fuel Use Act; and the National Energy Conservation Policy Act. "This article examines the objectives of the NEA, what motivated Congress to pass these varied statutes, whether the legislation accomplished what its drafters thought it would, and what its ultimate consequences were."

Riordan, Teresa.

Harnessing wind from moving cars. New York times, v. 143, Jan. 10, 1994: C2.

Thomas Alva Wither receives patent number 5,272,378 for generating electricity from wind generated from autos as they drive on freeways.

Robertson, Victor.

Scientists get to grips with biomass. The Scotsman, Apr. 1997: 34.

Examines criticisms of biomass production for energy purposes.

Romm, Joseph J. Curtis, Charles B.

Mideast oil forever? Atlantic monthly, v. 277, Apr. 1996: 57-60, 62-67, 70, 72-74.

Research programs supported by the federal government have made important breakthroughs in renewable energy and environmental technologies that could lessen the U.S.'s dependence on imported oil, reduce pollution and give the U.S. the lead in a vital new industrial sector. The authors say that budget cuts proposed by Congress would scrap all of these developments and leave the U.S. far behind and importing products original developed by U.S. scientists.

Rueckert, T. Easterly, J.

DOE Biomass Power Program update. Biologue and the Regional Biomass Energy Program reports, v. 13, 1995: 5-13.

Since it was established in 1991, the U.S. Department of Energy's Biomass Power Program had made significant progress in fostering the development of competitive advanced biomass power technologies and systems. From the initial program planning phase through program implementation and project development, the Biomass Power Program has sought substantial industry participation to maximize the effectiveness of its efforts. The following article provides an overview of the current role of DOE and industry in developing advanced biomass power systems, with highlights of the environmental and economic benefits of biomass power, and brief overviews of three

major collaborative DOE/industry efforts to scale-up high-efficiency systems for converting biomass resources to electricity.

Salant, Katherine.
Digging deep for ways to cut heating-cooling costs. Washington post, Feb. 11, 1995: E1.
Katherine Salant describes a program sponsored by Virginia Power in which electrically powered geothermal heat pumps were put in some Northern Virginia homes.

Salpukas, Agis.
70s dreams, 90s realities. New York times, Apr. 11, 1995: D1.
In the 1970s, the energy crisis and federal acts to combat it served as catalysts to the development of renewable energy sources, such as wind, solar and geothermal energy. But in the 1990s, stiff competition is threatening the renewable energy industry, which tends to be more expensive than industries exploiting non-renewable sources.

Green power wanes, but not at the grass roots. New York times, v. 146, Mar. 9, 1997: E5.

Sandia's work with state agencies. Solar industry journal, v. 5, 1994: 33-35.
Having determined that collaborative projects with states are an effective way to ensure energy projects are well suited to local and regional needs, Sandia reaches out to state agencies to promote the use of renewable energy technologies where they are appropriate. Most states have existing energy programs and staff, and their backing and support of alternative solutions to state energy needs are important. In addition, a state agency's staff is a crucially in selling the idea of using these non-familiar systems to sometimes skeptical audiences. The reason for Sandia's doing this technical outreach and collaboration with states is to promote the widespread and continued use of renewable energy systems on a scale that will positively affect the industries now producing these systems. The Department of Energy funds Sandia to establish and maintain such collaborations with the states, having found that the state level is an ideal one to see its renewable energy mission carried out to a successful and long-lasting conclusion.

Scientists develop bacteria to enhance ethanol's use. Wall Street journal, Jan. 13, 1995: B4.
National Renewable Energy Laboratory researchers in Golden, Colorado.

Sebastian, Pamela.
Deep heat derived from underground rock is studied as an energy source. Wall Street journal, Aug. 1, 1996: A1.

Sethi, Rajiv. Somanathan, E.
The evolution of social norms in common property resource use. American economic review, v. 86, Sept. 1996: 766(23).
The problem of drawing out commonly owned renewable resources is studied within an evolutionary-game-theoretic framework. Findings reveal that cooperative behavior established by standards of restraint and punishment may be stable against the intrusion of narrowly self-interested behavior. The impact of modifications in prices, technology and social cohesion on extraction behavior and the long-run stock are examined. Social norms can break down if threshold values of the parameters are exceeded, causing a reduction in the long-run stock.

Shao, Maria.
CAL energy: out of hot water. Business week, no. 3219, June 24, 1991: 127.
Discusses efforts by the California Energy Co., "the nation's largest independent purveyor of geothermal power," to restructure its internal operations in order to become more profitable. Discusses this energy company's strategy and contributions in the area of renewable resource utilization.

Silverman, M. Worthman, S.
The future of renewable energy industries. Electricity journal, v. 8, Mar. 1995: 12-31.
Investment and innovation in renewable energy--a key element of any long-term energy strategy--will not occur unless developers and investors perceive the industry to be attractive over time. The long-term attractiveness of renewable energy industries

should be maintained, for the sake of jobs, energy security, the environment, and our international competitiveness.

Silverstein, Kenneth.
Alternate fuels mandate looms: one million AFVs - 40,000 in the U.S. - are now in use worldwide. American city & county, v. 111, Aug. 1996: 10(1).
The Energy Dept ordered all fleet operators to begin buying alternate fuel vehicles beginning Sept. 1996. Energy tax credits will be available. By year 2001 75% of such vehicles as state police cars should be AFVs. The alternate fuels include natural gas, propane, ethanol, methanol, and electricity

Siuru, Bill.
Are alternatie fuels ready for prime time? Mass Transit, v. 23, Mar. 13, 1997: 59.
Reports on evaluations of perfomance, dependability, costs, and emissions of alternatively fueled transit buses.

Sobieski, Daniel.
Trash-to-energy facilities dangerous? Rubbish! Chicago defender, Mar. 30, 1996: 12.
Daniel John Sobieski asserts that trash-to-energy facilities do not pollute the air with poisonous heavy metals and toxic compounds, as some environmentalists have alleged.

Soerensen, B.
Strategy for a rich, fulfilling and sustainable society. International journal of solar energy, v. 17, 1995: 83-100.
This text is not about predicting the future, but rather aims at discussing a methodology for shaping a range of collaborating future societies through a conscious democratic process, instead of having more or less arbitrary events and interest groups determine the path of change. The underlying belief is, that there exists infinitely many possible futures, and that we can decide which one we want to be headed towards, as the outcome of a democratic process that lets our individual value system and preferences come into full display.

Sokol, David L.
Renewable energy can be competitive. New York times, v. 144, Apr. 16, 1995: E10.

Southerland, Daniel.
Alternative enrgy firm is formed. Washington post, Oct. 18, 1995: C3.
Bechtel Enterprises Inc. and PacifiCorp Holdings Inc. have formed a joint venture called EnergyWorks to launch small alternative energy projects around the world.

Spaid, Elizabeth Levitan.
Chattanooga becoming known for electric buses instead of the choo-choo. Christian Science monitor, Jan. 23, 1995: 3.
Chattanooga TN is becoming a center for electric buses and a national hub for research and development of pollution-free, battery-powered buses and cars. Nine of the city's 62 buses run on batteries, and seven more will be added in 1995, making it the largest fleet in the U.S.

Special issue: valuing the benefits of renewables. Energy policy, v. 24, Feb. 1996: 127-202.
Partial contents.--The problem of valuing new energy technologies, by Shimon Awerbuch.--Valuing the flexibility of alternative sources of power generation, by Chris Chapman and Stephen Ward.--Distributed generation: an alternative to electric utility investments in system capacity, by Thomas E. Hoff, Howard J. Wenger and Brian K. Farmer.--Monte Carlo simulation techniques and electric utility resource decisions, by Peter J. Spinney and G. Campbell Watkins.--Informing decision makers and identifying niche opportunities for windpower: use of multiattribute trade off analysis to evaluate non-dispatchable resources, by Stephen R. Connors.--A marketing orientation is the key to a sustainable energy future, by Gary L. Nakarado.--Capital budgeting, technological innovation and the emerging competitive environment of the electric power industry, by Shimon Awerbuch, Jesse Dillard, Tom Mouck and Alistair Preston.

Stanko, Dieter.
Big fleets switching to natural gas. New York times, Feb. 19, 1995, sec. CN: 4.
With Connecticut's state government among the leaders in encouraging the use of alternative fuel technology to meet looming federal air quality standards, many of the state's private companies and municipalities are deciding to switch from gasoline or diesel-powered fleet vehicles to ones fueled by compressed natural gas.

State of the world 1995: a Worldwatch Institute report on progress toward a sustainable society. New York, W. W. Norton & Co., 1995. 255 p.
Partial contents.--Nature's limits, by Lester R. Brown.--Protecting oceanic fisheries and jobs, by Peter Weber.--Sustaining mountain peoples and environments, by Derek Denniston.--Harnessing the sun and the wind, by Christopher Flavin.--Creating a sustainable materials economy, by John E. Young and Aaron Sachs.--Making better buildings, by Nicholas Lenssen and David Malin Roodman.--Facing China's limits, by Megan Ryan and Christopher Flavin.--Leaving home, by Hal Kane.--Budgeting for disarmament, by Michael Renner.--Forging a new global partnership, by Hilary F. French.

Stein, Ben P.
Sea's got the power. Science world, v. 50, Apr. 15, 1994: 16(4). (Special Earth Day action issue: make waves)

Sterzinger, George.
Making biomass energy a contender. Technology review, v. 98, Oct. 1995: 34-40.
Turning trees and other plants into a gas and using it to power a jet engine shows promise as an economical way to produce electricity. Modest public and private investment could make this energy source a commercial reality.

Steyer, Robert.
Tire chain: firm shreds tires to fuel power plants. St. Louis post-dispatch, May 8, 1995, sec. BP: 3.
Tire Shredders Unlimited, headed by Jack Walters, is profiled. The company expects to shred 2.5 million tires in 1995, which are used by utilities and companies willing to use tires for fuel.

Swanekamp, R.
Ridge station eases Florida's waste-disposal problems. Power, v. 138, Oct. 1994: 84-85.
Two results of Florida's continuing population growth are 1) a critical need for electricity, and 2) a solid-waste disposal crisis. During a recent winter cold snap, electric demand in one service territory surged 25% over generating capacity and 10% over net system capability. Rolling blackouts ensued. At the same time, Florida's fragile wetlands environment is suffering from years of unfettered development. Groundwater sources are contaminated, landfill space is scarce, and illegal tire dumps blight the landscape. The recently constructed Ridge generating station in Polk County, Fla. is addressing both the state's electrical and environmental needs. Ridge, which entered commercial operation in May, burns a unique mix of urban woodwaste and scrap tires to provide 45 MW of critically needed electricity while keeping large quantities of solid waste out of landfills. When pipeline construction at an adjacent landfill is completed, the facility also will burn the methane gases produced when garbage decomposes.

Sykes, Lisa.
The power of nature. Geographical, v. 68, Nov. 1996: S13.
New Zealand is now leading the way in establishing a Southern Hemisphere Free Zone. New Zealand harnesses geothermal energy for its own energy needs.

Symonds, William C. Coy, Peter. Naughton, Keith.
How to build a clean machine. Business week, no. 3477, May 27, 1996: 90-92.
Fuel cells are clean, quiet and expensive. These cells are powering hospitals and are on the verge of commercialization. The fuel-cell power technology is discussed.

Tenebaum, David.
Tapping the fire down below. Technology review, v. 98, Jan. 1995: 38(10).
Scientists from the Los Alamos National Laboratory succeeded in tapping a major alternative power source in the Jemez Mountains: hot dry rocks (HDR). A new development in geothermal energy research, the HDR method involves pumping water into artifically-made fissures in the earth's crust. The superheated water is then

forced up into a second well to provide enough heat to generate electricity. HDR could improve the use of environment-friendly geothermal energy sources, which outperform other alternative sources such as solar and wind power.

Trainer, F. E.

Can renewable energy sources sustain affluent society? Energy policy, v. 23, Dec. 1995: 1009-1026.

Figures commonly quoted on costs of generating energy from renewable sources can give the impression that it will be possible to switch to renewables as the foundation for the continuation of industrial societies with high material living standards. Although renewable energy must be the sole source in a sustainable society, major difficulties become evident when conversions, storage and supply for high latitudes are considered. It is concluded that renewable energy sources will not be able to sustain present rich world levels of energy use and that a sustainable world order must be based on acceptance of much lower per capita levels of energy use, much lower living standards and a zero growth economy.

Transit experts discuss advantages of biodiesel. Biologue and the Regional Biomass Energy Program Reports, v. 12, 1994: 23-24.

This article discusses the evaluation of three public transit experts of biodiesel fuels as an alternative to petroleum-derived diesel fuel.

Travis, John.

Enzymes may turn paper, grass into fuel. Science news, v. 150, July 6, 1996: 7.

Researchers have developed an enzymatic method of transforming renewable resources such as paper, grass and corn syrup into hydrogen gas. Hydrogen is a clean fuel that generates little other than water when it burns.

Turhollow, Anthony.

The economics of energy crop production. Biomass and bioenergy, v. 6, 1994: 229-241.

This paper presents 1989 and 2010 cost estimates for growing and supplying biomass for five combinations of major cropping strategies and regions. Four of the dedicated feedstock supply systems (DFSS) use herbaceous energy crop (HEC) technologies, and one uses short-rotation woody crops (SRWC). The costs of producing systems for hybrid poplar, sorghum, switchgrass and energy cane are determined through the examination of such factors as ultimation systems, species, treatment, regions and site variability. The Midwest and South are the areas of focus, because they have the best potential for high yields and for contributing large quantities of land to the production of dedicated energy crops. At the assumed yields, sorghum in the Midwest and energy cane in the Southeast, appear to be the low-cost DFSS. Energy cane, susceptible to frost damage, is restricted to the Deep South. Sorghum should be restricted to cropland with low erosion potential. To be competitive with corn in the Midwest and soybeans in the Southeast, dedicated crops must sell at between $43 and $60/dry Mg in 1989 and $30 and $43/dry Mg. in 2010.

Turnbull, J. H.

Developing an integrated approach to biomass energy systems in the United States. Biomass and bioenergy, v. 6, 1994: 151-158.

Biomass feedstocks could become the major renewable energy resource for power generation in the U.S.A. during the next two decades. Pilot projects involving thousands of acres of plantings for either existing or new generation facilities are being planned by the Electric Power Research Institute, the U.S. Department of Energy, and the U.S. Department of Agriculture. These pilots will define characteristics of production systems and infrastructures in different regions of the country, identify opportunities to decrease costs, and validate the principles being promulgated by the National Biofuels Roundtable.

Udall, James R.

Power to the people; are you willing to pay more for clean energy? Sierra Club bulletin, v. 82, Jan.-Feb. 1997: 26(2).

The usage of alternative energy sources has failed to grow because of a lack of investment by the government. This roadblock has been surmounted, however, by a new program offered by electric utilities which allows consumers to pay a small surcharge as an investment in wind or solar power. The costs of these alternative sources has dropped dramatically in recent years.

Updike, Edith Hill. Naughton, Keith.
A sport utility you plug 'n' drive. Business week (industrial/technology edition), no. 3500, Nov. 4, 1996: 192L.
Toyota Motor Corp. is planning a September launch of the RAV4 Low Emission Vehicle, combined with the unveiling of a more futuristic hydrogen fuel cell RAV4 in October. Toyota's entry into the electric car market is discussed.

U.S. Congress. House. Committee on Appropriations.
Department of the Interior and related agencies appropriations bill, 1997; report together with supplemental, dissenting, and additional views to accompany H.R. 5662. Washington, G.P.O., 1996. 146 p. (Report, House, 104th Congress, 2d session, 104-625)

U.S. Congress. House. Committee on Appropriations. Subcommittee on the Department of the Interior and Related Agencies.
Department of the Interior and related agencies appropriations for 1997. Hearings, 104th Congress, 2nd session. Mar. 7-Apr. 25, 1996. Washington, G.P.O., 1996. 1119 p.
Part 6--Testimony of public witnesses for energy and other programs; Secretary of Energy: Department of Energy, Energy Conservation; Department of Energy, Fossil Energy; Department of Energy, Office of Hearing and Appeals; Department of Energy, Energy Information Agency; National Endowment for the Arts; National Endowment for the Humanities; National Gallery of Art; Institute of Museum Services; Commission on Fine Arts; Kennedy Center; Smithsonian Institution.

U.S. Congress. House. Committee on Commerce. Subcommittee on Energy and Power.
Future of alternative fuels. Hearing, 104th Congress, 1st session. June 6, 1995. Washington, G.P.O., 1995. 95 p.
"Serial no. 104-29"

U.S. Congress. House. Committee on Energy and Commerce. Subcommittee on Energy and Power.
Alternative fuels. Hearing, 103d Congress, 1st session. Oct. 7, 1993. Washington, G.P.O., 1994. 68 p.
"Serial no. 103-78"

U.S. Dept. of Energy. Energy Information Administration. Office of Coal, Nuclear, Electric and Alternative Fuels.
Renewable Energy Annual. Washington, GPO.
The 1996 version of this report was the second in an annual series of reports on this topic which are issued by the Energy Information Administration. This report is designed to provide information on the renewable energy situation worldwide. It includes information on such topics as biomass, solid waste, geothermal, wind energy, solar energy, waste-to-energy resources, landfill gases and other topics.

Valuing the benefits of renewables. Energy policy, v. 24, Feb. 1996: 127-202.
Contents.--The problem of valuing new energy technologies, by Shimon Awerbuch.--Valuing the flexibility of alternative sources of power generation, by Chris Chapman and Stephen Ward.--Distributed generation: an alternative to electric utility investments in system capacity, by Thomas E. Hoff, Howard J. Wenger and Brian K. Farmer.--Integrating financial theory and methods in electricity resource planning, by Frank A. Felder.--Monte Carlo simulation techniques and electric utility resource decisions, by Peter J. Spinney and G. Campbell Watkins.--Informing decision makers and identifying niche opportunities for windpower: use of multiattribute trade off analysis to evaluate non-dispatchable resources, by Stephen R. Connors.--Evaluating the economics of photovoltaics in a demand-side management role, by John Byrne, Steven Letendre, Chandrasekhar Govindarajalu, Young-Doo Wang and Ralph Nigro.--A marketing orientation is the key to a sustainable energy future, by Gary L. Nakarado.--Capital budgeting, technological innovation and the emerging competitive environment of the electric power industry, by Shimon Awerbuch, Jesse Dillard, Tom Mouck and Alistair Preston.

Vivian, John.
Pellet stoves wood energy for all. Mother Earth news, no. 152, Oct. 1995: 30-37.
The use of pelleted fuel can clean up the woods of Maine and Eastern Canada, as well as the Pacific Northwest, and can help clean up the air by supplanting coal and oil. The basics of pellet stoves are discussed.

Vogel, Kenneth P.
Energy production from forages (or American agriculture--back to the future). Journal of soil & water conservation, v. 51, Mar. 1996: 137-139.
It is doubtful whether the conversion of land back to energy production can be achieved without stable, long-term programs for biomass energy production. The importance of grasslands in this process is discussed.

Voyage publishing: science and the Environment Electronic News summary magazine [Online] Available Internet: http://www.voyagepub.com/publish/ (as of Feb. 2, 1996).
A biweekly free magazine specializing in world news summaries on environmental issues. Designed for high school and university teachers and students, but valuable for many others as well. Each issue summarizes about 80 articles under 10 headings taken from analysis of over 500 journals. Citation contains only an address to an electronic journal that appears on the Internet.

Wald, Matthew L.
Energy Secretary says power is underpriced. New York times, v. 146, Jan. 20, 1997: A9.

New York's natural gas-powered fleet to grow by 240. New York times, v. 142, July 1, 1993: B2.
Increase in non-emergency cars, vans and small trucks for New York City.

Webb, Jeremy.
Anchors aweigh for wave-power pioneers. New scientist, v. 147, July 29, 1995: 6.
The Osprey, the world's first wave-powered electricity generator intended for commercial use, will be launched next week in Northern Scotland. The Osprey is designed to produce two megawatts of electricity from waves.

Weisman, Alan.
Harnessing the big H. Los Angeles times, Mar. 19, 1995, sec. MAG: 18.
A cadre of scientists is trying to suppress the epidemic of man-made energy by studying ways to harness hydrogen, which would create pollution-free energy. However, the DOE allots hydrogen about one-ninetieth of what it spends on continuing petroleum research, and the public has expressed little interest.

Weisman, Jonathan.
Drive to open power industry to competition gains steam. Congressional Quarterly weekly report, v. 54, Oct. 12, 1996: 2911-2917.
Legislation to deregulate the electric power industry will spark intense debate during the 105th Congress, convening in Jan. 1997. Proponents of deregulation argue that removing federal obstacles to competition will slash power costs for industry, businesses and individual consumers. Those opposed contend that too much emphasis on cost-cutting may lead to more air pollution, unreliable power distribution, higher rates for those in states already producing cheap power, bail-outs for companies who invested in nuclear power plants and the death of the renewable energy industry.

An energy star flames out. Congressional Quarterly weekly report, v. 54, Oct. 12, 1996: 2916.
"It was an enticing dream that brought Kenetech Corp. to Northern California's Altamont Pass in 1981: wind power, a cheap natural energy source as clean and constant as the breezes rising from the Pacific Ocean. Fifteen years later, the San Francisco company's flagship wind division is bankrupt . . . . Uncertainty over Congress' intentions on deregulation is draining new investments from renewable energy resources. Energy experts say a legislative mistake by Congress--like omitting some sort of transitional protection for the fledgling industry--could kill renewables out-right."

Grumbling over energy cuts elicits a response. Congressional Quarterly weekly report, v. 54, June 1, 1996: 1524-1526.
Democrats and Republicans from the House Appropriations Energy and Water Development Subcommittee jointly protested the appropriations allocation for 1997 which was a 5.4% cut from 1996. The protest got some support and the cut was reduced to 1.4% but energy research programs are still likely to be hard hit because

both environmental cleanup and nuclear defense activities have strong supporters. Renewable energy supporters believe research is essential to the US future energy supply but opponents see the research as social engineering and promote a free-market approach.

Westinghouse pact. New York times, v. 143, July 4, 1994: 38(L).
Water, wind, solar energy development joint venture between Westinghouse Electric Corp. and New World Power Corp.

Whiteley, Peter O.
A house of independent means. Sunset, v. 196, Mar. 1996: 100-103.
Sun, wind and propane are all that power a house in Northern California. The Marin County house, which features no compromise on amenities, stands "off the grid" of public utility power lines.

Whiting, M., Jr. Williams, R.
One, two, three . . . renewable fuels in a WTE power plant. Solid waste technologies, v. 8, Nov.-Dec. 1994: 10-14.
Project developers took an innovative step to design a facility that could take advantage of three renewable fuels plentiful in central Florida--wood waste, scrap tires, and landfill gas. The development and use of renewable fuels in the U.S. increased considerably since the energy crisis of the 1970s. By 1990, renewables supplied 8 percent of the U.S. energy demand. The 40 megawatt (net) Ridge Generation Station in Polk County, Florida uses an innovative combination of three renewable fuels in one power plant: urban wood waste, scrap tires, and landfill gas. This paper focuses on the development and operation of the plant and describes the fuel selection, site selection and permitting processes as well as plant design, operation, financing and economics and project benefits.

Whitney, Hunter
When science imitates nature: using artificial photosynthesis to harness solar energy. Omni, v. 16, May 1994: 25(1).

Whittell, Polly
Around the world on sun and soy. Motor boating & sailing, v. 174, Dec. 1994: 42(8).
Soybean oil-powered boat Zodiac 'Sunrider.' Includes related information.

Will hybrids help? R&D, v. 38, Mar. 1996: 38.
One of the most promising alternatives to combustion engines being studied is hybrid technology. Hybrids include conventional cars with batteries that will take over when the combustion engine produces excessive emissions, as well as vehicles that use alternative propulsion technologies, such as gas turbines and fuel cells.

Wilson, Bob.
Alternative fuels: still making all those nowhere plans for nobody. Diesel progress engines & drivers, v. 61, July 1995: 25.
Discusses the efficiency of cars and engines designed to use alternative fuels.

Wilson, Jim.
Solar boating gaining its sea legs. Popular mechanics, v. 173, Dec. 1996: 14.
This year's Solar Splash Boat Race proved that solar speedboats are coming of age. The University of Michigan won the sprint event.

Wimberly, Jim.
Federal support of renewable energy RD&D. Resource, v. 3, Aug. 1996: 29.
Considers to what extent federal funds should be used to support research, development and deployment of renewable-energy technologies.

Woodyard, Chris.
Alternative energy not paying off. Houston chronicle, Nov. 30, 1996: C1.
Energy Dept managers overestimated by 79% the potential energy savings from harnessing renewable sources such as the sun and the wind and advanced technologies in the year 2000, according to a government-commissioned study.

The World from eh? to zed! OWL, v. 21, Feb. 1996: 18-19.

Automobiles are one of the most convenient forms of transportation. Some automakers are making automobiles that run on solar energy, hydrogen fuel or electricity. Information on the automobile and an electric car is presented.

Wu, Corinna.

Hybrid cars: renewed pressure for fuel-efficient vehicles. Science news, v. 148, Oct. 7, 1995: 232(2).

Carmakers are under pressure to develop automobiles that are both fuel-efficient and emissions-free. The hybrid electric vehicle, which combines a gas engine and an electric motor, shows the most promise among several alternatives. Details of its design are given.

Yonley, Carrie.

Using industry waste as fuel helps clean the environment. St. Louis post-dispatch, Nov. 2, 1996: A38.

Carrie Yonley discusses the benefits on using industry waste as fuel, asserting that replacing coal with appropriate wastes saves money, reduces air emissions and lowers the cost of waste disposal for industry in general.

NUCLEAR ENERGY

Abelson, Philip H.
Nuclear power in East Asia. Science, v. 272, Apr. 26, 1996: 465(1).
Eastern Asia has been overtaking the US in nuclear technology since the US stopped commissioning new nuclear reactors around 1986. Driven by growing economies and electricity demand, South Korea in particular is taking a lead in advanced, efficient and standardized nuclear power plants.

Bodansky, David.
Nuclear energy: principles, practices, and prospects. Woodbury, N.Y., American Institute of Physics, 1996. 396 p.

Chernobyl, 10 years later. Environment, v. 38, Apr. 1996: 3-5, 35-37.
"26 April 1996 marks the 10th anniversary of the accident at the Chernobyl nuclear power plant in Ukraine. The accident left a very large footprint on the nuclear power industry as well as on public perceptions of nuclear energy around the world. To mark the anniversary, Environment's editors asked some distinguished scholars to reflect on Chernobyl's implications and legacy."

Cohn, Steve.
Too cheap to meter: an economic and philosophical analysis of the nuclear dream. Albany, State University of New York Press, 1997.
This work will be available later in 1997.

Collier, John G.
Introduction to nuclear power. 2nd ed. Washington, Taylor & Francis, c1997.
This work will be available later in 1997.

Colvin, Joe F.
Nuclear power in a competitive environment: myths and facts. Nuclear news, v. 40, Mar. 1997: 33-35.
This article says "NEI President and CEO Joe Colvin undertakes to dispel some common myths contributing to misunderstandings that surround the electric power industry deregulation issue."

Daley, Michael J.
Nuclear power: promise or peril? Minneapolis, MN, Lerner Publications, 1997.
Explores opposing viewpoints on expanding the uses of nuclear power with emphasis on pollution, safety, and waste disposal.

Future financial liabilities of nuclear activities. Paris, Organisation for Economic Co-operation and Development, 1996. 95 p.
"The study provides a comprehensive picture on policies for recognising and funding future financial liabilities arising from nuclear activities and their implementation schemes in NEA Member countries. Mechanisms for reporting and funding future financial liabilities are described, analysed and compared. The report offers some findings, conclusions and recommendations for consideration by Member countries."

Governing the atom: the politics of risk, edited by John Byrne and Steven M. Hoffman. New Brunswick, NJ, Transaction Publishers, 1996. 307 p. (Energy and environmental policy series; v. 7)

Hagen, Ronald.
Nuclear energy thrives in Asia. Honolulu, East-West Center, 1995. 8 p. (Asia Pacific issues no. 26)
"Nuclear power may have stopped growing throughout much of the world, but it is alive and thriving in Asia. Many Asian nations see nuclear power as one way to satisfy their growing power demands and reduce their dependence on other nations for imported fuels; nuclear power is also valued for simple prestige. But nuclear energy is expensive to develop, competes with independent power producers, and is very controversial because of concerns over safety and weapons proliferation. Countries such as Japan, South Korea, Taiwan, China, and India plan to expand their already substantial nuclear power programs. Others, such as Pakistan, Indonesia, Bangladesh, and Vietnam, hope to either launch new programs or expand small ones. A few have

ruled out the idea completely. Generation of nuclear power will therefore grow in Asia, although not as fast as power from other sources."

Hileman, Bette.
Hard choices for nuclear energy. Chemical & engineering news, v. 74, Oct. 28, 1996: 24-28.
Even as some experts consider growth in nuclear power essential for the 21st century, there is opposition to the idea. Problems associated with nuclear reactors may best be avoided by expanding the world's energy supply through the use of alternative energy sources.

Hirsch, Robert L. Kulcinski Gerald. Shanny, Ramy.
Fusion research with a future. Issues in science and technology, v. 13, summer 1997: 60-64.
Questions whether the United States should stay involved in the International Thermonulear Experimental Reactor (ITER). Claims that tokamaks and the hot deuterium-tritium (DT) fuel cycle are unlikely to become commercially viable.

Holland, Gini.
Nuclear energy. Tarrytown, N.Y., Benchmark Books, 1996. 63 p. (Inventors & inventions)
Discusses the history, sources, and uses of nuclear energy and examines its dangers and its possible future.

Jones, Barclay.
Nuclear power: boom or bust? Environmentalists should rethink the issue. Wisconsin state journal, July 21, 1996: 2H.

Lemonick, Michael D.
Blinded by the light. Time, v. 142, Dec. 20, 1993: 54.
Breakthrough in nuclear fusion research.

Lenssen, Nicholas. Flavin, Christopher
Meltdown. World watch, v. 9, May 1996: 22-31.
The Chernobyl nuclear accident was the worst industrial disaster ever to befall humanity and left a wound that has not yet healed with time. Reasons why the nuclear power industry appears to be nearing the end of its road are discussed.

Liability and compensation for nuclear damage: an international overview. Paris, Nuclear Energy Agency, Organisation for Economic Co-operation and Development, 1994. 201 p.

Martin, William F. Bennett, R.S.
Cool views on global warming. Wall Street journal, Apr. 2, 1997: A15(W).

Neuse, Steven M.
David E. Lilienthal: the journey of an American liberal. Knoxville, University of Tennessee Press, 1996. 406 p.

Nuclear energy. Forum for applied research and public policy , v. 11, spring 1996: 85-129.
Partial contents.--Atoms in flux, by Michel Damian.--U.S. nuclear power remains on hold, by John F. Ahearne.--World's energy appetite may crave nuclear power, by William Fulkerson and Truman D. Anderson.--French nuclear power charges into future, by Henri Catz.--Russian atomic energy reaches critical mass, by Artiom Ustinov.--Japan's nuclear power faces uncertain future, by Toshiki Mashimo.--India's energy future may see rise of nuclear, by Basudeb Chaudhuri.

Nuclear energy data, 1996. Paris, Organisation for Economic Co-operation and Development, 1996. 43 p.
Presents replies to a questionnaire sent to OECD countries on electricity generation, nuclear fuel cycle and nuclear power.

Nuclear industry continues improvement. Nuclear news, May 1996: 20-22.
"Statistics compiled by the Institute of Nuclear Power Operations show the U.S. nuclear industry in line with performance goals established for 1995."

Nuclear safety research in OECD countries: areas of agreement, areas for further action, increasing need for collaboration. Paris, OECD Nuclear Energy Agency, 1996. 77 p.

"The international nuclear safety community shares a range of specific concerns. Continuing research is necessary to address many of them. In this report, senior experts discuss research areas of special importance for safety and regulation, safety research areas for which a common technical position exists, areas for which further discussion is needed in order to achieve a common technical position, and areas to which priority should be assigned."

Paine, Jeffrey R.

Will nuclear power pay for itself? Social science journal, v. 33, no. 4, 1996: 459-473.

"The analysis shows that nuclear power is currently nowhere near meeting its costs."

Parker, Mike. Surrey, John.

Contrasting British policies for coal and nuclear power, 1979-92. Energy policy, v. 23, Sept. 1995: 821-850.

"This paper examines the evidence of an underlying anti-coal, pro-nuclear bias in British energy policy from the time Mrs. Thatcher's first government took office in 1979 to the October 1992 crisis over pit closures. At the outset the underlying objectives were to break the power of the miners' union, to demonstrate the failure of public ownership, and to build a series of large nuclear reactors even though the need and the economics were difficult to establish. Subsequently the objectives for the coal industry have been achieved, though its size is much reduced and it faces an uncertain future. By contrast, in spite of government support of nuclear power, only one new reactor has been ordered and built since 1979 and the possibility of any further nuclear stations being built is extremely remote."

Parris, Thomas M.

Nukes on the Net. Environment, v. 39, Jan.-Feb. 1997: 45(1).

There are many sources of nuclear power information on the Internet. These include the International Atomic Energy Agency, the US Energy Information Administration and Nuclear Regulatory Commission, and the European Nuclear Society.

Pool, Robert.

Beyond engineering: how society shapes technology. New York, Oxford University Press, 1997.

This work will be available later in 1997.

Ramberg, Bennett.

Take another look at policy on nuclear fuel. New York times, v. 146, Dec. 10, 1996: A2.

Revkin, Andrew C.

Connecticut reactor to close, a victim of economic change. New York times, v. 146, Dec. 5, 1996: A1.

Reynolds, Albert B.

The return of nuclear power: nuclear energy is about to make a big comeback--just in time. Omni, v. 16, Dec. 1993: 6.

Silvennoinen, P.

Economics of nuclear electricity and inter-fuel competition. Nuclear engineering and design, v. 160, Feb. 1996: 5-12.

The costs of generating base-load electricity are compared on a unified costing basis assuming the plants' size for the different fuel alternatives--nuclear, coal, gas, biomass and peat -- to vary according to the infrastructure requirements. Fuel costs are assumed to reflect the market values in Europe to as realistic an extent as possible. Recognizing that there may be a substantial local or regional differences, it is concluded that nuclear electricity generally enjoys a narrow competitive edge, which can become more significant if fossil fuel prices escalate or if energy and carbon taxes are introduced.

Starr, Chauncey.
The future of nuclear power. Nuclear news, v. 40, Mar. 1997: 58-60.
The magazine's editor notes "'Chauncey Starr is president emeritus of the Electric Power Research Institute, and a former ANS president (1958-59). This article is based on a speech he presented in September 1996 at a symposium at Argonne National Laboratory, observing the facility's 50th anniversary--'Research Challenges: The Next 50 Years.'"

Timbers, William H., Jr.
Betting on the future of nuclear power: overcoming formidable obstacles. Vital speeches of the day, v. 63, Jan. 15, 1997: 219(5).
Nuclear power could reemerge in the future despite contrary forecasts by Conventional Wisdom. This is because six factors, including the growing demand for electric power brought by computer technology, have been overlooked.

U.S. Congress. House. Committee on Commerce.
Compilation of selected energy-related legislation. Feb. 1997. Washington, G.P.O., 1997. 538 p. (Print, House, 105th Congress, 1st session, committee print 105-I)
"This committee print replaces the edition of the compilation of selected nuclear energy legislation dated January 1994. It contains the texts of the primary nuclear energy and radioactive waste laws within the jurisdiction of the Committee on Energy and Commerce of the House of Representatives."

U.S. Congress. Senate. Committee on Energy and Natural Resources.
Agreement for cooperation on peaceful uses of atomic energy between the United States and the European Atomic Energy Community. Hearing, 103d Congress, 2d session ... September 29, 1994. Washington, G.P.O., 1995. 61 p.

U.S. General Accounting Office.
Nuclear safety: uncertainties about the implementation and costs of the nuclear safety convention; report to congressional requesters. Jan. 2, 1997. Washington, G.A.O., 1997. 17 p.
"GAO/RCED-97-39, B-275746"
"This report provides information on (1) how compliance with the Convention [on Nuclear Safety] terms and obligations will be reviewed by the ratifying countries (hereinafter, also called parties) and (2) the potential costs to the United States to participate in the Convention."

Wolfe, Bertram.
Why environmentalists should promote nuclear energy. Issues in science and technology, v. 12, summer 1996: 55-60.
Contends that nuclear power "may be the only viable energy option that can prevent economic stagnation, energy conflicts, and environmental degradation."

SOLAR ENERGY

Acker, Richard H. Kammen, Daniel M.
The Quiet (energy) revolution: analysing the dissemination of photovoltaic power systems in Kenya. Energy policy, v. 24, Jan. 1996: 81-111.

Allen, Scott.
The Sun breaks through. Boston globe, Jan. 15, 1996: 29.
Solar power may finally be getting ready for prime time. The cost of the photovoltaic panels that turn sunlight into electricity has fallen more than 75 percent since the days when Jimmy Carter was president.

Anderson, Dennis.
The case for solar energy investments. Washington, World Bank, c1995. 16 p.

Barnett, A. Sklar, A.
Solar energy: an investment in our nations energy and economic security. Solar industry journal, v. 7, 1996: 39.
The solar energy industries are engaged in aggressive efforts to develop, validate, and deploy solar energy systems for a wide variety of applications in every sector of the economy. In many cases, efforts are in partnership with the United States Department of Energy (DOE) and its laboratories. These partnerships are heavily cost shared by industry and were entered into with good faith by companies and corporations willing to include their significant cost-share in their budget planning.

Bartels, Dennis.
A rare good thing. Alternatives, v. 21, Oct. 1995: 36-40.
The Hopi Solar Program (HSP), located on Second Mesa AZ, is one of the most exemplary of the non-profit renewable energy technologies (RET)-providing operations that do exist. The HSP and barriers to the use of RETs are discussed.

Behnke, Larry.
Power from the sun: not that difficult; not that expensive. Countryside & small stock journal, v. 81, July-Aug. 1997: 22(3)
Homesteaders should consider whether solar electricity generation is appropriate for their living situation. A photovoltaic system can be built for as little as $3,600, which provides inexpensive power and independence from the power companies. Instructions for building a solar power system are presented.

Berman, Daniel M.
Who owns the sun? People, politics, and the struggle for a solar economy. White River Junction, Vt., Chelsea Green Pub. Co., c1996. 331 p.

Beyette, Beverly.
Racing to their moment in the sun. Los Angeles times, Sept. 9, 1996, sec. E: 1.
The design and construction of a solar powered car by Los Altos High students in Los Angeles, which they hope to race in Australia if they raise the last $15,000 of $100,000 they need, is featured.

Booth, Michael.
Move on to harness sun, Ranchers find solar power economical. Denver post, Jan 17, 1997, sec. C: 1.
That's a match made in heaven for economy-minded ranchers and farmers across the nation, who are slowly moving toward improved solar technologies to perform routine functions on their remote spreads, including water pumping, fence electrification and gate lifting. Pete Mitchell, a rancher near Brush, is a solar-energy proponent. "Over the long run, it will save us quite a bit," said Mitchell, who has had a solar-powered water pump in a remote pasture for more than four years. While major solar conversions have not yet proven as economically sound for urban and suburban homes, solar cells have become more efficient and are winning support for remote uses when it would cost far more to extend a traditional power line.

Broman, Lars.

Thermophotovoltaics bibliography. Golden, CO, National Renewable Energy Laboratory; Springfield, VA, National Technical Information Service, U.S. Dept. of Commerce [distributor], 1994. 22 p.

Butler, B.

Planning for success. Solar industry journal, v. 5, 1994: 2.

The solar industry has benefitted from federal research and development programs over the last 15 years and has achieved significant technology development to make sustainable industry growth possible. While the potential for a sustainable U.S. solar industry is not in question, there is skepticism about whether solar energy can realistically provide significant energy in a timeframe that justifies continued support. Solar energy must achieve greater market penetration on a sustainable basis--not tied to federal policy, but rather to the marketplace. This new stage entails quantitative measurement of energy produced annually, jobs created and sustained, export markets penetrated, and pollution avoided as requirements that government cannot totally control but must foster. Some principles must be articulated to guide the new industry/government partnership that has evolved over the last few years and direct the way in which we work together.

Butler, B. Sklar, S.

The solar energy industries FY 1995 appropriations recommendations for the U.S. Department of Energy: the solar commercialization challenge. Solar industry journal, v. 5, 1994: 40-41

This article contains the Solar Energy Industries Association budget recommendations for DOE for the commercialization of solar energy. Areas covered are photovoltaics, solar buildings, solar thermal, and other programs such as resource assessment and integrated resource plannning.

Carrier, Jim.

Sun power shines just out of reach. Denver post, Nov. 27, 1995, sec. A: 1.

The National Renewable Energy Lab near Golden CO is featured, and solar energy in Colorado is discussed.

Chandrasekaran, Rajiv.

GWU hopes car outshines competition. Washington post, June 14, 1995, sec. B: 1.

George Washington University student Cory Knudtson has led a team of nearly 30 students in designing and building a futuristic solar-powered vehicle from the ground up in hopes of competing against 39 other engineering schools in a 1,250-mile solar car race from Indianapolis to Golden CO.

Charters, W. W. S.

Solar energy: a viable pathway towards ecologically sustainable development. Solar energy, v. 53, Oct. 1994: 311-314.

This is the written form of Professor Charter's lecture, given at the ISES World Congress in Budapest in August 27, 1993. Highlights of his lecture include sustainable development, renewable energy waves, framework for solar development, future roles for solar energy, and his personal solar activities.

Cole, N. Skerrett, P. J.

The Hopi solar electric enterprise. Solar today, v. 9, Sept.-Oct. 1995: 20-22.

Respect for traditional values and a desire for cultural and energy independence make photovoltaics an attractive technology to the Hopis. This article discusses the development of individual photovoltaic systems for electricity generation on the Hopi Indian reservation instead of the traditional powerline and outside suppliers. Topics discussed include tribal self-help support, decreasing the costs, education awareness.

Dagostino, Mark.

Harvesting the sun's bounty. Boston globe, Jan. 1, 1995, sec. NH: 1.

New Hampshire resident Leandre Poisson's use of solar energy in his home and to raise his garden is discussed. Poisson, the architect who designed the TriSol triangular-shaped home, of which there are 60 in the world, is profiled.

Davidson, Jane. Wood, Byard.

Solar hot water for the home. Mechanical engineering, v. 118, Aug. 1996: 60-62.

Thanks to technological advances and better industry standards, the performance and reliability of solar water heaters have improved. This in turn has made them cost-comparative and environmentally safe.

DeSilver, Drew
Here comes the sun. Vegetarian times, no. 218, Oct. 1995: 82-89.
Solar energy is poised for a comeback now that technologies using sunlight to generate heat and electricity are cheaper, more reliable and more efficient than ever before. The history of solar power's use is presented.

Drennen, Thomas E. Erickson, Jon D. Chapman, Duane.
Solar power and climate change policy in developing countries. Energy policy, v. 24, Jan. 1996: 9-16.
Drennen and others examine the economic competitiveness of photovoltaic (PV) systems. Even after including externality costs, without significant technological breakthroughs, the economics of PV applications are unlikely to allow for an unsubsidized, widespread adoption of this technology in the near future.

Epstein, R. T.
Solar transformation: sun on the reservation. Mother Earth news, v. 141, Jan 1994: 52, 74.
To most Americans, the simple act of flicking on the light is as taken for granted as breathing air--without so much as a thought about its possible environmental consequences. But to Sylvia Brownskill and hundreds on the New Mexico Navajo Indian reservation, accessing electricity without harming the environment is of the utmost importance--and until recently, virtually impossible. Four years ago, however, practical technology for producing "clean" energy became available, and now even in the most remote locations of the reservation people can flick on a light switch, knowing that the electricity generated is produced in its entirety by the power of the sun.

Essoyan, Susan.
Something new under the Hawaiian sun: a solar car. Los Angeles times (Wash. Ed.), Apr. 5, 1995: A5.
"YB Planning Inc. of Tokyo signed a joint venture agreement in late February with Suntera, the Solar Electric Chariot Co. of Hawaii, to import up to 2,000 SunRays to Japan over the next 1 1/2 years. The first 200 of the innovative electric mini-cars are to be delivered by this fall." The president of YB planning "plans to market the sporty, egg-shaped SunRay as a commuter vehicle. The first 200 will cost him $21,680 apiece, with that figure expected to drop closer to $13,000 as production picks up. The company says the two-seat SunRay, which can be charged with ordinary household outlets or solar panels, reaches 70 m.p.h. and has a range of up to 100 miles between charges."

Evaluating the economics of photovoltaics in a demand-side management role, by John Byrne, et. al. Energy policy, v. 24, Feb. 1996: 177-185.

Faber, Scott.
Sunshine flights. New scientist, v. 146, June 17, 1995: 29-32.
Pathfinder is a pilotless aircraft carrying no fuel. "Instead, the electric motors that drive its eight propellers draw their power from the solar panels covering its wings." Profiles Pathfinder and other solar powered prototypes.

Flavin, Christopher.
Harnessing the sun & wind. USA today (magazine), v. 124, Nov. 1995: 70-73.
"As alternative sources of energy, these elements can provide the equivalent of nearly 1,000 trillion barrels of oil a year." A series of 1994 developments suggests "the time has come for solar and wind energy to compete directly with fossil fuels. Major wind power projects were announced in India, China, Germany, and Argentina, setting off a boom in wind turbine construction. At the same time, tens of thousands of homes from Sri Lanka to Switzerland were equipped with solar cells for electricity generation. A number of major corporations, including Enron, Westinghouse, and Siemens, improved the credibility of the renewable energy markets when they announced new investments in solar and wind technologies."

Fowler, Allan.
Energy from the sun. New York, Children's Press, 1997.
This work will be available later in 1997.

Fowler, Paul Jeffrey.
The evolution of an independent home: the story of a solar electric pioneer. Worthington, MA, Fowler Enterprises, 1995. 254 p.

Freeman, Mark.
Passive solar for home heat. Country journal, v. 22, Nov. 1995: 34-36.
Information on solar heating a house is given. Glazing, insulation, heat sinks, sunspaces, and the (mythical) overheating problem are discussed.

Gilchrist, Gavin.
The big switch: clean energy for the twenty-first century. St Leonards, NSW, Australia, Allen & Unwin, 1994. 304 p.

Glaser, P. E. Leonard, R. S.
Solar energy systems for industrialization. Space power, v. 13, 1994: 225-279.
This is a presentation given to illustrate a need for solar energy, and to suggest a solution as well as its implementation. Current sources of global energy mainly consist of fossil fuels, which are finite in their supply as well as harmful to the environment. A viable solution is solar energy, which is relatively inexhaustible in supply and available with emerging technology. In addition, a process for wireless energy transmission is presented. The benefits of this technology include assisting rural areas of developing countries and aiding those countries' national economies. Implementation methods for this technology on a global scale are also given.

Gunther, Judith Anne
Power houses. Popular science, v. 248, May 1996: 77(5).
Houses can use solar cell panels as a roof, providing electricity for the household. Innovations in solar cells have improved efficiency and lowered costs and have a wide variety of applications in houses and buildings. A class of solar cells called thin-film cells is being used for glass panels.

Halpert, Julie Edelson
Harnessing the sun and selling it abroad; U.S. solar industry in export boom. New York times, June 5, 1996: C1.

Halverson, F.
Solar power-up. Solar today, v. 8, Nov.-Dec. 1994: 16-18.
This article describes the curriculum for an elementary school project on solar power arising from a cooperative effort between teachers and engineers working with utility companies. The students design and build photovoltaic-powered model cars in design teams of three. They must make group decisions about design problems, build the model and present details to students, teachers and parents.

Hammad, M.
Photovoltaic, wind and diesel: a cost comparative study of water pumping options in Jordan. Energy policy, v. 23, Aug. 1995: 723-726.

Hill, R.
Commercializing photovoltaic tehcnology. Mechanical engineering, v. 116, Aug. 1994: 80-83.
This article examines the status of photovoltaic conversion technology to provide power for a variety of applications in remote locations and in reducing production costs to increase markets for photovoltaic conversion systems. The topics of the article include reducing costs, applications of photovoltaics, stand-alone systems, grid-connected systems, and photovoltaic systems as a cost-effective alternative.

History and overview of solar heat technologies. Cambridge, Mass., MIT Press, 1997.
This work will be available later in 1997.

Hoagland, William
Solar energy. Scientific American, v. 273, Sept 1995: 170(4).
Experts predict that sophisticated solar energy technologies will allow people to harness the sun's rays for virtually all their energy needs. A brief overview of developments in solar energy is presented.

Hogan, Dan.
Turning on the sunshine. Current science, v. 82, Nov. 15, 1996: 8-9.
Clean, cheap solar power may finally become a reality in the near future. Recent breakthroughs in harnessing and storing the sun's energy are discussed, as are their potential applications.

Implementation of solar thermal technology. Cambridge, Mass., MIT Press, 1996. 995 p.

Jeffords, J.
Washington watch: why we rescued solar energy R&D. Solar industry journal, v. 6, 1995: 34.
The ideal government-sponsored technology research and development program is one that is built steadily over time, receives moderate budget increases over a multi-year period, plateaus as it reaches its optimal size, and then tapers off as its goals and objective are met and the newly born technology is ready for life in the marketplace. Presumably, emerging technologies thus laboratory-incubated and graduated go on as a commercial commodity to further the public good, bringing to fruition the societal benefits which constituted the rationale for public investment in the first place--benefits such as improved public health through cleaner air, and improved public welfare through job creation and balance of trade.

Kanamine, Linda
Experimental Calif. solar plant 'bottles' energy for later use. USA today (newspaper), June 4, 1996, sec A: 2.
Scientists say a unique $189 million electric power plant in California's Mojave Desert is a practical way to generate solar energy even when the sun isn't shining. Mirrors in the plant reflect the sun to molten salt, which is heated to 1,050 degrees and can be used to store the heat for electricity.

Kaufman, Allan.
Exploring solar energy II: activities in solar electricity. Ann Arbor, MI, Prakken Publications, 1995. 101 p.

Kliewer, Terry.
Prairie View team launches drive for solar-car title. Houston chronicle, Nov. 3, 1996, sec. A: 33.
Prairie View A&M University was outspent, out-designed and outrun in the 1995 national solar-powered car races, but engineering students at the school expect 1997 to be different. Winning the 1997 Indianapolis-to-Colorado Springs "sun-car" race will be a tall order.

Komp, Richard J.
Practical photovoltaics: electricity from solar cells. 3rd ed. Ann Arbor, MI, Aatec Publications, 1995. 197 p.

Lehman, H. Jane.
Designers make a run for the sun. Washington post, May 6, 1995, sec. E: 1.
The trend of designing solar-powered homes is coming back in the 1990s.

Lovejoy, Derek.
Are there limits to growth? The need for a transition to a solar-based economy. Natural resources forum, v. 20, Feb. 1996: 73-77.
It can be shown that, combined with greatly improved energy efficiency, a transition to a solar (renewable) energy based economy, capable of sustaining the anticipated growth in the world economy, is possible. However, the constraints are extremely tight.

MacGregor, Kerr.
Solar energy for survival. Safe energy, v. 103, winter 1994-winter 1995: 14-15.
A brief article examines the long term global requirements for energy and argues that renewable energies, and in particular solar energy, will be increasingly important.

Manly, Howard.
He's preaching the power of the sun. Boston globe, Sept. 29, 1996, sec. WKC: 1.
The work of Clifford Davis, unofficial pied piper of the virtues of solar energy in Boston's Roxbury area, is detailed.

Marion, William.
Solar radiation data manual for buildings. Golden, Colo., National Renewable Energy Laboratory, [1995]. 255 p.

Mason, Julie.
Solar-powered lights a slow process. Houston chronicle, Sept. 28, 1996, sec. A: 32.
The city of Houston is spending about $3.7 million for solar-powered, flashing school zone signs scheduled for installation at 218 elementary schools beginning in Oct. 1996.

Milburn, Michael P.
Sun provides renewable energy alternatives for developing world. Alternatives, v. 22, Jan. 1996: 4-5.
More than 200,000 homes in developing countries get their electricity from photovoltaic cells instead of conventional sources. The solar cell is one option for providing energy without causing further environmental damage.

Miniclier, Kit.
Indian conference sheds light on electricity. Denver post, Dec. 5, 1996, sec. B: 8.
Solar generators, which are offering a glimmer of hope for a handful of families on the 1.5 million-acre Navajo Nation, were part of a demonstration in Denver Dec. 4, 1996 during the annual technical conference of the Council of Energy Resource Tribes, or CERT.

Moran, Robert.
Solar thermal and photovoltaics: world growth markets. Norwalk, CT, Business Communications Co., 1996. 179 leaves

Nansen, Ralph.
Sun power: the global solution for the coming energy crisis. Ocean Shores, WA, Ocean Press, 1995. 252 p.

Naranjo, Ralph.
Unlocking solar secrets. Cruising world, v. 21, Oct. 1995: 23-28.
The technology and the cost of such technology needed to harness solar energy to power a boat are examined. The article concluds that the eventual benefit is worth the initial cost of getting the needed equipment.

Paddock, Richard C.
Unplugged and living off the sun. Los Angeles times, Oct. 5, 1995, sec. A: 1.
Alternative power, hailed in the 1970s as the U.S.'s energy savior and scorned in the '80s for falling short of its promise, is quietly making a comeback in the backwoods of California. Statewide, an estimated 20,000 households produce their own power, called living "off the grid."

Parks, Noreen.
Bounty from the sea. Earth, v. 5, Aug. 1996: 50-55.
Warmed by the sun, the surface waters of the oceans are like a giant solar collector. Engineers in Hawaii are developing a technology called ocean thermal energy conversion (OTEC), pioneered by John Pina Craven, that uses the solar energy stored in the oceans to make electricity.

Partnerships with federal agencies benefit everyone. Solar industry journal, v. 7, 1996: 34-37.
Federal agencies administer more than 31 percent of the land in the United States, much of it in the western states and Alaska. Many of these areas are remote and environmentally sensitive. This represents an opportunity for photovoltaic power systems. The United States Department of Energy (DOE) has entered into partnerships with four agencies that have responsibility to administer the land. These agencies include the Department of Defense, the National Park Service, the Bureau of Land Management, and the U.S. Forest Service. The goal includes assessments to determine what has been done with photovoltaics, the satisfaction of programs, and the potential for expansion.

Pepper, Jon.
Backers of Edison's new solar project really buying into it--More power to them. Detroit news & free press, Apr. 21, 1996, sec. D: 1.
Jon Pepper comments on Detroit Edison's first solar power generating facility that opened on Apr. 20, 1996 in Scio Township near Ann Arbor MI.

Potts, Michael. Scanlon, Matt
The future of solar is now. Mother Earth news, no. 151, Aug.-Sept. 1995: 38(8).
Recent advances in photovoltaic (PV) technology have made home solar energy systems more efficient and cost-effective than ever before. Advice on how to put a self-contained PV system in place is provided, together with energy conservation tips.

Quinn, Randy.
Sunlight brightens our energy future. World & I, v. 12, Mar. 1997: 156-163.
Looks at the current state of solar energy technology.

Revkin, Andrew C.
Under solar bill, homeowners could cut electric cost to zero. New York times, July 25, 1996, sec. B: 1.
Thanks to a little-noticed bill passed by the New York Legislature, state residents may soon be able to turn their rooftops into small-scale solar-power plants and see their electric bills drop to zero or even register a credit.

Riccardi, Nicholas.
Solar power in the city. Los Angeles times, Dec. 13, 1996, sec. B: 2.
Rows of solar panels generate 100 kilowatts of energy that are dispersed into Southern California Edison's power grid, providing power to Huntington CA and the surrounding San Marino neighborhood. The project is expected to be a model for bringing solar energy to cities.

Rivard, Nicole.
Some real good news about solar living. Environmental magazine, v. 7, July 1996: 48-49.
In June 1996, the Real Goods Trading Corp opened its Solar Living Center, a 12-acre solar and wind energy demonstration site in Hopland CA. The center demonstrates sustainable building and conservation techniques.

Romano, Jay.
Letting the sun shine in. New York times, Aug. 27, 1996, sec. 9: 5.
Some of the many ways that solar power can be put to work around the home are discussed. While solar-powered systems and appliances typically cost more than their conventional counterparts, some pay for themselves over time, while others pay dividends of another kind.

Scanlon, M.
1994 Guide to solar power for home owners. Mother Earth news, v. 141, Jan. 1994: 48.

Scheer, H.
The economy of solar energy. Advances in solar energy, v. 9, 1994: 307-337.
Solar energy is often regarded as environmentally friendly, but, at the same time as not economical. A global perspective shows, however, that renewable energies can bring about substantial economic and social benefits today, even before their wide market introduction has begun. The author views them as a basic innovation for durably overcoming the ever increasing risk innate in the current economic development: they provide new jobs in industry, crafts, and agriculture; a long-term reduction of administrative and health costs; reduced subsidies, increased foreign exchange assets for national economies; reduced military expenses to secure the energy supply structure; and preservation of agriculture on a sustainable basis. In the medium- and long-term, they are a precondition for reducing operation and management costs of the energy supply system. On the basis of a completely new tax system--the entropy tax--solar energy can become the trigger of a new economic dynamics which remains within the ecological limits of growth.

Scheer, Hermann.
A solar manifesto: the need for a total solar energy supply-- and how to achieve it. London, James & James, 1994. 218 p.

Scott, R. D. W.
The future of solar power in the urban environment. Renewable energy, v. 5, Aug. 1994: 225-228.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
This paper discusses design issues associated with the integration of PV systems into building architecture and quantifies the PV energy contribution to typical commercial buildings.

Service, Robert F.
New solar cells seem to have power at the right price. Science, v. 272, June 21, 1996: 1744-1745.
New thin-film materials, such as a mixture of copper, indium, gallium and selenium, are showing signs that they can be both inexpensive and efficient as solar cells. The copper mixture has been made into prototype cells that convert nearly 18% of incoming sunlight to electricity.

A Showcase for photovoltaics. ASHRAE journal, v. 38, May 1996: 23-24.
The natatorium constructed for the 1996 Olympics will be one of the most used and visible of the venues, and this exposure is among the reasons it was chosen to showcase the world's largest building-mounted photovoltaic installation and other renewable energy technologies. This project features a $5 million photovoltaic (PV) installation that has 2,856 PV modules that cover 40,000 ft (3 716 m) of roof space. Dan Ton, the DOE's project manager, said the modules provide 340 kW of peak electrical power.

Silber, Kenneth
Global market bullish on sun: solar energy is booming, thanks to high-tech advances and international demand. Insight, v. 12, July 22, 1996 v. 12 no. 27: 41(1)
Solar energy is driving economic development in remote areas of Mexico, Brazil, Indonesia and India. Solar-rechargeable appliances, especially in telecommunication, have also boosted demand. One major advantage of solar power is its reliability (thanks to new technologies) and cleanliness.

Sklar, Scott.
Consumer guide to solar energy: easy and inexpensive applications for solar energy. 2nd ed. Chicago, Bonus Books, 1995. 188 p.

Slesser, M.
Can solar energy substitute for oil: a natural capital accounting approach. OPEC review, v. 17, autumn 1993: 377-398.
"This paper explores in a quantitative manner the potential to substitute solar energy for natural capital."

Smith, Charles
Revisiting solar power's past. Technology review, v. 98, July 1995: 38(10).
The drive to develop devices capable of delivering renewable energy and solar energy, in particular, was spawned over 100 years ago during the Industrial Revolution. Even as early as this period, several engineer-visionaries already realized the need for alternatives to finite fossil fuel supplies and decided to concentrate their efforts on solar power, considering its benefits and the few technical obstacles involved in harnessing it. Unfortunately, many of their inventions failed to prosper due to lack of funds and public support, despite their merits.

Smith, Joel J.
Troy company will help build solar shingles. Detroit news, Feb. 15, 1996, sec. B: 1.
A new roofing material designed by a Troy MI firm keeps the rain from seeping into a house; and as an added bonus, it will also power the home's refrigerator, lights and TV. United Solar Systems Corp., a joint venture of energy Conversion Devices and Canon Inc., announced that the company will begin producing solar electric shingle roofing in July 1996 in its Troy plant.

Solar electricity. Chichester; New York, Wiley, 1994. 228 p.

Solar energy 24 hours a day. Business week, no. 3480, June 17, 1996: 91(1) .
Solar Two power plant near Daggett, CA, collects solar energy during the day and releases it during the night or on cloudy days.

Solar energy fuels solutions to hunger and poverty in Central America. American Dietetic Association journal, v. 95, Oct. 1995: 1102.

The Central American Solar Energy Project has introduced solar ovens as a tool for improving health and sanitation conditions, promoting economic empowerment and safeguarding the ecosystem in Central America. The use of the ovens to combat poverty and hunger is discussed.

Solar-power tower set for dual-use design. Design news, v. 51, Aug. 26, 1996: 39.

Southern California Edison and the DOE are the primary operators of the Solar Two experimental power plant, which went on-line in June in the Mojave Desert. Solar Two happens to be the largest light-collection facility in the world.

Southerland, Danile.

Preparing for its day in the sun. Washington post business, Jan 30, 1995: 5.

Solar power is making a comeback, as dramatized by the activity at Frederick VA-based Solarex, the largest U.S.-owned solar cell producer. Amoco Corp., Solarex's owner, sold 50 percent of the company to Enron, and together the companies hope to use Solarex to reduce the cost of producing solar power.

Spotts, Peter N.

Gear up for a four-day race, fueled by the sun. Christian Science monitor, June 20, 1995: 12.

Sunrayce '95 is featured. The event is a competition among 40 solar-powered cars designed by students from colleges, universities, and vocational schools in the U.S., Canada, and Mexico.

Stone, L. Weiss, J.

Building a dream: living and learning solar "off the grid." Solar today, v. 10, May-June 1996: 28-30.

This article describes a photovoltaic power system designed and built specifically for a residential house in the Colorado Rockies.

Strong, Steven J.

Power windows: building-integrated photovoltaics. IEEE spectrum, v. 33, Oct. 1996: 49-55.

"Replacing time-honored skylights and shingles with photovoltaic building-components can yield an energy surplus."

Sudermann, Hannelore.

Even on a rainy day in Brussels, Greenpeace shows its sunny side. Wall Street journal, Dec. 10, 1996, sec. B: 1.

Greenpeace arrived in Brussels on a drab December day in a truck covered with solar panels to promote solar energy and to invite EU energy ministers to their solar kitchen. But Belgium averages 203 days of rain annually and Brussels residents can expect a total of 43 hours of direct sunlight. Since energy from sunny days can be stored and drawn upon later, the demonstration was a hit.

Textor, Ken.

Simple solar water heat. Country journal, v. 22, Nov. 1995: 37-39.

The sun can be used to heat the water for one's home. Information on solar hot water heaters is given.

Udall, James R.

Power to the people; are you willing to pay more for clean energy? Sierra Club bulletin, v. 82, Jan-Feb. 1997: 26(2).

The usage of alternative energy sources has failed to grow because of a lack of investment by the government. This roadblock has been surmounted, however, by a new program offered by electric utilities which allows consumers to pay a small surcharge as an investment in wind or solar power. The costs of these alternative sources has dropped dramatically in recent years.

Valenti, Michael.

Storing solar energy in salt. Mechanical engineering, v. 117, June 1995: 72-75.

The DOE, Bechtel and a consortium of Western utilities are constructing Solar Two, the world's largest solar power tower, in Barstow CA in the Mojave Desert. The demonstration project will use molten salt to absorb and store solar energy until it is needed to generate electricity.

Swimming with the sun. Mechanical engineering, v. 118, Aug. 1996: 122.

The Aquatic Center on the Georgia Institute of Technology campus used in the 1996 Summer Olympics uses the sun's rays to warm a pool that is designed to enable athletes to swim faster. Information about the facility's solar heating system is presented.

Wald, Matthew L.

At Clarkson U., students are racing with the sun. New York times, May 17, 1995, sec. B: 8.

At Clarkson University in Potsdam NY, students learn by taking part in engineering competitions. In April 1995, Clarkson took first place in a competition for hazardous waste disposal. A Clarkson team is working on a solar-powered car for the 1,150-mile Sunrayce in June.

Webb, Jeremy.

By the light of the sun. New scientist, v. 148, Oct. 7, 1995: 40-41.

While most of the world has ignored the potential of solar energy, a healthy market for it has grown up in Kenya. Because of the lack of state-owned electricity in rural areas, people have turned to the solar energy as an alternative to the slowly expanding electrical grid.

Weiss, Rick.

The Sun also braises: renewable energy advocates offer invention that can harness and ease global warming. Washington post, Oct. 7, 1996, sec. A: 3.

As advocates of solar cooking know, the greenhouse effect can be harnessed in a way that benefits the environment. All it takes is some cardboard, aluminum foil and a plastic bag.

Wood, Daniel B.

It works, but can anyone afford it? Christian Science monitor, June 10, 1996: 3.

Daniel B. Wood discusses an experimental project known as Solar Two in California's Mojave Desert, which is expected to produce electricity at a cost that compares with that of inexpensive natural gas. Wood says that the $50 million site is technolgically impressive, and as a demonstration project it will operate up until 1998, producing enough electricity for 10,000 homes. Wood explains that critics wonder whether poor countries can afford to build such a huge, centralized plant.

Yannas, Simos.

Solar energy and housing design. London, Architectural Association, 1994. 2 v.

WIND ENERGY

Abelson, Philip H.
Power from wind turbines. Science, v. 261, Sept. 3, 1993: 1255(1).

Andersen, N.
Wind energy technology transfer. Renewable energy, v. 5, Aug. 1994: 556-565.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
As more countries develop an interest in producing electricity from wind power, the manufacture of wind turbines is becoming a growth industry. A Danish wind turbine manufacturer, known worldwide, Vestas, has produced and installed wind turbines in many countries including India and Greece. This article describes the transfer of technology necessary for the local manufacture of wind turbines and includes a statement of Vestas' policy on technology transfer.

Asmus, P.
Hot air, hot tempers, and cold cash. Amicus journal, v. 16, fall 1994: 30-35.
Discusses clashes of ethics and clashes of interest in the controversy over wind power. To most observers, Rattlesnake Ridge is hardly a landmark worth capturing on film, or even acknowledging in one's nature journal. Set in the brush and wheat fields of eastern Washington State, the dry, rocky ridge has none of the lush forests and swift streams that are hallmarks of the glorious landscape of the Pacific Northwest. Nevertheless, when well-heeled developers from that much-despised state to the south, California, put forth a proposal for a project at the ridge, local citizens organized in its defense.

Bates, Karl Leif.
Man hopes pulling energy from highways is a breeze. Detroit news, June 25, 1996, sec. A: 1.
Royal Oak MI computer consultant Thomas Alva Wither on June 24, 1996 tested a prototype of a device that he hopes will generate electricity from the windy medians of urban freeways under the Lonyo Ave. bridge of I-94 in Detroit.

Bowcott, Owen.
Largest offshore wind farm planned. Guardian, Aug. 15, 1996, sec. 1: 2.
PowerGen claimed Aug. 14, 1996 that the world's largest offshore wind farm, built on a shifting sandbank two miles beyond the Norfolk England coast, could be generating electricity by 1998.

Carrier, Jim.
'Green energy' an option. Denver post, June 19, 1996, sec. C: 1.
Colorado residents could choose between coal plants and windmills for their home electricity source under a plan by Public Service Company of Colorado, the state's largest utility. If enough people want "green energy," PSC will erect small wind plants in eastern Colorado within two years.

Cassidy, Tina.
Windpower giant files Ch. 11. Boston globe, May 31, 1996: 37.
Kenetech Windpower Inc., the country's largest developer of wind farms, filed for bankruptcy protection on May 29, 1996.

Catto, Gavin.
Wind energy: the present and the future. Power technology international, fall 1996: 89-92.
Wind energy has become a billion-pounds-a-year industry. Its installed capacity worldwide exceeds 4.5 gigawatts. Technical advances coupled with the buying power and mass-production techniques of the main turbine manufacturers are pushing the cost of wind energy down to attractive levels.

Chisolm, William.
Campaign to block wind farm. The Scotsman, Oct. 9, 1996: 4.
Discusses opposition to a wind farm because of the visual damage it would cause to the landscape.

Connors, Stephen R.

Informing decision makers and identifying niche opportunities for windpower. Energy policy, v. 24, Feb. 1996: 165-176.

An overview of the multiattribute trade off approach is presented, and it is applied to resource strategies incorporating windpower in the New England regional power system.

Cornelius, Coleman.

Utility takes to the wind. Denver post, Nov. 18, 1996, sec. B: 1.

In a move that electrifies renewable energy advocates, the electric utility in Fort Collins CO is the first in the state to offer its customers the power of the wind. Fort Collins Light and Power and its supplier, Platte River Power authority, are starting a program to allow city residents to use wind-generated electricity.

Daniels, S. H.

Wind power finally coming of age. ENR, v. 232, Mar. 28, 1994: 8-9.

This article is a review of current U.S. efforts in the development of wind power facilities. A brief overview is provided, and efforts of several utilities are listed.

Flavin, Christopher.

Harnessing the sun & wind. USA today (magazine), v. 124, Nov. 1995: 70-73.

"As alternative sources of energy, these elements can provide the equivalent of nearly 1,000 trillion barrels of oil a year." A series of 1994 developments suggests "the time has come for solar and wind energy to compete directly with fossil fuels. Major wind power projects were announced in India, China, Germany, and Argentina, setting off a boom in wind turbine construction. At the same time, tens of thousands of homes from Sri Lanka to Switzerland were equipped with solar cells for electricity generation. A number of major corporations, including Enron, Westinghouse, and Siemens, improved the credibility of the renewable energy markets when they announced new investments in solar and wind technologies."

Windpower's future grows brighter. Strategic planning for energy and the environment, v. 15, summer 1995: 55-61.

Modern technologies to generate electricity from windpower were introduced only 15 years ago. Today, equipment and control improvements have moved this benign process into a strong competitive position, both nationally and internationally. Altogether, the world had roughly 20,000 wind turbines in operation by the end of 1993, producing 3,000 megawatts of electricity. More than a dozen American and European companies, many with government assistance, are pursuing advanced wind technologies that some believe are capable of closing the cost gap with fossil fuel plants. According to one study, the average capacity factor of Californian wind turbines--the percentage of their annual power potential generated--rose from 13 in 1987 to 24 in 1990. These machines are now estimated to be "available" to operate 95 percent of the time, which is better than most fossil fuel plants. The machines now entering the market generate 300--750 kilowatts per turbine rather than the 100-kilowatt average of the late eighties' models. They have lighter and more aerodynamic blades made of synthetic materials, improved rotor-hub connections and drive trains, new blade controls, and more advanced power electronics, including some that operate at variable speeds, which allows the turbines to run more efficiently in a range of winds. The new designs are less expensive and can be deployed in more moderate wind regimes. In 1994, wind developers using the new technology signed contracts to sell wind-generated electricity for as low as 4-5 [cents] per kilowatt-hour.

Gantenbein, Douglas.

Something in the wind. Atlantic monthly, v. 272, Oct. 1993: 36, 38, 40, 42.

Examines the problems associated with making wind power economically feasible.

Garrad, A. D.

Development of wind energy in Europe--outlook for the future. International journal of solar energy, v. 15, 1994: 193-200.

Paris : Euroforum Conference on Renewable Energies in Europe : July 5-6, 1993.

This paper traces installed wind turbine capacity in Europe from 1981 to 1994, and examines the technologies used, costs involved, sites and markets.

Gaudiosi, G.
Offshore wind energy in the Mediterranean and other European seas. Renewable energy, v. 5, Aug. 1994: 675-691.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
A general overview of the offshore wind energy activity is reported for the Mediterranean and other European seas. More specifically papers presented at the British Wind Energy Association (BWEA) Seminar of June 1993 in Harwell and at OWEMES European Seminar of February 1994 in Rome, are reviewed. Emphasis is given to resources assessment, planning, technical development, applications, economics, and environment.

Gipe, Paul.
Growth in sight. Independent energy, v. 24, Apr. 1994: 91-98.
Windpower activity in the United States is increasing. New projects and capacity additions are moving from the drawing board to the completion phase. After announcements about huge new projects during the past two years, wind companies can finally be seen putting turbines in the ground in North America. And more growth is one the horizon as the dust settles from California's bidding wars. By mid-year, a host of new projects will be completed: in Tehachapi, Cannon's 14.5 MW windpower project comprised predominantly of Vestas' V39; in Palm Springs, New Wind's 8 MW plant and Kenetech's 39 MW repowering of the former Renewable Energy Ventures site. In Minnesota, Kenetech plans to complete a 25 MW project for Northern States Power, the largest windpower project in North America outside California. And in Alberta, Kenetech anticipates completing construction on another 9.9 MW to join the 9 MW installed late last year. Clearly, the company dominates developments in North America.

Tilting at windmills. Independent energy, v. 25, May-June 1995: 66-70.
In the spring of 1994 an angry mob confronted a group touring proposed sites for a new wind power plant near Mojave, Calif. The armed vigilantes were responding to rumors that the U.S. Bureau of Land Management was planning to build a wind farm near their remote homesteads. Though there was no truth to the rumors and the incident was settled peacefully, the event illustrates the sometimes highly charged atmosphere around proposals for new wind plants, or for power plants of any kind, in the United States. Analysis of surveys by the British Broadcasting Corp. (BBC) and the Department of Trade Industry in the United Kingdom; MRL Research Group in New Zealand; and the Center for Design Research in California gives potential developers and investors insights into public attitudes toward wind power. In general, the surveys on both sides of the Atlantic reveal that those who favor renewable energy are more likely to find wind's effect on the community acceptable, and those who are neutral will accept wind turbines in the landscape if they know they are beneficial.

Wind energy comes of age. New York, Wiley, 1995. 536 p. (Wiley series in sustainable design)

Griffin, Rodman D.
Tilting at windmills. CQ researcher, v. 2, July 10, 1992: 583(2).
Wind power has become a popular source of alternative energy in the US. It is considered the cleanest renewable power source and is relatively cheap considering that facilities are simple and capable of being mass produced. The author says that wind equipment is expected to satisfy around 10% of the US energy requirements in the 1990s. Within the second decade of the next century, wind energy may account for about 25% of the country's energy demands. While the US had a headstart in the field, Europe has been able to catch up with Germany, the Netherlands and Denmark being the world's major markets for the industry.

Harper, M.
UK development of wind energy. Energy world, v. 219, June 1994: 15-17.
A brief article outlines the history of wind energy development in the UK. Identified benefits include localised generation, reduction of dependence on non-renewable sources and commercial benefits. Despite these, there is considerable objection usually on amenity and noise grounds. A strategy for overcoming the public resistance is discussed.

Hermann, Eric.
The last days of the world's largest windmill. Mother Earth news, no. 156, June 1996: 54-58.
The world's largest windmill, raised in Wyoming for Medicine Bow Power, was destroyed in a January 1996 storm. The 257-foot windmill created enough energy for 1,600 homes.

Horrighs, W.
Wind power: breakthrough to global dimensions. Power technology international, fall 1996: 79-80, 82.
The beginning of the 1980s saw the start of wind-turbine manufacture. Soon it had become a booming industrial sector, thanks mainly to the spirit of some young entrepreneurs and political support in many countries. But the wind-power market has assumed global dimensions and major structural changes have to be faced.

Kahn, Edward.
The production tax credit for wind turbine powerplants is an ineffective incentive. Energy policy, v. 24, May 1996: 427-435.
The U.S. Energy Policy Act of 1992 created a production tax credit of 1.5 cents/kWH available for ten years to promote certain renewable energy technologies, including wind turbines. Kahn argues that the impact of the wind turbine production tax credit will be minimal. Kahn shows that tax credits can only be absorbed by equity investors if there is a large fraction of equity in the project capital structure.

Lindley, D.
The future for wind energy development in the U.K.; prospects and problems. Renewable energy, v. 5, Aug. 1994: 44-57.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.

Marshall, Jonathan.
Going with the wind. San Francisco chronicle, June 14, 1995, sec. B: 1
FloWind Corp., a small San Rafael CA wind energy firm, is featured, and its bid to join the big leagues of independent power companies is discussed.

Mays, I. D.
Wind energy prospects for the future. Renewable energy, v. 5, Aug. 1994: 718-729.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
The United Kingdom is well placed to utilize its natural wind resources to provide a diversity of electricity supply as well as reducing the emission of carbon dioxide and other pollutants. This article examines wind energy prospects for the future and estimates that ten per cent of the United Kingdom's electricity supply could come from wind power by early in the next century. The wind industry must work with communities to ensure that developments meet local needs and receive public support. Funding must continue through the Non Fossil Fuel Obligation mechanism.

McGowan, Jon G.
Tilting toward windmills. Technology review, v. 96, July 1993: 39-46.
"Recent progress is putting to rest lingering misconceptions of wind as an unreliable, expensive, and minor source of electricity. The European Community in particular has launched a major effort to build its wind-power industry. But the substantial assets of the United States--both in technology and in the size of its wind resource--could restore leadership to this side of the Atlantic."

Modelling of atmospheric flow fields. Singapore; River Edge, N.J., World Scientific, c1996. 753 p.

Myerson, Allen R.
Energy alternative blows in oil heartland of Texas. New York times, v. 143, Jan. 18, 1994: D4.

Nadis, Steve.
Highway winds: a surprising new alternative in the search for energy. Omni, v. 16, July 1994: 18(1).

Nadler, A.
Where the wind blows. Public power, v. 54, Mar.-Apr. 1996: 14-16.
This article is a review of the status of the wind power industry. Historical development is discussed, and several current projects are reviewed. Technical and financial details are provided in each case.

Reason, L. Coates, S.
Stimulating the market for wind energy. Renewable energy, v. 5, Aug. 1994: 661-667.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
Various mechanisms used to support the wind energy industry around the world are reviewed with an aim to determining their effectiveness. From these results, a number of policies are put forward which aim to provide the most effective form of support for wind energy in the future.

Rethinking development assistance for renewable electricity sources. Environment, v. 37, Nov. 1995: 6-15, 32-37.
"In assessing funding priorities for energy development, multilateral agencies need to take a new look at the vast potential of renewable energy technologies."

Righter, Robert W.
Wind energy in America: a history. Norman, Okla., University of Oklahoma Press, 1996. 361 p.

Ringer, Richard
Giving wind power a better image. New York times, v. 142, May 18, 1993: D2.

Riordan, Teresa.
Harnessing wind from moving cars. New York times, v. 143, Jan. 10, 1994: D2.
Thomas Alva Wither receives patent number 5,272,378 for generating electricity from wind generated from autos as they drive on freeways.

Saleh, L.
National programs for wind energy utilization in Egypt. Renewable energy, v. 5, Aug. 1994: 580-582.
Reading, World Renewable Energy Congress, Sept. 11-16, 1994.
This paper presents energy policy and describes the framework of energy utilization, in Egypt, with special emphasis on wind energy plans and programs. The paper also illustrates demonstration programs and projects performance results and experience gained through the last five years. The paper presents the national five year plan objectives that call for 70 MW wind farms in the area of the Red Sea, based on national investment together with private investment.

Salopek, Paul.
Energy dream is blowing in Midwest wind. Chicago tribune, Feb. 6, 1996, sec. 1: 1.
Wind power, an idea as old as the first windmills and sailing ships, is blowing into the Midwest, propelled by advances in technology that have made sleek, modern wind turbines nearly as cheap a source of electricity as coal or oil.

Schneider, Keith.
Utility customers put a premium on wind energy. New York times, July 13, 1996, sec. A: 6.
The region around Traverse City MI is developing a reputation as one of the most innovative areas in the Great Lakes basin for trying ideas that join environmental and economic goals. In one example, Traverse City Light and Power persuaded customers to pay 20% more for their electricity to gain a clean source of energy.

Sesto, E. Casale, C.
Wind power systems for power utility grid connection. Advances in solar energy, v. 9, 1994: 71-159.
This chapter presents a comprehensive overview of the state of the wind energy field. After an introduction of the history of wind exploitation, wind resource assessment and wind turbine operating principles are reviewed. The state-of-the-art as of 1994 of wind turbine generators is discussed, together with other aspects, such as technical, social, and environmental factors that influence the wind plant development; the various elements of energy costs; and the economic value of wind-generated electricity. The last part of the review provides data on presently installed wind plants and the wind turbine market worldwide. It then delineates various policies through

which governments can provide incentives to wind plant installation, and it forecasts the possible growth of the sector by considering the targets set by programs in a number of countries.

Smith, Peter.
Getting this farm going is no breeze. Boston globe, Nov. 17, 1996: sec. B, p. 8, col. 1.
Atop a remote unnamed mountain, across a valley from Mount Snow and other Green Mountain peaks near Searsburg VT, a row of new steel windmill stands against the sky. When they begin spinning in Dec. 1996, they will inaugurate the largest commercial-scale wind farm ever built in the eastern U.S.

Stone, Laurie. Matise, Linda.
Catching the wind. Mother Earth news, no. 146, Oct.-Nov. 1994: 70(7).
Wind-generated electrical power; includes related article on self-sufficiency. Catching the Wind, part 4.

Stover, Dawn.
The forecast for wind power. Popular science, v. 247, July 1995: 66-72, 85.
Notes that "the potential of wind power is enormous. Just one percent of Earth's winds could theoretically meet the entire world's energy needs. Within the United States, wind could generate all of the electricity used today, even when land restrictions are taken into account."

Street, Penny. Miles, Ian.
Transition to alternative energy supply technologies: the case of windpower. Energy policy, v. 24, May 1996: 413-425.
Street and Miles look at ways of bringing about a shift in technological regime away from hydrocarbon based energy technologies in order of contribute to a reduction in greenhouse gas emissions, with special reference to windpower.

Sullivan, Walter.
150 windmills to test elusive power source. New York times, v. 143, Nov. 18, 1993: B1.
Wind to produce electricity could supply 20% of energy supply according to Edward Demeo.

These farms may harvest wind - on the ocean. Business week, no. 3374, May 30, 1994: 129(1).
Electric generating windmills that float.

Walker, J. F. Wind energy. New York, John Wiley, 1997.
This item will be available later in 1997.

Wasserman, Harvey.
Inherit the wind: will clean energy pass us by? Nation, v. 264, June 16, 1997: 11(5)
Author believes that reluctance to invest in wind farms and air-turbine development may leave the U.S. out of a revolution in wind power, the world's fastest-growing energy source. Deregulated oil company and utility mega-mergers and subsidies for nuclear power will keep the U.S. committed to expensive, obsolete power.

Weisman, Jonathan.
An energy star flames out. Congressional Quarterly weekly report, v. 54, Oct. 12, 1996: 2916.
"It was an enticing dream that brought Kenetech Corp. to Northern California's Altamont Pass in 1981: wind power, a cheap natural energy source as clean and constant as the breezes rising from the Pacific Ocean. Fifteen years later, the San Francisco company's flagship wind division is bankrupt .... Uncertainty over Congress' intentions on deregulation is draining new investments from renewable energy resources. Energy experts say a legislative mistake by Congress--like omitting some sort of transitional protection for the fledgling industry--could kill renewables out-right."

Wind energy, 1994: presented at the Energy-Sources Technology Conference, New Orleans, Louisiana, January 23-26, 1994. Sponsored by the Solar Energy Division, ASME. Edited by Walter D. Musial, Susan M. Hock, and Dale E. Berg. New York, American Society of Mechanical Engineers, 1994. 279 p.

Wind energy bibliography. Golden, CO, National Renewable Energy Laboratory; Springfield, VA, National Technical Information Service, U.S. Dept. of Commerce [distributor], 1995. 41 p.

A Wind-powered energy charger: "breezy" can breathe new life into your dying radio and flashlight batteries. Mother Earth news, no. 138, June-July 1993: 62(6).

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Alternatives to Traditional Transportation Fuels, 1995. BOOK. 1996. Provides information on transportation fuels other than gasoline and diesel, and the vehicles that use these fuels. Includes historical and year-ahead estimates. 75 p.; ill.

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Annual Energy Review, 1996. BOOK. 1997. Presents the Energy Information Administration's historical energy statistics. For many series, statistics are given for every year from 1949 through 1996. Covers all major energy activities, including consumption, production, trade, stocks, and prices, for all major energy commodities, including fossil fuels, electricity, and renewable energy sources. 409 p.; ill.

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Compilation of Selected Energy-Related Legislation: Energy Conservation, Low-Income Assistance, and Related Matters, January 1997. BOOK. 1997. Includes: Energy Policy and Conservation Act; Energy Policy Act of 1992, Title 1, Energy Efficiency, Titles 3-6, Alternative Fuels and Electric Vehicles, and Title 12, Renewable Energy; Title 49, United States Code, Chapter 329, Automobile Fuel Economy; Emergency Energy Conservation Act of 1979; Energy Conservation and Production Act; National Energy Conservation Policy Act; and Low-Income Home Energy Assistance Act of 1981. 441 p. 0-16-054049-6
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Cooling Your Home Naturally. BOOK. 1994. Provides some common sense suggestions and low-cost retrofit options to help "Keep your cool" and save electricity in the home during hot sunny days. Includes a list of organizations which can assist in making wise energy related purchases. 8 p.; ill. 0-16-045716-5

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Energy-Efficient Lighting. BOOK. 1995. Introduces lighting technology. Discusses how to save energy while maintaining good light quality and quantity. Topics covered are: lighting principles and definitions; types of lighting and how each works; and energy-efficient lighting options, including daylighting, for new or retrofit applications. Includes a list of organizations which can supply more information on energy-efficient lighting. 8 p.; ill.
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Photovoltaics: Basic Design Principles and Components. BOOK. 1997. Provides information about generating electricity using a photovoltaic system, a way to generate electricity by using energy from the sun. 8 p.; ill.
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S/N 061-000-00891-8 **1.25**

Renewable Energy Annual, 1996. BOOK. 1997. Published by the Energy Information Administration (EIA) to provide current information on renewable energy worldwide. Documents and explains renewable energy information provided in EIA's Annual Energy Review, 1995. Covers the following energy sources: biomass, geothermal, wind, and solar. 200 p.; ill.

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Selecting a New Water Heater. BOOK. 1995. Describes various types of water heaters: storage; electric demand; heat pump; active, indirect; tankless coil; passive, direct solar; and active, indirect solar. Advises on how to rate efficiency and costs. Lists organizations and publications which provide more information on hot water energy efficiency. 6 p.; ill.

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Small Wind Energy Systems for the Homeowner. BOOK. 1997. Explains the benefits of domestic small energy wind systems. Helps the homeowner assess wind resources and possible sites. Discusses legal and environmental obstacles. Analyzes economic considerations such as pricing. 8 p.; ill.

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Solar Water Heating. BOOK. 1996. Provides basic information on the components and types of solar water heaters currently available and the economic and environmental benefits of owning a system. 8 p.; ill.

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Sunspace Basics. BOOK. 1994. Addresses basic elements of sunspace design; design considerations for supplemental space heating, growing plants, and use as a living space; design guidelines including siting, heat distribution, and glazing angles; and major sunspace components including: glazing options, thermal mass, insulation, and climate controls. Provides a list of sources for more information. 6 p. 0-16-045796-3

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