DOE/CS/30098-01
Volume 4 (of 4 Volumes)

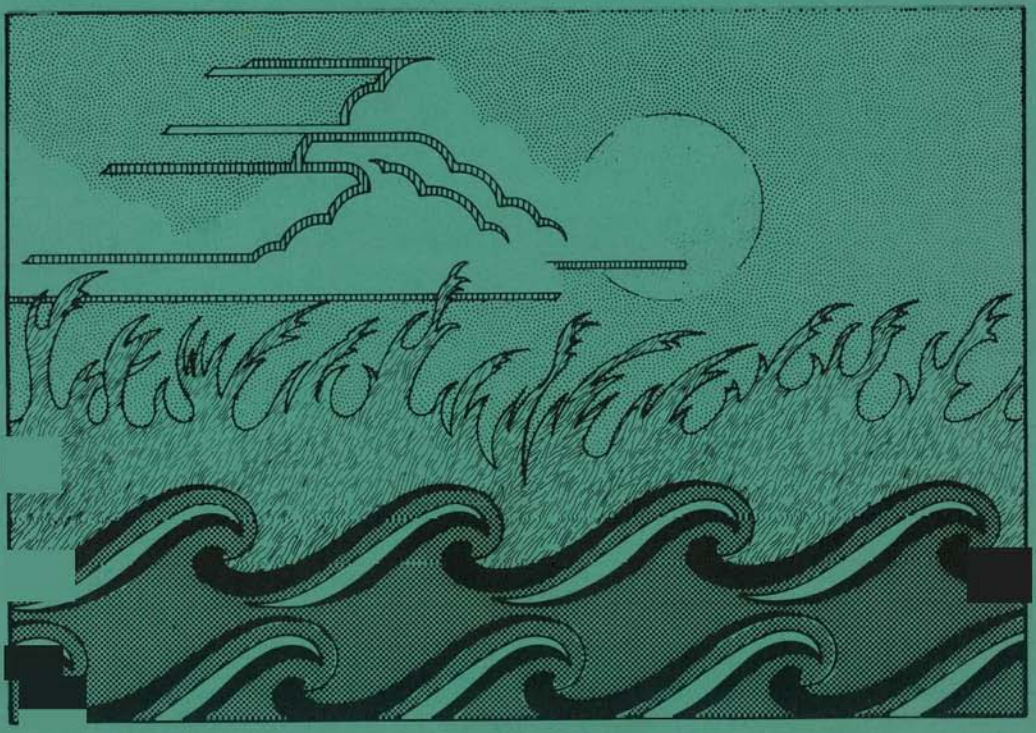
U.S. Department of Energy

July 1980

Assistant Secretary for Conservation & Solar Energy
Office for Solar Applications for Buildings
Under Contract No. FG01-79CS30098

Renewable Resources: A National Catalog of Model Projects

Volume 4: Western Solar Utilization Network Region



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Assistant Secretary for Conservation & Solar Energy
Office for Solar Applications for Buildings
Washington, D.C. 20585

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Volume 4 (of 4 Volumes)
Dist. Category UC 95A

Renewable Resources: A National Catalog of Model Projects

Volume 4: Western Solar Utilization Network Region

Prepared by:
Center for Renewable Resources
Washington, D.C. 20036
Under Contract No. FG01-79CS30098

July 1980

INTRODUCTION

This compilation of diverse conservation and renewable energy projects across the United States was prepared through the enthusiastic participation of solar and alternate energy groups from every state and region. Compiled and edited by the Center for Renewable Resources, these projects reflect many levels of innovation and technical expertise. In sum, they typify the drive and dedication that is being invested by small and large organizations and by people of all persuasions in finding alternatives to costly traditional energy paths.

In many cases, a critique analysis is presented of how projects performed and of the institutional conditions associated with their success or failure. The views expressed in the analyses are those of the local groups preparing the particular sections. As such, they provide the advantage of first-hand experience.

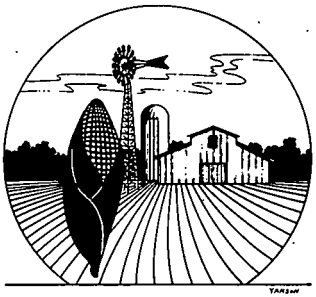
Some 2000 projects are included in this compilation; most have worked, some have not. Information about all is presented to aid learning from these experiences.

The four volumes in this set are arranged in state sections by geographic region, coinciding with the four Regional Solar Energy Centers. The table of contents is organized by project category so that maximum cross-referencing may be obtained.

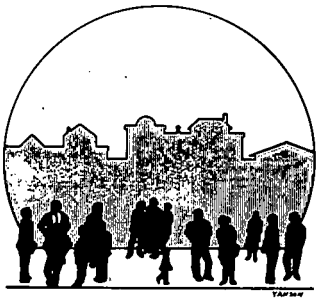
The Department of Energy is grateful to the hundreds who participated in gathering the descriptions presented here. These projects represent the creativity and determination of millions of Americans to take the energy challenge in hand and to produce results.

LEGEND

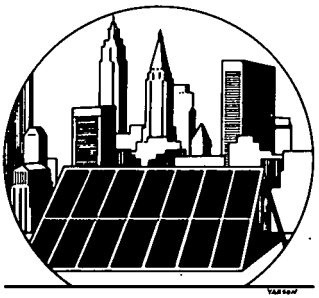
The following symbols are used throughout the catalog to represent the categories into which the projects fall.



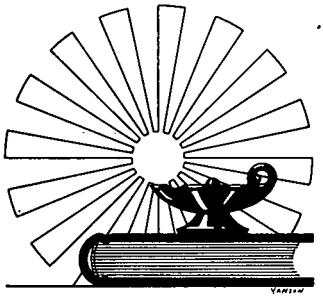
Agricultural



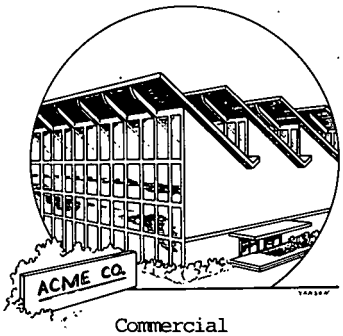
Community



Cities

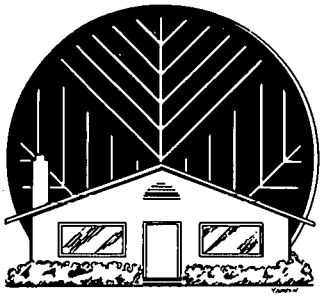


Education



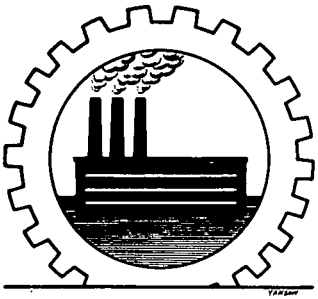
Commercial

Financing



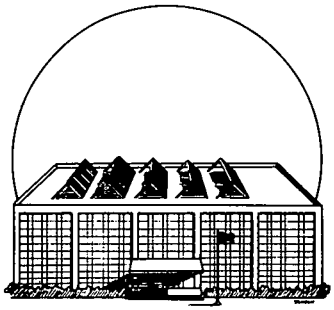
Housing

Legislation

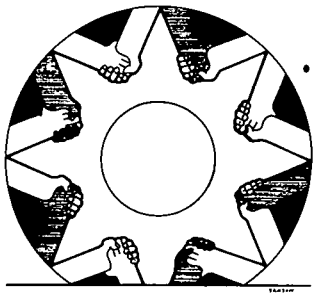


Industrial

Low Income

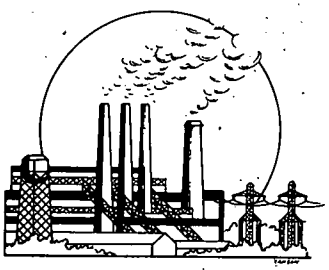


Institutional



Outreach

State



Utility

RENEWABLE RESOURCES

A NATIONAL CATALOG OF MODEL PROJECTS

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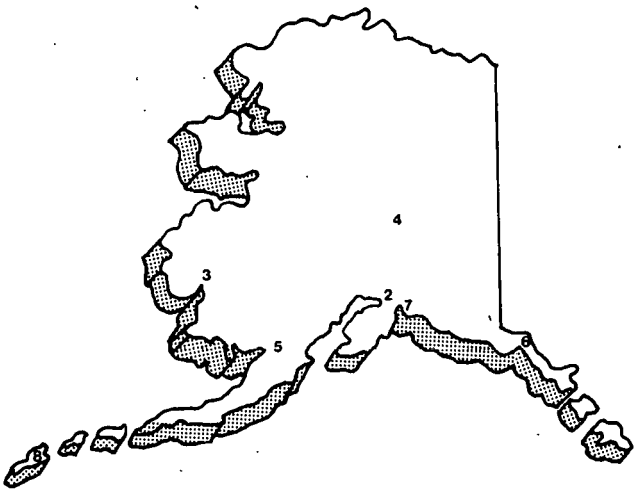

ALASKA

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Renewable Resources—A National Catalog of Model Projects

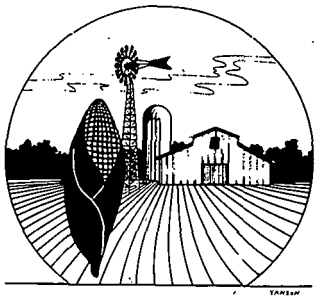
Category	Agricultural
State	AK
Project Name	Climb-in Freezer

Dan Denslow has designed and is now building a small "climb-in" freezer that is large enough for 3 to 6 families (about 210 ft of usable storage space). It will also be efficient enough to be powered primarily by an existing 2.8 KW wind generator in a marginal wind area; and built using relatively easy-to-find materials, and simple techniques.

One main feature of the design is the separation of the cabinet and condensing unit. The former is in a shady, colder-than average environment. The latter sits in a cool place that rarely gets below freezing. The 6.5'x 7' cabinet will have an R-value of 50. The evaporator, condensing unit and accessories will be selected to give maximum energy efficiency, reliability and serviceability.

Critique/analysis: Calculations indicate that this freezer (with 10 to 15 times the storage volume of a typical home freezer), if used in a sub-arctic temperature environment for cooling, freezing, and storing 6,000 lbs of food per year, will use less than 500 KWH electricity per year. This is less than half the energy typically used to operate a chest-type 15 ft. domestic freezer.

Organization	Dan Denslow
Address	Ambler, AK 99786
Contact	Dan Denslow
Telephone	n/a
Funded By	DOE - AT Small Grant
Cost	$2,950
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Agricultural
State	AK
Project Name	Delta Barley Project

An integrated alternative energy system consisting of solar thermal collectors and wind generators is being built on the newly opened Delta Barley Project land near Delta, Alaska.

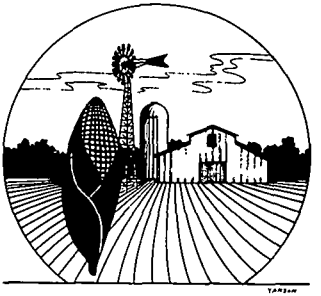
Two Jacobs wind generators rated at 8K each will be used to provide the energy needed to run a grain-cleaning operation and to meet other micsellaneous electrical needs of the farm. Excess electricity will be used to run the resistance heating coils in the storage tank.

Two rows of 34' x 76' solar collectors and a 25,000-gallon storage tank will be used to provide space heating in the home and farm buildings, heating four acres of soil, and distilling alcohol. The system is designed to function for up to six days without sun. However, supplemental use of a coal-fired hot water system is expected to be used from November 15 to January 15.

The back-up systems are integrated into the heat-storage system. Space heating is accomplished by piping hot water from the storage tank through radiators. Grains will be dried by forced hot air. Four acres of soil will be heated by running pipe underneath the topsoil and circulating warm water through the system. From May through August, freon from 600 sq. ft. of collector will be fed through a heat exchanger coil contained in the mash, to heat it to distillation temperatures.

Organization	Delta Barley Project
Address	S.R. Box 7634 Palmer, AK 99645
Contact	Byron Hollembaek
Telephone	(907) 745-3844

Funded By	Private
Cost	$150,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category Agricultural

State AK

Project Name Greenhouse

John Collette of Fairbanks, Alaska has overcome the drawbacks of a short growing season, cold air temperatures, and insufficient ground temperatures for growing food. He designed a green house adaptable to Alaska's severe climate.

The 22' x 48' greenhouse collects heat that is not vented outside, but is instead transferred to water through a heat exchanger. Large radiators near the hotter apex of the structure warm circulating fluid, which is coursed through 2,000 feet of plastic pipe in the soil. The ground is kept wet by drip irrigation.

The water content of the soil allows heat to be transferred from the buried pipe and stored for night and late-season use. The ground storage of heat raises the ground temperatures at the roots of the plant--an important effect since warmed ground produces healthier plants with greater yields.

Future design improvements include the temporary use of fixed insulation and reflectors.

Organization John Collette

Address S R 20087
Fairbanks, AK 99701

Contact John Collette

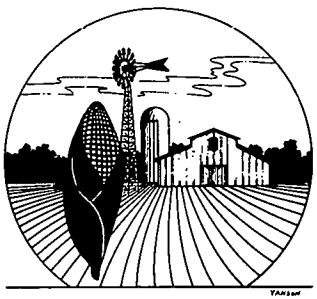
Telephone (907) 479-5153

Funded By DOE - AT Small Gr.

Cost $9,500

Congressional District I

Compilation Date February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	AK
Project Name	Tanana Chiefs Agriculture Program

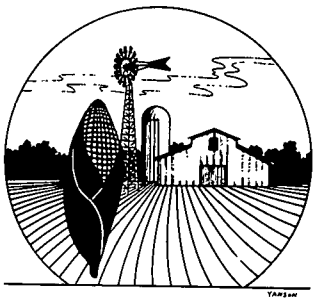
Tanana Chiefs Conference is planning to construct a solar heated food-production and food-preservation center utilizing a solar greenhouse with ground-heat storage. Also planned is the development of a Yukon River powered waterwheel to pump irrigation water.

Tanana Chiefs Agriculture Program is aimed at meeting the local needs of native villages for food-production, food-preservation, and preparation. It is primarily responding to the requests of the 40 villages in the 265,000 square mile Doyon region for basic gardening supplies and technical assistance. The goal of the program is to increase local self-sufficiency by increasing food-production and reducing energy costs.

Critique/analysis: A 50 percent increase in the number of gardens planted (more than 1,000 gardens) occurred in 1979, and TCC believes that a continued interest in small-scale agriculture and renewable energy applications will help alleviate some of the villagers' basic problems.

Organization	Tanana Chiefs Conference, Inc.
Address	First and Hall St. Doyon Building Fairbanks, AK 99701
Contact	Morris Morgan or Sam Skaggs
Telephone	(907) 452-8251

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

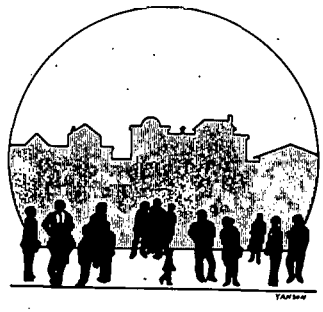
Category	Community
State	AK
Project Name	Pilot Wind Generator

In Gambell, Alaska, the Alaska Area Native Health Service's Environmental Health Branch is now constructing a pilot project in the wind generation of electricity.

The system will consist of four upwind 4KW wind generators on 40 ft. towers. Electricity (AC) will be produced by shunting the power through four synchronous inverters. The primary goal is to power electric lights and motors needed to operate a laundromat and pump-house for the village of Gambell.

The Alaska Village Electric Co-op currently requires that excess electricity not be fed into their power grid. The Gambell project thus represents a compromise: excess power will be used in resistance coils to heat water for the laundromat instead, to cut heating oil requirements.

Organization	AK Area Native Health, Service, Environmental Health Branch
Address	Box 7-741 Anchorage, AK 99510
Contact	Mark A. Newell, Design Engineer
Telephone	(907) 279-9628
Funded By	Public Health Service, Sanitation Facilities Construction Program
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	AK
Project Name	RurAL CAP

Since 1975, the Rural Alaska Community Action Program (RurAL CAP), a non-profit corporation, has been conducting energy-conservation workshops, covering procedures and techniques for installation of energy-conserving materials, and performing energy audits in the homes of low-income rural Alaskans. Instruction booklets and videotapes are presented, along with "hands on," how-to-do-it demonstrations.

Arctic conditions in much of rural Alaska require builders and weatherizers to use special techniques, making the instruction of homeowners in the use of special devices vitally important.

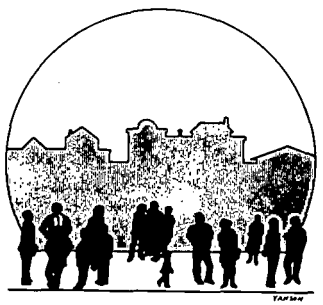
The weatherization program has already decreased rural fuel consumption by an estimated 30 to 60 percent in five years.

RurAL CAP, which receives funds for weatherization from the Community Services Administration, works with regional non-profit associations. RurAL CAP is also funded by CSA to act as an energy advocate. Because transportation is limited and winters severe, energy in rural Alaska is both scarce and vital for existence. In an attempt to pinpoint and stave off problems, RurAL CAP has sponsored a workshop at which rural participants can express local concerns.

RurAL CAP is now looking for ways to engender self-help to overcome rural energy problems. These include workshops, advocacy of alternative technology and conservation, and literature dissemination.

Organization	Rural Alaska Community Action Program, Inc.
Address	P.O. Box 3-3908 Anchorage, AK 99501
Contact	Denny Dennison
Telephone	(907) 279-2511

Funded By	Community Services Administration
Cost	n/a
Congressional District	I
Compilation Date	February 1980



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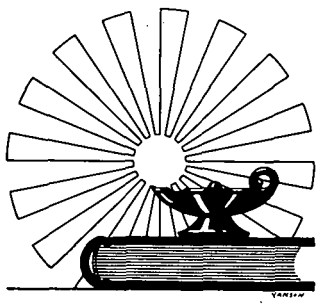
Category	Education
State	AK
Project Name	American Institute of Architects
Organization	American Institute of Architects
Address	c/o Robert Balivet,AIA Energy Comm. Chmn., 1326 Bennington Anchorage, AK 99504
Contact	Robert F. Balivet
Telephone	(907) 272-5435
Funded By	American Institute of Architects
Cost	n/a
Congressional District	I
Compilation Date	February 1980

The Alaskan Chapter of the AIA sponsors Energy Design Clinics at which architects and building designers share technical knowledge with the general public. Using large graphic displays, a limited bibliography, and sketching materials, volunteer professionals discuss energy concepts and design problems on a one-to-one basis with the public at energy fairs. The objective is to bring concepts understood and used primarily by professionals within easy reach of lay people.

The first Design Clinic, held at the two-day Sun Day Celebration, in the Spring of 1978, included a solar heated tent structure. Other clinics have been conducted and more are planned.

Costs, mainly those for graphic materials, are minimal. Most are met by the Alaska Chapter AIA, individual volunteers, and entry fees.

Critique/analysis: Because Alaska has many micro-climates, from arctic to rain forest, the need for information on architecture appropriate to the different areas and the transfer of that knowledge are critical. These workshops facilitate that necessary interaction.



Renewable Resources—A National Catalog of Model Projects

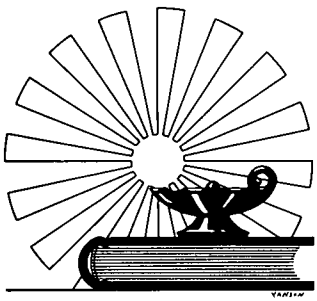
Category	Education
State	AK
Project Name	"Bethel House"

In the town of Bethel, the Department of Maintenance and Technology of Kuskokwim Community College has constructed an energy-efficient home. This project was designed to serve as a vehicle for training local people in construction skills, with an emphasis on energy efficiency. The house uses passive solar techniques (such as large south-facing windows, triple glazing, heavy insulation, etc.) and has electric resistance heat providing supplemental heating needs. However, this home uses approximately half as much energy as other homes in this part of the country, resulting in substantial fuel savings.

Critique/analysis: Bethel's needs and problems are representative of some of the realities all Alaskans have to face: high fuel and material costs, severe weather, permafrost instability, and lack of skilled labor. Fuel oil for the Bethel area is shipped by barge from Seattle. The Kuskokwin River is free of ice for a period of 4.5 months each summer, during which time all supplies must be shipped to this area. The cost of shipping these essential goods over such a distance is high, as is the area cost of living. The winters in Bethel are long and severe. Wind chill factors exceed -50°F for days on end, so heating costs are tremendous and fuel waste unconscionable.

Organization	Tanana Community College
Address	P.O. Box 368 Bethel, AK 99559
Contact	Robert Gibson
Telephone	(907) 543-2621

Funded By	Kuskokwin Community Collge
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

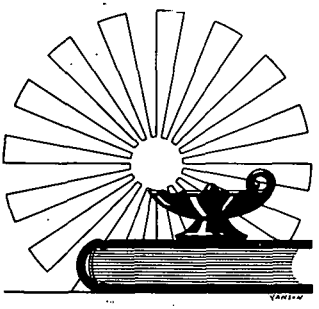
Category	Education
State	AK
Project Name	School Greenhouse

John Cunningham's science class received a grant from the Department of Energy's Appropriate Technology Small Grants program to insulate and double-glaze the panes of a greenhouse. The students, all of whom are high school dropouts, attend school for part of each day and work the rest. They are taught science according to their abilities and interests. The emphasis was on practical applications, and the students themselves prepared the proposal that DOE funded.

The greenhouse resembles a garage with a pitched roof. Students will close off the north wall with outdoor plywood, insulate it, and paint the inside wall white to reflect heat back into the space. The existing corrugated fiberglass walls will be doubled-paned with either plastic or rolled fiberglass, depending upon the class preference. After conducting experiments with different kinds of insulation, the class will look at cost factors and choose the best insulation for their greenhouse.

Students are now designing, and will soon build, solar collectors for heating the greenhouse. They plan to install rock storage, but for now, heat will be retained in water-filled barrels. They also plan to install a solar hot water collector for heating the grow beds.

Organization	SAVE 1 High School
Address	5300 A Street Anchorage, AK 99503
Contact	James Cunningham
Telephone	(907) 272-1474
Funded By	DOE
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Financing
State	AK
Project Name	Loan Fund

In 1978, the Alaska State Legislature created an Alternative Power Resource Revolving Loan Fund. This fund, which is taken from the State General Fund surplus, is administered by the Alaska Department of Commerce and Economic Development for the development of energy sources other than fossil or nuclear fuels.

Through this revolving fund, loans are made to Alaskan residents for the purchase, construction, and installation of alternative power resources. The loans may not exceed $10,000, and the maximum repayment time is twenty years. No more than 80 percent of any project may be funded through the fund. Interest may not exceed 8 percent per year of the unpaid balance, and interest and principal are returned to the revolving loan fund.

So far, few applications have come in for these loans. A delay in funding and a lack of advertising are most likely at cause.

Organization	AK Dept. of Commerc Eco. Dev., Div. of Business Loans
Address	Pouch D Juneau, AK 99811
Contact	Sharon Traylon
Telephone	(907) 465-2510
Funded By	State of Alaska
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	AK
Project Name	Farm

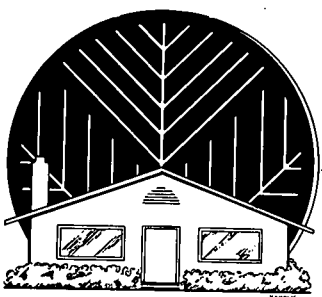
Charles and Sara Hornberger own a homestead in south-central Alaska on Lake Clark. Striving towards food and energy self-sufficiency, they have built a well-insulated home, have utilized wood heat, have increased their garden size and growing season, and have installed a wind generator.

In 1979, they were able to lengthen the growing season by removing the topsoil from a garden bed, laying a grid of plastic pipe in the hole, and replacing the topsoil. A solar collector on the roof of the house heats water, which is then pumped through the buried pipes to warm the soil. A small gasoline pump is used for water circulation.

On January 9, 1979, a Jacobs 110-volt wind generator began producing electricity. When the wind is blowing, the Hornbergers use the electricity directly from the generator and electricity goes into nine large batteries.

The Hornbergers live in an area that is not very windy, but they have never run out of electricity. During the first winter, they went a full month without wind and without curtailing their power usage.

Organization	Charles & Sara Hornberger
Address	P.O. Box 69 Iliaman, AK 99606
Contact	Charles & Sara Hornberger
Telephone	Phone-radio patch- TRIDENT-334-7361 or "WJH-67-Chulita"
Funded By	Private
Cost	$9,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Housing
State	AK
Project Name	Roggasch Residence

Bob Roggasch has built a 90 percent passive solar house. Located on a wooded lot outside Fairbanks, it won an award at the Tanana Valley Fair for being the most energy-efficient home in interior Alaska. The entire house is currently heated by a 10-inch electric space heater in the living room. One-third of the home's heat is provided by "living heat," such as people's breathing, moving, and cooking.

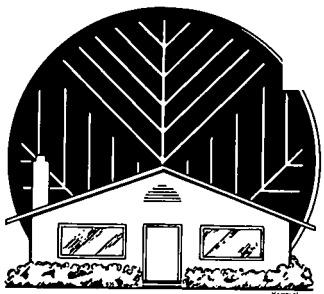
Air infiltration in the home has been reduced so much that the house's temperature variance is only 5 degrees. Bob's heating costs for 1978 were $175, at 12¢ per KWH. The house is half-underground, with a double wall consisting of concrete block on the outside and 9.5" thick foam insulation on the inside. The floor has 3.5" of insulation, as opposed to the usual 2". Aluminum foil was used to form a vapor barrier and reflect heat. Windows have tight-fitting insulated shutters, and the largest windows face south.

Mr. Roggasch maintains that his super-insulated house costs approximately as much as a conventional home. The money that he put into insulating walls would have been used to purchase a furnace or other heating system. If a heating system is required, the cost will run 10 percent over the normal cost of a house.

Currently, Bob is teaching classes in insulation technology at the local community college. He is also working as an independent contractor, building energy-efficient houses.

Organization	Robert Roggasch
Address	S.R. Box 10464 Fairbanks, AK 99701
Contact	Bob Roggasch
Telephone	(907) 479-6470

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

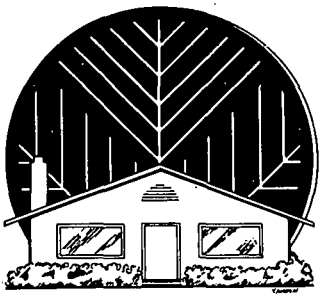
Category	Housing
State	AK
Project Name	Self-Sufficient Homestead

The Denslows have a homestead in interior Alaska, 40 miles north of the Arctic Circle. They utilize a Jacobs 2,800-watt, 110-volt DC wind generator to power their household and shop appliances, which include washing and sewing machines, incandescant and flourescent lights, a blender, a flour grinder, a toaster, hand and stationary power tools, and electronic devices such as TV, CB radio, and cassette player.

The Denslows also have a small greenhouse with drums of water that stabilize the interior temperature. It is used for starting plants while temperatures are still too low to plant outdoors and to grow plants such as tomatoes, cucumber and peppers that require longer growing seasons.

The Denslows are experimenting with crop varieties and gardening methods that give good yields in the arctic environment. They are interested in trying to grow fruit trees, grains, and crops and in exploring techniques for producing fuel-grade alcohol. Their farm consists of energy-efficient woodheated buildings. The home, which is partially solar, and the shop are well-insulated and feature triple-glazed windows.

Organization	Dan Denslow
Address	Ambler, AK 99786
Contact	Dan & Joyce Denslow
Telephone	n/a
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	AK
Project Name	Crab Gurry Digestor

Charles Vowell is building a methane generator in Unalaska, Alaska, a town on Unalaska near the end of the Aleutian Chain.

Unalaska's principal industry is crab fishing and processing. Crab gurry, or offal (a mixture of shell, intestines, and other parts), is a by-product of processing crab meat. The gurry has in the past been dumped back into the sea, causing a health problem. Vowell plans to utilize the crab gurry as the main material in his methane digestor.

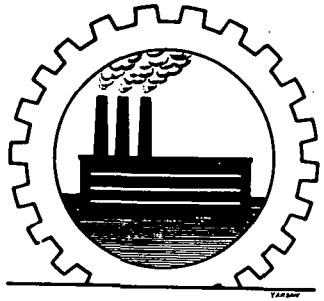
A 10,000-gallon oil tank, approximately 8 ft. in diameter by 28 ft. high, is being used as the digestion tank. The tank which, is mounted on creosote pilings, has heating coils in the bottom, manholes and input-out put pipes, and 3" of urethane foam sprayed on for insulation. Heat for initial warm-up will be provided by an oil-fired hot water heater, then will be changed to a methane hot water heater after methane production begins. The digestor will be maintained at 95°F by a thermostatically controlled pump that will circulate hot water through pipes to heat the methane producing slurry.

The digestor is a continuous feed design, with 250 gallons to be added daily on a 40-day cycle. The methane will be "scrubbed" by iron filings to remove hydrogen sulfide and by lime water to remove carbon dioxide. The gas produced will be metered by a standard natural gas meter. Optimum output will be about 1,500 cubic feet per day, enough to provide cooking and clothes drying for about twenty homes. Storage of the methane will be limited to about six hours, so the gas will have to be consumed at approximately the same rate as it is produced.

The purposes of this project are to generate a combustible gas for cooking, clothes drying, and hot water heating, and to transform gurry from a serious disposal problem to a resource.

Organization	Charles Vowell
Address	R. Charles Vowell Box 154 Unalaska, AK 99685
Contact	R. Charles Vowell
Telephone	(907) 581-1204

Funded By	Private, DOE At Small Grants Program
Cost	$25,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	AK
Project Name	DOT & PF Projects

The Department of Transportation and Public Facilities (DOT & PF) has an active program in energy and building research. The objective of the program is to research and develop techniques that serve four goals: improving the efficiency of new and existing public facilities; providing viable alternatives to sources of energy public facilities now rely on; reducing the cost of constructing, operating and maintaining public facilities; improving the quality and duribility of public facilities while making the built environment and more compatible.

Five programs and products are being sponsored by the DOT & PF. First is the Alaskan Wind Power User's Mannual. The publication will be easy to comprehend and suitable for use by the designer and user of a wind facility. It will include information on everything known about wind energy in Alaska, it potential, its limitations, and its problems.

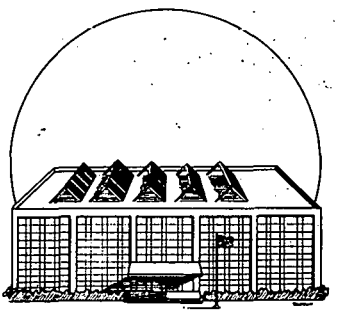
The Rural Airport Lighting Project is testing the usefulness of a low-cost, low-power strobe-lighting system being installed at St. Michael Airport to test feasibility.

The Alternative Power Supply for Rural Airport is aimed at developing the design criteria for useful passive solar applications in the Alaskan climate. It will also identify those parts of the state that could benefit most from solar energy.

The Solar Heated Fire Station Demonstra-
ı Project of the Chena Goldstream Volunteer
ɜ Department has received a construction grant from the state to build two solar-heated garages to house fire-fighting equipment.

Organization	Alaskan DOT & Pub. Division of Research and Development
Address	P.O. Box F Fairbanks, AK 99708
Contact	Lee E. Leonard
Telephone	(907) 499-2241

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Legislation
State	AK
Project Name	Residential Conservation Tax Credit

During the 1977 legislative session, the Alaskan State Legislature exacted a law allowing tax credits for residential use of fuels and for conservation measures.

A tax credit of 5 percent, or a minimum of $10.00, has been created. It applies to alternative fuels as well as fossil fuels. To the extent that the tax credit on fossil fuels seems anti-conservationist, it is a form of tax relief for the citizens under the burden of rising fuel costs.

The major move in this bill provides for a 10 percent (or $200) maximum tax credit for capital improvements related to fuel conservation made during the past year on a personal residence. The credit applies to costs (including labor) incurred in retrofitting insulation, insulating windows, and installing of alternative sources of power generation not dependent on fossil fuels.

Organization	Rules Committee: State of Alaska
Address	Pouch AD Juneau, AK 99811
Contact	Bill Luria
Telephone	(907) 465-3573

Funded By	State of Alaska
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	AK
Project Name	Alaskan Federation for Community Self-Reliance

The Alaska Federation for Community Self-Reliance (AFCSR) is a clearinghouse for information on energy-conservation, solar heating and cooling, energy matters, and small-scale agriculture projects for northern applications.

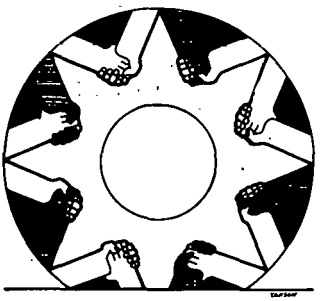
In addition to providing literature on these and other subjects, AFCSR offers various services to the community. For instance the AFCSR is co-sponsoring a class, Energy-conscious Home Designs, with the Cooperative Extensive Service based at the University of Alaska. The course consists of a design clinic and a lecture series on energy-efficient homes.

The clinic provides a chance for students to design their own energy-efficient building using concepts introduced during the lecture and in discussions. Each lecture is presented by a local builder, designer, or contractor familiar with energy-efficient buildings. Projects are reviewed every three to four weeks.

AFCSR also offers a Home Energy Economy Service, in which energy-audit teams analyze homes to identify sources of heat loss and suggest home improvements that will cut heating costs. The audit includes a cost estimate of the proposed improvements and of the time needed to realize a return on the investment through fuel savings.

Organization	The Alaska Federation for Community Self-Reliance
Address	946 Cowles Street P.O. Box 73488 Fairbanks, AK 99707
Contact	Jim Olney
Telephone	(907) 456-7646

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	State
State	AK
Project Name	Alaska Council on Science & Technology Grants Program

The Alaska Council on Science and Technology offers grants from the State of Alaska General Fund Surplus for developing "northern technology" in Alaska. Grants for up to $5,000 are awarded for the purchase of equipment, materials, or services related to energy generation, waste disposal, recycling, food production, transportation, and building design. Awards are also given for residential or industrial devices, designs or techniques that are more efficient, less costly, or less energy-intensive than methods now in use. Stress is placed upon the appropriateness of projects to Alaska.

In an effort to simplify the application process and extend opportunities, ACST accepts proposals in writing or on a ten-minute cassette tape.

Organization	Alaska Council on Science & Technolo—
Address	Pouch AV, Juneau, AK 99803
Contact	Christopher Noah
Telephone	(907) 465-3510

Funded By	State of Alaska
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	AK
Project Name	Alaska Renewable Resources Corporation

The Alaska Renewable Resources Corporation represents one of the most ambitious and significant efforts by any state for the general development of a renewable resource economy. Through the development of this corporation, the state in effect has sought to trade a portion of the state's fixed and depletable assets, such as land and minerals, for renewable resource development that will provide the basis for a diverse, self-sustaining economy. Funding for the corporation is provided by an appropriation equal to 2.5 percent of certain royalties and other nonrenewable energy receipts. FY 81 projections are for an entitlement of about 24 million dollars.

The corporation seeks to foster the development of renewable resources in Alaska through investment in Alaskan-owned businesses and industries. The Corporation seeks able entrepreneurs who will be able to effectively use operating capitol provided by the Corporation. In many instances, the corporation will be a partner with such entities; but, it will never own more than 49 percent of a business nor take over its management.

Alaska has not had a tradition of entrepreneurship. The ARRC "ethic" is that it hopes to achieve a self-sustaining, diverse, appropriate and self-sufficient economy based on renewable resources.

Organization	Alaska Renewable Resources Corp.
Address	P.O. Box 1047 Juneau, AK 99801
Contact	William Spear
Telephone	(907) 272-2500

Funded By	State of Alaska
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	AK
Project Name	Energy Conservation and Waste Heat Utilization
Organization	Alaska Division of Energy and Power Development
Address	McKay Building 7th Fllor, 338 Denali St. Anchorage, AK 99501
Contact	n/a
Telephone	(907) 276-0508
Funded By	State/ACTION
Cost	n/a
Congressional District	I
Compilation Date	February 1980

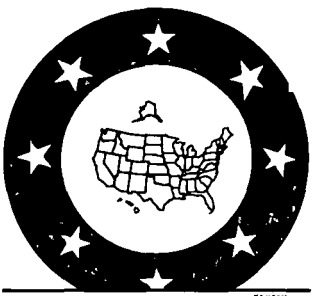
Through the Alaska Division of Energy and Power Development (DEPD), the Alaskan state government has actively promoted renewable resources and energy conservation.

Representatives of the Department's activities are four projects. The Energy Conservation Advocates Project is a volunteer-oriented grant program funded by ACTION to "develop workable volunteer-oriented energy conservation programs in Alaskan communities which will educate, assist and motivate Alaskans in meeting the on-going demands of the energy crisis". This program has featured energy-conservation workshops, provided public information and education programs on energy conservation and alternative energy and has organized community energy conservation projects for Alaskan youth.

The Rural Energy Conservation Program is part of the Operation Outreach Program. The DEPD is implementing its energy-conservation campaign in rural Alaska. The program offers workshops and training in energy handling, and energy-conservation techniques.

The Waste Heat Utilization Program reflects DEPD's recognition of the importance of waste heat utilization to conservation efforts. The DEPD is working in this program with Anchorage Municipal Light and Power, Bethel Utilities, and utilize waste heat. In 1978, DEPD conducted a study of waste heat and made the information available to utility managers as a publication. In general, communication between DEPD and local utilities and the exchange of technical information on waste heat uses is thorugh.

The Community Energy Inventory Project staff has compiled a series of files on energy supply, demand, and cost in all Alaskan communities. It has also assessed the possible local alternative energy sources available to each community and identified data deficiences and future information needs.



Renewable Resources—A National Catalog of Model Projects

Category	State
State	AK
Project Name	Office of Northern Technology

The Office of Northern Technology was created by executive order by Governor Jay Hammond to act as statewide information broker on alternative energy. It also promotes the state's public policy of developing and applying small-scale, locally-oriented technologies within Alaska.

Present activities center around advocacy for alternative technology within the state bureaucracy. Previous projects include "A House for Bethels'" half-an hour audio-visual presentation on a locally designed and constructed energy-efficient home, and the report "A Design for Agriculture in the Tanana Loop: Appropriate Technology and Small-scale Farming."

Organization	Office of the Governor
Address	Pouch AD Juneau, AK 99811
Contact	Bill Luria
Telephone	(907) 456-3573
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	AK
Project Name	Waste Heat Plant

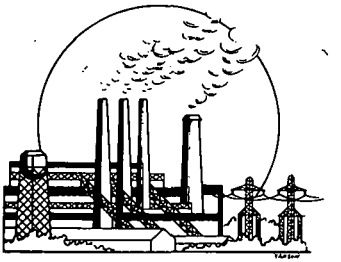
The Anchorage Municipal Light and Power Department has constructed a waste heat plant. Two gas turbines combine their exhaust gases, which fire waste heat boilers and provide steam to run the turbine. Heat from the cooling water system will be recovered through a heat exchanger and used to raise the Municipality's water-supply temperature. The temperature increase will keep the water mains from freezing during the winter months.

Projected fuel savings of approximately 1,990,000 MCF, or 2 trillion, of natural gas per year are expected. At the present contracted gas price, that is a savings of $1 million.

Critique/analysis: The construction of this plant has created reserve capacity when the machines are placed into daily peaking service. Equipment may now be safely removed from service for maintenance on a scheduled basis without endangering Municipal Light and Power's capability to provide essentail service.

Organization	Anchorage Municipal Light and Power Dept.
Address	1200 West 6th Ave. Anchorage, AK 99501
Contact	Thomas R. Stahr
Telephone	(907) 279-7671

Funded By	Tax-exempt revenue Bonds
Cost	$33,639,900
Congressional District	I
Compilation Date	February 1980



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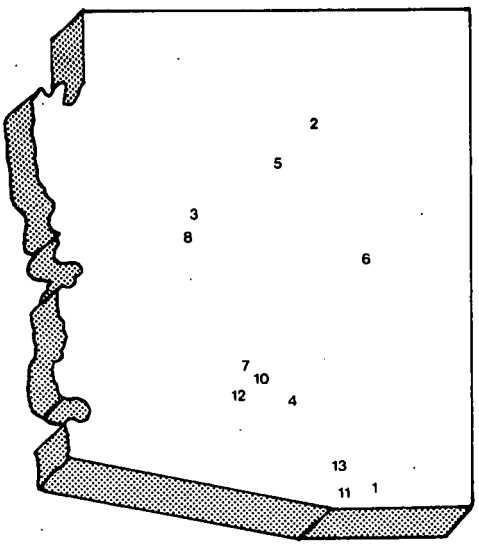
1. Bisbee
2. Cameron
3. Chino Valley
4. Coolidge
5. Flagstaff
6. Lakeside
7. Phoenix
8. Prescott
9. Schuchuli
10. Scottsdale
11. Sierra Vista
12. Tempe
13. Tucson



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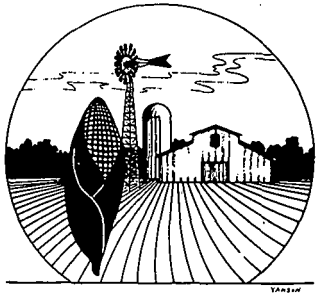
Category	Agricultural
State	AZ
Project Name	Crop Residue Gasifier

The University of Arizona constructed a 'producer gasifier' to produce low BTU gas from dry crop residue materials. The gasifier consists of a vertical metal cylinder with a special air nozzle and grate arrangement at the bottom. When crop residues, such as barley straw cubes, are ignited and partially combusted in the system, the result is a mixture of carbon monoxide and dioxide, hydrogen, methane and nitrogen.

The gas produced has an energy value of approximately 100 BTUs per ft^3, and combusts well when placed in a burner. Straw cubes and charcoal are particularly suitable fuels. The average system output is 100,000 BTUs hourly.

Critique/analysis: Tests are under way this fall to use the gas as a fuel for a modified spark-ignition engine powering an irrigation pump.

Organization	University of Arizona
Address	University of Arizona Tucson, AZ 85721
Contact	Douglas W. Williams
Telephone	(602) 262-1873
Funded By	Office of Research Univ. of Arizona
Cost	$4,250
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	AZ
Project Name	Russian Thistle Biomass

The Office of Arid Land Studies is currently examining Russian Thistle (or tumbleweed) as a potential source of burnable biomass.

The thistle (Salsola kali L.) has a number of beneficial characteristics. It can be effectively cultivated on retired agricultural lands. It is free of carcinogenic hydrocarbons and sulfur (although somewhat higher in carbon monoxide and carbon dioxide). Finally, the fuel is especially adaptable to arid areas that have suffered revenue losses due to water shortage.

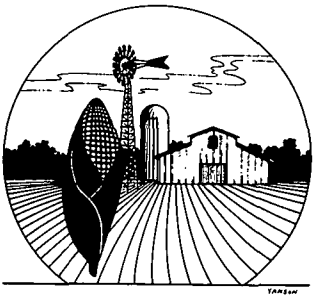
As an additional study, the University plans to research the feasibility of biomass conversion to liquid fuels. In liquid state, the fuel would be lead- and sulfur-free.

There are two phases to the program, the first being a study of harvesting, compaction and handling of plant matter from natural stands. Potential biomass yields of natural harvests will be determined, and harvested materials will be used to determine possible methods of drying, compacting and burning the thistle.

Fertilizer, tillage and irrigation techniques will be tested on seeded plots during the project's second phase.

Organization	Office of Arid Land Studies
Address	845 North Park Ave. Tucson, AZ 85719
Contact	n/a
Telephone	(602) 262-1955

Funded By	DOE; Arizona Solar Energy Commission
Cost	$58,407
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	AZ
Project Name	Solar Anaerobic Digestor

An anaerobic digestor, constructed from three 55-gallon metal drums and capable of producing 20 cu. ft. of gas daily, has been constructed by the U of A as a demonstration project. The $150 digestor holds 150 gallons of manure/water slurry in the barrels, which were welded together to form horizontal cylinder.

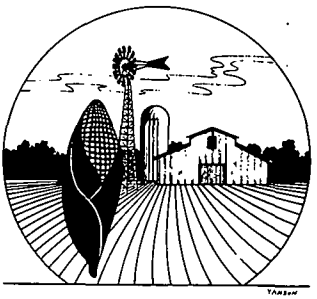
Temperature in the blackened drums is maintained at 95 degrees F. The resultant gas, consisting of 60 percent methane and 40 percent carbon monoxide, is stored in two tractor tire inner tubes having a capacity of 20 cu. ft.

Studies completed by students conclude that the system, fed by a daily mixture of five gallons of a 50/50 manure and water mixture, can meet the daily cooking needs of a family of four. The digested manure, which retains its fertilizer value, is then spread on the cropland.

Critique/analysis: The digestor has been operating with cow manure, and now goat manure is being tested. The University hpes the digestor will be replicated. A report notes its use is targeted for developing countries, most of which raise goats.

Organization	Univ. of AZ (UA)
Address	Department of Soil, Water & Engineering Tucson, AZ 85721
Contact	Douglas W. Williams
Telephone	(602) 262-1873

Funded By	State
Cost	$150
Congressional District	II
Compilation Date	February 1980



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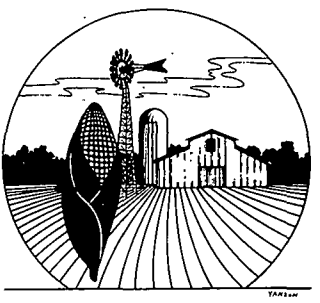
Category	Agricultural
State	AZ
Project Name	Solar Barrel Technology

The agricultural community of Huevos Rancheros del Sol is attempting to upgrade the energy efficiency of its activities through various solar projects.

The ranch is currently experimenting with three barrel-type solar systems designed to heat, respectively, a chicken coop, domestic hot water, and shower and kitchen water supplies.

Other Ranch projects include construction of numerous solar ovens, used regularly for cooking meals, and two solar greenhouses, one built of adobe. Renovation of a 1937 solar water system on one of the Ranch houses is underway. A solar water distiller and an anearogic digestor are also being developed for use on the Ranch.

Organization	Huevos Rancheros del Sol
Address	6413 South 16th Street Phoenix, AZ 85040
Contact	Larry Bard
Telephone	(602) 268-1522
Funded By	DOE
Cost	$11,500
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	AZ
Project Name	Solar Irrigation Pump

The Coolidge Deep-Well Solar Irrigation Pump, capable of producing 150 kilowatts, is the largest system of its kind in the world. Over 23,000 sq. ft. of parabolic-trough collectors power an organic Rankin engine to extract vitally-needed irrigation water.

A 30,000-gallon oil tank and engine are used for operations at night and during inclement weather.

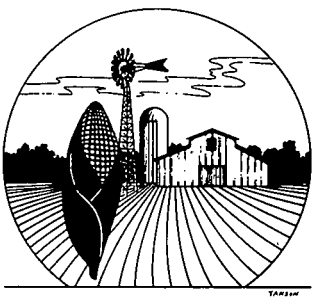
According to a recent economic analysis, the system will be economical by 1992 if electricity rates rise 10 percent annually. However, as project Manager Dariush Rafinejad noted, the prototype system is especially costly due to research and design considerations.

"If the same system were put into the field today, it would cost about $2.5 million," he said.

The pump is currently owned by DOE, and will be transferred to the host Dalton Cole Farm in 1982.

Orgar.ization	Arizona Solar Pumping Project Dept. of Energy U. of Arizona
Address	Dalton Cole Farm Coolidge, AZ 85228
Contact	Dr. Frank Mancini ASEC
Telephone	(602) 255-3683
Funded By	DOE & Arizona Solar Energy Commission
Cost	$4.5 million
Congressional District	I
Compilation Date	February 1980

Critique/analysis: Expenditures in 1977 for farm irrigation pumping are estimated to have exceeded million in the U.S., with the majority coming the western states. With energy costs from ...entional fuels projected to increase dramatically, irrigation pumping in some parts of the arid Southwest has already become uneconomical. Agricultural and engineering exports have turned their attention to solar energy as a potential alternative source of power for irrigation as well as other agricultural needs.



Renewable Resources— A National Catalog of Model Projects

Category	Cities
State	AZ
Project Name	Ellis-Shackelford House

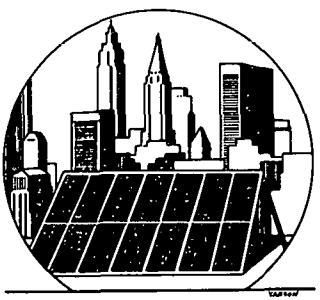
The Bolshevic Revolution had just begun in Russia when Dr. W.C. Ellis began construction of his three-storey mansion in Phoenix, one of the more elaborate and sophisticated buildings of its day.

Besides a soft- and city-water system, automatic flush toilets and a central vacuum system, the Ellis house was fitted with a "Day and Night" solar water heater.

Today, several owners later, the house has been renovated by the City of Phoenix, which now uses the building as a museum. And according to the Museum's curator, Terry Houghland, the building's solar system still works. The only component showing age is the rusted water-storage tank. The Arizona Solar Energy Commission is investigating the possibility of replacing the tank.

Gordon Shakelford, who owned the house for 30 years, noted that the "Day and Night" system was fairly common in the early 1900s. Approximately 75 percent of the hot water needs are provided by the heaters, he said. Shakelford sold the building in 1963, and for five years the home was used as a half-way house. Use of the heaters was discontinued for years until its renovation by the city.

Organization	Ellis-Shackelford House
Address	Arizona Historical Society 1242 N. Central Ave. Phoenix, AZ 85004
Contact	Donald Osborn, ASEC
Telephone	(602) 255-3682
Funded By	Private
Cost	n/a
Congressional District	I
Compilation Date	February 1980



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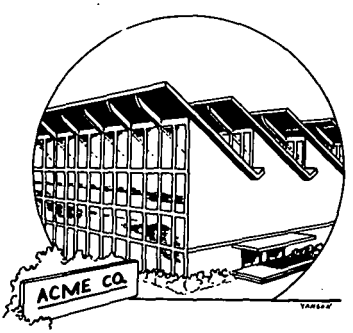
Category	Commercial
State	AZ
Project Name	Adobe Brick Production

The Chino Valley Adobe Works was founded in June 1978 in response to the rapidly growing demand for a thermally efficient building material. This is the first adobe brick-production yard in North Central Arizona since the arrival of the Mormon settlers in the early 1900s.

Today, having evolved from traditional hand-made production, the adobe company utilizes a semi-mechanical process resulting in a Uniform Building Code-approved brick. The material is available on a commercial basis.

Organization	Chino Valley Adobe Works
Address	Star Route 2, Box 300 Chino Valley, AZ 86323
Contact	Nigel Dickens
Telephone	(602) 636-2988
Funded By	n/a
Cost	n/a
Congressional District	III
Compilation Date	February 1980

Critique/analysis: Chino Valley Adobe Works plans to grow with the housing market, serving the region with quality energy-efficient adobe brick.



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Category	Commercial
State	AZ
Project Name	Home Weatherization

Organization	Electric League of Arizona (ELA)
Address	3334 North 20th St. Phoenix, AZ 85016
Contact	Dick Ruekner
Telephone	(602) 263-939

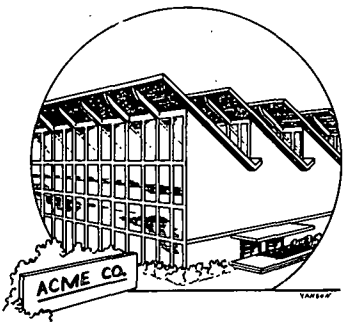
Funded By	ELA
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

In cooperation with the electric utilities and home builders, the Electric League of Arizona sponsors three programs to improve energy efficiency of new homes.

Under the Energy Value and Home Program, the League sets insulaton, window protection, and heating/cooling standards, while providing guidelines for weatherization. This program is well publicized in the home-buying market. An Energy Value Award offered by the League has proven a significant conservation incentive to residents and a strong sales tool for builders.

A similar program has been established to improve thermal efficiency of mobile homes.

Consumer information on insulation and energy-saving devices is also provided under the program. The League sponsors energy and home-improvement shows annually.



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Category	Commercial
State	AZ
Project Name	Solar Nursing Home

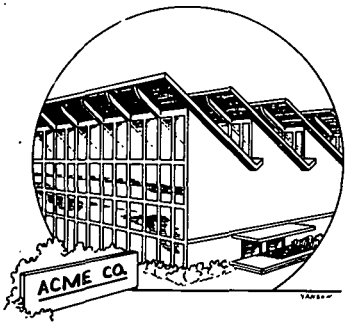
The Arizona Eastern Star Nursing Home recently constructed a 400 ft^2 collector system for its space- and water-heating needs. The project is considered to be one of the largest unsubsidized solar systems in the Southwest.

The system consists of a closed-loop oil fluid heat transfer connected to an 8,000 gallon storage tank.

The project was completed as a joint venture by a solar manufacturer, a construction company, a contractor and a consulting engineer. The system is rented to the home on an eight-year lease with option to buy.

Organization	Arizona Eastern Star Nursing Home
Address	24th St. & Camelback Road Phoenix, AZ 85026
Contact	Jim Kelly
Telephone	(602) 957-0506
Funded By	Private
Cost	n/a
Congressional District	IV
Compilation Date	February 1980

Critique/analysis: One of the project's prime objectives is to demonstrate to commercial utility consumers the viability of solar as a dependable technology capable of substantially reducing energy bills.



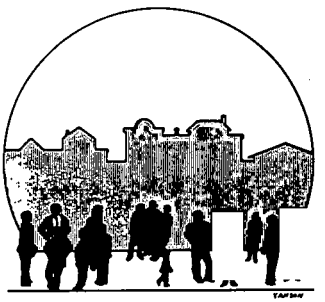
Renewable Resources—A National Catalog of Model Projects

Category	Community
State	AZ
Project Name	Catalina del Solar

A 184-unit townhouse community is currently under construction that is outfitted with solar hot water systems and optional solar collector units containing integrated two-staged evaporative coolers.

Solar access and protection of the city and mountain views were primary considerations in the planning of the community.

Organization	Architect
Address	833 N. Fourth Tucson, AZ. 85705
Contact	Larry Medlin
Telephone	(602) 623-6406
Funded By	n/a
Cost	n/a
Congressional District	n/a
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	AZ
Project Name	Cameron Farm Project Solar Greenhouse Complex

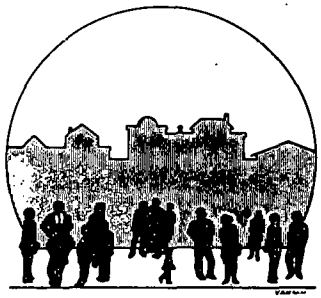
The Cameron Farm Project is a community project for the construction of a solar greenhouse complex. It includes a 96 x 15 foot passive greenhouse with a massive native stone (north) wall, three experimental solar stills, and a hybrid darieus rotor/photovoltaics electrical generation system to power pumps and fans.

The greenhouse complex will provide training in solar and wind design and construction for ten community people from Cameron, Navajo Nation. It will also provide technical jobs and food for ten to fifteen people. The solar stills will demonstrate appropriate technology for saline water reclamation for domestic or intensive agricultural use.

The entire greenhouse complex will be energy self-sufficient. However, a gas-driven generator will be available to back-up the wind charger. The complex is meant to serve as a model training site.

Organization	Cameron Farm Project
Address	P. O. Box 85 Cameron, AZ 86020
Contact	Ross Smallcanyon
Telephone	(602) 679-2219

Funded By	DOE, CETA, HUD
Cost	DOE $15,200
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	AZ
Project Name	Community Solar Greenhouse Opens

The Flagstaff Community Center for Appropriate Technology (FCCAT) has big plans for its newest addition, a community solar greenhouse.

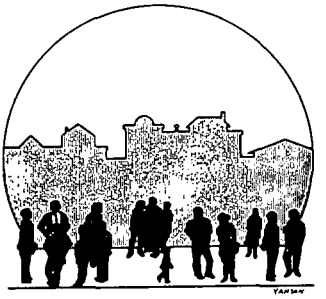
Opened in September, 1979, the greenhouse will serve as a center for vegetable-growing and distribution program. The center will also serve as a community foodbank for the low-income residents.

FCCAT also developed an appropriate technology education program designed to tie into the community's education system and the public library.

FCCAT is staffed by a director, CETA-funded assistant director, gardener, bookkeeper, and two VISTA volunteers. The governing board is composed of three elected officials, three low-income representatives, and three community members-at-large.

Critique/analysis: Through fund raising efforts, FCCAT hopes to be self-reliant within two years.

Organization	Flagstaff Communit Center for Appropriate Technology (FCCAT)
Address	P.O. Box 1433 Flagstaff, AZ 86001
Contact	Buck Orndorff, Director
Telephone	(602) 779-0505
Funded By	Community Services Admin., Northern AZ Council of Govern.
Cost	$45,000 for Greenhouse, $20-$50,000 annually for programs
Congressional District	III
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

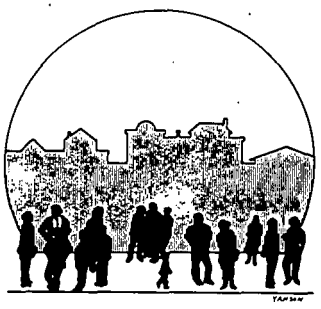
Category	Community
State	AZ
Project Name	Mobile Home Retrofit

The Solar Energy Application Committee is sponsoring a project to design and fabricate an inexpensive, simple modular solar heating and cooling system for mobile homes.

Project plans call for a single glaze air-type collector. Gathered heat will be transferred via ducts to water-filled jars or cement blocks located underneath the home. A fireplace or electric space heater will provide back-up heat.

Critique/analysis: Mobile home insulation, system cost and installation ease need further examination, according to reports.

Organization	Solar Energy Applications Committee
Address	148 Sierra Grande Sierra Vista, AZ 85635
Contact	Goodwin Peterson Professor
Telephone	(602) 458-6099
Funded By	n/a
Cost	$6,500
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	AZ
Project Name	PUSH ENERGY HOUSE

People United For Self Help (PUSH) is a community organization actively involved in educating low-income people on energy conservation.

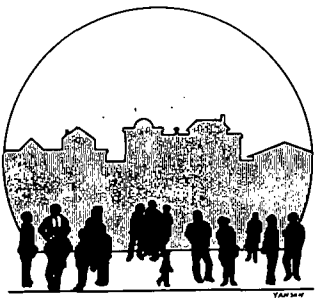
During the last two years, PUSH has remodeled and retrofitted a low-income home in South Phoenix. Today the PUSH Energy House, as it is now called, is fitted with a solar vertical hot-air collector, a solar greenhouse, and a thermosyphon hot-water system. The house also contains three solar cookers, an adobe Indian oven and four seed-starting boxes.

As such, the PUSH House is considered a showplace of homemade low-cost solar equipment. The project was conducted with community help by members of PUSH and CETA. As such, it is reportedly the only solar project in the Phoenix area to involve a low-income constituency.

Approximately 1800 people have toured, or participated in workshops held in, the PUSH House.

Critique/analysis: Staff funding for workshops ended in fall of 1979. Further funding has not been found.

Organization	People United fo Self Help (PUSH)
Address	5208 S. 13th Place Phoenix, AZ 85040
Contact	Bob Larson
Telephone	(602) 261-8948
Funded By	CSA & CETA grants
Cost	$34,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

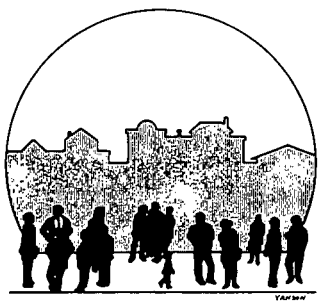
Category	Community
State	AZ
Project Name	Schuchuli Village Photovoltaic Project
Organization	Papago Tribal Council
Address	Schuchuli, Arizona
Contact	Louis Rosenblum
Telephone	(216) 433-4000 Ext. 301
Funded By	Dept. of Energy & NASA-Lewis
Cost	$333,400
Congressional District	II
Compilation Date	February 1980

The Schuchuli photovoltaic project is reportedly the first photovoltaic system to provide power for an entire village. The project is part of DOE's National Photovoltaic Program designed to stimulate new markets for solar cell power through cooperative cost-shared experiments with potential users.

Until recently, energy had been an expensive and scarce commodity for the people of Schuchuli. They relied on kerosene lamps for lighting, laundry was washed by hand or taken twenty miles to the nearest commercial laundry, and perishable foods and medicines could not be stored. Water for domestic use and stock had to be pumped by diesel engine, which was a big drain on the resources of the people.

Today this has all changed, however, thanks to the photovoltaic cell. An array of 192 photovoltaic power modules, each containing forty-two solar cells, provides sufficient electricity to power 15 refrigerator-freezers, a washing machine, a sewing machine, the village water pump, lights for the village's 15 homes, a church, and a feast house.

The system produces 3.5 kw at 120 volts DC. Excess power is stored in a bank of batteries. NASA will be analyzing data from the system for two years. The Papago Tribal Authority and the Public Health Service will help maintain the system.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	ACCES Energy Newsletter

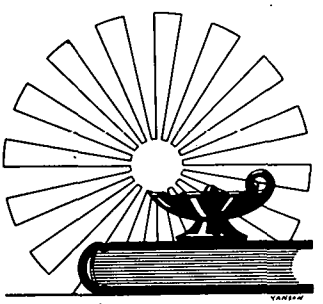
"ACCESS-Energy" is a bimonthly energy newsletter received by approximately 2,000 government, industrial, citizen and educational subscribers.

Produced by the University of Arizona Cooperative Extension Service and the Council for Environmental Studies, "ACCESS-Energy" is not exclusively solar, but addresses conservation and other renewable resource issues as well.

Recent articles include "Arizona Energy Use," "Wind Energy Sources," and "Indians and Resource Development." In addition, Federal Register notices are frequently highlighted, and recent publications are listed in the publication.

Critique/analysis: Impact of the newsletter has been positive. The publication has received much constructive comment, which shows it to fill an educational and energy-networking function.

Organization	University of Arizona
Address	University of Arizona Cooperative Extension Service Tucson, AZ 85721
Contact	Roger Caldwell
Telephone	(602) 626-3576
Funded By	College of Agriculture Administration
Cost	$5,000 yearly
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Arizona Solar Action Team

Organization	Arizona Solar Action Team
Address	c/o Flagstaff Community Center for Appropriate Tech. P.O. Box 1443 Flagstaff, AZ 86002
Contact	Buck Orndorff or Joe Costion
Telephone	(602) 779-0505

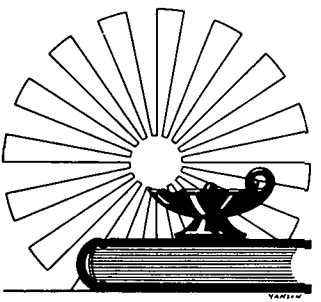
In October, 1978, three members of the Arizona Solar Energy Association attended a solar greenhouse workshop at Ghost Ranch, NM. As a result, interest and activity in greenhouses has grown considerably in Arizona.

Following their training, and as a condition of their sponsorship contract with ASEA, the three held community greenhouse workshops in Bisbee, Camp Verde and Payson. The weekend sessions were attended by an average of 20 persons. At least two of the meetings inspired further local workshop planning and participation.

The trio, now known as "The Arizona Solar Action Team," continues to conduct workshops, and has developed a slide show for passive solar education, funded by the ASEA/ASEC.

Funded By	Arizona Solar Energy Commission
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Critique/analysis: Due to sporadic funding problems, the team's grassroots educational project has been limited.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Arizona State University Residential Solar Workshop

Organization	Environmental Research
Address	College of Agric. ASU Tempe, AZ 85281
Contact	(Dr.) Stanley A. Mumma
Telephone	(602) 965-3585

Funded By	DOE
Cost	$11,110
Congressional District	III
Compilation Date	February 1980

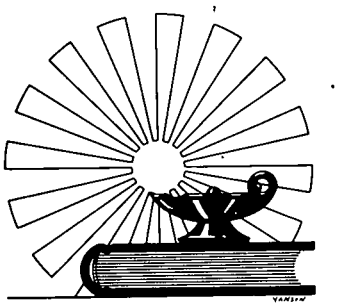
A professor and two graduate students from Arizona State University's College of Agriculture, have assembled a package of solar water-heater components that homeowners can purchase locally. They have also organized a workshop for explaining the component assembly.

In August of 1978, after two pilot workshops were evaluated, a two-evening, eight-hour workshop was offered to 80 homeowners (with a waiting list of 200).

Participants built two solar collectors on the first evening and learned how to install them on the second. The success of this workshop led ASU to offer it on a regular basis of four sessions per month. To date, approximately 700 homeowners have built and installed solar hot water systems for a price of $400 per system.

The collectors include 34" x 76" standard patio glass for glazing, commercial serpentine copper tubing, an aluminum absorber plate with extruded fins, and an extruded aluminum collector box with steel-backing. Plumbing includes a low-horsepower bronze body, magnetic drive coupling, a circulating pump, soft copper tubing, and a low voltage controller. Existing hot water tanks are retrofitted to suit the system.

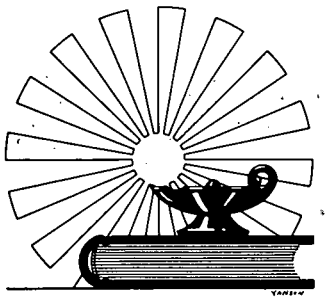
Critique/analysis: The project goal is to have 10 percent of the 500,000 homeowners in metropolitan Phoenix attend the workshops during the next five years. This will result in 50,000 new solar units and an annual energy savings of 300 million KWH.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Century 21 Home Economics Program
Organization	Paradise Valley Economic
Address	Paradise Valley High School Home Economics Dept. 3950 East Bell Rd. Phoenix, AZ 85032
Contact	Sue Armstrong
Telephone	(602) 866-1237
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Century 21, a high school home economics program preparing students for the future, has an emphasis on renewable energy sources. The study of solar energy and the construction and use of solar cookers are featured.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Clear View Collector — An Innovative Approach

Organization	University of Ari
Address	College of Engineering Civil Engineering Building Tucson, AZ 85721
Contact	Dr. T. Triffet
Telephone	(602) 626-2361

Funded By	Arizona Solar Energy Commission
Cost	$309,000
Congressional District	II
Compilation Date	February 1980

An innovative 4x8' solar air-type collector now sits on the roof of the College of Architecture, University of Arizona. The solar demonstration project was made possible by a $309,000 grant the Energy Research Commission gave.

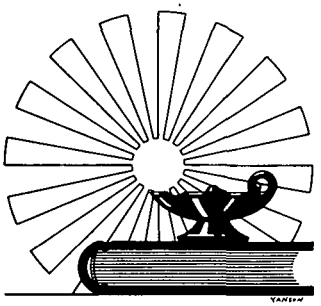
The collector, which sits above the building's courtyard, is composed of two walls of glass, between which are suspended Venetian blinds. Standard 4'x8' patio doors comprise the interior collector wall; the outer wall is formed by two standard sheets of 4'x8' glass. Each wall consists of a total of 32 panels. The collector stands 16' high.

Air is forced through plenums located on the east and west ends of the giant collector. Heat collected and radiated by the dark Venetian blinds is discharged into a nearby classroom and courtyard. The remainder of the building is not heated by the system.

Cooling is provided by an evaporative system in which ambient air is pre-cooled by water circulated through finned coils. The water is then "cooled" in large towers located on the building's rooftop.

The entire project is extensively monitored; data is relayed to the UA Solar Energy Research Facility's microcomputer. Although useful for demonstration, the data is insufficient for detailed engineering evaluations.

Critique/analysis: A recognized weakness in the demonstration system is the lack of any thermal storage capability, and further data services will enhance the engineering value of the study.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Energy Curriculum Development

Organization	Coconino Natural Resource Conservation District
Address	2727 N. Fourth St., Suite 130 Flagstaff, AZ 86001
Contact	David J. Parkman Director County Pub. School Envir. Ed.
Telephone	(602) 779-3311 Ext. 1394

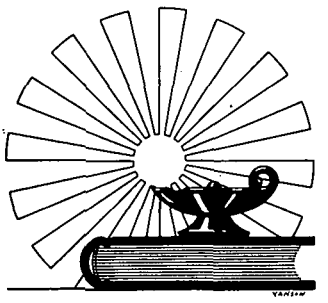
Funded By	Private Foundation/ Grants
Cost	n/a
Congressional District	III
Compilation Date	February 1980

The Environmental Education Program (EEP) provides technical and research assistance to teachers, schools and youth projects in the area of environmental studies. The program includes curriculum development, development of outdoor environmental study areas near school sites, and interdisciplinary instructional support systems.

EEP has expanded to include all eight school districts in Cococino County, affecting approximately 14,000 K-12 graders.

The project began in 1974 through the efforts of the USDA Soil Conservation Service and the Flagstaff Junior High School. The program quickly grew. One year later it became known as "The Research Center for Environmental Education." Today the Center's educational research covers many fields, including solar energy, renewable and non-renewable natural resources, and wildlife biology.

Critique/analysis: The Environmental Education Program presents an opportunity for students to become more sensitive to the environment. Of greatest concern to date has been lack of funding and manpower to facilitate the program.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	ERL Clearview Collector

Organization	UA Environmental Research Laboratory
Address	Tucson International Airport Tucson, AZ 85706
Contact	John Peck, Helen Kessler
Telephone	(602) 626-2931

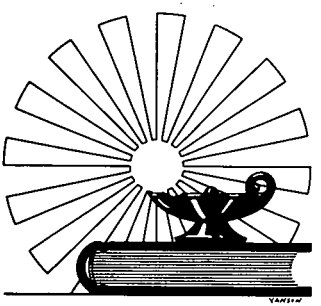
Funded By	Various
Cost	n/a
Congressional District	II
Compilation Date	February 1980

In its continuing effort to develop efficient technologies for the rigorous Arizona desert climate, the Environmental Research Laboratory (ERL) swapped its conventional flat-plate collector system for a hybrid "clearview" system. The "clearview" consists of a large rectangular box constructed of double-tempered patio glass on one wall, a masonry wall or sliding double-glazed patio door on the other wall, between which hangs a Venetian blind.

The blinds, which serve as absorber plates, are substituted with heat-absorbing glass in one section of the ERL system. Block walls and an interior rock bin wall provide thermal mass for storage and temperature fluctuations.

In a related study, ERL is investigating the durability of exterior stucco surfaces, which are widely popular in Arizona and are an important component to the longevity of mason walls.

Critique/analysis: This demonstration project tests and develops techniques that can be directly adapted to use in standard mass-market homes.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	IDDA Solar Training Workshop

Eighteen Native Americans from nine state tribes are now participating in a solar energy training and demonstration project sponsored by the IDDA through a Community Services Administration grant.

The program has three goals: 1) to train the participants in professional solar installation skills and assist them in obtaining state solar contractor's licenses; 2) to install air-type solar collectors on 40 low-income Indian residences; and 3) to support the Indian-owned solar enterprise, Birdsprings Solar Corporation, through purchase of all hardware needed by the program.

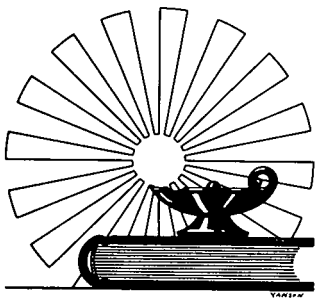
At present, 90 percent of the installations have been completed by the trainees, who call themselves "The Arizona Solar Savages." Some of the Solar Savages have joined the Arizona Solar Energy Association to participate in state and national issues.

Future plans call for an expanded program to include photovoltaics, space heating and residential energy analysis.

Organization	Indian Development District of AZ (IDDA)
Address	1717 W. Camelback, Suite A108 Phoenix, AZ 85105
Contact	Andy Marshall Program Manager
Telephone	(602) 248-0184

Funded By	Community Services Admin.; DOL
Cost	$326,000
Congressional District	State-wide
Compilation Date	February 1980

ique/analysis: The tribal governments are rtedly enthusiastic about the program and the essional attitude of the trainees.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Little Singer School Goes Solar
Organization	Indian Developme District of AZ
Address	1717 W. Camelback, Suite A108 Phoenix, AZ 85105
Contact	Andy Marshall Prog. Mgr.
Telephone	(602) 248-0184
Funded By	Community Services Admin.
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

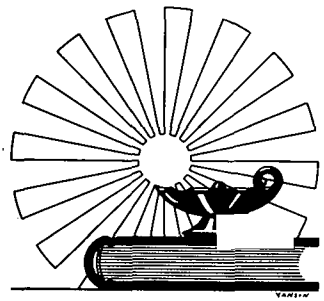
Solar technology has enabled the isolated Navajo community of Birdsprings to construct its first school, a project town leaders view as essential to the preservation of the community's culture.

Since the late 1920s, Birdspring youth had been sent to boarding schools for their education. The cost of bringing utilities into the town was reported to be the principal obstacle to the project, proposed many years ago by the local medicine man, Little Singer.

Recently, however, the community became host to a communally owned solar-collector manufacturing plant, and with large-scale local support, including labor and donations, the school project was under way. Construction of the $100,000 building was completed in the fall of 1979.

The building, which resembles the indigenous "hogan" structure, consists of two geodesic domes connected by a walkway. Each dome contains a classroom. The building is outfitted with locally manufactured "Shandiin" air-type collectors.

Critique/analysis: The people of Birdsprings are reportedly very pleased with the project, which has provided the community with jobs and income as well as a badly needed school.

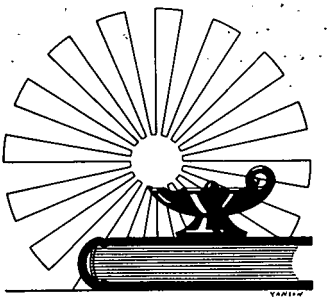


Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Low-cost Solar Heating/Cooling Modules

This research team is developing an air-heating collector that uses fins that reflect light during the summer (when the collector acts as a roof shade) and absorb light during the winter (when it functions as a solar heater). The collector is made from sheet metal and a replacement low-cost plastic film.

Organization	Arizona Scientific Research
Address	10121 Catalina Highway Tucson, AZ 85715
Contact	Walter Meinel
Telephone	(602) 749-3954
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

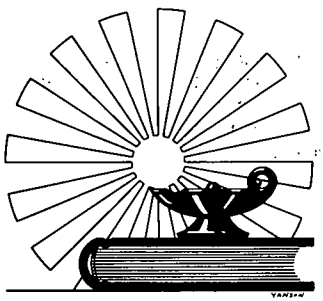
Category	Education
State	AZ
Project Name	Mobile Solar Energy and Library

Organization	YMCA Outpost
Address	2627 Benson Highway Tucson, AZ 85706
Contact	Joe Blankenship
Telephone	(602) 294-9049 or 887-9465

A large mobile van has been outfitted to provide a traveling exhibit, library, and workshop facility on solar energy. This van provides an outreach consumer-education program. This exhibit helps (1) promote basic understanding of solar energy; (2) demonstrate commercially-available designs and applications; (3) increase consumer awareness of tax incentives; (4) provide a library of material from private and public sources on energy and energy conservation.

Funded By	Bicentennial Commission, Lawrence Livermore Lab, ASEC, Tribal Amer. Consulting Corp., et al
Cost	Approx. $20,000 per year
Congressional District	II
Compilation Date	February 1980

Critique/analysis: It is hoped that this project will be organized into a statewide program in both urban and rural areas. Most of the labor on this project has been the volunteer services of young people interested in learning more about solar energy. The biggest problem has been uncertain funding and support.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Navajo: Project SAW
Organization	Window Rock School District #8
Address	Box 559 Fort Defiance, AZ 86504
Contact	Pat Graham
Telephone	(602) 729-5705
Funded By	DOE
Cost	$46,800
Congressional District	IV
Compilation Date	February 1980

In June of 1978, Window Rock School District #8 began Project SAW (solar, adobe, wind), an alternative energy-education program oriented toward young and adult residents of the Fort Defiance Indian Reservation.

High school students on the reservation have been working during the school year and summer months in the construction of a solar Hogan (a traditional eight-sided Navajo home).

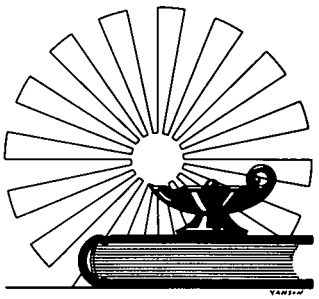
The Hogan, which is scheduled for completion in June of 1980, will include two greenhouses, a solar water heater, a sleeping loft, an eastern entry, block walls of rammed earth, a central fireplace, skylights, and a wind-electric system.

Future plans for the Hogan are to use it as a supplement to Window Rock's home economics program. In addition, after the Hogan is monitored to check its efficiency, blueprints will be made available to reservation residents.

Adults on the reservation have had the opportunity to participate in Project SAW through night classes offering the theory and construction of the Hogan.

To publicize this project, an audio-visual record of the Hogan's progress has been maintained. The project was also featured at the 79 Native American Solar Energy Conference.

Critique/analysis: School administrator Pat Graham states that preliminary monitoring of the Hogan has provided encouraging data. In temperatures of 10 below zero the Hogan has maintained an interior temperature of 50 degrees F.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Prescott Schools Energy Curriculum

Since 1976, Prescott Unified School District #1 has developed and implemented an energy curriculum for grades K-10 that has reportedly attracted attention from educators throughout the country.

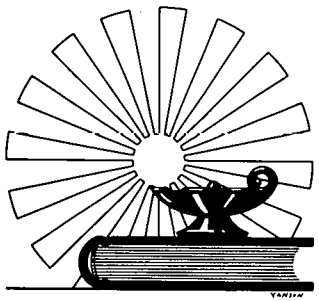
Prescott's curriculum was developed to provide an extensive energy curriculum in elementary schools. In the upper grades the curriculum is offered in specific classes.

The District also has an active energy-conservation program that has resulted in a 30 percent savings in gas and electricity. Conservation in the areas of food service, transportation and building maintenance have been largely responsible for the savings.

The curriculum materials, now being tested by District personnel, will be available in late 1980 for other interested Districts in Arizona and the rest of the nation.

Organization	Prescott Unified School District #1
Address	P.O. Box 1231 Prescott, AZ 86302
Contact	Henry Dahlberg, Ed.D.
Telephone	(602) 445-5400, ext. 246

Funded By	Title IV-C, Elem. & Secondary Education Act
Cost	$150,000
Congressional District	III
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Solar/Adobe Project

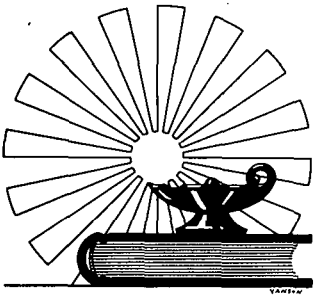
Organization	The Solar/Adobe Project
Address	c/o Nigel Dickens Star Route 2, Box 300 Chino Valley, AZ 86323
Contact	Nigel Dickens
Telephone	(602) 636-2988

Funded By	DOE, 1978; Community Organizations Private funding
Cost	Varies, depending on funding
Congressional District	III
Compilation Date	February 1980

Out of a mutual need for low-cost, energy-efficient homes, three families in the Chino Valley manufactured 10,000 adobe bricks for their respective homes during the summers of 1975 and 1976.

Since then the adobe neighborhood has grown considerably, attracting state and national interest as an appropriate technology for local housing needs. An offshoot was the Solar/Adobe Project, during which hundreds of Arizonans attended three six-day workshops on solar and adobe building techniques. By 1978 the interest was strong enough to prompt a $22,000 DOE grant for 12 two-day workshops throughout Arizona for low-income people, owner-builders and professionals.

Critique/analysis: Due to rapid increases in residental construction, labor and energy costs, adobe is now viewed by many as an ideal material for the owner-built home. Adobe is also desirable for passive solar heating and cooling systems due to its thermal qualities. The Solar/Adobe Project has exceeded initial expectations and will continue to offer seminars in the future. The Arizona Solar Energy Commission, through the Arizona Solar Energy Association, will be sponsoring series of the workshops in 1980.



Renewable Resources—A National Catalog of Model Projects

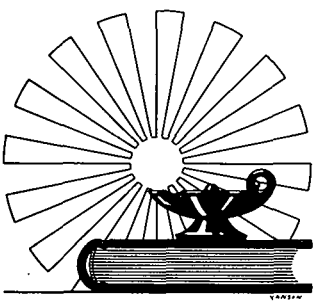
Category	Education
State	AZ
Project Name	Solar Home Research

The Environmental Research Laboratory of the University of Arizona and the U.S. Home Corporation have designed and built two solar homes.

Both structures, located in FHA-financed neighborhoods, are fitted with a solar collection system, massive interior and exterior walls for energy efficiency, and optimized evaporative cooling systems.

Organization	Environmental Resear Lab.
Address	University of Arizona Tucson Intl' Airport Tucson, AZ 85706
Contact	John Peck or Helen Kessler
Telephone	(602) 626-2931
Funded By	Arizona Solar Energy Commission HUD
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Critique/analysis: There were initial problems because the houses were unavailable for FHA financing although they were located in a predominantly FHA-funded community. Recently, however, the FHA regulation was modified, and one home sold as a result. Many prospective home buyers have reportedly made favorable comments about the homes and their energy systems.



Renewable Resources—A National Catalog of Model Projects

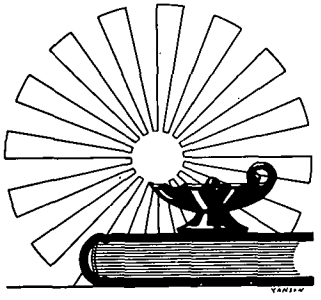
Category	Education
State	AZ
Project Name	Solar School Addition

The Primavera School in Prescott recently constructed a 1,400 ft^2 classroom addition, heated in part by a Trombe Wall and fitted with skylights that eliminate the need for interior lighting.

The school also has a Clivus Multrum waterless toilet system, reportedly the first time the technology has been used for a public facility.

The classroom was built with donated funds.

Organization	William Otwell Architect
Address	115 East Gurley Prescott, AZ 86301
Contact	Bill Otwell
Telephone	(602) 445-4951
Funded By	Private
Cost	n/a
Congressional District	I
Compilation Date	February 1980

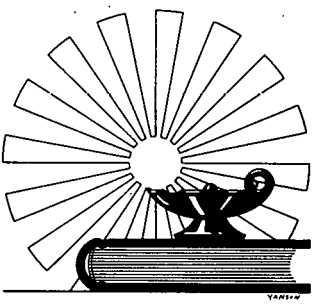


Renewable Resources— A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	Tucson Solar Sourcebook
Organization	New West Trails
Address	2237 East 18th Tucson, AZ 85719
Contact	Joyce Hardin
Telephone	(602) 624-9644
Funded By	Donations and Volunteers
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The People's Yellow Pages is a "grassroots" guide to community organizations and people in the Tucson area. Included is a section on people and organizations in the Tucson area who are involved in solar energy and appropriate technologies. The latest edition was published in February 1980.

In addition, the New West Trails group has published the "Tucson Solar Sourcebook, 1978". The source book includes solar energy information and lists of individuals and groups (local and national) who deal with solar energy. A brief bibliography on solar and appropriate technology is also included.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	AZ
Project Name	U.A. Solar Energy Research Facility

Tests are currently being conducted on innovative solar technologies in Solar Energy Research Facility Labs located on the roof of the Civil Engineering Building. The technologies being tested include:

1) A pressurized boiler receiving focussed energy from a paraboloidal reflector five feet in diameter. The coolant fluid is water, and the receiver cavity is two inches in diameter and five inches long. Pressures up to 4,000 pounds per square inch and temperatures of 1000° F. are generated by the apparatus.

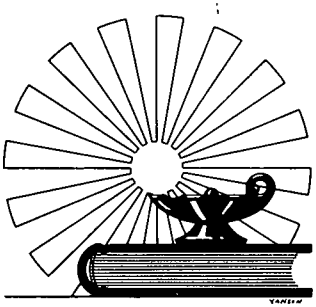
2) An azimuth-tracking concentrating collector used to heat non-pressurized water. The collectors are parabolic troughs 2.5 feet in width, twenty feet long, and mounted on a platform that floats on six inches of water in a circular pond.

3) An evaporative cooler that takes in ambient air predried by a dessicant. The dessicant is a liquid solution of calcium chloride salt in water. Solar energy is used to dry water from the dessicant for reuse in the cycle.

The facility also receives the telecommunicated data from the Parade of Homes and the Architecture Demonstration projects. A full-time staff of three people assist with the experiments and the data reduction.

Organization	The University of Arizona
Address	College of Engr. Tucson, AZ 85721
Contact	Dr. T. Triffet
Telephone	(602) 626-2361

Funded By	University of Arizona & ASEC
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	AZ
Project Name	Dog Day Afternoon
Organization	Frank P. Mancini
Address	1375 W. 14th St. Tempe, AZ 85281
Contact	Frank P. Mancini
Telephone	(602) 968-4381 or 255-3682 (ASEC)
Funded By	Private
Cost	$350
Congressional District	IV
Compilation Date	February 1980

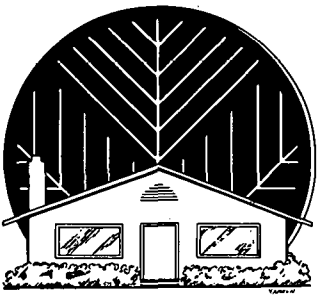
Tempe, Arizona resident Frank Mancini recently harnessed passive solar energy to keep the stifling desert summer sun off his panting pooch.

Replicating a system used in a human residence in Oregon years ago, Mancini built a roof pond on the dog's quarters. A 48'x 60'waterbed was designed to cool in the summer night air; during the day the mattress was covered with an insulative spread. The result: a comfortably cool pad for Rover's daytime naps.

In order to heat the hut at night, Mancini reverses the process, exposing the water during daylight and capturing the energy with an insulating cover at night.

The house was completed in the summer of 1979. The 500 lb. water system performed well, maintaining an interior daytime temperature of 85° in near 110° weather. No data is available for winter performance.

Critique/analysis: Unfortunately, the dog house skytherm is vulnerable to canine curiosity and temper tantrums. During the summer one of the residents jumped on the pond mattress and chewed a hole in it. After drying out the house and replacing the mattress, Mancini had a new roof installed to prevent further damage to the pond, which sells for $350.



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	AZ
Project Name	Residential Dry Evaporative Cooling Project

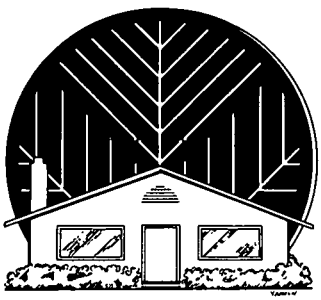
Two experimental air-to-air heat exchanges, driven by evaporative coolers to produce closed-circulation dry cooling are being tested on a large Arizona desert home.

The building was previously cooled by compression refrigeration.

Installation began in September, so a complete cooling analysis cannot be performed until the summer of 1980. The testing will include alternating cooling systems so performance on a daily basis can be compared.

The main problem thus far is that the equipment is large and expensive.

Organization	Solar Central of Ohio & Jeffrey Cook
Address	3627 Camino Sin Nombre Scottsdale, AZ 85253
Contact	Prof. Jeffrey Cook
Telephone	(602) 965-6210 or 955-1956
Funded By	Private
Cost	Approx. $3,000
Congressional District	IV
Compilation Date	February 1980

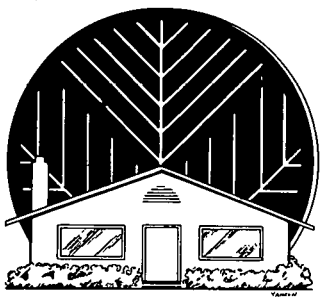


Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	AZ
Project Name	Residential Solar Absorption Cooling

A residential solar heating and cooling system has been installed on the Yellott residence. Thirty-six Yazaki "Blue Panels" provide heat for fan coils that warm the residence in winter. In summer, heat from the collectors is used to activate a two-ton lithium-bromide absorption cooling unit. Instrumentation has been provided by the Arizona Solar Energy Commission, and Yellott will provide a 12-month performance evaluation and report.

Organization	Yellott Engr. Associates, Inc.
Address	901 West El Caminto Phoenix, AZ 85021
Contact	John Yellott
Telephone	(602) 943-5805
Funded By	Yellott and Yozaki
Cost	$25,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

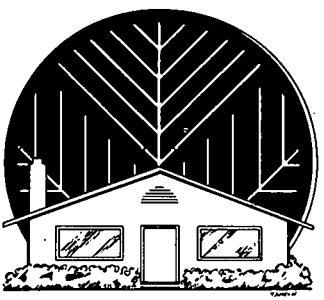
Category	Housing
State	AZ
Project Name	Solar Adobe Home

A 1,000 ft^2 passive solar adobe home has been constructed in Prescott. Construction costs were estimated at $6,000.

Principal to the heating scheme is a 15'x20' solar greenhouse that is attached to the building's southern wall. The home also features a waterless compost toilet that saves up to 50 percent of home water consumption while providing compost "good enough to put on the carrots in the greenhouse."

Organization	William Otwell Architect
Address	115 East Gurley Prescott, AZ 86301
Contact	Bill Otwell
Telephone	(602) 445-4951

Funded By	Private
Cost	$6,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

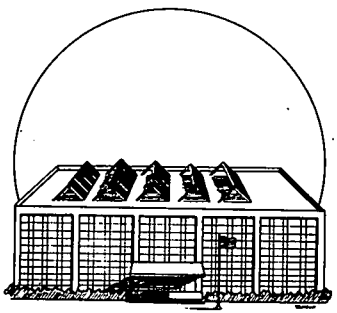
Category	Institutional
State	AZ
Project Name	Mt. Hopkins Solar Furnance

The ten-meter reflector operated by the Smithsonian Astrophysical Observatory on Mt. Hopkins, south of Tucson, is designated for use as a solar furnace. This instrument may be capable of producing a near 10,000 sun concentration within a two and one-half inch circle at the focal plane, and thus presents unique opportunities for testing various types of thermophotovoltaic (TPV) receivers and specialized "power tower" materials.

Additionally, the reflector could provide a small power-plant prototype capable of servicing a village or subdivision.

However, many questions concerning alignment, tracking, the effects of wind forces and safety considerations must be resolved before the instrument can be utilized for such purposes.

Organization	Solar Energy Resea
Address	College of Engr. Experiment Station Univ. of Arizona Tucson, AZ 85721
Contact	Dr. T. Triffet
Telephone	(602) 626-4965
Funded By	Electric Power Research Inst.
Cost	$90,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	AZ
Project Name	Arizona Solar Energy Legislation

Organization	Arizona Solar Energy Commission
Address	1700 West Washington Phoenix, AZ 85007
Contact	Donald E. Osborn Assoc. Director
Telephone	(602) 266-3682

Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

In 1974 Arizona became one of the first states to pass any form of solar tax incentive. Today Arizona provides a 35 percent residential solar income tax credit with a $1,000 maximum credit level. When it is added to the Federal credit, solar residences qualify for a combined credit of up to 65 percent or $3,200. The 35 percent level is maintained through 1984 when the credit begins to decline 5 percent annually. In addition, the state sales tax and property tax are waived for solar devices.

As well, homebuilders are permitted to apply the credit to speculative homes that utilize active or passive solar design. A 35 percent commercial solar income tax credit is also offered for the commercial or industrial use of solar. This credit has no upper limit.

Legislation related to consumer protection has also been enacted. Solar installation contractors will be required to obtain special solar certification as of June 1980. In addition, all dealers of solar units must provide a full disclosure of warranties, and the sources of any performance data on marketed systems. To qualify for the residential solar credit, the system must have a two-year warranty on major components and a one-year warranty on the entire system.

Other legislation in effect permits local governments to provide for solar access and "sun rights" as well as to require new homes to be constructed to facilitate solar water heating retrofit.

The Commission, which was legislatively set up in 1974 as the Arizona Solar Energy Research Commission, was renamed the Arizona Solar Energy Commission and granted broader powers and duties in 1979.

Renewable Resources— A National Catalog of Model Projects

Category	Low Income
State	AZ
Project Name	CEO Weatherization

Low-income homeowners now receive minor energy repairs and general weatherization services under the Committee for Economic Opportunity (CEO) Weatherization Program.

Approximately 20 employees, many of them CETA workers, replace broken windows and doors, caulk and weatherstrip the building 'envelope,' and insulate attics, water heaters and pipes.

The program has an outreach project that provides clients with general energy conservation and appropriate technology information. A video tape, used for solar training workshops, is also available to bublic libraries.

Critique/analysis: DOL and DOE regulations have reportedly delayed the program.

Organization	CEO Weatherization
Address	602 E. 22nd Street Tucson, AZ 85713
Contact	Michael Firth Energy Coordinator
Telephone	(602) 622-4896
Funded By	CSA DOE DOL
Cost	$250,000 for FY '80
Congressional District	II
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	AZ
Project Name	Low Income Housing Retrofit

Organization	Bisbee Solar Project
Address	Drawer CD Bisbee, AZ 85603
Contact	George Momper
Telephone	(602) 432-5139

The Low Income Housing Solar Retrofit Project, financed by the Department of Economic Opportunity, is presently training CETA youth and unemployed miners in solar collector installation techniques. The trainees receive instruction in solar theory, shop assembly and installation of commercially-available systems, including passive solar, water- and air-type heating technologies.

As part of their education, trainees will install and monitor solar systems on 9 private residences. A market analysis will be conducted to determine the success of solar technology for low-income households.

The Southern Arizona Human Resources Council (SAHRC) is administrator for the project, which is implemented by the Cochise Community Action Agency (CCAA).

Funded By	DEO
Cost	$30,000
Congressional District	II
Compilation Date	February 1980

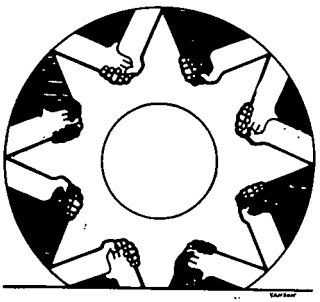
Critique/analysis: A final project report was not available at printing time. However, the coordinator reportedly hopes to extend the program through the winter of 1980.

Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	AZ
Project Name	Cooperative Extension Service Information Line

Pre-recorded messages on solar, energy conservation, food drying, gardening, etc., can be obtained through the Cooperative Extension Service Information Lines.

Organization	Cooperative Extension Service
Address	131 West Congress Tucson, AZ 85701
Contact	Cooperative Extension Service
Telephone	(602) 882-5161
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980



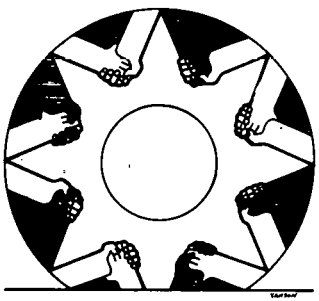
Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	AZ
Project Name	Mountain Solar Energy Association

In response to a common interest in self-sufficiency and energy-effective lifestyles, the residents of the White Mountains have formed a solar energy association. By meeting once a month, a "community information exchange" has been evolving. Slide programs on passive solar energy followed by group discussions based on personal experience comprise the agendas. The main focus has been: attached food- and heat-producing greenhouses, retrofitting existing houses, and new construction including the "greenhouse/envelope system," several of which have been built by group members. Future programs will cover both thermosiphoning and active water heating devices, and homemade electricity produced by wind generators and photovoltaic cells. Also planned are hands-on workshops, guest speakers, and tours of local projects.

Organization	White Mountain Solar Energy Association
Address	P.O. Box 670 Lakeside, AZ 85929
Contact	Jeffrey Gluck
Telephone	(602) 336-1565

Funded By	n/a
Cost	n/a
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	State
State	AZ
Project Name	Arizona Solar Energy Commission

The Arizona Solar Energy Commission is the state agency responsible for promoting development, commercialization and utilization of solar energy and other renewable energy sources. Established in 1974, the Solar Commission has an active public information program including a statewide, toll free "Energy Hotline," consumer guides, and solar industries guide. The commercialization program consists of consumer protection and industrial promotion projects.

The Commission's Research Development and Demonstration program ranges from small "seed money" grants to large demonstration projects. Focus has been given to areas of regional concern. The RD and D program operates on a $450,000 budget.

Critique/analysis: The Commission has a staff of five professionals and three support personnel. It is hoped that funding and staff levels can be increased to meet the almost overwhelming requests for information, programs, and grants.

Organization	Arizona Solar Ene: Commission
Address	Capitol Tower, Rm.502 1700 West Washington Phoenix, AZ 85007
Contact	James F. Warnock Executive Director
Telephone	(602) 255-3682
Funded By	State of Arizona
Cost	Approx. $660,000 per year
Congressional District	I, II, III, IV
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	AZ
Project Name	Classroom Solar Heat

Organization	Northern Arizona University
Address	Flagstaff, AZ 86001
Contact	Dr. J. Mehrhoff
Telephone	(602) 523-5252

Northern Arizona University recently installed a 2,000-plus ft^2 air type collector system on one of its classrooms as part of a solar space-heating demonstration project.

The 7,000 ft^2 classroom maintains comfortable temperatures due to a 1,000 ft^3 rock storage bin, which provides additional heat for night classes and during bad weather.

The Engineering College will monitor the performance of the system, which it will use for training students in solar energy.

Funded By	Arizona Solar Energy Commission
Cost	$98,000
Congressional District	IV
Compilation Date	February 1980

Critique/analysis: Lack of maintenance has caused some fogging of the collectors. However, university officials have recently taken corrective measures: the system is now being cared for.

Renewable Resources—A National Catalog of Model Projects

Category	State
State	AZ
Project Name	Hospital Tests Solar Hardware

The Arizona State Hospital in September of 1979, installed two experimental solar collector systems to supply hot water to the kitchen and laundry departments of the dietary building.

Approximately 800 ft^2 of flat plate collectors and an equal square footage of solar-concentrating collectors are being used on a test basis. As such, hospital officials expect to determine which type is more productive.

The dietary building has an average hot-water demand of 3,000 gallons daily. Both units are said to be exceeding their predicted performance.

Organization	Arizona State tal
Address	2500 East Van Buren Phoenix, AZ 85008
Contact	Phil Brown
Telephone	(602) 244-1331 Ext. 315
Funded By	AZ Solar Energy Commission
Cost	$99,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	AZ
Project Name	Oracle Asphalt

For three years the Arizona Department of Transportation (ADOT) has been using the sun to heat asphalt for use on State roadways.

The asphalt is heated in an 8,000 gallon capacity emulsion tank by 265 ft^2 of plate collectors that maintain tank temperatures between 90° and 150°.

The system is fully instrumented for year-round data read-out. These types of solar heating systems are now being designed and constructed for use by various transportation departments throughout the Southwest.

Because of its success, the Department is beginning work in cooperation with the Arizona Solar Commission on a major solar highway work station in Northern Arizona. The facility will include a solar asphalt-heating station, solar-heated buildings, and a solar pond.

Organization	Arizona Department of Transportation
Address	1625 W. Jefferson Phoenix, AZ 85007
Contact	John B. Hauskins P. E.
Telephone	(602) 261-7721

Funded By	ADOT
Cost	$13,500
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	State
State	AZ
Project Name	Photovoltaic Dust Warning Sign

A photovoltaic electric system now powers a dust-warning sign on Arizona's Highway I-10 as part of the state's Dust Storm Alert System.

The system charges two wet-cell batteries, which in turn provide electricity to the warning sign. The Arizona Department of Transportation (ADOT) currently monitors the sign, which traditionally had been operated by a liquid petroleum-fueled generator.

The Alert System currently costs $24,000 per year to operate. By converting the entire system to solar power, a reduction of $12,500 per year could be obtained, a savings of approximately 50 percent.

Additional photovoltaic projects are planned due to the success of this project, including rest stop lighting, and communication transmission.

Organization	Arizona Dept. of Transportation
Address	1645 West Jefferson Phoenix, AZ 85007
Contact	David Olivarez
Telephone	(602) 261-7374
Funded By	Federal Highway Administration
Cost	$4,000
Congressional District	II
Compilation Date	February 1980

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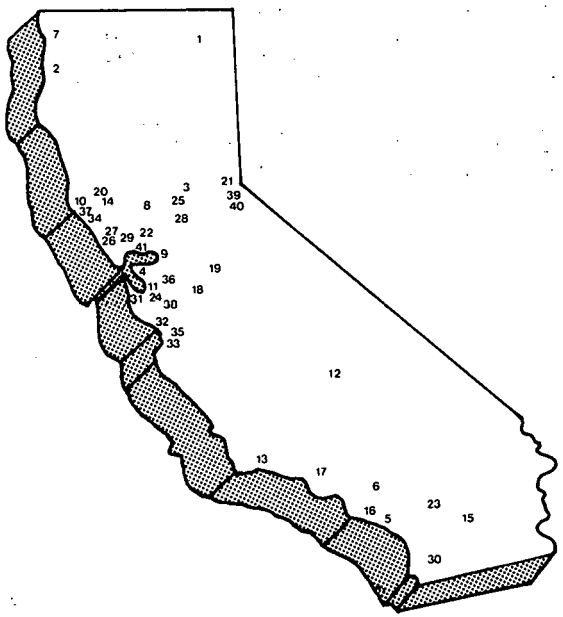

CALIFORNIA

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Outreach

State

Utility

Late Addition

Renewable Resources— A National Catalog of Model Projects

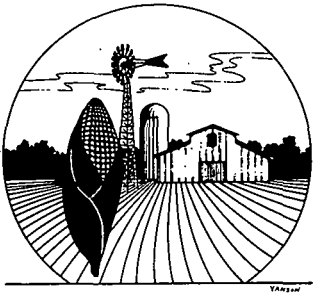
Category	Agricultural
State	CA
Project Name	Farallones Rural Center

The Farallones Rural Center began in 1974 with donations of land (80 acres in Western Sonoma County) and initial funding. It is an educational demonstration center of alternative lifestyles and appropriate technologies, including solar space and water heating, solar cooking and dehydration, solar greenhouses, composting toilets (commercial and home made), wind electric, organic gardens, pasture stewardship, woodlot management, and animal development.

Between twenty and forty people (depending upon the time of year and number of ongoing workshops) live at the Rural Center. They conduct the workshops spring through fall. Focus is on "hands on" learning.

The overall purpose of the Rural Center is to educate the general public and to achieve a better integration of food production, energy use, resource recovery, shelter design and land use.

Organization	Farallones Institute
Address	Rural Center 15290 Coleman Valley Rd. Occidental, CA 95465
Contact	Peter Zweig
Telephone	(707) 874-3060
Funded By	Donations, members, publications, foundation grants and government grants
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CA
Project Name	Hollandale Dairy

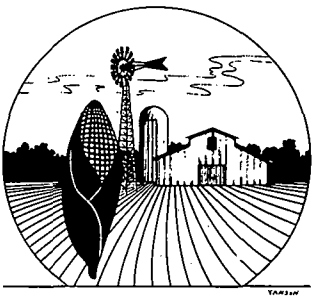
The Hollandale Dairy, a family-operated, 300-cow dairy, uses a solar hot water system to heat the 300 gallons of water consumed daily. (Dairy operations are well-suited for using solar because the year-round demand is for heat at moderate temperatures.) Hot water is used for warming or priming the cows' teats before milking, and for sterilizing the stainless steel storage tank.

The system consists of six flat-plate collectors with a total of 120 ft^2 of collector area, and three 120-gallon storage tanks, one of which has a gas fired back-up water heater.

The dairy's cows are milked on a schedule that meshes well with the heating cycle of the collectors and maximizes the system's efficiency. The first use of hot water, in the early afternoon, follows a full morning of heating. The second use is in the evening, after an afternoon of heating and storage.

The solar installation heats 46 percent of the dairy's hot water, with a savings of $704 per year on fuel bills.

Organization	Hollandale Dairy
Address	5829 East River Road Oakdale, CA 95361
Contact	Bill Wilson
Telephone	(209) 526-2000
Funded By	Materials & labor donated by Modesto Junior College; Pacific Gas & Light, Energy Systems, and others
Cost	$5,050
Congressional District	XIII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CA
Project Name	Solar Raisin Drying

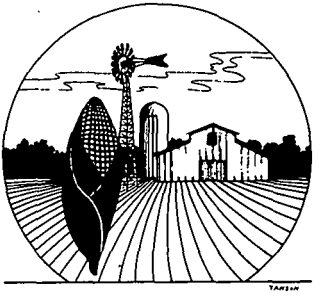
The Lamanuzzi and Pantaleo dehydrator plant near Fresno began using a solar heating system for a raisin-drying tunnel in August of 1978. The tunnel is capable of drying more than 12 tons of fresh grapes per day, yielding about two tons of raisins.

The system contains thirty solar collectors totaling 21,600 ft^2. Air is drawn through the collector system by two fans that use about fifty horsepower. Heated air from the collectors is introduced into a heat-storage tank containing 1.4 million pounds of one-inch river rock. The closed system forces heat through the fruit-drying racks in the dehydration tunnel, extracting about ten tons of vapor per day. Air leaving the drying tunnel continues in the system, mixing with fresh air en route to the collectors.

Although the system is capable of producing heat as high as 250 degrees F, only 150 degrees F is needed for fruit drying. In a twenty-four hour cycle, using solar heated air, the system is expected to save about 360,000 ft^3 of natural gas.

The system is monitored to collect data on the effect of weather conditions on the heat production, as well as to measure heat storage and the flow and speed of air.

Organization	Lamanuzzi and Pantaleo Company
Address	2510 North Grantland Fresno, CA 93718
Contact	Dr. Edgar J. Carnegie
Telephone	(805) 546-2378
Funded By	DOE
Cost	$984,000
Congressional District	XIV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CA
Project Name	University Solar Farm Greenhouse

The greenhouse at the University of California Center, Santa Cruz Farm, completed in December of 1979, is designed to accommodate the temperature, light, and space requirements of propogation. The structure is separated into three levels for climatic variations adapted to germination, early transplant and late transplant.

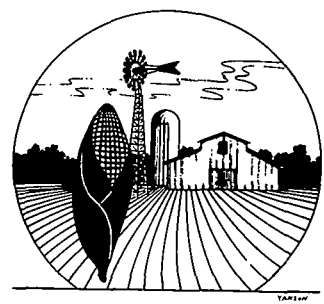
The greenhouse relies primarily on an insulative envelope of air that operates by natural convection. Thermal mass is contained in the earth.

Construction plans included beds for direct planting and compost bins for CO_2 and heat-production. Several off shoot projects have developed, including a proposed aquaculture waste water treatment system for the Farm Center.

Construction was completely by hand since there is no electricity at the farm. Most materials, such as recycled greenhouse glass, unmarketable cement, etc., were donated or salvaged. The labor was a cooperative effort by the Environmental Studies interns and the farm apprentices in the UC Extension Program.

The UCSC Farm Center is an educational and research facility at which the French integrated biodynamic theory of appropriate technology is taught. The Farm is open to the public for visits and tours.

Organization	University of Calif. Santa Cruz Farm Center
Address	Santa Cruz, CA 96050
Contact	Kent Royle
Telephone	(408) 423-3945
Funded By	UCSC Student Originated Learning Grant, book sales
Cost	$1,000
Congressional District	XVII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

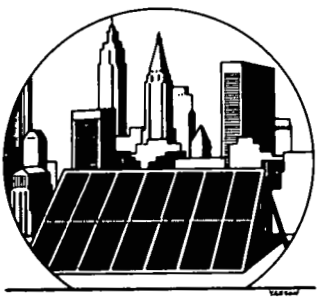
Category	Cities
State	CA
Project Name	Fremont Senior Citizens' Center

The new Central Park recreation center for senior citizens will have active space and water heating through a forced air solar system. The Center, scheduled for completion in March of 1980 will be the city's first major solar installation. The solar system is expected to supply 70 percent of the space heating and water heating. A heat pump serves as the back-up and cooling system.

Critique/analysis: The design of the building contains no passive elements. The designers felt that passive systems would not be adequate in this particular use.

* The project's sponsoring organization is the City of Fremont., 39700 Civic Center Drive, Fremont, California 94538.

Organization	Fremont Senior Citizens' Center
Address	Central Park Paseo Padre, Fremont, CA
Contact	Jim Hanson
Telephone	(415) 791-4165
Funded By	HUD Community Block Grant Program and City of Freemont
Cost	$48,000
Congressional District	IX
Compilation Date	February 1980



Renewable Resources—
A National Catalog
of
Model Projects

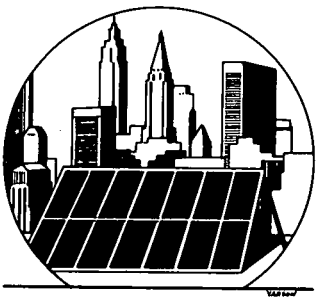
Category	Cities
State	CA
Project Name	Riconada Park Pool

The water in two public swimming pools in Palo Alto is being heated by 1,600 ft^2 of solar collectors. They provide all heating for the two pools during the summer months. During the winter, natural gas is used as a back-up system. Pool covers have been used to additionally conserve energy use.

Each year 120,000 people use the year-round pools, so this is a particularly visible demonstration of solar energy use. Newspaper articles announced the opening of the solar system at the pools, and there was a public exhibit of the pools during Sun Day in May of 1979. Many other communities have asked for advice on how to do similar projects.

Organization	City of Palo Alto
Address	1300 Newell Road Palo Alto, CA 94301
Contact	Carlene Bidwell or Connie Smyser
Telephone	(415) 329-2266 or (415) 329-2268
Funded By	City of Palo Alto Contingency Fund
Cost	$27,000
Congressional District	X
Compilation Date	February 1980

Critique/analysis: Energy-savings evaluation information is being compiled but is not yet available. There have been no operational problems to date, although one of the pool covers was vandalized and had to be replaced.



Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	CA
Project Name	Solar City Hall

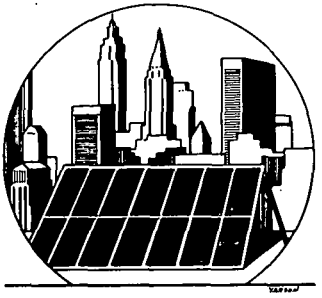
The expanding city of Cerritos needed to replace the "makeshift" facility that was serving as City Hall. Therefore, the City decided to build the nation's first solar city hall. Ground-breaking took place in August of 1976, and the building opened in March of 1978.

The concrete building provides a large thermal mass. The solar unit provides space heating and cooling and hot water heating. The 1,260 ft^2 of south-facing panels provide approximately 57 percent of space heating and 95 percent of water heating. The panel loop feeds a 3,000-gallon water-storage tank.

Public participation was invited in all the decision-making processes related to building planning. The City Hall is open to the public, and a city publication attracted public attention that led to an official open house in November of 1978.

Organization	City of Cerritos
Address	18125 Bloomfield Avenue Cerritos, CA 90701
Contact	Frank Gutierrez
Telephone	(213) 860-0311
Funded By	City of Cerritos, federal grant
Cost	$4,300,000 approx. total
Congressional District	XXXIII
Compilation Date	February 1980

Critique/analysis: The project solved a public need in an energy-efficient, aesthetically-pleasing manner--a visible demonstration of an attractive, working solar project. City officials report "some minor problems" with the solar system. The project will be tested to confirm the accuracy of the estimates of the system's efficiency. All in all, though, the system functions quite smoothly.



Renewable Resources—A National Catalog of Model Projects

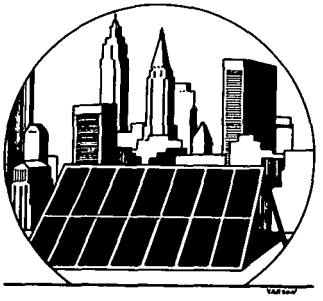
Category	Cities
State	CA
Project Name	Solar Fire Station

The City of Fremont installed a solar hot water system in its Station. The Irvington System supplies 80 percent of the station's hot water needs. Although sufficient funding to install space heating was not available, the building was designed so that the space heating could be retro-fitted at a later date.

Critique/analysis: The city's Public Works Director and Public Building Supervisor plan to make passive and active solar an integral part of City Building construction in the future.

* The project's sponsoring organization is the City of Fremont, 39700 Civic Center Drive, Fremont, California 94538.

Organization *	Irvington Station Fire Department
Address	40700 Chapel Way Fremont, CA 94538
Contact	Jim Hansen
Telephone	(415) 791-4165
Funded By	HUD Community Block Grant
Cost	n/a
Congressional District	IX
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

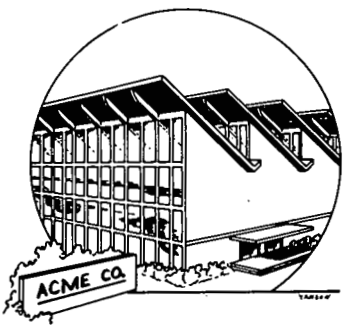
Category	Commercial
State	CA
Project Name	Restaurant Conservation

A restaurant in Santa Cruz is utilizing waste heat to pre-heat water for dishwashing. A double-walled heat exchanger preheats all water used in the kitchen for the main water heater.

Critique/analysis: No monitoring has been done yet, but when the necessary equipment arrives it will be.

Organization	AOI
Address	4685 Scotts Valley Dr. Scotts Valley, CA 95066
Contact	Roger Newdeck
Telephone	(408) 438-3333

Funded By	DOE
Cost	$9,400
Congressional District	XVII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CA
Project Name	Solar Bank

The solar system on the Auburn Branch Heart Federal Savings and Loan Building provides heating, cooling, and domestic hot water.

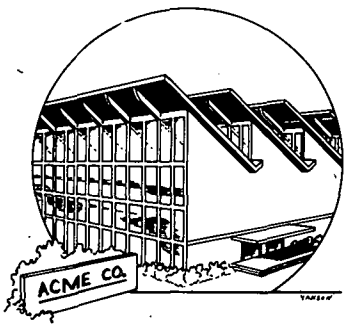
The system incorporates 2,072 square feet of double-glazed flat-plate collector panels augmented with 1,500 square feet of metalized film reflectors. These reflectors contribute approximately 30 percent more solar radiation to the collectors. Heating needs are taken care of directly by the heated water from the collectors, and the refrigerated cooling is supplied by a 25-ton chiller run by the heated water. A gas-fired back-up boiler serves as an auxiliary source of heat when the amount of solar energy provided is insufficient.

The system supplies approximately 96 percent of the cooling load, 80 percent of the heating load and 98 percent of the domestic hot water.

Community interest in the project has been high. The Bank has had national and international inquires through correspondence, as well as many visitors from various parts of the world.

The Susanville Branch office is also space-heated by solar. The office opened for business in the fall of 1979.

Organization	Heart Federal Savi and Loan
Address	649 Lincoln Way Auburn, CA 95603
Contact	R. M. McChesney
Telephone	(916) 823-7283
Funded By	Private
Cost	$134,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Commercial
State	CA
Project Name	Solar/ Wind Ski Lodge

The Sierra Ski Ranch's new Ranch House Lodge, located at the top of 8,000-foot Huckleberry Mountain, uses solar and wind power for virtually all of its hot water heating needs.

In addition to the rising prices of fossil fuels, the decision to use alternative sources of energy was inspired by the fact that the Ranch House's access road was too steep and rocky to allow the transport of oil or propane.

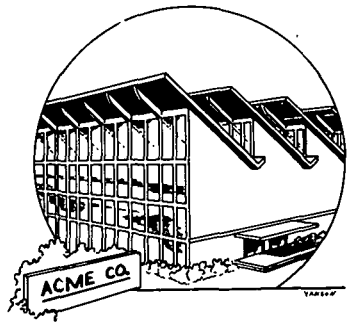
The majority of the energy is provided by electrical power from the wind-driven generator. Three eleven-foot wooden blade rotors are attached to a 10-kw electrical generator and mounted on a 100-foot tower. The generator is able to withstand windspeeds of 100 mph, with maximum efficiency at 35 mph.

The solar system incorporates twenty-four solar collectors mounted on the south and west sides of the lodge. Silicon transfer fluid is circulated through the collectors and piped (for purposes of heat exchange) to the 2,000 gallon insulated storage tank, which is fed by an on-site well. The hot water is used for domestic purposes, including heating.

The system's back-up power is provided by Pacific Gas and Electric and by three diesel-powered generators.

The Ski Ranch has received numerous visitors and inquiries from other ski areas in the United States regarding their wind and solar energy installation.

Organization	Sierra Ski Ranch
Address	Twin Bridges, CA 95735
Contact	Vern Sprock
Telephone	(916) 659-7453
Funded By	Sierra-Ski Ranch
Cost	$25,000-wind generator $50,000-solar system
Congressional District	XIII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CA
Project Name	Solar/Woodstove Domestic Hot Water

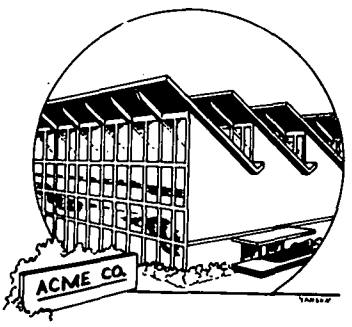
This project involved installing and monitoring eight different combinations of woodstoves and solar systems for providing domestic hot water. In the fall of 1978, Joe Carter and Richard Conrat retrofitted several solar and wood systems to provide hot water in the homes of volunteers. The volunteers had to purchase the equipment, but they received free installation in exchange for monitoring the systems for a year.

A second project involved establishing a woodstove-testing facility for controlled study of different configurations of heat exchangers for use in conjunction with a variety of woodstoves. (Eleven manufacturers donated woodstoves for the project.) Through a series of controlled tests with thermosiphons and forced flow modes, research was conducted on several questions: What are optimum conditions for maximum heat energy absorption by the exchanger? Does an increased exchanger surface-to-volume ratio increase efficiency? Does the firebox heat exchanger have any adverse effects on internal combustion?

Critique/analysis: Although specific results of these projects have not yet been published, data is being compiled, and information may be obtained from Sunworks.

Organization	Mill Creek Energy/ Sunworks
Address	1420 Felta Road Healdsburg, CA 95448
Contact	Joe Carter Richard Conrat
Telephone	(707) 433-3693

Funded By	DOE
Cost	$7,750
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CA
Project Name	Sonoma State University Laundry

Some students and a professor at Sonoma State University have developed a system to use waste heat from clothes dryers to preheat water for washing machines in commercial and other large-scale laundry operations.

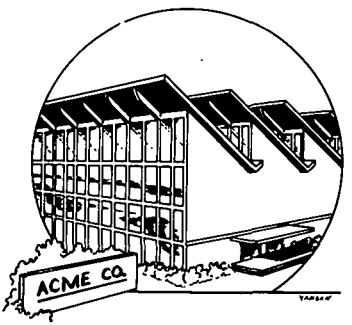
It is anticipated that adding the system to a laundry room in the dormitories will cut the energy consumption by 20 to 40 percent depending on the weather and the number of people using the clothes lines. One laundry room will be modified, monitored, and compared to an unmodified laundry room to find out.

Gas clothes dryers are typically only about 5 percent efficient at evaporating water. This waste heat can be recovered by placing an air-to-water thermosiphon heat exchanger in the exhaust duct of the dryer. The heated water can be circulated to a preheater tank via natural convection so the system requires no moving parts.

The construction and design was done by three students as an independent study project. The project has been installed, but work is still being done on the problem of filtering lint out of the heated air to prevent clogging of the heat exchanger. The project should be completed in June of 1980.

Organization	Sonoma State University
Address	Sonoma State University Rohnert Park, CA 94928
Contact	Roy Irving or Anne Dewey
Telephone	(707) 664-2577
Funded By	DOE, small grants program
Cost	$4,788
Congressional District	II
Compilation Date	February 1980

Critique/analysis: The system is easily replicable and involves only low-technology, but it is somewhat oversized in this experimental version.



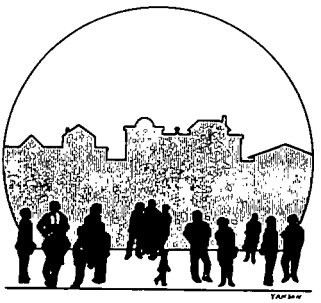
Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CA
Project Name	Indian Solar Systems

The forced-air heating system in the Community Center employs eight 4' x 10' collectors in a drain-down system with an 800-gallon storage tank. The tribe is paying for a full-time maintenance person to maintain the systems and explain them. It has also prepared a 20-page booklet about the solar systems, which it will distribute to other interested tribes.

The solar business includes retail systems, installation, consulting services and a bookstore.

Organization	Native Sun
Address	600 Petaluma Blvd. North Petaluma, CA 94952
Contact	Cindy Smith
Telephone	(707) 763-1413
Funded By	DOE
Cost	$10,980
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CA
Project Name	Solar Swimming Pool

The solar pool-heating system for this non-profit club was installed in 1974 at the suggestion of a club member whose son is an engineer working in solar.

The heating system consists of two loops with ethylene glycol in the absorber loop. The collectors provide 60 percent heating in the winter and 100 percent during the summer. The cost of the system for the 100,000+ gallon pool will be amortized in only 35 years.

Critique/analysis: The system is fairly appropriate for the climate. Glass is not needed (and was not used), collector inclination is correct, and the radiation is not obstructed at any time. However, the double loop system runs longer than is required. This design should not be replicated in Southern California as there is no threat of freezing in the area.

Organization	Mulholland Club Pool
Address	2555 Crestview Dr., Los Angeles, CA 90046
Contact	Dan Obannon Sy Wexler
Telephone	(213) 654-0550
Funded By	n/a
Cost	$6,000
Congressional District	XXIII
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Audubon Canyon Volunteer Ranch

Direct solar energy, wood and wind are all utilized to provide hot water and space heating and electricity for the Audubon Society's educational facility at Stinson Beach in Marin County. The Audubon Canyon Volunteer Ranch has 1,000 acres of wildlife sanctuaries, including one of the last egret sanctuaries in the state. The ranch was built up after the major oil spill in the early 1960's for preservation of California coastal/lagoon marine life and fauna. It has five to six thousand visitors each year and offers two and three day classes to people from first grade through senior citizens.

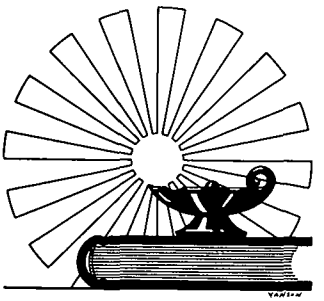
The site consists of an older refurbished education/kitchen/diving building plus a dormitory. One set of solar panels on the education building provides hot water for the kitchen and class facilities. The system has a by-pass to the back-up system (electric) for times when there are no guests and demands are minimal. The water temperature averages 140 degrees and it is stored in a 120-gallon tank.

The dorms utilize a thermosiphon system with flat plate collectors and a 123-gallon storage tank. They also use a franklin-type cast iron woodstove with a heat exchanger that takes one hour to heat water.

A windmill powers all the lights in the compound. It operates a 12 volt, 1 kilowatt generator that runs a six horsepower compressor. It is marginally efficient. The dorm was entirely hand-built by volunteers three years ago. It is built on a "post system" where walls are not structual supports, but flexible.

Organization	Audubon Canyon Volunteer Ranch
Address	4900 State Rt. 1, Stinson Beach, CA 94970
Contact	Ann Rosetta
Telephone	(415) 868-9980

Funded By	Private Audubon funds
Cost	Wind $3,500 Solar $3,000
Congressional District	II
Compilation Date	February 1980



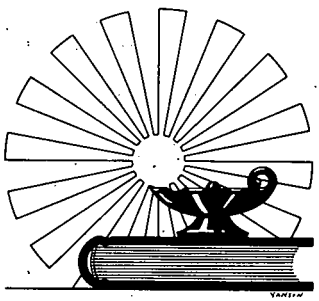
Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Cabrillo College Solar Curriculum

Cabrillo College offers a "Solar Energy Technology Certificate of Proficiency" to its students. Courses offered include "Solar Remodeling I & II," "Solar in Agriculture," and "Solar Electronics." The new certificate course is quite popular, and most classes are full.

Organization	Cabrillo College
Address	6500 Sequel Drive Santa Cruz, CA 95003
Contact	David Burton
Telephone	(408) 425-6452

Funded By	n/a
Cost	n/a
Congressional District	XVII
Compilation Date	February 1980



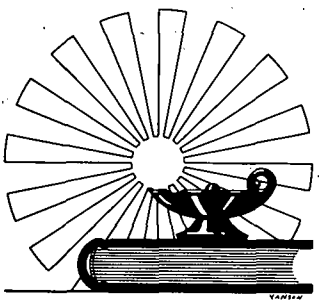
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Department of Corrections Solar Installer

The California Energy Commission plans to monitor and test a solar system while training inmates at a minimum-security prison. The State Department of Corrections facility in Corona will receive $19,000 worth of monitoring equipment to test systems for the State and private industry. The purpose is to provide general information on systems; it is not a certification program.

In the process of testing the systems, the inmates will receive training in installation. Attempts will be made to place trainees in businesses upon their release. The training program began in the summer of 1979, and testing was scheduled to start in early 1980.

Organization	Dept. of Correctio Solar Installer Training & Systems
Address	Corona, CA 91720
Contact	Wayne Parker
Telephone	(916) 322-9725
Funded By	CA Energy Commission
Cost	$19,000 for testing equipment
Congressional District	XXXVII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Energy Van and Theater Troupe

Organization	CalPIRG, San Diego
Address	3000 E Street San Diego, CA 92102
Contact	Chris Walker or Steven Sweetwood
Telephone	(714) 236-1508

Funded By	CA Energy Commission, Office of Consumer Education
Cost	$10,000-Van $20,000-CATT
Congressional District	XL
Compilation Date	February 1980

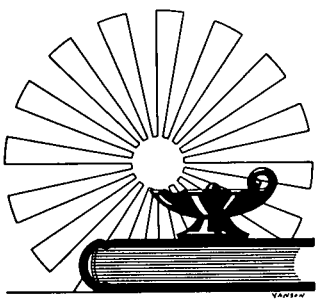
California Public Interest Research Group (CalPIRG) in San Diego has sponsored two programs designed to provide energy education for the general public in an entertaining way.

The CalPIRG Energy Van was funded through a one-year grant from the California Energy Commission in August of 1978 to educate the public about energy conservation and solar energy in different areas of the city, especially low-income areas. The van had mobile displays and presentations demonstrating various devices and options. Free pamphlets on more than 20 topics were distributed, as well as questionnaires, to help people evaluate their homes for energy efficiency. Although the grant expired in July of 1979, CalPIRG is continuing to sponsor educational workshops using the existing materials.

As part of the project, a special CalPIRG report, "Solar Energy Survey," was published in June of 1970. The survey gave comparative information about local solar businesses. The questionnaires had a "pre-audit" and "post-audit" phase. The survey indicated that inexpensive measures such as weatherstripping were employed by people who did the self-conducted audits and that the more capital intensive measures such as insulation were done less frequently.

CalPIRG is currently sponsoring the Consumer Action Theatre Troupe. CATT is presenting three productions--on energy, health, and housing--to ---ent information in a manner that is interest-:o the public.

"Worlds Apart," the energy production, was shown in October and November of 1979, and the other productions will be presented Winter 1979-80 and Spring 1980. Copies of the productions are available at a nominal charge and permission to produce will be granted upon request.



Renewable Resources—A National Catalog of Model Projects

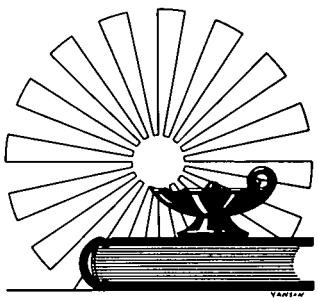
Category	Education
State	CA
Project Name	Habitat Center

The Habitat Center, founded in 1976, is a non-profit institute devoted to education, research, and technical assistance in the areas of passive solar design and construction. The Center's focus is on low-cost, ecologically sound, human-scale technologies that are effective but simple enough to be built and used by community people with a minimum of special training. The Center sponsors "hands on" workshops, as well as lectures and classes.

Activities at the Habitat Center's new location in Pacheco include the construction of a low-cost, passive solar heated and cooled integrated house-greenhouse. The house will feature solar heated hot water, and greenhouse food production.

An ecosystemic approach to plantings on the site will be emphasized, mixing production of food with that of drought tolerant plants that also provide wildlife habitats.

Organization	Habitat Center
Address	162 Christen Drive Pacheco, CA 94553
Contact	Jennifer Kelly
Telephone	(415) 825-8434
Funded By	DOE, HUD, CA of Housing and Dept. Community Development
Cost	$120,000/yearly
Congressional District	VII
Compilation Date	February 1980



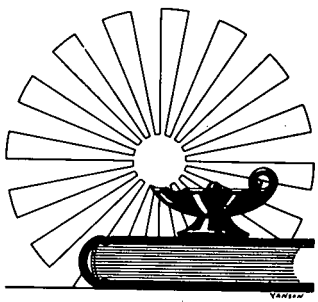
Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Net Energy Solar Technician Training (SUEDE)

Net Energy's Solar Technician Training Program is part of the Solar Utilization Economic Development and Employment (SUEDE) Program. Sixteen CETA employees are trained in solar energy theory, design and practice. They attend school and workshops for three months and install solar devices for six months. They design, construct and install passive tank-type solar water heaters, flat-plate water heaters, attached solar greenhouses and other south wall retrofits. The installations are made on low-income houses and are free-of-charge once the houses are weatherized.

Critique/analysis: Tours are planned for the public. The City of Arcata Planning Codes have been changed to exempt some solar devices from set-back restrictions. Energy analysis will be based on comparing fuel bill and temperature records kept on a daily basis by the homeowner.

Organization	Net Energy Solar Technician Training (SUEDE)
Address	854 9th St., Arcata, CA 95521
Contact	Kitt Mann
Telephone	(707) 822-5926
Funded By	Community Services Admin., Dept. of Labor and DOE
Cost	$186,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Net Energy Weatherization & Alternate Energy Demonstration

Four attached solar greenhouses, constructed on low income homes by Net Energy, were the first demonstrations of attached solar greenhouses in the community. The project generated tremendous interest in the concept, resulting in many installations by owner-builders. A set of plans for a free-standing greenhouse has been developed for distribution to the public.

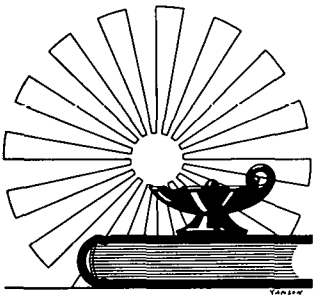
A basic lean-to configuration was used, designed to provide heat and growing space. One greenhouse was constructed in a weekend workshop.

The greenhouses are being monitored to gauge the temperature swing, and fuel bills are monitored to determine heat savings.

Critique/analysis: The County Building Department has altered its initially suspicious and negative stance, and has developed and adopted a valuation and permit fee determination system based on Net Energy's suggestions.

Organization	Net Energy
Address	854 9th St., Arcata, CA 95521
Contact	Kit Mann
Telephone	(707) 822-5926

Funded By	Community Services Admin. Weatherization monies
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

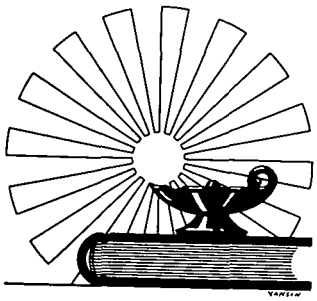
Category	Education
State	CA
Project Name	Owner-Builder Center

The Owner-Builder Center offers classes and workshops in the Bay Area to people interested in building their own energy-efficient homes. The 48-hour housebuilding course teaches standard construction techniques from foundation to finishing. It includes greenhouses and other passive design features. The center also provides courses in remodeling, design and drawing plans. Three times a summer the Center holds intensive three-week sessions where students are taught the 48-hour housebuilding course and receive on-the-job training by building a passive solar home.

The school also gives workshops in solar hot water installation and will begin leasing their housebuilding course to other communities in 1981.

Critique/analysis: In the summer of 1979, the Owner-Builder Center worked on a passive home designed by a former student. The project had a high educational impact on the community with articles in local papers and local TV news interviews.

Organization	Owner-Builder Center
Address	1824 - 4th St. Berkeley, CA 94710
Contact	Blair Abee
Telephone	(415) 848-5950
Funded By	Tuition and fees
Cost	n/a
Congressional District	XIX
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

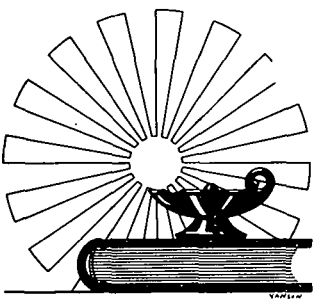
Category	Education
State	CA
Project Name	Project Life Lab

In the summer of 1978, a solar greenhouse was retrofitted to the elementary school building in the Live Oak School District, as a community project. The enthusiasm aroused by the project led to the creation of an entire "hands on" science program at the school.

Live Oak School District received funds in July of 1979 to establish an environmental education project for elementary students in biology, nutrition, ecology, and energy conservation. The students take part in experimental lessons on the farm site in conjunction with classroom study. For example, construction of a solar oven is followed up with a classroom lesson. The project involves all 450 students plus teaching staff. Interns from local colleges are also involved.

The 4-H clubs make use of the site for livestock. In addition, the students' families are involved in the projects so that what is done at the school will be carried on at home. The public may visit the farm and lab site.

Organization	Live Oak School I trict
Address	966 Bostwick Lane Santa Cruz, CA 95062
Contact	Roberta Jaffe
Telephone	(408) 475-0111
Funded By	Federal funding through ESEA Title IVC
Cost	$50,000 annually
Congressional District	XVII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

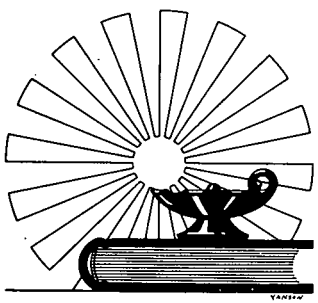
Category	Education
State	CA
Project Name	Redwood Park Energy Demonstration

The Howland Hill Outdoor School in the Redwood National Park is utilizing broad community participation to build and maintain a center to demonstrate appropriate technology. Schools, churches, youth and other community groups will be able to use the camp at various times of the year for overnight, or one-to-two week stays. Facilities will include two solar greenhouses, a wind generator, a breadbox and other solar collectors, and weatherization demonstrations. The project is being supervised by the Howland Hill school director and assistant director and will include labor and volunteers from many areas of the community. All the systems will be monitored.

The camp will enable local people to build, work with, and live with renewable energy systems. Many materials will be donated. Construction of many systems will be done in workshop format. Currently the project involves county schools, Redwood National Park Service, Youth Conservation Corps, local businesses and community groups. The Project will be publicized through county schools, environmental newsletters, and community organizations.

Organization	Howland Hill Outdoor School
Address	Redwood National Park Headquarters Crescent City, CA 95531
Contact	Jay Dottle
Telephone	(702) 464-6101

Funded By	Redwood National Park
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Sierra Committee Solar Training Project
Organization	Sierra Committee
Address	7993 Rock Springs Road Penryn, CA 95663
Contact	Carl Young
Telephone	(916) 663-3192
Funded By	Department of Social Services, CETA, donations
Cost	$80,000
Congressional District	I
Compilation Date	February 1980

Sierra Committee is a non-profit, educational corporation that conducts a training program to prepare AFDC* recipients in Placer County to find and keep private sector employment in the solar energy field.

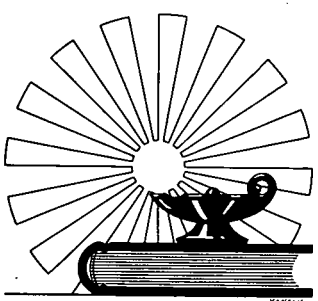
The project provides classroom and "hands on" training in the installation of passive and active solar systems in two six-month sessions. Classes are held full-time five days a week, and the first session began in June of 1979. Training seminars revolve around basic concepts in passive and active design, and a survey of the hardward currently available from various manufacturers.

Retired plumbers, carpenters, and small business people from Placer County communities are recruited to conduct both classroom and workshop training, to supervise the installation process, and to be available to the trainees on a continuing basis for advice and further training.

The program plans to install water-heating systems and solar greenhouses in the homes of low income people and the elderly in the community. Each system and greenhouse will be designed for the home and the homeowner in order to maximize the energy benefit to the family.

In addition to providing low-cost solar systems for rural AFDC families, the "hands on" training program provides community education in solar energy, and nurtures community self-reliance.

*Aid to Families With Dependent Children



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Solar Energy Technician Training Program
Organization *	Alternative Energy Center
Address	Sonoma State Univ. Rohnert Park, CA 94928
Contact	Roy Irving Anne Dewey
Telephone	(707) 664-2577
Funded By	CETA
Cost	$160,000 per year to train 16 people
Congressional District	II
Compilation Date	February 1980

One of the first solar training programs in California is offered through the Environmental Studies and Planning Department at Sonoma State University.

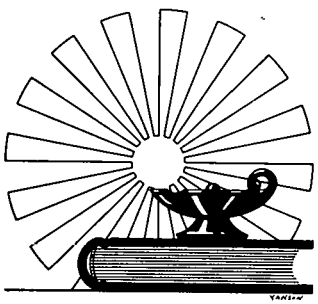
The program is not an installer-training course, but rather is designed to train a person to perform all of the necessary thermodynamic, trigonometric, and economic calculations necessary to choose the most cost-effective solar energy system for a particular application. Some "hands-on" experience is provided in order to familiarize students with the practical problems involved with solar heating systems. The training consists of courses in general physics, trigonometry, management, solar energy theory and applications, computer programming and electives.

CETA Title I funding pays for all administrative and instructional costs including salaries, office and classroom supplies and training materials. It also provides a training allowance for each student equal to the minimum wage for 39 hours per week, plus all books, tools and tuition fees.

Critique/analysis: The Project Director and Administrator/Job Developer have helped set up similar programs on other campuses in response to nationwide inquiry. The program has stimulated the solar industry and economy in [illegible]na and surrounding counties. Forty-seven [illegible]nicians have been trained since the [illegible]ram began in 1977.

The two managers of the program are not reapplying for funding for next year. The program is not supported by the school and therefore very dependent on the people who have established it.

* The project's sponsoring organization is CETA.



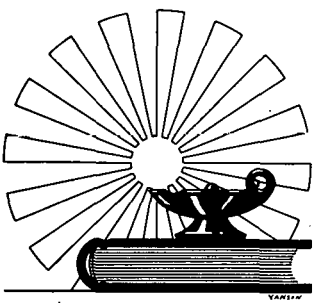
Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Solar Skills Training for CETA Workers

The Lakeview Educational Association provides CETA workers training in "Solar Energy Technologies," "Installing Solar Devices," and "Manufacturing." Students must take 250 hours of classes to complete a program in one of these subjects. They are also offered the option of eight weeks of on-the-job training and assistance in finding permanent employment.

Critique/analysis: Solar businesses are somewhat skeptical of the training program, though the more successful businesses employ the most program graduates. A few articles in local papers and an Open House on Sun Day of 1979 have provided most of the publicity the program has received.

Organization	Lakeview Educatio Association
Address	833 West Fir St., San Diego, CA 92101
Contact	n/a
Telephone	(714) 233-3485
Funded By	San Diego Regional Employment Training Consortium, CETA
Cost	$155,000 for 9 months
Congressional District	XXXIX, XL
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Solar Workshops for Local Government Officials

Organization	League of California Cities
Address	1400 K Street Sacramento, CA 95814
Contact	Katie Alvord
Telephone	(916) 444-5790

The League of California Cities held regional workshops for local government officials designed to teach them about solar energy and to help them make informed decisions about solar development, solar building inspection, planning and policy.

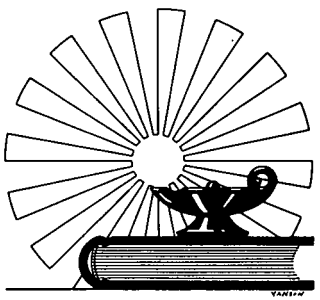
This project began in 1978 with proposals for the development of a workshop target audience, workshop format and a proposal for a reference handbook to be used at workshops. The Solar Handbook for Local Government Officials was published in early 1979 and used in six pilot workshops in the spring of 1979 before being utilized in the current series.

The project began with a research phase aimed at determining the level of solar understanding and activity at the local level of government. With the help of an advisory board of local government officials, an appropriate technology workshop and handbook was designed, set up and implemented.

Much of the information presented was delivered by local government officials aware of recent local solar developments.

Funded By	Intergovernmental Personnel Act, Calif. Energy Com.
Cost	$46,000 first stage $21,000 second stage
Congressional District	State-wide
Compilation Date	February 1980

Critique/analysis: Because solar energy is expanding so rapidly, it has been difficult to keep all information up to date. A major complaint from those attending the workshops was that there was not enough time. The program director would like to see more time allotted for advanced solar workshops as well as time and funding for workshops for other interested groups.



Renewable Resources— A National Catalog of Model Projects

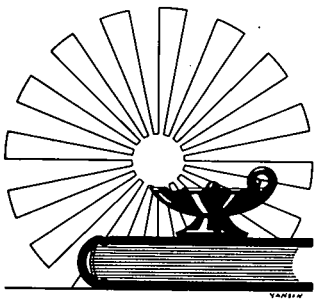
Category	Education
State	CA
Project Name	University Energy Program
Organization	Environmental Studie Energy Program
Address	Sonoma State University Rohnert Park, CA 94928
Contact	Steve Norwick
Telephone	(707) 664-2306
Funded By	State Colleges & Universities
Cost	n/a
Congressional District	II
Compilation Date	February 1980

In 1973, Roy Irving started the Solar Energy program as a student project. He and six other students built the first energy center, and had the first "Alternative Energy Fair." After graduating, Roy founded the Energy Studies Program in the Environmental Studies and Planning Program department (ENSP) in 1977.

The Energy Plan is one area of concentration offered through ENSP. A two-year program that features courses in solar energy, physics, math, social sciences, and management can be taken after completing two years general studies.

The Energy Studies Plan stresses low-technology solar (passive), although theories of active solar are taught as well. It also emphasizes energy use and energy-efficiency.

Critique/analysis: Enrollment in the ENSP department is increasing every year, and demand for the Energy Plan is tremendous. The community has felt the impact of the program through increased stimulation of interest and knowledge in solar and other alternative energies. The program is publicized only through the University's catalogue and through a brochure available to interested parties through the department.



Renewable Resources— A National Catalog of Model Projects

Category Education

State CA

Project Name Wind and Kid Power

Organization	Vallejo Unified School District
Address	Loma Vista Farm/Garden Center 146 Rainer Street Vallejo, CA 94590
Contact	Caroline Libbey
Telephone	(707) 643-0341

The Farm/Garden Center is an education-demonstration center for the Vallejo Unified School district.

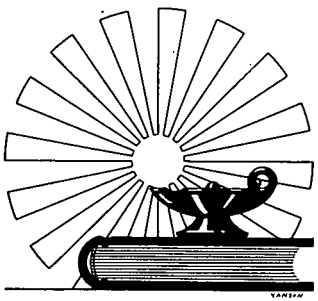
Students may visit the farm on a daily basis, for one week periods, or once or twice a week. Their classroom math, writing and discussions focus on their "hands on" experience of the farm. The directors of the farm project have researched the effect of the farm experience on the academic performance of the children, most of whom are low-income minority children. The improvement in reading, writing and math skills is significant.

Using the simple vertical-axis Savonius Rotor design, the wind machine powers a pump that aerates the pond at the Farm/Garden Center. The purpose of the wind power project is to diffuse wind technology to the community and to involve the students with technical and scientific personnel in research and industry.

The Savonius Rotor was chosen because its design is simple, the costs (for building materials, construction, and maintenance) are relatively low, it can utilitze wind from all directions, it has a high starting torque and it is appropriate for pumping water. The windmill was constructed and installed by a local craftsperson with the help of students. The wind and performance data are being monitored through a weather station and PG&E.

The wind-power demonstration has served as an effective teaching tool to prepare children for a broader perspective on energy and ecosystems. Parents are encouraged to participate at the Center and the wind project was highlighted during the last Sun Day event. The project, begun in September of 1978 and completed May of 1979, was evaluated by the State Office of Appropriate Technology as one of the best demonstrations of appropriate technology in a public place.

Funded By	Public Gas & Electric (PG&E) DOE
Cost	$4,500
Congressional District	IV
Compilation Date	February 1980



Critique/analysis: The wind tower was toppled and severely damaged by 80 to 90 mph winds before it was grounded. The machine will be repaired and operating by Spring of 1980. Plans are also being made to construct a solar greenhouse to eventually replace the gas-powered hydroponic greenhouse.

Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Wood Energy Cogeneration

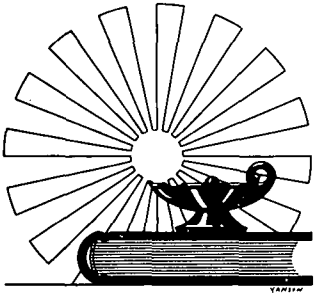
Students at the University of California Santa Cruz (UCSC) campus have developed a co-generation plant that would use wood wastes to provide electricity and heat for the campus.

Two members of the UCSC Alternative Energy Collective conducted a preliminary feasibility study that found that a 2.5 megawatt system would be optimal, providing 75 percent of the campus' electricity needs and meeting 50 percent of its heating load. The system would use waste wood from local sawmills that would be burned in a fluidized-bed combustor to drive an indirectly-fired gas turbine. Waste heat would be used for space-and water-heating through the present district heating system. The Alternative Energy Collective is now seeking funds for a $20,000 engineering study.

Critique/analysis: The project would remove a waste-disposal problem the sawmills have, and it could turn other waste wood in the country (including municipal trimmings) into resources. Particulate-control devices will be added to the system to control pollution.

A series of public symposiums on the project took place in April and May of 1979. The response was generally favorable, and several helpful suggestions for noise control traffic routing were made.

Organization	UC Santa Cruz Wood Energy Cogeneration
Address	Santa Cruz, CA 95060
Contact	Scott Roseman
Telephone	(408) 475-6868
Funded By	DOE
Cost	n/a
Congressional District	XVII
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Financing
State	CA
Project Name	Solar Loans

Organization	Home Federal Savings and Loan Association
Address	701 Broadway San Diego, CA 92101
Contact	H. Dennis Campbell
Telephone	(714) 238-7564

Funded By	n/a
Cost	n/a
Congressional District	XXXIX and XL
Compilation Date	February 1980

Over two years ago, Home Federal Savings and Loan of San Diego began a comprehensive program committed to energy conservation and solar development. Among its actions were the establishment of preferred-rate home-improvement loans for energy-conservation retrofits, and for energy-efficient construction for existing conventional loan customers; the establishment of an Energy Counselor; and steps to provide conservation literature for the public.

The Association acts on the premise that by providing loans for energy-efficient homes, the borrower will have reduced utility bills and more spendable income. Thus, the applicant is a better risk and will possibly be able to qualify for larger loans.

Home Federal has financed nearly 200 multi-family solar units (including a 38-home tract using active solar water heating and many passive features), a HUD award-winning passive house, and many other active and passive solar homes. In addition, three of the bank's branches are outfitted with active solar hot water systems.

The preferred-rate home-improvement loan is designed so that the interest-rate reduction increases proportionately with the percentage of the loan used towards energy conservation. In other words, the larger the percentage of a home-improvement loan used for energy conservation, the larger the interest-rate reduction.

The Association has a full-time Energy Counselor who works with the building and utility communities to encourage their cooperation in and understanding of the incentive programs for energy-efficient home construction. (Home Federal sponsored an energy seminar for builders in November 1979.)

Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	CA
Project Name	Energy Efficient Home

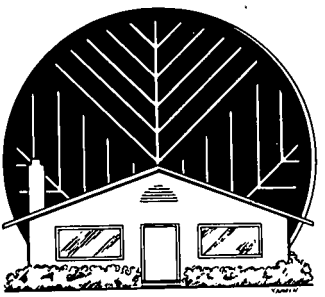
With the help of a thermal envelope specialist from San Francisco, Tom Smith built a highly efficient solar demonstration home. The home was designed to achieve 80 percent self-sufficiency for heating (with a wood-burning stove for backup) and cooling. The house is economical, uses standard building techniques and materials, and is in complete compliance with building codes. The building was also designed to be financed conventionally.

The thermal envelope concept basically involves an exterior shell that wraps the house, creating an "envelope" of tempered air. Between the shell and the house wall on the south side is a greenhouse. The shell creates a convective loop and provides a space that acts both as a collector and a storage medium.

Smith's heating expenditure for the entire winter consists of the purchase of two-thirds of a cord of wood. In contrast, a neighbor spent more than $200.

Critique/analysis: Smith's home has had an impact on the country. He has responded to more than 10,000 letters! Some 5,000 people have toured his home and the handbook describing the home is in its 4th printing. Currently 1,000 homes across the country are being built based on the thermal envelope concept.

Organization	Tom Smith
Address	P.O. Box 2356 Olympic Valley CA 95731
Contact	Tom Smith
Telephone	(916) 583-5362
Funded By	Conventional 30 year mortgage through Bank of America
Cost	$54,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

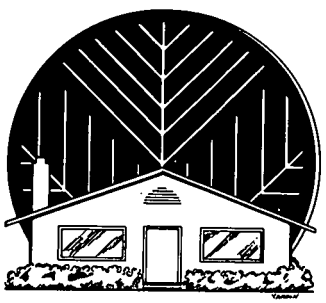
Category	Housing
State	CA
Project Name	Farm Labor Center: Solar Water Heaters

The Southwest Border Regional Commission has a one-year project to extend the benefits of solar energy to low-income people in the Border Region and to encourage economic development. The Farm Labor Center is a 35-unit housing development for farm workers operated by the Riverside County Housing Authority.

Breadbox solar water heaters were installed on the existing houses in the winter of 1979-1980. The breadboxes were designed and are being built in the training program of the San Bernadino West Side Community Development Corporation. This community-based training program will also install the breadboxes.

The installation will be open to the public; arrangements to see the systems may be made through the office for the Farm Labor Center. The Housing Authority plans to run an educational program for the residents to explain how the systems work.

Organization	Farm Labor Center
Address	47094 Van Buren Indio, CA 92201
Contact	Wayne Parker
Telephone	(916) 322-9725
Funded By	Southwest Border Regional Commission
Cost	$120,000
Congressional District	XXXVIII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

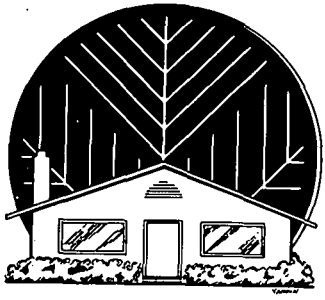
Category	Housing
State	CA
Project Name	Passive Solar Home Retrofit

The owner-builder moved to the community in 1977, saw that there were no solar homes within 100 miles, and decided to build a demonstration of passive solar retrofit. He bought a commercial building of concrete block and is converting it into an office, shop and residence. Construction started in February of 1979. Completion has been delayed, presumably until about the fall of 1981. However, some of the solar features can be seen.

The retrofit utilizes a modified trombe wall with an attached greenhouse. There was no detailed comparison made during the planning to compare non-solar versus solar design. Wood will be used as a back-up heating fuel; wind power will be used for electricity.

Already there has been some local interest, although there hasn't been much to show so far. There has been one article in the Klamath Falls paper. At any time the builder is in town--as determined by a phone call--any interested party is welcome to visit.

Organization	Horace McCracken
Address	329 W. Carlos Alturas, CA 96101
Contact	Horace McCracken
Telephone	(916) 233-3175
Funded By	Personal
Cost	n/a
Congressional District	I
Compilation Date	February 1980



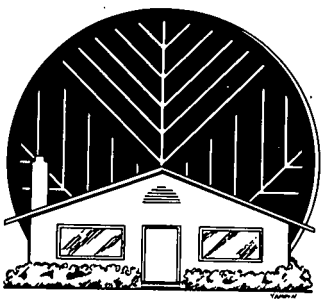
Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	CA
Project Name	Solar for Low & Moderate Income Housing
Organization	Colorado Park Apt
Address	1141 Colorado Ave., Palo Alto, CA 94303
Contact	Louis Goldsmith
Telephone	(415) 856-9377
Funded By	HUD Demonstration Program
Cost	$23,000
Congressional District	X
Compilation Date	February 1980

The Colorado Park Housing Corporation's circulating solar hot water system provides hot water for 60 low to moderate income apartments, serving approximately 180 people. The collectors are located on the south-facing roof of the Community Center, which also houses the laundry facilities and the natural gas back-up system.

Members of the Colorado Park Housing Corporation and members of the City Council of Palo Alto proposed the project. It has been in operation since 1977.

Critique/analysis: There have been no operational problems; however, this project has had little impact or response from the community due to the lack of publicity, other than the opening ceremonies in 1977. This type of low-income community housing project is easily replicated.



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	CA
Project Name	Stanford Univ. Dormitory Solar Heating

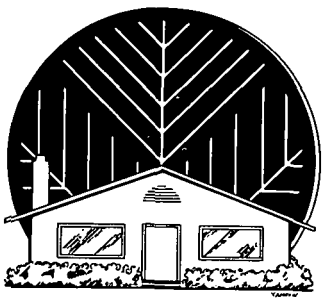
A women's residence on the Stanford University campus was retrofitted in December of 1977 with an active, liquid solar domestic water heating system. The planning, design and installation were done by a group of students enrolled in an energy-conservation course sponsored by the Stanford Workshop on Political and Social Issues Department. The dormitory houses 32 students during the nine-month school year and fewer during the summer.

A 172 ft.^{2} array of panels is mounted on the roof of the residence hall. A 225-gallon storage tank is located in the basement of the building, along with a back-up conventional water heater. The storage tank is connected in a thermosiphon loop, eliminating the need for an additional pump, to another 225-gallon tank and the 30-gallon gas fired water heater.

The solar system is estimated to provide about 30 percent of the energy needed to heat the water supply from September to June. During the summer, when the number of residents decreases, the percentage of energy supplied by the solar system increases. The hot water supply was increased with the installation, and the student group involved in the project did energy-conservation education programs with the residents that helped cut down shower time. The conservation effort resulted in a 34 percent reduction in electricity use alone. Low-flow shower heads were installed as well and have reduced water flow by about 50 percent.

Critique/analysis: There have been minor mechanical problems such as air entrapment, which has been corrected, and the system has performed very well since.

Organization	Stanford University
Address	Stanford, CA 94305
Contact	n/a
Telephone	(415) 497-2300
Funded By	Energy Conservation Ctr. in the Office of Housing Management at Stanford
Cost	$5,700 for the system; $2,300 for stairs & railing
Congressional District	X
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	CA
Project Name	Ventura del Sol Apartment Complex

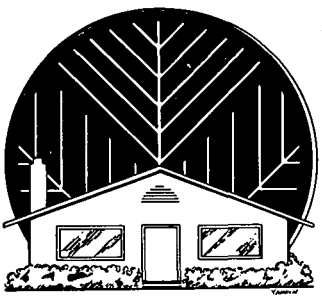
Ventura Del Sol is a 254-unit apartment complex that, according to the designer, is the world's largest solar space-heating and domestic hot water system. The solar system services the apartments, two recreation rooms, three laundries, a jacuzzi, and a pool.

The cost of auxiliary gas in one year of operation at 100 percent occupancy has been less than $4 per unit per month. The system cost no more to install than gas furnaces; the developer, who has 96 units now in operation, claims the system cost less to install than gas furnaces. The system's designer believes that the utility bills are the lowest for any apartment project in the U.S.

Systems manufactured by the same company as this one have been used for projects in fifteen states, Canada, Mexico, Switzerland, Iran, Hawaii, Australia and Argentina. (Both Iran and Mexico installed major systems in government buildings and are currently designing the system into projects of 310, 500, and 1,200 homes.)

The Ventura Del Sol Project was featured by "60 Minutes" in its June 3 and September 9, 1979 programs, and by the Department of Energy film, "The Great Adventure."

Organization	Ventura Del Sol
Address	6500 East Telegraph Rd. Ventura, CA 93003
Contact	n/a
Telephone	(805) 644-5503
Funded By	Conventional construction loan through Santa Barbara Savings
Cost	$291,000
Congressional District	XVIII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CA
Project Name	Davis Energy Efficiency

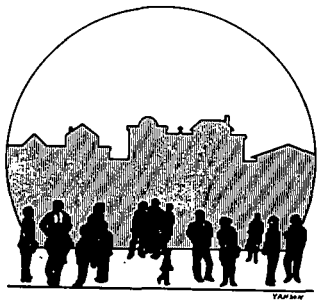
Davis, California, a college town of close to 40,000 near Sacramento, was the nation's first city to begin confronting the energy problem on the local level. Over the last decade, its pro-solar, pro-conservation, and pro-environment policies have inspired local action in communities across the country.

Even before the Arab oil embargo, Davis had embarked on a program to conserve energy. In 1968 the City Council moved to curb growth. It passed legislation regulating insulation, glass, and orientation. Energy efficiency was used as an important criterion in deciding which developer's plans would be accepted for the limited growth. Developers were also encouraged to incorporate solar technologies into their buildings.

The city has long encouraged transport by bicycle and bus. It is cutting back on the use of pesticides on trees and shrubs that shade the streets, opting instead for biological controls for insects. City-owned cars and trucks have all been converted into compacts. And recently the city has adopted a conservation retrofit ordinance.

The results of these programs is extraordinary. While the population has increased by 7 percent, consumption of electricity has declined by 6 percent. Since the 1973 Arab oil embargo, electricity consumption per customer has declined by nearly 18 percent.

Organization	City Hall
Address	218 F Street Davis, CA 95616
Contact	n/a
Telephone	(916) 756-3740
Funded By	n/a
Cost	n/a
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

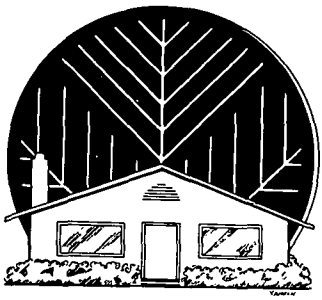
Category	Housing
State	CA
Project Name	Village Homes: Conservation-oriented Subdivision
Organization	Village Homes
Address	2310 Portage Bay Ave. Davis, CA 95616
Contact	Judy Corbett
Telephone	(916) 758-8505
Funded By	Conventional development financing
Cost	$40-$100,000 per unit
Congressional District	IV
Compilation Date	February 1980

Village Homes is a development of 240 units that includes 40 apartments on 70 acres in Davis. All the homes are passively designed, and most have solar water heating. In addition, the entire development has features that minimize energy use.

The lots are small and grouped in clustered "cul de sacs." All the houses face a common center area. Many of the streets, which run behind the houses, are dead-ends, discouraging car use within the Village. There are well-planned bike paths through greenbelts; they allow off-street travel by bike or foot throughout the entire development. A small business and recreation area is planned for use by Village residents to cut down on automobile trips to town.

Other conservation measurements incorporated into the development include narrower streets, the use of which minimizes black asphalt surface (which raises the temperature); extensive greenbelts of native plants and fruit trees (which produce food for use within the development); and a community compost for organic waste, to be used in community gardens. Other unique features include an above-ground drainage system of culverts that replaces ground water through percolation (unlike storm drains, which carry water away from the site).

Critique/analysis: Village Homes has brought Davis into the national spotlight as a tangible, visible realization of many energy-conservation and solar concepts. The development has been featured in over 60 publications throughout the U.S. and other countries. The developers and residents have given lectures and taught classes on passive design through the University of California Energy Extention. The Village has been featured on educational television and major network specials.



Renewable Resources— A National Catalog of Model Projects

Category	Industrial
State	CA
Project Name	Environmental Container Reuse Program

Organization	Eco-ENCORE!
Address	5951 Doyle Emeryville, CA 94662
Contact	Richard Evans
Telephone	(415) 849-2525

Funded By	DOE
Cost	$7,900
Congressional District	IX
Compilation Date	February 1980

In 1975 the Ecology Center of Berkeley started the Environmental Container Reuse Program (ENCORE!) to demonstrate the feasibility of reusing wine bottles. The project was so successful it expanded, moved to a larger building and added solar and conservation measures that made it even more successful.

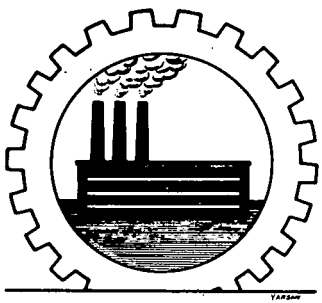
Approximately one million wine bottles received from wineries, community groups, and individuals are washed, sterilized, packaged and returned to wineries for reuse every year. The demand outstrips the supply of recycled bottles that can be washed and reused.

The reuse process uses only about one-third the energy required to manufacture new bottles. The project organizers found that half of the energy used in the washing process could be saved by reclaiming some of the heat in the discharge water and by supplementing the gas-fired boiler with solar energy. The heating from waste-heat recovery actually contributes more to heating the water than the solar panels do.

The hot waste-water is run counter-current to the incoming clean water through two heat exchangers and is then further heated as it circulates through the solar panels before entering the washing machine. This eliminates the need for steam in the rinse section of the washer and reduces steam consumption in the wash ection.

Besides reducing the fossil fuel requirements of the process to a very low amount, the solar and conservation project improves the economics of the bottle washing.

In 1978 the Ecology Center sold the project to Eco-ENCORE!, a California corporation.



Renewable Resources— A National Catalog of Model Projects

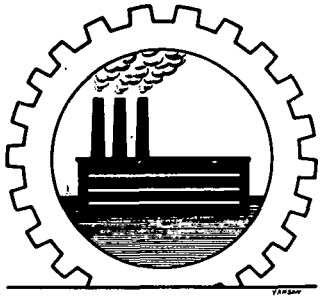
Category	Industrial
State	CA
Project Name	Georgia-Pacific Corporation
Organization	Georgia-Pacific Corporation
Address	90 W. Redwood Ave., Fort Bragg, CA 95437
Contact	Inez Freeman
Telephone	(707) 964-5651
Funded By	Privately funded through lumber company owners.
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The Georgia-Pacific Lumber Mill began burning bark and waste wood for steam generation and electricity in 1910. The Powerhouse expanded as the mill and city of Fort Bragg grew. At one time, the mill supplied all the power Fort Bragg, Mendocino, and Point Arena needed.

The Powerhouse utilizes three boilers with a combined capacity of 15 megawatts. They are fueled almost entirely by wood and formerly wasted wood products — bark, chips, slabs, chunks, shavings and sawdust. The efficiency, currently at 70 percent, is limited by wet fuel and other factors.

The Powerhouse has the capacity to supply the city of Fort Bragg with power if necessary and its waste-burning capacity eliminates the need for landfill elsewhere.

The local utility and Georgia Pacific have joint programs to inform the public of the system, and Georgia-Pacific issues news releases as appropriate.



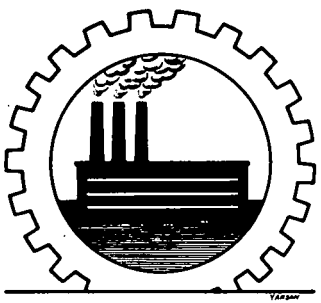
Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	CA
Project Name	Hewlett Packard Building

The active solar system at Hewlett-Packard Automated Measurement Division plant was designed by a plant-facilities engineer to preheat boiler water for space heating, air conditioning, reheating, and for domestic water heating. The system was retrofitted onto a 165,000 ft^2 building. It saves an average of $1,000 to $2,000 per month on gas bills and an estimated 65 percent of the total gas bill.

The conventional heating-and-cooling system in the Hewlett-Packard Plant typifies that on many buildings constructed before the price of energy began to rise in 1973. The inexpensive solar installation that was added demonstrates how an industry can reduce fuel bills using available personnel and expertise.

Organization	Hewlett Packard Corporation
Address	Sunnyvale, CA 94088
Contact	n/a
Telephone	(408) 735-1550
Funded By	Hewlett-Packard
Cost	$30,000, exclusive of labor costs
Congressional District	X
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	CA
Project Name	Peach Pits for Fuel

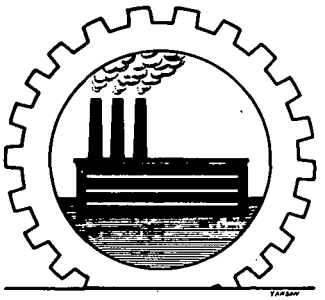
Peach pits have long posed an environmental problem in peach-growing areas, since limited use has been found for them. But using peach pits for biomass eliminates the disposal problem while providing an additional energy source.

Tri-Valley Grower's Plant #7 is one of the world's largest facilities for preserving, storing, and distributing food products. Six thousand tons of peach pits with a heat value of about 8,500 btu/pound are available to TVG per season.

During 1978, TVG installed the necessary equipment (an existing 60,000 pound/hour steam-generating boiler) for utilizing peach pits as boiler fuel. First, the pits are transported to two disintegrators that grind the pits down to .050 inch particles. The burner system swirls the pits out of the burner where 2200 F boiler heat creates instant ignition. Boiler fuel is 80 percent ground peach pits fired with 20 percent natural gas or fuel oil to eliminate flame-out problems.

Organization	Tri-Valley Grower (TVG) 61
Address	Box 948 Modesto, CA 95353
Contact	Ralph Chandler
Telephone	(916) 920-6033
Funded By	CA Energy Commission
Cost	$345 000
Congressional District	XIV
Compilation Date	February 1980

Critique/analysis: Problems were encountered in reaching the optimal peach pit size (.050 inches). These cut the grinding capacity by 50 percent and increased the amount of particulate emissions. Apart from these inconveniences, the system has worked satisfactorily.



Renewable Resources—A National Catalog of Model Projects

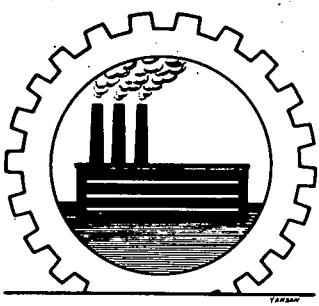
Category	Industrial
State	CA
Project Name	Solar Industrial Building

One of the largest solar buildings in the nation utilizes active solar devices and Trombe walls to provide electronics firms in Palo Alto, California with space-and-water-heating and the potential for cooling.

Two separate, but semi-adjacent buildings each have a large array of collectors on their south-facing roofs, tilted at the optimal angle as an integral part of the building design. This fluid system is designed for expansion to include and be compatibel with present cooling systems, but developers have not been able to secure funding to activate it. The back-up system is natural gas. Passive solar heating is provided through glass panels on the south-facing walls of each building. The panels capture solar heat, which rises and is drawn into the building over the top of the panels.

Critique/analysis: DOE is monitoring the enery savings, but results at this early stage of operation are too scant for evaluation. The primary community response has been from other developers wanting to know how to replicate the project. The building has been widely publicized in Santa Clara County via newspaper articles and T V reports.

Organization	Solar Industrial Building
Address	2330 Scott Blvd., Santa Clara, CA 95050
Contact	Richard Trice
Telephone	(415) 321-3040
Funded By	DOE, Building owners
Cost	n/a
Congressional District	X
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

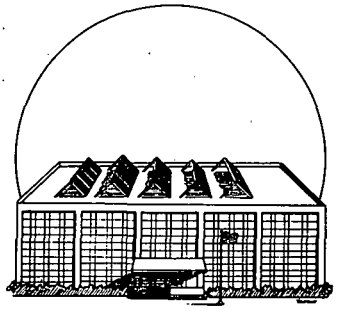
Category	Institutional
State	CA
Project Name	Argonne Day Care School Solar System

The Argonne Day Care Center has a solar water-preheating system that provides about 200-gallons of hot water per day for the school. The system, operating since January of 1978, is monitored and raises the average temperature from 60 degrees F to 110 degrees F. The school children and nearby residents can observe solar working.

Organization *	Argonne Day Care School
Address	750 16th Avenue San Francisco, CA 94118
Contact	Steven Hauhn Ed Dierauf
Telephone	(415) 387-1600

Funded By	San Francisco United School District
Cost	$4,500
Congressional District	VI
Compilation Date	February 1980

* The project's sponsoring organization is San Francisco Unified School District, 135 Van Ness Avenue, San Francisco, CA 94102.



Renewable Resources— A National Catalog of Model Projects

Category	Institutional
State	CA
Project Name	El Camino Real School Solar Project

The El Camino Real Solar Project is a retrofit installation of evacuated tube solar collectors that serve as an alternative energy source to drive two absorption chillers for air conditioning the 45,000 ft^2 elementary school building.

Water is heated to a high temperature in the 5,000 ft^2 of collectors and is then pumped through the collector flow loop to a heat exchanger. The thermal energy is then transferred to a second high-temperature water loop that has an auxiliary water heater. The solar control system turns the auxiliary water heater on automatically whenever there is not enough solar energy available to meet the building load.

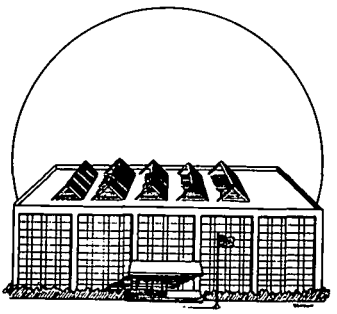
The high temperature water in the second loop provides the energy to power the two 100-ton absorption water chillers. The chilled water is then used in the air conditioning system to cool the building. The high temperature water is used directly to heat the building whenever needed.

When the solar energy being collected is greater than the energy needed for heating or cooling the building, the excess energy is dissipated by a heat rejector on the roof.

The project is the first combined heating and cooling system in the state to be installed as part of the National Solar Heating and Cooling onstration Program. It has been operational ce April of 1979, supplying up to 55 percent ot the heating and cooling needs of the school.

Organization	Irvine Unified School District
Address	4782 Karen Ann Lane Irvine, CA 92714
Contact	David E. King
Telephone	(714) 551-3090

Funded By	DOE Demonstration and cost sharing
Cost	$428,000
Congressional District	XXXVI
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	CA
Project Name	"Site One" Office Building

The State Architect Office's goal for Site One is to "provide a handsome, amenable, energy-efficient environment for people" by applying passive solar principles of residential construction to state buildings.

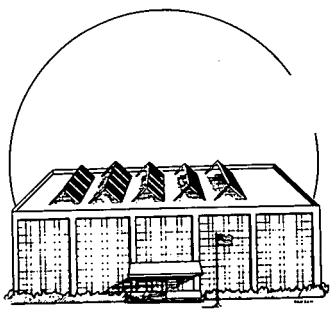
About 60 percent of the construction of the 270,000 ft^2 building was complete as of April 1980.

The building is designed around a 150' x 144' enclosed atrium. This atrium serves as the main circulation, and it has places for employees to meet for lunch or coffee. The atrium is covered by large louvers, which allow heating of the concrete interior during the winter. Summer cooling is accomplished by night (cool-air) flushing and rock-storage flushing. During the daytime, air circulation from the atrium and 1,320 tons of rock storage provide cooling. Trellises, movable louvers and sunscreens all control light and temperature. These features permit the incorporation of large window areas while minimizing cooling needs. There is a back-up water chiller system from the State central system.

Large numbers of people are expected to examine this design, and it is expected to be used as a basis for other energy-efficient designs for large governmental office buildings.

The light, temperature, and visual aspects are expected to be very good, although there is some skepticism among state workers about working in an interior open-landscaped office environment.

Organization	Office of the Stat Architect
Address	9th & P Streets Sacramento, CA 95814
Contact	Glenn Hezmalhalch
Telephone	(916) 322-4932
Funded By	State of California
Cost	$19 million
Congressional District	III, IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

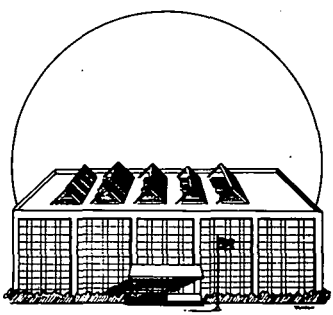
Category	Institutional
State	CA
Project Name	Solar Fire Station
Organization	Lake Valley Fire District Station
Address	Box 11132 Tahoe Paradise, CA 95705
Contact	Jerry Lucas
Telephone	(916) 544-7940
Funded By	N.A.S.A.-U.S. Government provided 70% of cost
Cost	$11,000
Congressional District	XIII
Compilation Date	February 1980

During the construction of the Lake Valley Fire District Station in 1975, a solar company approached the fire department with the idea of making this station a solar demonstration project. This was the first federal solar project in California, and the smallest funded by the government.

The drain-down active solar system averages about 50 percent efficiency over the year. The sixteen solar collectors can supply radiant heat to the living area, a domestic hot water loop, and - to keep the fire trucks clear during winter- two other heating loops to melt ice build-up on the driveway and on the engine floor area. A conventional boiler functions as a back-up system, although it has been discovered that an "either/or" function is more efficient than having the boiler supplement the collectors and the 650-800 gallon storage.

Critique/analysis: On the average, two to three people per week look at the facility as a demonstration of solar energy use.

IBM monitors the system for the Department of Energy; however, this information is not readily available to the fire department personnel who oversee the system. The system has had some problems, especially in the first two years of operation. Fifty percent efficiency was the original goal and has been attained, but the system is an awkward, early and non-integrated attempt. For example, the cinder block construction and garage doors allow excessive heat loss.



Renewable Resources— A National Catalog of Model Projects

Category	Legislation
State	CA
Project Name	Davis Energy Conservation Building Code and Retrofit Ordinance

The Davis Energy Conservation Ordinance states that new residential housing built in Davis shall not lose excessive heat in the winter or gain excessive heat in the summer. The requirements, which are expressed in BTU's gained or lost per square foot of the house each day, vary depending on the size of the housing unit. The thermal efficiency of all housing designs presented to the city's building-inspection division must be tested against conditions assumed to exist on typical summer and winter "design" days.

Various methods are used to meet the requirements: insulation, south-facing glazing, proper shading, and thermal mass. Builders may follow either a performance path, demonstrating that the proposed design meets the Btu loss and gain requirements, or may follow a descriptive path conforming to specific provisions.

A Retrofit Ordinance passed in October of 1979 stated that, upon reselling a home, a homeowner must either upgrade the property by following outlined energy conservation technologies or demonstrate that the energy improvements already existing in the house save at least as much energy as the prescribed conservation technologies. These technologies include attic insulation, weather-stripping, a water-heater blanket, and a low-flow shower head.

Critique/analysis: The code and ordinance are still relatively new, so there has not yet been a visible effect on energy consumption. Similar ordinances are being considered in many cities throughout California, including Indio, Sacramento Bakersfield, and Chico.

For more information on Davis see "Appropriate Technology Subdivision" of the Housing category.

Organization	City of Davis
Address	226 F Street Davis, CA 95616
Contact	Housing Inspector, Energy Specialist
Telephone	(916) 756-3740
Funded By	n/a
Cost	n/a
Congressional District	IV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	Legislation
State	CA
Project Name	San Diego County Hot Water Heating Ordinance

Organization	County of San Diego Board of Supervisors
Address	1600 Pacific Highway San Diego, CA 92101
Contact	Roger Hedgecock
Telephone	(714) 236-2271
Funded By	n/a
Cost	n/a
Congressional District	XXXIX & XL
Compilation Date	February 1980

In December of 1978, the San Diego County Board of Supervisors adopted the first ordinance in the nation mandating solar water heating in new homes. The ordinance requires that after October 1 of 1979 new residential construction on lots in areas that have demonstrated solar access but that are not served by natural gas shall have a solar heater as the primary means of water heating. This extends to all areas of the County after October 1, 1980.

The County of San Diego originally became involved with energy management and planning as a result of the oil embargo of 1973-1974. In response to the lack of a coherent energy policy from the federal and state governments, the County Board of Supervisors decided to provide what leadership it could in local energy planning.

The Board's first step was to establish procedures for maximizing energy conservation through use of energy-conserving systems and practices, including solar technologies. Between fiscal years 1974 and 1976, energy consumption within county facilities was reduced by 59 percent! Subsequently, the County developed an energy element for the General Plan and in August of 1977 it set up an energy office. This office prepared the Solar Ordinance Feasibility Analysis and draft ordinance.

The need for the ordinance was suggested by public interest groups during hearings on the ty Energy Element.

In 1979 the City of Santa Barbara adopted a similar hot water heating ordinance.

Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	CA
Project Name	State of California 55 Percent Solar Tax Credit

The 55 percent solar tax credit was created by landmark legislation sponsored by Assemblyman Gary Hart in 1977. It applies to any solar system installed between January 1, 1977 and December 31, 1980 which has a useful life of at least three years. The tax credit is for 55 percent of the total cost of purchasing and installing a solar system for under $12,000. The legislation also creates a 25 percent tax credit for a system installed on non-single-family dwellings where the cost is greater than $12,000.

The solar tax credit is not merely a deduction used in computing the total amount of income tax. It is subtracted from the state income tax owed. If the tax credit is greater than the total state tax bill, the unused credit carries over to following years.

Conservation measures such as insulation, weatherstripping, and water flow restrictors are eligible for the solar tax credit when installed in conjunction with a solar system to improve the system's performance and when consistent with the system usage.

Organization	CA State Energy Commission
Address	Solar Office 1111 Howe Avenue Sacramento, CA 95814
Contact	n/a
Telephone	(800) 852-7516
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	CA
Project Name	Open Road Urban Corps

The SW Border Regional Commission has a one-year project to extend the benefits of solar energy to low-income people in the Border Region and to promote economic development.

The San Diego project will consist of 30 single-family homes in the southeastern part of the city. Three types of low-cost water-heating systems will be installed on previously weatherized homes by a community-based training program, Open Road. The three systems, (thermosyphon, bread box and a pump-operated system) will be monitored.

Organization	Open Road Urban Corps
Address	4235 National Avenue San Diego, CA 92113
Contact	Walter Eadumu or Jerry Hull
Telephone	(714) 263-4491
Funded By	Southwest Border Regional Commission
Cost	Part of a $120,000 project
Congressional District	XXXXI
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	CA
Project Name	San Bernardino Solar Economic Development

The San Bernardino West Side Community Development Corporation (CDC) is the nation's largest community-based renewable energy enterprise. Minority-owned and operated, West Side CDC runs a vocational school that trains people in energy skills. It has also installed solar systems on low-income housing, a senior citizens center, and farm labor housing. It is now developing a solarized industrial park that will incorporate maximum conservation and solar features.

The organization was started by current president, Valerie Pope Ludlam, and a group of welfare rights women, many of whom are still involved.

The vocational school trains CETA workers in all aspects of solar production including manufacturing, installation, and monitoring. Many trainees are placed in the sheetmetal and machine industries because the solar industry in California is still relatively small.

The industrial park will house a solar assembly plant, a research and training institute, and a concrete-block manufacturing plant, for starters. The plant will use photovoltaics and wind for electricity and cure the concrete blocks with solar heat.

Minority-owned and -operated

Organization	San Bernardin t Side Community Development Corp.
Address	1736 W. Highland Ave. San Bernardino, CA 92411
Contact	Dwane Burgess
Telephone	(714) 887-2546
Funded By	CETA, CSA, State Energy Commission, HUD, DOE
Cost	n/a
Congressional District	XXXII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	Low Income
State	CA
Project Name	Solar Heated Greenhouse

The Central Valley Community Development Corporation, a non-profit community group, has constructed a low-cost, attached commercial greenhouse that it is now operating.

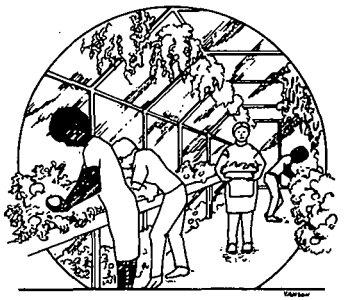
The purpose of the greenhouse is to demonstrate to local family farmers how simple solar passive methods can greatly reduce the high cost of constructing ordinary commercial greenhouses. In addition, it is hoped that the greenhouse will demonstrate to farmers the viability of year-round farming.

The 84' long greenhouse is made of 15 support beams, poured concrete piles (to support south wall), scrap metal truss plates, polythene double-layered glazing, compost drums and several 55-gallon heat-storage drums.

Critique/analysis: The keys to this project are scale (these commercial greenhouses are relatively small), the incorporation of passive solar features, and the use of mostly recycled materials. Construction methods have been taught to 16 youths, and farmers are being introduced to cheap ways f extending the growing season.

CVCDC is now constructing another greenhouse; it will be similar in design to the first one built, but will be unattached.

Organization	Central Valley Community Development Corporation
Address	6607 Avenue 306 Goshen, CA 93227
Contact	Central Valley Community Development Corporation
Telephone	(209) 732-4711
Funded By	DOE
Cost	$7,574 (DOE Grant)
Congressional District	XVII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

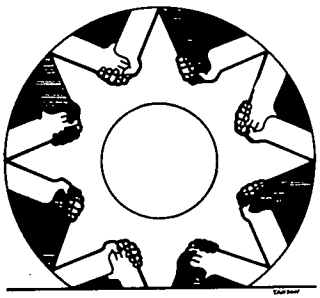
Category	Outreach
State	CA
Project Name	Alternative Energy Coop
Organization	Alternative Energy Coop
Address	P.O. Box 66959 Santa Cruz, CA 95062
Contact	Scott Roseman
Telephone	(408) 475-6868
Funded By	Donations, membership fees and sale of books
Cost	n/a
Congressional District	XVII
Compilation Date	February 1980

The Alternative Energy Coop (AEC) is a resource center that provides the Santa Cruz area with publications, displays, workshops and other information on renewable energy. Volunteers operate the Coop. It offers an excellent book and tool library to its 50 to 100 members, and publishes an alternative energy newsletter. Coop members attend local fairs, at which they sell books or display functional alternative energy devices. AEC is now sponsoring "Do-it-yourself" solar workshops and gathering data on the potential of renewable resources in the Santa Cruz area. The coop has been providing information and referral for area residents for five years.

For Sun Day of 1979, the Coop developed Solar Energy Education packets and coordinated solar presentations at over half of the schools in the county. The school outreach is continuing.

In conjunction with the Club Zayante, an AEC member, the group is comparing different solar flat-plate collectors. Some of the qualities being studied are the amount of energy needed for construction, the amount needed for operation, the lifespan of the equipment, and its cost-effectiveness. The Zayante Area is representative of one of the Santa Cruz microclimates--that above the fog belt.

The operating philosophy of the Coop is to keep things simple and inexpensive. The use of simple technology facilitates do-it-yourself projects and workshop construction. Recycled materials are used whenever possible. New designs are tested with both total energy requirements and applicability to local microclimates in mind.



Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	CA
Project Name	Community Network

Organization	Community Network
Address	709 Davis Street Santa Rosa, CA 95401
Contact	Susan Keller or Ginny Doyle
Telephone	(707) 528-6543

Community Network educates the public about appropriate technology with emphasis on energy and housing. The organization originated in the spring of 1977 in a Sonoma State University class called "Back to the Land."

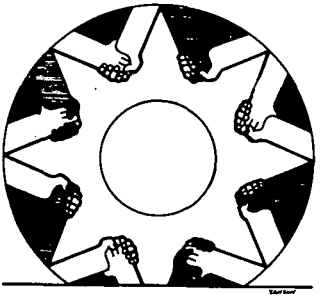
Ongoing programs include "hands on" workshops (as a means of placing solar systems in the community as well as education); workshops on weatherization and housing renovation; lectures on solar, energy conservation, and other appropriate technologies; and the Skills Exchange. The Network is also actively involved in the development of ordinances and codes that support energy conservation.

The project is designed to generate its own income base once fully operational. Each program component generates fees for services. For example, the Skill Exchange will be supported through memberships, instructors for workshops are paid from fees charged to participants, a news service is funded from memberships and sales of advertising and a housing advisory service is administered by contract with the Sonoma County Housing Authority. Private funds will be sought to develop the Community Network as a model for other communities.

Funded By	CETA, self-funded
Cost	$60,000
Congressional District	IV
Compilation Date	February 1980

A Technical Advisory Council advises the staff and membership on appropriate technology issues. Numerous businesses have become involved by offering donations to the Network staff and discounts to members. Solar industry and solar technicians are receiving increased demand for services as a result of the public education efforts. Within the county, local networks of people are forming community advisory councils to help decentralize Network planning and design.

The Network's programs are publicized by radio, newspapers, public speaking engagements, lecture series, fairs and exhibits.



Renewable Resources— A National Catalog of Model Projects

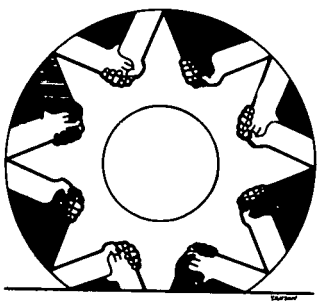
Category	Outreach
State	CA
Project Name	Integral Urban House

The Integral Urban House, established in October of 1978 by the Farallones Institute, is a project devoted to the study and demonstration of environmentally sound strategies and techniques of food production, energy conservation and generation, waste recycling, and pest management applicable in urban areas.

The staff of ecologists and builders has transformed a dilapidated Victorian building into a self-reliant urban educational facility. The building's water supply is heated by the sun. Passive and active systems of solar collection have been installed to regulate the building's internal temperature. The household waste water and sewage are recycled through a series of biological treatments and used for garden irrigation and fertilization. All the vegetables and meat consumed by the four resident staff members are produced on site.

In addition to serving as a model for other urban dwellings, it is also used to hold public classes on solar energy systems, habitat design, urban food-raising and waste recycling. "Hands on" workshops are conducted in the husbandry of small animals, in aquaculture and in beekeeping. Apprenticeships are also available. Teacher-training programs and environmental education seminars are conducted to develop instructional skills for teachers. Professional consultation is offered for people seeking guidance in modifying their own homes with energy and cost-cutting technologies.

Organization	Farallones Institut
Address	Integral Urban House 1516 Fifth Street Berkeley, CA 94710
Contact	Mary Schmidt
Telephone	(415) 525-1150
Funded By	Members, publications, donations, foundation and government grants
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	CA
Project Name	Renewable Energy Information Center

Organization	Net Energy
Address	854 9th Street Arcata, CA 95221
Contact	Suzanne Guerra
Telephone	(707) 822-5926

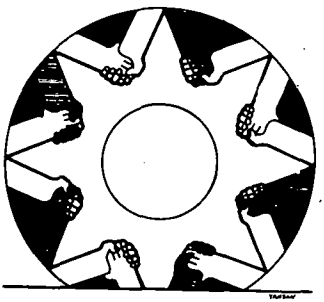
Funded By	Community Services Administration DOE, CETA
Cost	$200,000 yearly budget
Congressional District	II
Compilation Date	February 1980

The Net Energy Community Energy Program (NECEP) offers free or low-cost workshops on alternate energy and energy conservation geared for the general public. It has a speakers' bureau, films and slide shows, and demonstration models. Information materials on conservation and alternate energy projects is disseminated through displays and exhibits at local community events and fairs. NECEP also sponsors work-study programs and student internships.

Alternate Energy Consulting is offered on a sliding-scale basis for private citizens, other non-profit groups, government agencies such as the U.S. Forest Service, National Park Service, and local recycling centers. The Program focuses on simple, inexpensive designs and methods with local and regional applications.

The Education Program maintains and operates the Appropriate Technology Resource Center and Library, the only library north of Sonoma with current information on technical and practical aspects of alternate energy. The library includes a card-file index of books and organizations. It has an extensive collection on alternate energy, particularly on solar and wind, and covers ten other subject areas related to regional appropriate technology (forestry, waste management, etc.).

Critique/analysis: Net Energy has established a reputation as a source of accurate and useful information on appropriate technologies, and concern for the community, as evidenced in its work with other non-profit agencies. The Education Program has generated interest among local homeowners and contractors, and among local government officials.



Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	CA
Project Name	Solar/Energy Information Center
Organization	Alternative Energy Center
Address	Sonoma State Univ., Rohnert Park, CA 94928
Contact	Anne Dewey
Telephone	(707) 664-2577
Funded By	CETA
Cost	n/a
Congressional District	II
Compilation Date	February 1980

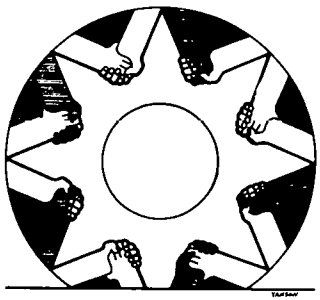
In response to the extensive publicity and interest generated by a Solar Technician Training Program, a Solar/Energy Information Center has been established at Sonoma State University.

The information coordinator handles verbal and written requests for information and maintains files on products, consumer information and education, tax-credit information, bibliographies, and referrals for services. To generate interest in solar energy, the center promotes itself and offers lectures and slide shows to the public.

The Center provides information to consumers in Sonoma and surrounding counties. The referral file should help stimulate local solar businesses.

Critique/analysis: The directors of the Solar Technician Training Program tried to get the information office funded by the school. The Administration refused, saying that such information dissemination is a job of the utilities. Therefore, the coordinator is now funded by CETA and uses space provided by the Alternative Energy Center.

The Information Center stresses direct solar over other alternatives. It has limited information and referral for materials not in files. The scale is mostly local but calls are received from across the country.



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	CA
Project Name	SUNRAE

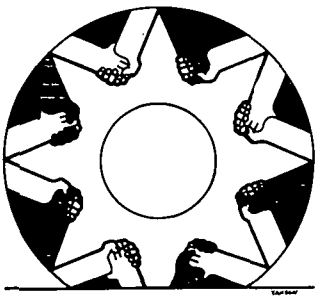
Organization	Solar Use Now for Resources and Employment (SUNRAE)
Address	5679 Hollister Avenue Goleta, CA 93017
Contact	Ed Maschke, Peter Alpert, Alan Mirviss
Telephone	(805) 962-7755 or (805) 964-4483
Funded By	Energy Commission (workshop funding)
Cost	n/a
Congressional District	XIX
Compilation Date	February 1980

Solar Use Now for Resources and Employment (SUNRAE) is a citizen's solar lobby group with local chapters in Santa Barbara, Sacramento, San Diego, San Jose, and San Francisco. SUNRAE wrote the 55 percent tax credit legislation sponsored by Assemblyman Gary Hart and has actively lobbied for other solar bills, including solar pool-heating legislation. SUNRAE's efforts include renewable energy displays, educational outreach programs, coordination of SunDay activities in Sacramento and Santa Barbara, a comprehensive recycling operation, and "hands on" solar construction workshops.

SunStart, SUNRAE's workshop program teaches solar applications to homeowners in the Tri-County region in the form of "hands on" workshops at which attached solar greenhouses and domestic hot-water systems are constructed.

All construction involves low-cost passive designs easily retrofitted onto most homes or community buildings. The idea is to construct projects that provide highly visible working models of solar's potential.

Each workshop utilizes a different community group, construction site, and solar system particularly chosen and designed for the application. Workshop size is limited to allow everyone a chance to get involved.



Renewable Resources— A National Catalog of Model Projects

Category	State
State	CA
Project Name	Cal Transportation Cafateria
Organization *	Cal Transportation Department
Address	1121 O St., Sacramento, CA 95814
Contact	Bob Peterson
Telephone	(916) 445-5352
Funded By	State General Funds
Cost	$41,000
Congressional District	III
Compilation Date	February 1980

The solar hot water heating system for the State Department of Transportation's cafeteria is a joint project of the Governor's Office, the Solar Cal office, the Business and Transportation Agency, the Office of the State Architect and the Department of General Services. The system was designed by the State Architect and the Berkeley Solar Group. Built primarily as a demonstration, the building is part of the State central heating system and has little use for supplemental solar hot water heating.

Eight hundred square feet of collectors heat water for use in cooking and dishwashing. The system employs a 900-gallon tank with a gas-fired water heater as a back-up.

Critique/analysis: The system is not visible from the street; nor are there any signs in or around the building describing the system. There has been no contact by other building managers or any press follow-up. Tours can be arranged or the system can be viewed from the cafeteria coffee shop. The potential educational value of the "demonstration" has not been tapped.

The system has not been monitored in its first six months of operation; the monitoring system is inadequate and a proposal to upgrade it has been submitted.

A few collector tubes have leaked and destroyed the mirror finish, the collector glazing is not kept clean, and a few glazing covers have cracked or blown off. Maintenance of the system is in general, erratic.

* The project's sponsoring organization is the State Department of Transportation.

Renewable Resources— A National Catalog of Model Projects

Category	State
State	CA
Project Name	Department of Water Resources Wind Project at Pacheco Pass

The Pacheco Pass Wind Project involves three demonstration projects to utilize prototype wind machines in pumping water into the San Luis Reservoir from the aquaduct of the State Water Project. When the pumps are not operating, the power will be fed directly into the utility grid. Pacheco Pass Project's three components cover experiments with technologies and billing practices. First the Department of Energy is considering Pacheco Pass as a site for testing large wind machines of 2.5 MW. State Department of Water Resources (DWR) would get the power in exchange for providing the site and maintenance and operation. Second, the (DWR) and the State Energy Commission have contracted to situate a smaller prototype wind machine in Pacheco Pass, with the state owning the machine and power. Third, DWR has contracted to buy power from a private firm for a low rate. The firm will build a first array of about 10 machines (50 KW) totaling .5 MW of power, which DWR will purchase at rates comparable to the lifeline rates for small energy users. If the installations are successful, the project will be expanded to include up to 1,000 wind machines.

The machines will be visible from the highway and DWR will develop a visitor display at the Visitors Center at the San Luis Reservoir. The U.S. Department of Energy has been interested in the public's reaction to the prototype, which is 14 stories high. The intense concentration of this many machines may be aesthetically offensive to some people and will probably create some noise as the large machines' [illegible]es spin at speeds close to 500 mph. (On [illegible]other hand, Pacheco Pass is a fairly remote [illegible] -- one reason it was selected for this demonstration.)

Several other sites including Wheeler Ridge in the Tehachipi Mountains, and a site in the Mojave desert near a hydroplant at Cottonbark, are being considered for wind generation of power along the aquaduct.

Organization	CA Dept. of Water Resources (DWR)
Address	Energy Division P.O. Box 388 Sacramento, CA. 95802
Contact	Robin Reynolds
Telephone	(916) 322-2080
Funded By	DOE (under consideration), California Energy Commission, and private firm
Cost	n/a
Congressional District	XV
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	CA
Project Name	Solar & Insulation Complaint Mediation

The Department of Consumer Affairs has a mediation program for solar and insulation complaints. To register complaints or receive solar and insulation information, consumers can call a toll-free hotline (800- 952-5567) between 9:00 a.m. and 5:00 p.m. Monday through Friday. Staff in the Solar and Insulation Unit work closely with the related licensing boards in the Department--particularly with the Contractors' State License Board--to help expedite the complaint-resolution process.

Consumer-education materials are also being developed to inform the public about solar energy and insulation technologies that include information on purchasing, selecting a contractor and resolving complaints. The Unit is also examining solar energy and insulation advertisements, requiring substantiation, and taking necessary legal action against individuals and companies who abuse the public trust.

While the Solar and Insulation Hotline is intended as a consumer resource for solar and insulation information and complaint handling, it has not been established as a general energy-information line. The Energy Commission Public Information Office has a toll-free number for general questions and information (800-852-7516).

Organization *	Solar & Insulation Complaint Mediation
Address	120 N Street Sacramento, CA 95814
Contact	Kathy Ramsey
Telephone	(916) 322-5756
Funded By	Energy Commission
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

* The project's sponsoring organization is the Department of Consumer Affairs Solar and Insulation Unit, 1020 N Street, Sacramento, California 95814.

Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	CA
Project Name	City Solar Utility

The City of Santa Clara formed a solar utility division in 1978 in addition to its other utility departments, which include electricity, water and sewer services. The City began leasing solar equipment for swimming pool heating to apartments, condominiums, hotels, motels, swim clubs and backyard pools. The utility now leases solar process and domestic water-heating systems as well.

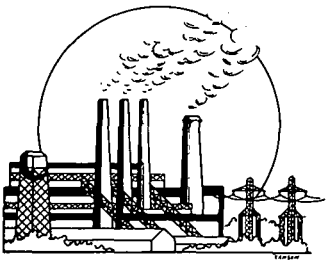
The City installs and maintains the solar heating systems, charging the customer for installation costs (which cover labor and materials) and monthly service.

Under the leasing system, the utility carries responsibility for system evaluation and long-term service. Leasing protects the consumer from risk in the case of loss of solar access. Also, leased equipment is exempt from property tax, providing an added benefit.

The utility will not install solar systems if it is infeasible because the roof exposure is wrong, the pump capacity insufficent or the roof in poor condition. The utility won't install equipment on roofs that are difficult to work on either.

The City has installed 140 systems to date. Responsibilities for the Solar Utility are shared by the Energy Conservation Department, the City Mayor's Science Advisor and the Solar ility Engineer. The City, as well as the gas ility, provides home energy audits.

Organization	City of Santa Clara
Address	1500 Warburton Avenue Santa Clara, CA 95050
Contact	Robin Saunders
Telephone	(408) 984-3183
Funded By	City of Santa Clara, utility customers
Cost	$200,000
Congressional District	XII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	CA
Project Name	Large Wind Demonstration

Organization	Southern California Edison Company
Address	Palm Springs, CA 92262
Contact	Bob Scheffler
Telephone	(213)572-2914

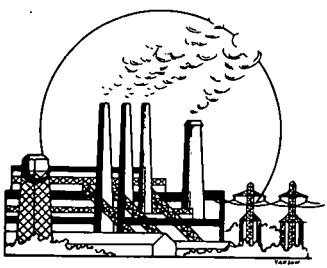
Funded By	Southern California Edison
Cost	$2,000,000
Congressional District	XXXVIII
Compilation Date	February 1980

Southern California Edison (SCE) has contracted with a windmill manufacturer for a 3 MW (3000 KW) wind turbine generator to be installed and operated at a utility-owned site near Palm Springs, California. Electricity produced by the wind turbine generator will be fed directly into existing SCE transmission and distribution lines.

The purpose of the project is to demonstrate the technical and economic feasibility of the wind machines. The utility sees this as a necessary intermediate step before the commercialization of other such generators for use in the SCE system. It will provide valuable utility-oriented operating experience and will also give the public a first-hand understanding of how wind-generated electricity may help meet their future energy needs.

The Department of Energy has been monitoring wind data at the site since late 1976 as part of the federal government's Wind Energy Program. The installation is scheduled for completion in early 1980.

Critique/analysis: SCE puts out a glossy public information piece describing its various solar energy and wind projects, including the centralized collector facility concept. While maintaining that the "use of nuclear energy can and must be expanded," SCE acknowledges that "solar water heating, pool heating and space heating systems are...becoming more economical every year."



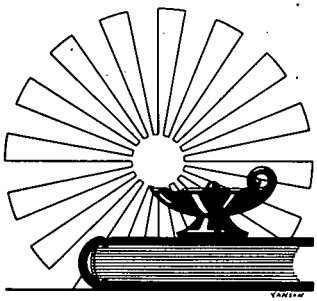
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	Mesa Project

The Mesa Project is designed to serve as a demonstration center for renewable energy sources, a consumer awareness and information center, and a horticultural teaching facility. The project will include a solar garden-center complex, a demonstration residence, gardens and orchards on 5.5 acres. The two buildings on the site incorporate earth berms, landscraded wind-screening, south windows and skylights, thermal storage heat-circulating fireplaces and wood-burning stoves, indigenous clay and sandstone materials, passive water heating, a greenhouse for space/heat and food growing, and an earth-covered roof on which strawberries are planted.

The Center will teach self-sufficiency skills, relate social issues to appropriate technology, and plan larger appropriate technology applications.

Organization	Community Environmental Council, Inc.
Address	930 Miramonte Dr. Santa Barbara, CA 93101
Contact	Paul Relis
Telephone	(805) 962-2210
Funded By	Various foundations
Cost	$350,000.00
Congressional District	XIX
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CA
Project Name	San Diego Center for Appropriate Technology

The San Diego Center for Appropriate Technology operates demonstrations of integrated appropriate technology systems, educational programs, and tours of the working systems.

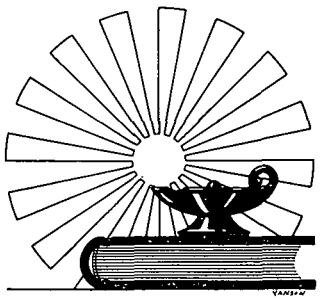
A four-person, full-time volunteer staff and a CETA employee conduct the tours of the building's passive solar greenhouse and passive water-heating system. The Center also has a demonstration windmill for water aeration, a solar oven, solar distillers, and a methane digestor. It has developed one slide show on the integrated system concept and is working on another one especially for teachers of grades 4 through 12.

The Center's sponsors, San Diego State University Cooperative Campus and Ministries Ecological Life Systems Institute, have library and offer free lectures and classes.

The Center is now establishing another location at Imperial Beach to acquaint people on both sides of the border with integrated appropriate technology and self-sufficiency projects.

Organization	San Diego Center for Appropriate Technology
Address	6863 Hardy Ave. San Diego, CA 92115
Contact	Jim Bell
Telephone	(714) 286-4301

Funded By	Technology CETA and San Diego State University
Cost	n/a
Congressional District	39
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Financing
State	CA
Project Name	Cooperative Electrical Management Program

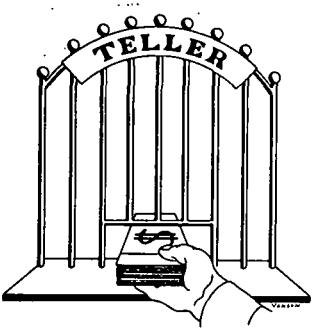
Pacific Gas and Electric Co. (PG&E), in conjunction with the cities of Davis, Merced, and Chico, is conducting a demonstration project to give the city governments cash for reducing peak electricity demand within the city boundaries. The cities will receive $10,000 for each percent shaved off the one o'clock to six o'clock p.m. peak, up to a maximum of 10 percent or $100,000 per city.

The two-year pilot program was undertaken to see if residential energy-conservation efforts could be tailored to help alleviate the utility's peaking problems. Most space heat in the three towns is supplied by natural gas, and traditional conservation efforts tend to reduce peak electricity use only slightly. In order to design strategies tailored to peak consumption, the utility is financing one full-time energy coordinator in each of the three cities. The coordinator will serve as staff to two committees and will carry out the devised programs. A committee of city residents will consider strategies, and a technical and management committee of utility and city experts will provide technical assistance to the citizens committee and the energy coordinator.

Since the program is experimental, the amount of money spent will not necessarily reflect the utility savings from reduced peak demand.

Organization	Pacific Gas and Electric Company
Address	Rate Department 77 Beale Street San Francisco, CA 94106
Contact	Sam Barakat
Telephone	(415) 781-4211

Funded By	PG&E
Cost	n/a
Congressional District	
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

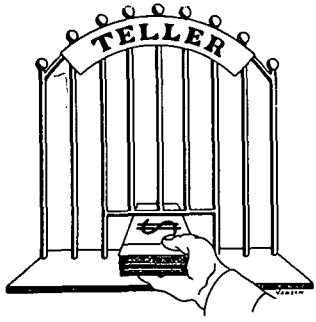
Category	Financing
State	CA
Project Name	Safe Energy Fund

A unique model solar-financing program developed by a San Francisco designer and installer of solar systems allows investors to know that their money is being used for a good cause.

The program, known as the Safe Energy Fund, was designed to "make the monthly cost of solar energy immediately competitive with electricity and natural gas." The Fund, which was developed by the Solar Center (a leading Bay Area designer and installer of solar systems) and is being implemented through the Continental Savings Bank in San Francisco. It therefore provides affordable long-term financing to people who convert their buildings to solar energy.

Solar T-Bills (money market certificates that are pegged to the yields of U.S. Treasury Bills, but are savings deposits rather than government notes) are deposited in Continental's special Safe Energy Fund account. The money collected through the sale of the Solar T-Bills is then used to provide loans that are 1 ½ percent above the average interest paid to depositors and have a 20-year term.

Organization	Solar Center
Address	62 Townsend Street San Francisco, CA 94107
Contact	Peter Barnes
Telephone	(415) 957-9660
Funded By	n/a
Cost	n/a
Congressional District	
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

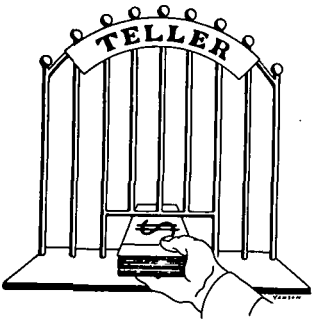
Category	Financing
State	CA
Project Name	Secondary Solar Loan Market
Organization	California Energy Industries Assoc.
Address	c/o Solar Center 62 Townsend Street San Francisco, CA 94107
Contact	
Telephone	(415) 957-9660
Funded By	n/a
Cost	n/a
Congressional District	
Compilation Date	February 1980

Sunny Mac is a "Solar Mortgage Corporation" being promoted by the California Solar Energy Industries Association (CalSEIA) as a means of insuring that adequate loans are available for solar energy projects. Formulated as an alternative to several utility-financing demonstration programs ordered by the state Public Utilities Commission (PUC), Sunny Mac would purchase solar loans from banks, savings and loan associations, and credit unions. It is modeled after existing home mortgage corporations that have been set up to buy home mortgages from financial institutions. The idea is that more solar loans will be made if lending institutions can then sell the loans to a "secondary loan market" and get their money back to loan again. Sunny Mac would pay the lending institution a small fee to service the loan, so from the borrower's point of view, nothing changes.

Initial capital for Sunny Mac would come from major utilities. Additional capital could be raised from private investors, pension funds, lending institutions and federal, state, or local governments.

CalSEIA sees Sunny Mac as buying subsidized loans for solar water heating such as those being made by the demonstration utility loan programs, as well as market rate loans for other forms of renewable energy development.

This loan program entails several advan-
. First it would utilize an existing making network (i.e., lending institutions) rather than set up a new and competing mechanism in a utility. Second, it would strengthen competition in the solar-financing marketplace rather than sanction the monopoly financing that would result if all subsidized loans were



provided by utilities. Third, it would not be in a position to favor one qualified solar business or lending institution over another, and fourth, its sole purpose would be to finance the solar transition. The problems utility-financers would face in balancing their competing interests in financing other energy forms would be obviated.

Sunny Mac would be a non-profit corporation formed of representatives of: utilities, banks, savings and loans, credit unions, solar industries, and the public.

The Sunny Mac proposal is currently being considered by the PUC.

COLORADO

1. Alamosa
2. Arvada
3. Aspen
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6. Carbondale
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8. Denver
9. Eaton
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12. Frisco
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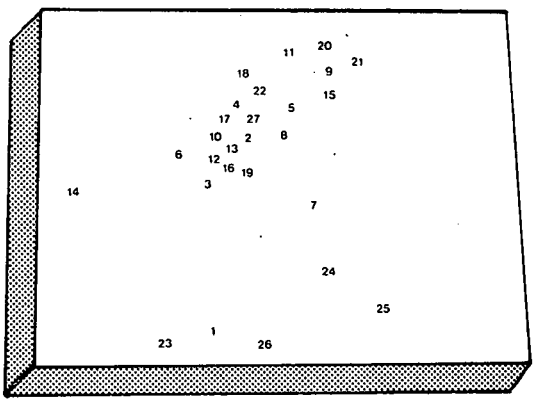
15. Greeley
16. Lakewood
17. Longmont
18. Loveland
19. Littleton
20. Lucerne
21. New Raymer
22. Niwot
23. Pagosa Springs
24. Pueblo
25. Rocky Ford
26. San Luis
27. Westminster



COLORADO

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Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CO
Project Name	Greenhouse for Hog Farrowing Barn.

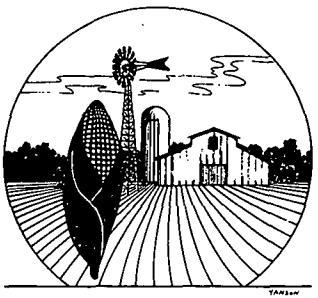
Organization	Public Energy Information Office (PEIO)
Address	City Hall 250N. 5th Street Grand Junction, CO 81501
Contact	Karen Hastings, Director
Telephone	(303) 243-2633 Ext. - 204

Funded By	Mesa College
Cost	$1,500
Congressional District	IV
Compilation Date	February 1980

Mesa College, in conjunction with Colorado's Public Energy Information Office (PEIO) has built a passive solar greenhouse and attached it to a hog-farrowing barn at the Mesa College Farm in Grand Junction. The farrowing barn is without conventional heat, and the solar greenhouse will serve to reduce the necessary size of any future heating system. The farrowing barn is 1200 sq. ft. and the greenhouse is 300 sq. ft. -- large enough to supply heat to 450 sq. ft. of barn.

The demonstration site was chosen because of (1) enthusiasm of the college science staff (2) the promise of relatively easy financing (3) the large size and visibility of the greenhouse (4) the seeming certainty of sustained monitoring and maintenance by the college (5) the upgrading of the newly acquired farm and possible provision of a future place for a total alternative energy experiment (6) the suitability of the site as an example of solar applications to the agricultural community, and the (7) commitment of the college to energy education.

Critique/analysis: The next workshop should be advertised as open to the public, financing arrangements should be worked out further in advance, and some plan for summer maintenance should be laid out.



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CO
Project Name	Planet Earthworms

Organization	Planet Earthworms
Address	5243 East 100th Ave., Denver, CO 80229
Contact	Jim McNelly
Telephone	(303) 457-2897

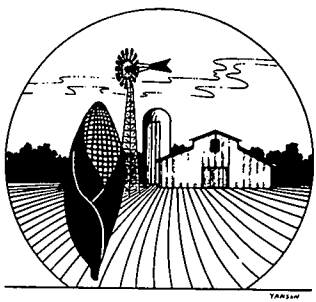
Funded By	Private
Cost	$50,000
Congressional District	V
Compilation Date	February 1980

Planet Earthworms provides an organic waste-utilization process on a municipal, farm or small-community scale. It combines aerobic composting with earthworm digestion called vermicomposting. (Aerobic composting reduces the volume of waste). The earthworm digestion further decomposes the compost into a more attractive soil amendment and fertilizer called "earthworm castings." The Planet Earthworm method is to harvest earthworm eggs in a semiautomated earthworm-feeding process. Earthworm eggs are then sold or incubated for production of more earthworms.

The process is established as a private commercial venture that reduces construction costs for sewage treatment, reduces transportation and landfill costs for source-separated organic municipal waste, and provides organic material stabilization for the application of compost to agricultural land.

The potentials of this process are several; aside from waste resource recovery, the aerobic composting process attains temperatures of over 160 degrees F that can be used to heat space and hot water. In addition, profitable composting will assist organic agriculture and reduce farm dependence on fossil fertilizers.

Critique/analysis: The earthworm industry has been tainted with unscrupulous promoters that have engendered community skepticism toward the industry as a whole. The EPA and other agencies hesitate to fund earthworm pilot projects. The potential for profit in waste recovery of what is now a pollutant and energy drain causes problems when working with public agencies concerned about land use space requirements, equipment, time, and manpower.



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CO
Project Name	Pumping Plant Efficiency Study

For the past four years teams of students have been trained at Colorado State University to test the efficiency irrigation pumping plants.

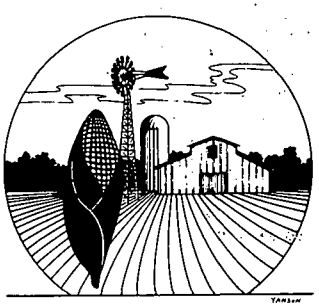
The teams visit individual farm pumps and measure the power consumption, pumping rate, total operating pressure, and other performance factors. These data are then analyzed to determine the overall pumping-plant efficiency. Using power bills of previous years, the teams then compute the potential energy savings and reduced cost of pumping if the farmer were to service or repair the pump to increase its efficiency.

Data has been collected from over 1,200 wells during the past four years, which represents about 7 percent of the large-capacity wells now being used in Colorado. Farmers are charged for the service, and the program has to be sold to the farmers. Because of the rising energy cost, it is expected that the interest in the service will increase.

Data is now being analyzed from the previous four years of tests and a publication describing the test program is expected to come out in January of 1980.

Organization	Colorado State University
Address	Civil Engineering Department Fort Collins, CO 80523
Contact	Robert A. Logenbaugh
Telephone	(303) 491-5861

Funded By	Individual Power Co.
Cost	n/a
Congressional District	state-wide
Compilation Date	February 1980



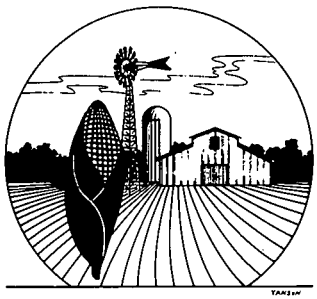
Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	CO
Project Name	Solar Feedstuff Production
Organization	Bio-Gas of Colora Inc.
Address	5610 Kendall Court, Arvada, CO 80002
Contact	Fred Varani
Telephone	(303) 422-4354
Funded By	Four Corners Regional Commission
Cost	$127,000
Congressional District	III
Compilation Date	February 1980

Bio-Gas of Colorado is experimenting with the concept of feeding algae to cattle as a supplemental feedstuff. The algae will be grown on various species of concentrate left over from anaerobic digestion.

In the future, an algae pond will be constructed inside a commercial greenhouse located at the E.S. Erwin test feedlot in Lamar, CO.

Cattle will be fed a mixture of normal feed ingredients and a select group will have algae as an additional component. Weight gains and other performance data will consume a digester residue/algae feed supplement as well. The data from this experiment will be compared with data developed by CSO International (Concord, CA), which will do a "Bioessay" on the process and develop a full-scale design for algae lagoons.



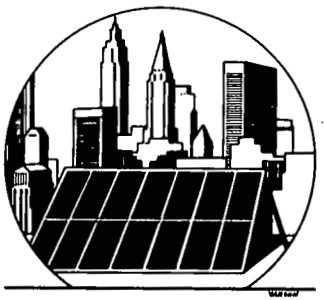
Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	CO
Project Name	Cooperative Opportunities Program

The Cooperative Opportunities Program in Otero, Bent, and Crowley are performing winterization/weatherization work. Two four-man crews install insulation, caulking, weatherstripping, storm doors, and windows. The crews also repair doors and windows in low-income residences in the 6 counties of Region VI.

Charles E. Kouns, the Energy Coordinator, wants to begin installing solar: "our plans are to go into low-cost stick-built solar collectors in the future."

Organization	Otero, Bent, Crowley Counties Coop. Opport. Prg. Inc.
Address	902 Elm, Rocky Ford, CO 81067
Contact	Charles E. Kouns, Energy Coordinator
Telephone	(303) 254-6617 (303) 254-6610
Funded By	DOE, CSA
Cost	$135,000
Congressional District	III
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	CO
Project Name	Danish Ordinance, Merit System Ordinance

The city of Boulder has a "Growth Limitation Ordinance" that has been in effect since March of 1977. If requests for construction of new buildings exceed the number allowed by the ordinance during any allocation period, a merit system competition is triggered. Units compete for a total of 105 points in a total of four categories: Public Facilities, Low/Moderate Income Housing, Environmental Elements, and Site Design and relationship with Surrounding Area. An energy conservation section within "Environmental Elements" allows a total of ten points to be awarded for outstanding energy conservation measures.

Currently, ten points are awarded in the energy conservation section for incorporating two of the following elements, including Minimum Public Service Insulation Standards (R-19 in the wall, R-40 in the ceiling):

1) Design or landscaping techniques, including orientation to take maximum advantage of the sun;

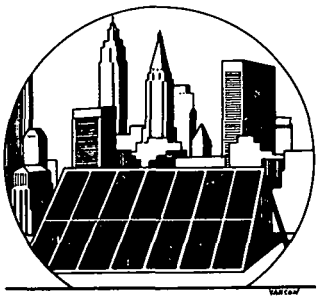
2) Use of solar or other non-fossil fuel sources;

3) Recycling/retrofitting an existing building or buildings; and

4) Water conservation efforts, including recycling.

Critique/analysis: According to Louise Allen, "The limitation of these existing provisions is that we have no uniform method of comparing and evaluating various energy-conservation proposals. I am currently exploring the feasibility of arriving at some method of calculating total energy performance of a proposed unit. Any energy

Organization	City of Boulder
Address	City of Boulder P. O. Box 791 Boulder, CO 80306
Contact	Louise Allen Susan Stoltz
Telephone	(303) 441-3270
Funded By	City
Cost	n/a
Congressional District	II
Compilation Date	February 1980



calculation, however, must take into account passive solar heat gain since Boulder's climate is uniquely suited to passive solar construction and many of the proposals are incorporating innovative passive features for energy conservation points."

Renewable Resources— A National Catalog of Model Projects

Category	Cities
State	CO
Project Name	Jefferson County Energy Conservation & Education

The Energy Conservation and Education project involved five full-time professionals and one secretary. The professionals served the office as educators, as do other Colorado State University Extension Agents.

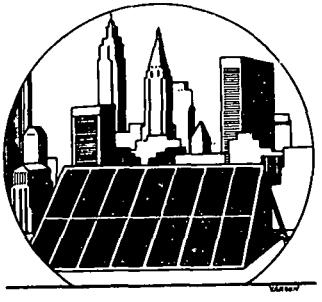
The accountability report indicates that the Energy staff at the Extension Service has made 6,126 contacts with the public from November of 1978 to March of 1979. The Thermoscan and Energy Audit Programs included 351 participants. Telephone requests for energy information from the office averaged 45 a week.

Professionals contacted in conjuntion with the program included 37 local contractors, 75 teachers and administrators, and 13 professionals in the energy field, among others. A summer youth program reached over 1,000 young people with programs describing ways to conserve energy.

Critique/analysis: CETA positions are training positions of a temporary nature. "Individuals are seeking, for their benefit, ongoing employment," stated Ivan Archer. "We had several persons leave doing the projects, which limited our accomplishment of stated goals."

Organization	Jefferson County Cooperative Ext. Service
Address	15200 W. 6th Ave. Golden, CO 80401
Contact	Ivan Archer
Telephone	(303) 279-4511

Funded By	Federal/CETA
Cost	$68,565.93
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	CO
Project Name	Summit County Extension Energy Office

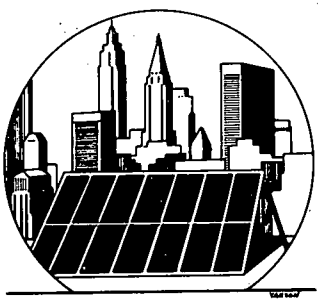
The Summit County Extension Energy Office organizes workshops and provides energy related information to the public through cooperative efforts with local extension offices. Workshops include solar, energy conservation, wood stove, home energy management, and agriculturally related programs. The diverse resources of Colorado State University are available in the organization and presentation of the workshops.

Inquiries are increasing as more agents and the general public take advantage of the office. The impact of the office is being felt in counties where local extension offices are incorporating energy-conservation programs in their program planning.

Critique/analysis: Office visibility is increasing as the office takes its program information to the public at country fairs, local celebrations, state fairs and other local and grassroots occasions. But continued funding is a major problem encountered in the program's development and planning.

Organization	CSU-Coop. Ext. Service Energy Office
Address	P.O. Box 70 Frisco, CO 80443
Contact	Richard Topielec
Telephone	(303) 668-5825

Funded By	Colorado Office of Energy Conservation
Cost	n/a
Congressional District	VI
Compilation Date	February 1980



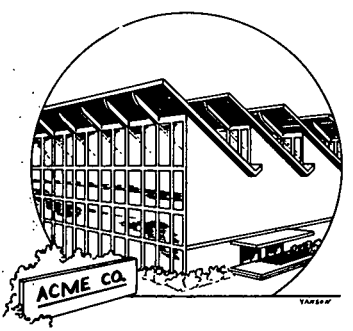
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CO
Project Name	Aspen Airport

The Pitkin County Air Terminal is one the nation's largest passively heated structures and the first public building in the United States to use a movable-insulation system.

The basic elements of the passive solar system are abundant southern glazing with movable insulation, interior thermal mass and a well-insulated structure. Most of the southern wall is double-glazed with a Kalwall system. This system allows solar energy penetration into the building during sunny winter days. During the evening or on cold cloudy days, the space between the glazings is filled with styrofoam beads to provide insulation. South-facing skylights with fiberglass glazing and movable insulating louvers complete the system.

Organization	Pitkin County Air Terminal
Address	506 East Main St. Aspen, CO 81611
Contact	Airport Manager
Telephone	(303) 925-8698
Funded By	n/a
Cost	n/a
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CO
Project Name	Solar Buildings

Organization	Downing - Leach/ Architects-Planners
Address	2305 Broadway Boulder, CO 80302
Contact	Steve Dewitt
Telephone	(303) 443-7533

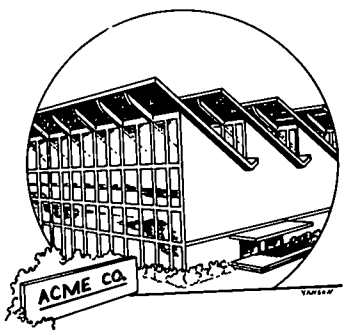
Funded By	HUD
Cost	$600,000
Congressional District	II
Compilation Date	February 1980

Downing-Leach, Architects-Planners based in Boulder, have been extensively involved in the design and construction of over 150 homes in the Boulder area. Some of these projects have utilized active, passive and hybrid approaches, on both new construction and retrofits. Some of the projects follow:

* Thirty-five townhouses retrofitted for domestic hot water.
* Hybrid solar residences using active systems, two-story greenhouses, heat recovery ducts, Suncontrol blinds, etc.
* Eighty-two apartment units for elderly for the Boulder Housing Authority.
* A residential passive solar retrofit with various thermal mass storage: water drums, concrete floors, and interior masonry.
* Four passive solar townhouses projects providing low to moderate income housing for energy-conscious residents.
* A 3,400 square foot office building using direct-gain skylights and active system for water and space heating.

Critique/analysis: When owners complained of excessive heat bills, monitoring equipment was alled. Along with on-site inspection, lems were found: workmanship was poor, an r re-did the electrical controls, windows are left open, filters were clogged, etc.

As a result, a homeowners' maintenance manual was written and provided free of charge, to owners. Maintenance problems were corrected and no complaints have since been received.



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CO
Project Name	Solar Carwash

After purchasing this carwash, the owners retrofitted it with a solar water-heating system. According to owner, Rex Chestnut, "I make somewhere around 8 to 10 percent on my $3,600 investment in solar energy."

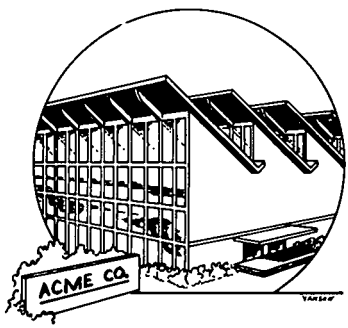
The Chestnuts' small carwash business has nine bays and serves an average of about 200 cars per day. Since people tend to wash their cars on sunny days, the Chestnuts are able to realize a 30 percent savings from solar. Because their gas bill is a significant portion of their overhead, they are very pleased with their collector.

The solar system has been operating since February of 1977. Phyllis Chestnut says, "The best application for solar is in laundries, carwashes, and motels -- places that use a lot of hot water and use it all day, all summer, and mostly in the daytime." The Chestnuts' enthusiasm about solar energy is contagious. Their son is building a solar home and buying another carwash to retrofit.

About twenty days were spent constructing the system. Since either Rex or Phyllis is usually there most of the day operating the carwash, labor was not a problem. They expect to save some money on their boiler replacement costs because, with the solar system, the boiler is turning on less frequently. "This might be more savings than our savings on the gas bill," says Phyllis, "because we've been replacing the boiler every three years or so or $1,500."

The solar system acts as "free" advertisment for a small business. "A lot of people have shown interest in it," says Phyllis.

Organization	Southcrest Carwash
Address	612 Missouri Ave. Longmont, CO 80501
Contact	Rex & Phyllis Chestnut
Telephone	(303) 772-9854
Funded By	Owner
Cost	$3,600
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CO
Project Name	Solar Clean, Wash and Dry, Ltd.

Since 1977, a 5,000 square foot mall in Colorado has been obtaining approximately 70 percent of its heating needs from the sun. The solar system provides space heating for the mall through the use of a hot water baseboard system and heat exchanger. In addition, an 1,800 ft^2 laundromat located in the mall uses sun-heated water for the washing machines. Back up is provided by a gas boiler.

The systems are quite efficient, saving between 50 percent in the winter and 70 percent in the summer on heating bills.

Organization	Solar Clean, Wash and Dry, Ltd.
Address	Solar Mall 2nd Ave. & Rt. 160 P.O. Box 1224 Pagosa Springs, CO 81147
Contact	Russell F. Sanders, Jr.
Telephone	(303) 264-2332
Funded By	Private
Cost	$25,000
Congressional District	III
Compilation Date	February 1980

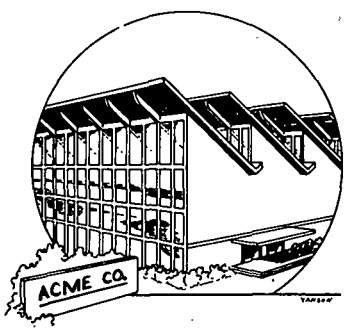
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	CO
Project Name	Solar-heated Transportation Facility

The Platte Bus Storage and Maintenance Facility, dedicated on June 2, 1977, was the nation's federally funded, solar-heated transportation facility. It features a $2 million solar heating system to provide approximately 40 percent of the six-acre structure's requirements. At the time of dedication, it was the largest solar-assisted heating installation in the world. On the roof are 1,390 solar collectors that provide a total collection area of 39,037 square feet. The system will save 15,000 gallons of fuel oil per year and pay for itself in less than sixteen years, based on the current price of heating fuels.

The 252-bus facility also has many other features to make it one of the most modern and environmentally sensitive transportation facilities in the nation. Entry to the garage is through a 30 footwide door that is protected by an air curtain. Ventilation for the building is linked to carbon monoxide sensors that maintain the air at fresh levels. The cold water bus wash system features a recycling unit that provides for reuse of 85 to 90 percent of the 40,000 gallons of water used daily. The buses exit from telescoping doors that close automatically and are interlocked with nearby unit heaters.

Organization	Regional Transportation District
Address	1325 S. Colorado Blvd. Denver, CO 80222
Contact	Jerry Richmond
Telephone	(303) 759-1000
Funded By	80% Federal, 20% local
Cost	$2 million (for solar)
Congressional District	I and II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Commercial
State	CO
Project Name	Sun Earth Day

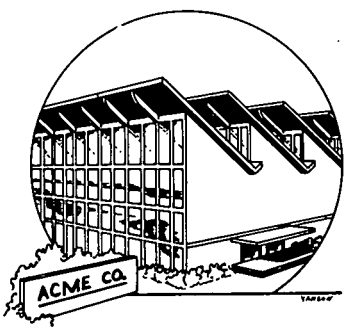
Organization	Colorado Sunworks
Address	P.O. Box 455, Boulder, CO 80306
Contact	Paul Shippee
Telephone	(303) 443-9199

Funded By	HUD
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Minimal - energy - use in buildings is successfully demonstrated in the Sun Earth House: 100 percent of the space heating demand is supplied by the passive solar system. The house was designed, built and marketed by Colorado Sunworks in 1977-78. Performance is monitored by computerized tracking of ninety energy sensors placed in the building during construction. The furnace was put to rest during its first winter because the pilot light was wasting natural gas. The result is extremely low fuel bill and comfortable living in an energy-efficient house.

The design features concrete walls insulated on the exterior. Earth is bermed up over the walls and piled one-foot deep on the flat roof to concrete an earth contact shelter. The south side exposes 300 sq. ft. of glass windows to the winter sun; this directly warms large barrels of water about 10° F on a clear day. Atrium windows admit sun directly to light-colored floor tiles, which then reflect the light to interior concrete walls, storing more energy for nighttime use. On winter nights, moveable insulation converts large window areas to R-20 heat loss barriers.

Other energy-conserving features of the Sun Earth House include a garage buffer to the northwest, air-lock entry, vertical sky-lights over the north wall, air-tight construction, a thermal envelope ceiling for natural heating and cooling, a fireplace piped to the outside, summer ıding devices, and passive tank-type water ıters.

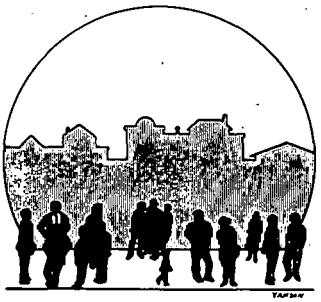


Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CO
Project Name	Citizen's Goals
Organization	Citizen's Goals
Address	P.O. Box 128 CO Springs, CO 80901
Contact	Ardeth Neiman
Telephone	n/a
Funded By	Junior League; CO Humanities Program, & Donations
Cost	approx. $40,000
Congressional District	V
Compilation Date	February 1980

In the mid-seventies, residents of Colorado Springs joined together to try to develop goals for making their community a more desirable place to live. A thirty-six member board of directors, representing a cross section of the city's business and professional interests, was established to guide the program.

Most of 1976 and part of 1977 were spent developing goals. A number of writers prepared background papers, which were passed along to a group of 103 concerned citizens chosen because they represented the points of view of all parts of the city. This development program, gathered at a mountain resort and worked for four days to evolve tentative goals relating to twelve areas of concern: government, health, human services, transportation, public safety, design of the community, education cultural and recreational activities, environment, natural resources, the economy and citizenship.



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	CO
Project Name	Colorado Solar Energy Association, Inc.
Organization	Colorado Solar Energy Association, Inc. (CSEA)
Address	P.O. Box 5272, Denver, CO 80217
Contact	Rachel Snyder
Telephone	(303) 231-1192
Funded By	Memberships, book sales, meeting admissions
Cost	n/a
Congressional District	I & II and others
Compilation Date	February 1980

CSEA is a regional chapter of the American Section/International Solar Energy Society. Originally envisioned as a communication network among solar professionals and enthusiasts, the organization has grown to include education/outreach activities and the management of the Solar Book Store in downtown Denver. The group operates money raised through dues ($10/year individual and $35/year corporate), profits from sales, and admissions receipts. Operation is handled by volunteers and one part-time staff person. CSEA has reached professional solar engineers and architects, businesspeople, consumers, students, government employees, and other officials with its meetings and publications. Bimonthly evening lecture series have drawn 200 to 225 people. Product exhibits by local solar businesses have been a prime attraction, as have the speakers, slide shows, films, and the ability to "rub shoulders" with solar professionals. Management of the bookstore (with the assistance of Environmental Action Foundation) has provided the organization with an identity, an office, a telephone, and an income source. It is hoped that soon the bookstore profits will cover a part-time salary. CSEA is a very useful referral service, from identifying local solar architects, offering participation in workshops or other activities, etc.

Critique/analysis: Old-timer volunteers can longer afford to commit great amounts of sonal time to the organization, and a ...ull-time staff person is clearly needed. According to Rachel Snyder, President, "We have identified a need to branch out... in terms of our presentations and programs, and begin to more closely target our audiences." She continues, "The general solar awareness programs are still popular; yet there is a need for more technical, more detailed workshops, seminars, and classes."

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CO
Project Name	Columbine Institute

In 1979 the Columbine Institute initiated "The Multi-faceted Passive Solar Greenhouse Construction and Youth Job Training Project." The program trained sixteen youths in the construction trades and, in the process, constructed four passive solar greenhouses.

Using CETA-based Youth Community Conservation and Improvement Project (YCCIP) funds, the program provided entry-level job skills in the construction trades. Youths attended a solar greenhouse workshop and then were provided with intensive on-the-job training during construction of the first greenhouse. All greenhouses were retrofitted onto existing structures.

In addition to building greenhouses, the project participants worked with the Boulder County Community Action Program's Winterization Program to winterize homes. This provided additional training in entry-level job skills, as well as an education in energy-construction principles and practices.

The project was multi-faceted in that the Columbine Institute coordinated the efforts of several agencies and individuals in order to maximize the impact of each dollar spent. The overall project cost is approximately $60,000.

Organization	Columbine Inst.
Address	5938 S. Vale Boulder, CO 80303
Contact	Mark McCray, Ph.D.
Telephone	(303) 494-0481

Funded By	DOE, CETA, Boulder County CPA
Cost	$60,000
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	Community
State	CO
Project Name	Eco-Cycle, Boulder

Funded in Boulder in July of 1976, this non-profit recycling company is now collecting 15 percent of that city's recycleable waste.

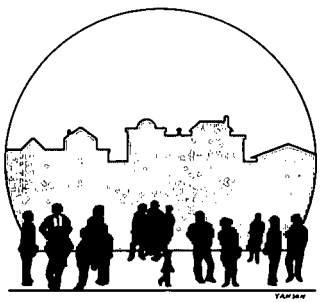
Eco-Cycle is a comprehensive recycling program that collects newspapers, high quality paper, corrugated cardboard, glass containers, tires, motor oil, appliances, and steel and aluminum cans. In two years the program has expanded into seven Colorado communities. The program presently handles both residential and commercial solid waste.

At present, the collection system relies on the participation of community organizations whose members sign up to collect recycleables. Eco-Cycle currently uses at least four community organizations each Saturday. Because response has been overwhelming, organizations now have to sign up eight months in advance.

According to Grogan, the coordinator, "The millions of dollars being used to construct high-technology resource recovery plants could be put to better use by implementing source-separation programs and providing recycling education."

Critique/analysis: The major problem is obtaining the necessary funding to purchase the expensive equipment needed to properly collect, process, and transport the recycled matter.

Organization	Eco-Cycle
Address	P.O. Box 4193 Boulder, CO 80306
Contact	Pete Grogan
Telephone	(303) 444-6634
Funded By	CETA, Boulder County, City of Boulder
Cost	Over $200,000 by summer 1979
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CO
Project Name	Eco-Cycle, Littleton

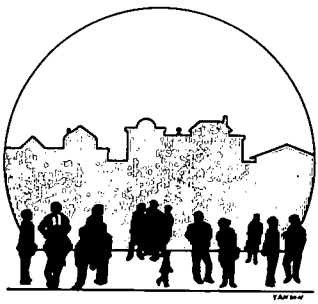
Eco-Cycle began operating in July of 1978. It was established with $30,000 in fines assessed against Littleton and Englewood for disposing of raw sewage into the Platte River. This legislative action set a precedent by allowing local fines to remain in the community.

Eco-Cycle is a non-profit corporation that recycles newspaper, aluminum, glass, tin, steel, oil, automobile parts, scrap metal and appliances. A monthly curbside collection service in Littleton and Englewood offers residents of each community a free pickup of recycleables. items. For convenience Eco-Cycle has a 24-hour, 7 day-a-week drop off center located at 2301 W. Bellview in Littleton. This service is available to the general public.

Various community groups and organizations (schools, churches, scouts, environmental and civic associations) have participated in the curbside collection service. By participating, groups can generate funds for their own needs while providing the necessary manpower needed to achieve community recycling goals.

Critique/analysis: Operating on a limited budget from month to month creates many problems, such as delay in repairing equipment and petty cash shortages. There is enough equipment to function at the present time; but, it is not always in working condition.

Organization	Littleton/Englewood Recycling, Inc. d.b.a. Eco-Cycle
Address	2301 W. Bellview Littleton, CO 80120
Contact	Paul Berteau, Coordinator
Telephone	(303) 795-7836
Funded By	Revenue for recycling plus seed money from fine; State funds.
Cost	$65,000
Congressional District	V
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

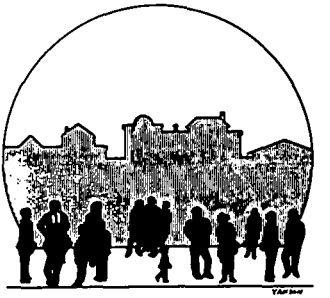
Category	Community
State	CO
Project Name	Larimer County Weatherization/ AT Project

The Larimer Community Action Program decided to demonstrate to the Community that low-cost solar energy could work and could help save citizens money. CETA workers built and installed solar collectors in three homes that previously qualified for CSA weatherization programs. In addition, wood stoves were installed in the homes to produce night-time heat. The collectors are for day use only; that is they have no storage capacity.

Critique/analysis: Because of lack of personnel, the program is difficult to operate along with the weatherization program.

Organization	Larimer County Weatherization/ Appropriate Technology Project
Address	2050 Airway Fort Collins, CO 80524
Contact	Paul Larsen
Telephone	(303) 221-2100

Funded By	Community Services Administration
Cost	$13,000/yr/materials
Congressional District	VI
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	CO
Project Name	Pikes Peak Solar Energy Association

The Pikes Peak Solar Energy Association, a non-profit educational organization in Colorado Springs, educates through "hands-on" workshops. Over the past year PPSEA has conducted four solar collector workshops constructing low-cost solar hot-air solar collectors on residences for day-time heating.

"Our last workshop was held to construct a unique collector design integral with the roof construction," reported Theo Bauder of PPSEA.

Critique/analysis: One day is not enough time to complete and install a collector.

Organization	Pikes Peak Solar Energy Assoc. (PPSEA)
Address	P.O. Box 15321 Colorado Springs CO 80935
Contact	Tom Ricker, President
Telephone	(303) 633-7531
Funded By	Annual membership fees, $10/year
Cost	Approx. $700 to $800 per workshop
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	Community
State	CO
Project Name	ROMCOE "Future Power" Project
Organization	Rocky Mountain Center on Environment (ROMCOE)
Address	Center for Environment Problem Solving 5500 Central Avenue Suite A Boulder, CO 80301
Contact	Susan Carpenter
Telephone	(303) 444-5080
Funded By	Carolyn Foundation Minneapolis, MN
Cost	$100,000
Congressional District	I, II, III
Compilation Date	February 1980

In February of 1977, the Rocky Mountain Center on Environment received a grant to design a project, "Future Power," that would enable communities to create their own energy structures. A primary assumption of the project states that communities can realize their energy futures only when alternatives exist to current energy problems.

The project first helped the community to identify its major immediate and long-term energy choices, and ways to implement change. The project also explored models for other U.S. communities to follow in creating similar energy goals.

Future Power selected three communities with different socio-economic profiles to spearhead the project: San Luis, a rural Hispanic town of 900 people, located in a mountain valley in southern Colorado; Grand Junction, a prosperous Western-slope city with a population of 25,000; and Montclair, a middle-class urban neighborhood in metropolitan Denver, population 6,000.

During the 14-month program ROMCOE worked closely with community coordinators and local steering committees, tailoring the project to their specific needs. Resource materials were supplied to the communities when needed.

Programs sponsored by the communities ranged from energy fairs to workshops. Among the pro- [illegible] follow-up projects were establishment of a [illegible]ic Energy Information Office, and proposed [illegible]ning for a local Training Resource Center.

Renewable Resources—A National Catalog of Model Projects

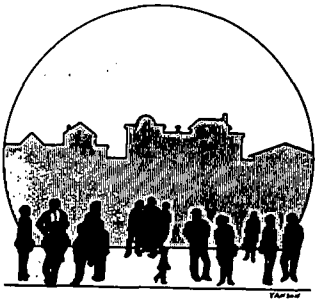
Category	Community
State	CO
Project Name	San Luis Valley Solar Energy Association & Energy Center

Since 1976 the San Luis Valley Solar Energy Association has been intimately involved in promoting the use of low-cost, do-it-yourself solar systems in the Valley. Since its inception in 1976, the Association has seen the growth of solar in the Valley increase from 10 projects to over four hundred.

The Association's activities to date have concentrated on developing various low-cost solar systems such as solar collectors, solar hot water heaters, solar greenhouses, and air-handling devices. This information is then shared with interested people through many "hands-on" workshops, consulting, and a monthly newsletter, Solar Flashes (which focuses on local issues, as well as programs throughout the state). One of the regular features of the publication has been a directory listing solar projects in the San Luis Valley.

Organization	San Luis Valley Solar Energy Assoc. & Energy Center
Address	512 Ross Street Alamosa, CO 81101
Contact	Bob Dunsmore
Telephone	(303) 589-2233

Funded By	Donations, NCAT, CO Office of Energy Conservation
Cost	$1,766/month for the Energy Center
Congressional District	III
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	CO
Project Name	The Solar Energy Assoc. of Northeastern CO, Inc., (SEANEC).

The Solar Energy Association of Northeastern Colorado, Inc., is a non-profit citizens' educational organization. It provides the community with a local source of information. Monthly meetings are free and open to the public. Speakers are invited to discuss their expertise in solar and the energy conservation.

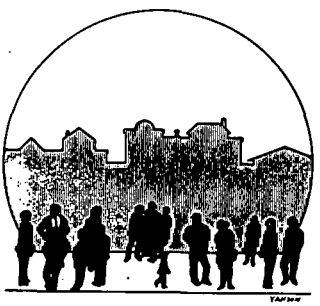
A monthly newsletter is published that addresses questions of local interest and disseminates information of general interest.

SEANEC was formed in February of 1977 by a group of people interested in sharing what they have learned about solar energy. The Organization's 140 members are located primarily in a two-county area, and the monthly meetings are held in Greeley and Ft. Collings each month.

SEANEC holds do-it-yourself workshops, and staffs solar information booths at various shopping districts. In addition, it hosts a yearly exhibit of solar, conservation, and alternative energy products at a local mall. "Solar is Hot! Don't Get Gurned" is a state publication published by SEANEC for consumers on the do's and don'ts of buying solar equipment.

Organization	The Solar Energy Assoc. of Northeastern CO, Inc., (SEANEC)
Address	P.O. Box 307 Eaton, CO 80615
Contact	Vern Tryon, Executive Director
Telephone	(303) 356-4000, ext. 478
Funded By	Memberships, sale of publications
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Critique/analysis: "Until this year, activities were limited because the organization was run completely by volunteers. Now with funding for a energy office, so much more can be accomplished. However, volunteers are still a very important part of the work we do," states Vern Tryon, Executive Director.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Bio-Gas of CO

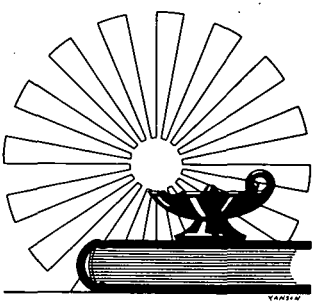
Over the past several years Bio-Gas of Colorado, a commercial venture, has been extensively involved in the research, development, and demonstration of the feasibility of biomass. In addition to these efforts, Bio-Gas has an education and training program in bio-energy technology and in the construction of small bioconversion projects. Lectures are given for schools, government conferences and private firms.

"Methane on the Move," is an educational report on a small anaerobic digestion unit. The report describes how a 12 - to - 50 cow digestion unit was built on a trailer and transported by tractor to 19 different demonstration sites in a five-state area. Bio-Gas conducted laboratory experiments to determine the yield coefficient of different manures and to define evaluation parameters for use in assessing the economic feasibility of building digestors on a small-or self-sufficient scale. The report contains discussions of three topics: the mobile digestion unit itself, a summary of its performance and how it was received, and the designs for four different sizes of digestors (digestor plans may be purchased).

Bio-Gas of Colorado, Inc., has concerned itself with the feasibility of applying bioconversion technology to small and large farms and ranches, feedlots, hog farms, chicken farms, racetracks, municipal sewage plants and power plants. Consultations have been held with parties in foreign nations developing bioconversion technologies.

NOTE: See Agricultural/Farm and Utilities categories for other Bio-Gas of Colorado programs.

Organization	Bio-Gas of Colorad
Address	5611 Kendal Ct. Arvada, CO 80002
Contact	Bill Pace, Fred Varani, Susan Schellenbach
Telephone	(303) 422-4354
Funded By	Four Corners Regional Commission
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

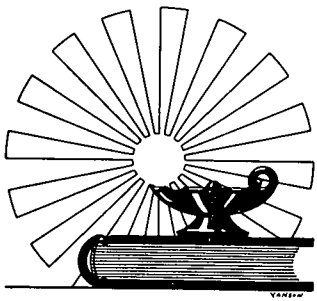
Category	Education
State	CO
Project Name	CO Coalition for Full Employment
Organization	CO Coalition for Full Employment (CCFE)
Address	2239 East Colfax Denver, CO 80206
Contact	Roger Kahn, Jim Lopez
Telephone	(303) 355-3554
Funded By	Churches & Federal
Cost	$150,000/year
Congressional District	I
Compilation Date	February 1980

The Colorado Coalition for Full Employment, Inc. (CCFE), is a private, non-profit organization founded in 1977 to work for full employment in Colorado. The CCFE operates under the guidance of a Board of Directors that represents the minority, trade union, environmental, church social service, and the business communities it works with.

To provide a climate for full employment in Colorado, the CCFE works with these constituencies to build coalitions for full employment. Additionally, the CCFE conducts community education around the interrelationships between jobs, the environment, and energy. The CCFE's activities include:

1. Increasing the responsiveness of special interest groups of employment, environmental, and energy problems.
2. Coordinating seminars, workshops, and conferences on employment, energy, environmental, housing and coalition-building issues.
3. Providing information and technical assistance to neighborhood residents about existing resources for addressing community needs.
4. Increasing grassroots awareness of and participation in the development of public policies.

   Facilitating leadership development, including training CETA participants as community educators.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Colorado College Environmental Action Windmill Project
Organization	Environmental Action
Address	Colorado College Colorado Springs, CO 80903
Contact	Bob Spencer
Telephone	(303) 475-0886
Funded By	Experimental Student Grants, Colordao Col. Campus Assoc.
Cost	$350
Congressional District	V
Compilation Date	February 1980

In the spring of 1979, in conjunction with a speech given by Barry Commoner, the Colorado College Environmental Action group (ENACT), erected a Savonius R-Windmill on the school's central quad.

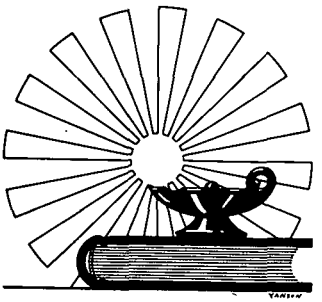
The windmill, comprised of a 10' x 3' turbine, made of three 55-gallon drums, that fits into a 17' water-pipe tower, has an optimal generating capacity of 500 watts. It is simple, cheap, and easy to construct, making it an ideal educational display project.

The purpose of the windmill project was to give ENACT members "hands-on" experience in wind technology and to educate the student body in the accessibility of a non-polluting and easily replicable alternative energy source.

According to Bob Spencer, a student instrumental in the project, under optimal conditions the windmill will have a pay-back period of approximately two years.

The windmill's design was obtained from Michael Hackleman's book, Wind and Windspinners. Materials for construction were locally purchased.

Critique/analysis: Spencer states that because the turbine is so heavy, the windmill has a lot of torque: it is therefore best suited for use as a water pump. Plans to use the windmill as an on-campus energy source were dropped when one of its admirers offered to maintain it in return for using it at his Blackforest, Colorado, residence.

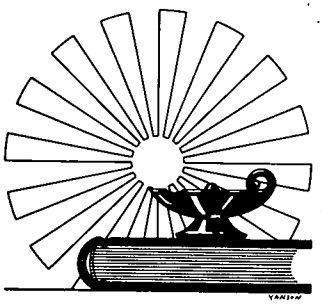


Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Colorado Jobs for Progress

The Comprehensive Offender/Ex-Offender Solar Greenhouse Program is designed to teach ex-offenders a trade in the solar energy field. The program offers them basic training in the design and construction of solar greenhouses, forced air heaters, grow-holes, and food dryers. The program's primary focus is to teach trainees designing, building, and maintenance of passive greenhouses. Under this program, greenhouses are attached to homes of elderly persons on fixed incomes. This provides the elderly with supplemental heat and vegetables.

Organization	Colorado Jobs for Progress
Address	1001 E. 62nd Ave., Room 231 Denver, CO 80216
Contact	Chuck Lacero
Telephone	(303) 289-5501
Funded By	Denver Employment Training, Vocational Rehabilitation, and Denver Opportunity
Cost	$350,000 per year
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CO
Project Name	DOE Wind Systems Program

Golden, Colorado is one of the sites of the Federal Wind Energy Programs, the ultimate goal of which is to accelerate the widespread commercialization of wind systems. To meet this goal for small wind energy conversion systems (SWECS) of less than 100 kW output, DOE has contracted with Rockwell International to support the existing wind industry through development, research, and testing efforts and to develop the market for SWECS.

Rockwell's Rocky Flats Wind Systems Program is performing a series of tasks to achieve the cost of reductions, improved reliability and market development which help make widespread SWECS utilization a reality. Important components of the program include:

1) A national Smal Wind Test Center (SWETC) to provide data to manufacturers, researchers, consumers, and others.

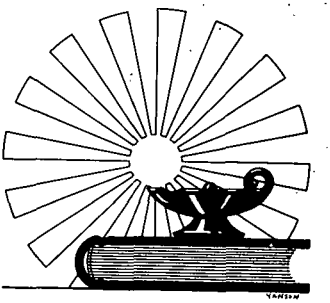
2) Advanced systems in three output ranges (1-2kW, 8kW, and 40kW) developed by private industry under subcontract to Rockwell to improve the state-of-the-art technology.

3) Market studies, mission analysis, studies of financial and insurance issues and field evaluation programs designed to surmount specific barriers to SWECS utilization.

4) Information provided to manufacturers, researchers and the public regarding the activities at Rocky Flats; subcontracted R & D projects; and the potential, availability, and use of small wind systems.

Organization	DOE Rocky Flats Pl... Wind Systems Program
Address	P.O. Box 464 Golden, CO 80401
Contact	Terry J. Healy
Telephone	(303) 441-1300

Funded By	U.S. Department of Energy, Federal Wind Energy Program
Cost	$12 million (FY 1979)
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CO
Project Name	G.L. Salmon Assoc.

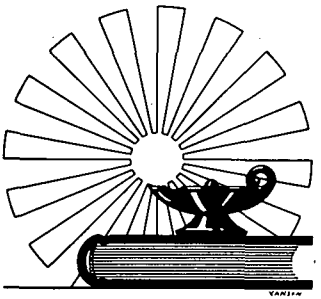
Organization	G.L. Salmon Assoc.
Address	P.O. Box 238 Loveland, CO 80537
Contact	Nancy Slamon
Telephone	(303) 669-4811

Funded By	St. Vrain School
Cost	$750
Congressional District	VI
Compilation Date	February 1980

In April of 1977, the Solar Energy Mobile Classroom project was conducted by Nancy Salmon in coordination with the University of Colorado, Denver Solar Energy Program. It was the first program of its kind in Colorado, designed to bring a solar energy educational program into elementary schools. A slide show on solar technologies was produced that includes examples of passive and active solar heating systems, solar thermal power, greenhouses, food dryers, photovoltaics, methane, digesters, wind machines, solar satellites, and waterwheels. A package of overhead transparencies was produced to explain how the sun works and how we can use its energy.

Children were given an indoor presentation; then they were taken outside and shown actual working solar hardware, including a photovoltaic-powered tape deck playing popular music, some solar toys, and other solar equipment. The project was designed for children in grades 4,5, and 6. It was taken to twelve elementary schools in the district over a period of two weeks and was seen by over 1800 children. "Two years later, one of the students who remembered me remarked that he still was impressed with the project and thought that it should have been continued," reported Mrs. Salmon.

Critique/analysis: The project was not introduced into other school districts because f were lacking. There were several pro- b experienced: teachers felt threatened by the appearance of an outside person; only two teachers showed up for the preliminary briefing given on the project; showed little interest or support; school principals showed little interest; and it was difficult to give presentations to children of widely varied backgrounds.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Harvey's Solar Projects
Organization	Harvey's Solar Projects
Address	P.O. Box 23, Lucerne, CO 80646
Contact	Dick Harvey
Telephone	(303) 356-7632
Funded By	Local sponsors
Cost	varies
Congressional District	VI
Compilation Date	February 1980

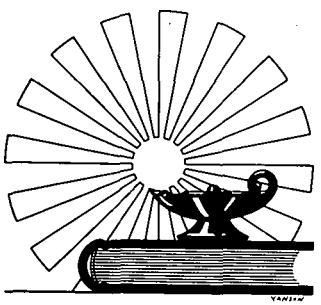
In the spring of 1978, Harvey put on his first do-it-yourself solar energy show in Greeley, Colorado at a local building supply center. These solar shows were used as a promotional device by local businesses, (mostly lumber yards and banks.)

Harvey calls his show a "see, feel, and touch" show. It is always held outside so that people can see food cooking in the solar oven and feel the hot air and hot water circulating through the collectors. He also has a solar heated and cooled dog-house through which can be seen the mechanics of the solar heat flow.

During the two years following the first show, twenty such shows were put on in Colorado, Wyoming and Nebraska. The demonstrations have had at least two noteworthy results: First, they showed people that there is an alternative to buy buying solar equipment -- building it. Second, the media were always very cooperative, giving the sort of advertising that could not be bought.

In August of 1979, Harvey conducted two workshops in the parking lot of a bank. He built an air solar collector and a water solar collector. His sponsors were the bank, the local electric company and the local gas company. The Community College gave credit for the workshop, and the area solar energy association set up a booth.

Critique/analysis: "I got paid well for the shows," says Harvey, "but they weren't regular enough to really make a living at."



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Hidden World Marionettes

Organization	Hidden World Marionettes
Address	P.O. Box 516 Niwot, CO 80544
Contact	Jane Michael
Telephone	(303) 652-2546

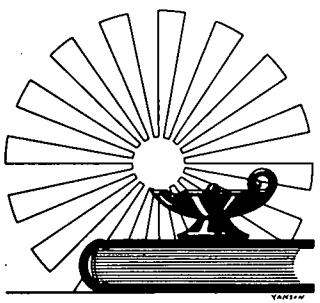
Funded By	Charging for the Performances
Cost	$100 for 1st performance; $65 for additional performance
Congressional District	II
Compilation Date	February 1980

The Hidden World Marionettes present a 45-minute live marionette program entitled "The Best Present of All." The story, from "Ranger Rick's Magazine", is about a king who tries to solve the energy problems of his kingdom by calling in the sources of energy and talking with them to see which sources will last the longest, do the least damage to the land, and be the safest to use for our future generations.

Two skilled puppeteers provide live voices and bring the marionettes to life. The marionettes are large, the voices and music are amplified by a public address system, and the marionette stage itself is 10' high, 12' long, and 8' deep. (Puppetry is one of the most effective means of teaching and introducing information of a technical nature to school-age children. It will keep the attention and interest even of preschool audiences.)

The story comes to the conclusion that the best present of all that the king could give to the children in his kingdom is enough heat and light from the earth (geothermal) and from the sun to last forever.

Critique/analysis: According to Jane Michael "Our only problem has been in trying to schedule enough programs to make a living and cover the costs of making the show. I contacted many ple about funding and grants, with very little cess. DOE was not interested in the program ause it is biased in favor of solar and points out some of the many risks of nuclear." She goes on to say, "We started out having the schools pay for the program out of activities funds, but we found that those were limited. We plan to continue to look for some grants and funding to do the program."



Renewable Resources—A National Catalog of Model Projects

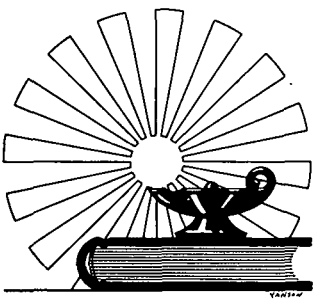
Category	Education
State	CO
Project Name	House of Essentials

The House of Essentials, begun in the summer of 1978, is a project demonstrating low-cost retrofit and self-sufficiency applications. Environmental Design students working with the University of Colorado faculty designed, acquired building materials for, and constructed the modifications of this typical Boulder, middle-income, single-family dwelling (approximately 50 years old). All of the wood, glass, cement, etc., have been donated from local businesspeople, whose help was secured by members of the class.

Other projects associated with the House of Essentials are a greenhouse, built on the south side of the house; a breadbox solar water heater, which preheats the domestic hot water; and a backyard garden where students are experimenting with a number of gardening approaches, such as French biodynamic campanion planting.

Colorado University's College of Environmental Design hopes that these projects mark the beginning of an expanded study of appropriate technologies, which may in the future see the design and construction of a small village demonstrating solar energy, conservation, self-sufficiency, and cooperative living.

Organization	U.C. Boulder; College of Envi... mental Design
Address	1826 Marine Street Boulder, CO 80302
Contact	Dennis Halloway
Telephone	(303) 492-7497
Funded By	Donations of materials
Cost	n/a
Congressional District	II
Compilation Date	February 1980



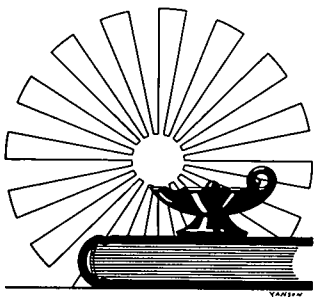
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Mountain Bicyclists' Association, Inc.
Organization	Mountain Bicyclists' Association, Inc. (MBA)
Address	1200 Williams St., Denver, CO 80218
Contact	Thomas C. O'Hara
Telephone	(303) 333-2453
Funded By	Gates Foundation of Denver, CO
Cost	n/a
Congressional District	I
Compilation Date	February 1980

The MBA has been awarded a three-year development grant by the Gates Foundation to implement a comprehensive bicyclist-education program for the Colorado school system and the general public. This program is being developed in cooperation with the Denver and Boulder school systems and the Colorado Department of Education. It is believed that this marks the first time that a bicyclist's education program has been developed through the combined efforts of public and private sector organizations for the purpose of encouraging bicycle use.

The complete education program of Mountain Bicyclists' is composed of three individual packages: The School System's Program, The Mini-Clinic, and the Extended Adult Program. The School System Program contains four modules and will be delivered primarily through the school's physical education program. The Extended Adult Program is a 10-week program designed for use in community colleges or other adult-education programs. More comprehensive than the Mini-Clinic (a four-hour clinic available at worksites, recreation, or other community centers) it will provide basic information and specialized route-planning to the site. The student will receive a thorough manual explaining bicycle maintenance and operation.

It is anticipated that the program will ailable for sale and distribution outside of the state of Colorado at the end of the three-year period to those wanting to encourage bicycling as a practical energy-efficient mode of transportation.



Renewable Resources— A National Catalog of Model Projects

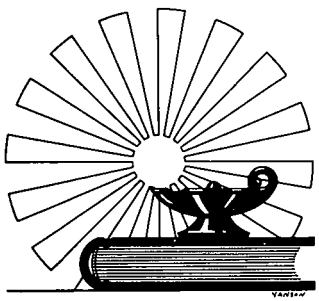
Category	Education
State	CO
Project Name	Operation Sundance

Operation Sundance is an environmental education program emphasizing solar energy and other natural energy systems. Students in the high mountain community of Evergreen are learning about solar energy through a very practical educational method: they designed and built a solar greenhouse. The project was started in 1974 and was completed on May Day, 1976. The greenhouse has been used continually since then by the high school during the school year. Horticulture is studied inside while the snow falls outside.

According to Arnie Langverg, one of the teachers, it is interesting to note that the students feel more optimistic about the use of alternative sources of energy in the future than do students who have not had exposure to the solar greenhouse.

Critique/analysis: Outside sources provided funding for construction of the greenhouse. When that funding ended, the staff was lost and had to be replaced internally, which caused a "shock". Summer maintenance is also a problem. It is difficult to get someone reliable who can keep the greenhouse up during the summer.

Organization	Jefferson Co. Open High School
Address	5050 S. Hwy 73 Evergreen, CO 80439
Contact	Jeff Bogard
Telephone	(303) 674-5205
Funded By	HEW Title III grant
Cost	$35,000/yr. for 3 years
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

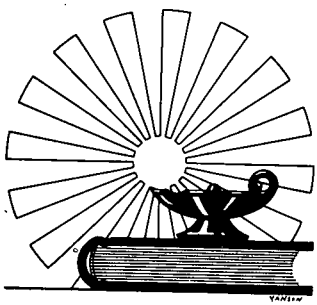
Category	Education
State	CO
Project Name	Prairie School

The faculty of Prarie School, a small rural, kindergarten through twelfth grade school in Colorado, wanted a solar greenhouse in which many different subjects could be taught. So they designed and built one.

Teachers of Physicial Science, Earth Science and Life Science all use the greenhouse in one way or another as part of their courses. The greenhouse provides additional space and materials for these courses. Plant-growing experiments, science fair projects and biology labs are all conducted with the help of the greenhouse.

The most direct use of the principles illustrated by the solar heating system is the incorporation of a unit on alternate sources of energy into a science class. This integration of the curricula takes place at all levels.

Organization	Prairie School
Address	P.O. Box 68, New Raymer, CO 80754
Contact	Gary L. Bloemker
Telephone	(303) 735-2206
Funded By	Title 4-C Mini-grant & School District funds
Cost	$3,500
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Public Energy Information Office

Organization	Public Energy Information Ofc. (PEIO)
Address	City Hall 250 N. 5th, Grand Junction, CO 81501
Contact	Karen Hastings, Director
Telephone	(303) 243-2633, Ext. 204

Funded By	Private (for greenhouse on a home)
Cost	$1,500
Congressional District	IV
Compilation Date	February 1980

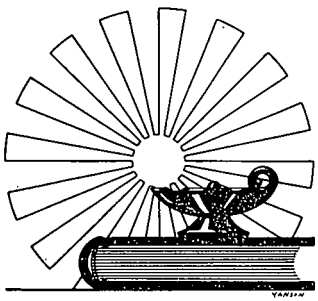
The objective of this workshop was not only to build a solar greenhouse but also to show people how it is done. The passive solar greenhouse is 220ft^2 and was built on the home of Brad and Jane Hendricks 0990 Road 106, Carbondale, CO, on Memorial Day Weekend in 1979.

The greenhouse is attached to the kitchen side of the house and will be used as a study, an eating space and a food-producing room, as well as a source of heat for the house. The workshop was organized in conjunction with the Division of Science and Mathematics at Colorado Mountain College, Carbondale.

Critique/analysis: This workshop was held after the experience of another workshop and much of it went smoother as a result (see Mesa College Workshop under same category and name of organization).

The major problem was a lack of time. Some of the foundation work was not completed in time for other preliminaries, such as laying of sill plates and cutting into the roof, which were to have been done ahead of time. Therefore, some unscheduled work had to be done before construction could be started. As a result, the second layer of glazing, some vent work, and some of the roof closure was not completed.

There were more women involved in this project than in the first one, and a pre-workshop pep-talk on the need to risk and share to maximize the learning process was successful.



Renewable Resources—A National Catalog of Model Projects

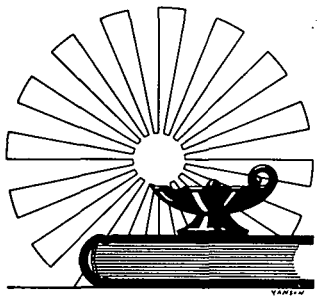
Category	Education
State	CO
Project Name	Public School Energy Curriculum

The Colorado State University Cooperative Extension Service has compiled an energy curriculum for grades 1 through 6. This project was made possible throuth a four-month grant from the Extension Service in cooperation with the Denver Public School System. The best of existing energy materials were selected, reviewed by teachers, modified, and put into final form in the The Best of Energy Book. The activities included are short and arranged into the subject areas of art, language arts, social studies, math, and science in a way that allows teachers to easily integrate the solar lessons into an already crowded teaching agenda. The book is being used on a test basis in 20 Denver elementary schools during the fall and winter of 1979.

A copy of the book may be obtained through the Denver Extension Service by January 1980.

Critique/analysis: There has been a problem obtaining sufficient funds to cover the costs of reproduction and materials.

Organization	CSU Cooperative Extension Service Denver County
Address	1300 E. Virginia Denver, CO 80209
Contact	Tom Feliu, Lisa Lively
Telephone	(303) 575-2716
Funded By	CSU Extension Service Denver Public Schools
Cost	$20,000
Congressional District	I
Compilation Date	February 1980



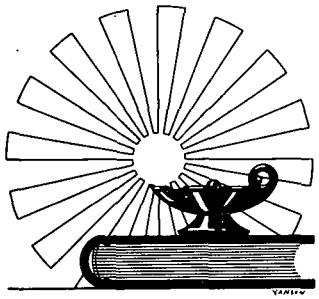
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Reed Junior High

From 1977 through 1979, ninth-grade students at Reed Jr. High designed, built and tested air-type solar collectors and a solar greenhouse. These are currently attached to a modular classroom at the school.

This program is part of the ninth-grade science curriculum, which includes a unit on home energy. The building of these solar systems helps illustrate such topics as: types and amount of solar radiation, the greenhouse effect, solar collectors, solar greenhouse's thermal mass, BTU and R value calculations, and passive solar principles.

Organization	Reed Junior High
Address	350 West 5th Loveland, CO 80537
Contact	Rand Hogarth
Telephone	(303) 667-5136
Funded By	Larimer County Human Development and community donations
Cost	$100 per collector, $600 greenhouse
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

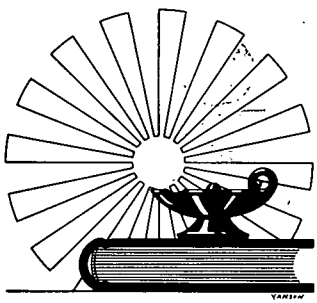
Category	Education
State	CO
Project Name	Regional Energy/Environment Information Center

The Regional Energy/Environment Information Center, part of the Denver Public Library, collects and makes available information on energy and environment subjects: solar, wind, biomass, geothermal, coal, oil shale, conservation and other subjects.

The library serves a ten-state region: Colorado, North and South Dakota, Nebraska, Montana, Wyoming, Utah, Arizona, New Mexico, and Nevada. Anyone can call collect to (303) 837-5994 for information and help.

The library staff has many ways to assist people in locating information. This includes computer searches, which are available at a nominal cost.

Organization	Conservation Library (Denver Public Library)
Address	1357 Broadway Denver, CO 80203
Contact	Ms. Kay Collins
Telephone	(303) 573-5152 ext. 254 or (303) 837-5994
Funded By	DOE, Dept. of Agr. CO Resource Ctr. & Denver Publ. Library
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Rocky Mountain School

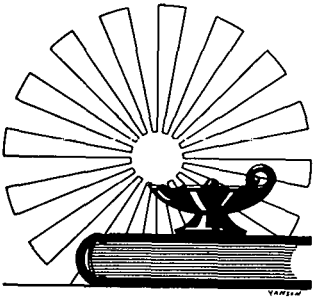
Environmental responsibility has been a cornerstone of the Colorado Rocky Mountain School's educational program for the past four years. In 1975, for instance, students measured heat losses from all school buildings as part of a science course. In 1976, the students in a physics course designed and built a solar-heated greenhouse. Other students are now growing vegetables in the greenhouse for the school's kitchen.

The "SUN-UP Dormitory" has also grown out of a science course in which twelve students worked with Ron Shore, studying different systems and sites on campus with potential to serve as such a facility. The dorm, which will house fourteen students and one faculty family, will be located near the science building. In part, the dorm was designed and built by the students.

Critique/analysis: According to the school officials, "This is the most cost-efficient project to date approved by the Department of Energy (dollars per BTU)."

Organization	Colorado Rocky Mountain School
Address	1493 106 Road, Carbondale, CO 81623
Contact	Randolph R. Brown
Telephone	(303) 963-2562

Funded By	HUD Grant
Cost	$42,000 (Solar system)
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

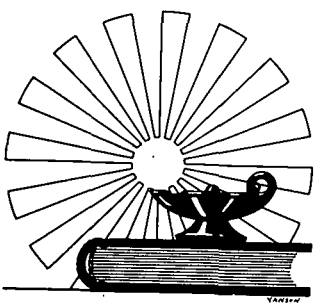
Category	Education
State	CO
Project Name	Solar Energy Applications Laboratory (SEAL)

Solar Energy Applications Laboratory in Ft. Collins owns four 3,000 ft^2 homes that are identical. Commercially available solar heating systems are installed on the homes for testing and comparison. In addition, the first solar home SEAL built was the first home to be heated and cooled with solar energy.

The fourth structure is a solar-heated greenhouse/residence combination. Built in 1976, the greenhouse provides daytime heating and solar collectors store heat for night-time use in both the greenhouse and the house. Plants grown in the greenhouse are irrigated with warm water. This allows lower air temperatures in the greenhouse at night, which saves energy.

In addition to studies of the influence of solar collectors and the greenhouse on system performance, improvements in heat-storage methods and equipment are being investigated. One such project is the enhancement of temperature stratification in the storage tank by use of specially designed diffuser piping through which water enters and leaves the tank. By minimizing mixing, hot water can be supplied to the several uses from the tank, while collection efficiency can benefit from the lower temperature of the liquid supplied to it.

Organization	Solar Energy Applications Laboratory (SEAL)
Address	Co. State University Foothills Campus Ft. Collins, CO 80523
Contact	R. R. French
Telephone	(303) 491-8618
Funded By	DOE
Cost	n/a
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	CO
Project Name	Solar Installation Training Course
Organization	Community College of Denver, Red Rocks Campus
Address	12600 W. 6th Golden, CO 80401
Contact	Craig Hilton Robert Hilton
Telephone	(303) 988-6160, Ext. - 369
Funded By	State of Colorado
Cost	$50,000 (1977-mid 1980)
Congressional District	II
Compilation Date	February 1980

Since 1977, a training program for solar installers has been offered at the Community College of Denver, at the Red Rocks Campus. Entitled "Solar Energy Installation and Maintenance," the program offers a one-year certificate and a two-year Associate Degree in solar installation.

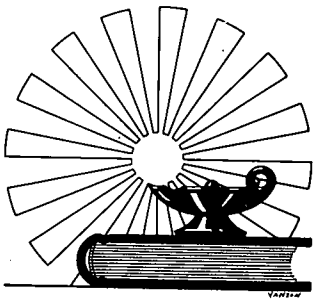
According to Hilton, "Solar installers need a variety of skills ranging from electrical wiring to plumbing, roofing, and sheet-metal work; and the educational approach at the Campus is based on teaching a whole new trade." The program focuses on four major areas in which an installer should be knowledgeable: basic theory, manual skills, solar materials, and supervised field work.

Basic Theory provides a good working knowledge of design, sizing, and controls of passive and active systems and an orientation to other solar technologies.

In Manual Skills, students learn piping and ducting methods, masonry, blueprinting and isometric reading, carpentry, and insulating techniques, etc.

In Solar Material, students learn about components and systems. They also learn to interpret manufacturers information and where to get supplies locally.

Supervised Fieldwork gives participants in the Denver program "hands on" experience with various types of equipment and installations. This final step consists of ninety contact hours of supervised fieldwork, which integrates the last modules of the curriculum.



Renewable Resources—A National Catalog of Model Projects

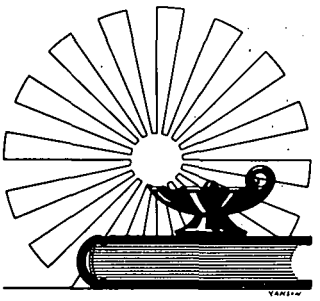
Category	Education
State	CO
Project Name	Solar Slide Show

A slide program about solar energy in Colorado was produced for the American Section/International Solar Energy Society Convention in August of 1978. Due to the interest in this slide show, SEES was founded to market and sell slide programs. These programs are developed by different people.

The five-part program includes: (1) Do-It-Yourself Workshop: Building a Bill North Collector; (2) Owner-Built Solar Systems; (3) Manufactured Domestic-Use Solar Systems; (4) Commercial, Multi-Family Residential and Large-Scale Demonstration Solar Systems; and (5) Solar Greenhouses.

The 100-slide set, with book of descriptions, is available from KaiDib Films, P.O. Box 261, Glendale CA 91209. Slides are available for preview and can be purchased individually as well as in the complete set.

Organization	Solar Energy Educational Service, Inc. (SEES)
Address	P.O. Box 307, Eaton, CO 80615
Contact	Vern Tryon, Director
Telephone	(303) 356-4000, Ext. 478
Funded By	Sales
Cost	n/a
Congressional District	IV
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

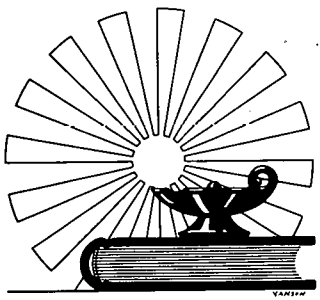
Category	Education
State	CO
Project Name	The Sunshine Co.
Organization	Solar Energy Exhibit Program
Address	1225 S. Grape St. Denver, CO 80222
Contact	Elizabeth Kingman
Telephone	(303) 757-5903
Funded By	Almost thirty individuals, companies and org.
Cost	$140,000
Congressional District	I
Compilation Date	February 1980

The purpose of The Sunshine Company - A Traveling Solar Exhibit, was to communicate, gather and exchange information about energy conservation and solar technologies, with an emphasis on their appropriate use in areas visited. It was not intended to make a political statement, but it was to function as a communication tool. The philosophy of the exhibit program was to allow people to explore these technologies in a practical and realistic sense, addressing the problem areas as well as aiming not only to educate and inform, but also to collect information on projects, people-related issues and circumstances in the communities visited.

Centered around people and information, the exhibit provided an ideal setting for the exchange of information, ideas and experiences. It was set up at places people frequent, such as malls and colleges. Special lectures were held in communities hosting the exhibit. In addition, the display was toured by many students. During its five-month tour, it was viewed by over 60,000 people in Colorado.

After its Colorado tour, the exhibit program went to Hong Kong for a week, where it was visited by over 35,000 people. The exhibit then went to Palermo, Italy, where it was seen by over 56,000 people during its two-week stay.

Presently, the exhibit is permanently installed at Golden Pond, Kentucky, at the Solar Visitor Center of the Tennessee Valley Authority.



Renewable Resources—A National Catalog of Model Projects

Category	Financing
State	CO
Project Name	Midland Federal Savings

Organization	Midland Federal Savings
Address	7502 W. 80th Avenue Arvada, CO 80003
Contact	Woody Leigh
Telephone	(303) 422-8131, Ext. 360

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

In 1975 Midland started making special loans for energy-efficient electric homes. In 1976 a solar program was started. At first, the loans were only made for homes with active solar systems; however, loans are now also being made for passive solar homes.

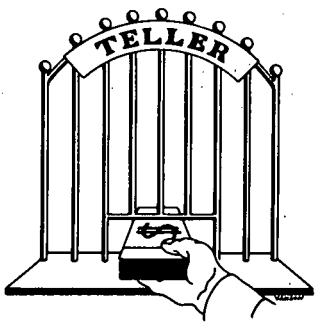
At the beginning of the program, a general policy for solar loans was written, as well as processing procedures for loan officers and minimum construction requirements. These requirements specified the amount of insulation, the need to include air lock entries and other basic energy conservation techniques. Homes also needed a "Thermal Efficiency Standard."

Forty-five loans for solar homes and six home-improvement loans for solar hot water systems have been made. The loans are conventional and made at the going rate. One hundred percent of the solar system is financed if the requirements are met. (Some do-it-yourself requests have been turned down because they did not meet requirements.)

The property must have a solar easement. Because of this requirement, most loans have been made on new construction rather than retrofit applications.

Critique/analysis: The solar systems did not increase the price of resales. This seemed to be [illegible]ause assessors and users weren't knowledgeable [illegible]ut the systems. People who resold their homes [illegible]er one year only got 25 to 50 percent of their money back on the cost of the solar system. However, it is believed that this will change with increased education about solar and increased fuel prices, according to Leigh.

NOTE: This is by no means the only solar loan program in Colorado.



Renewable Resources—A National Catalog of Model Projects

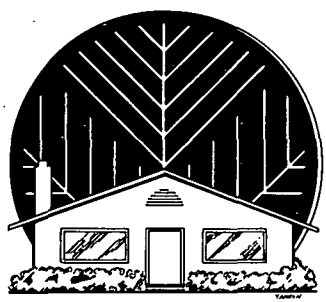
Category	Housing
State	CO
Project Name	West Pearl Solar Condominium

The West Pearl Condominum in Boulder is a four-story, 5,000 ft^2 building containing four apartments. Six hundred square feet of air-type collectors provide approximately 50 percent of the building's space heating. Storage capability is located in a 23-ton bin of stones.

In addition, each apartment also has an auxiliary heat source: two in-duct electric heaters.

Critique/analysis: Originally, the collector was served by a single blower. But when various air leaks were discovered in the collection system in the collector proper, in some of the duct attachments, and in one damper, the developer installed the two blower system to reduce pressure and thus lessen air leakage.

Organization	West Pearl Condominium
Address	2000 West Fifth Ave., Boulder, CO 80302
Contact	R.H. Bushnell, Engineer, Kinetics Construction Co.
Telephone	(303) 449-2979
Funded By	Private
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	CO
Project Name	Christian Reform Church

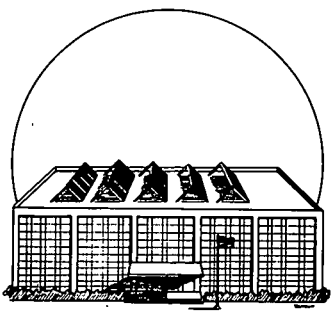
This 20,000 ft^2 building is a combination 17,300 ft^2 day-care center and a 2700 ft^2 church. There is no basement or attic.

The church remains unheated five or six days a week, but on other days is given preferential heating while the day-care center is temporarily allowed to be cooler than normal. The building is heated nearly 100 percent by a combination of 3,100 square feet of water-type collectors and by a heat pump.

The building has too tanks--one with a capacity of 8,000 gallons and another with a capacity of 6,000 gallons--into which the hot water flows, where it is stored. There is no auxiliary heat source and no cooling in the summer.

Critique/analysis: Balancing and optimizing the controls takes much time and care.

Organization	Christian Reform Church Center of Hope
Address	8400 W. 94th Street Westminster, CO 80020
Contact	D. Erikson
Telephone	(303) 424-9200
Funded By	Private
Cost	$80,000
Congressional District	IV, V
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	CO
Project Name	Colorado Solar Legislation

Organization	Colorado General Assembly
Address	c/o Colorado Office of Energy Conservation, (COEC) 1600 Downing, Denver, CO 80218
Contact	Peggy Wrenn, Director, Solar/Renewable Energy Programs
Telephone	(303) 839-2507

Funded By	Western Solar Utilization Network, Colorado Office of Energy Conservation
Cost	$6,000 plus in-kind staff support
Congressional District	I
Compilation Date	February 1980

Six thousand dollars of solar planning funds were used to contract with a professional engineer/lawyer to research and draft a package of solar energy legislation. The funding came from DOE through Western SUN (WSUN) in Portland, Oregon.

The solar legislation was designed to remove barriers to solar use and to provide incentives for the use of solar and other renewable energy sources in the state. The contractor, with the Office of Energy Conservation staff, reviewed other state legislation and drafted a series of proposals addressing the barriers identified in the Colorado Solar Action Plan. The Plan had been written as part of the WSUN planning effort by a statewide Citizens' Solar Advisory Group and principal investigators from the COEC and Colorado Energy Research Institute.

The Solar Advisory Committee reviewed the proposals and provided support for the revised package of proposals. The COEC staff secured legislative sponsors and provided staff support and information to the legislature.

Critique/analysis: Common problems encountered include:

1) Defining the terms "passive solar system" and "renewable energy";

2) Estimating fiscal impacts;

3) Determining where to locate the solar/renewable authority in state government;

4) Providing a mechanism for publicizing solar legislation.

Renewable Resources— A National Catalog of Model Projects

Category	Legislation
State	CO
Project Name	Pueblo Energy Commission

Organization	Pueblo Energy Commission
Address	City Hall Pueblo, CO 81003
Contact	Pat Kelly 700 W. 17th Pueblo, CO 81003
Telephone	(303) 544-8081

Funded By	n/a
Cost	n/a
Congressional District	III
Compilation Date	February 1980

Work is being done on conservation amendments to the Pueblo Zoning and Subdivision Regulations by a committee made up of members appointed by the Pueblo Association of Home Builders and by the Pueblo Energy Commission. A Regional Planning staff member and a private engineer are also playing supporting roles.

The amendments to the Pueblo Ordinances were proposed in September of 1979. Their purpose is to conserve natural resources, giving special attention to energy consumption in houses. At the heart of the amendments is an "envelope zone" concept which involves the proper solar orientation effort. There are no penalties being considered, but there are rewards for the developer, the builder, and the home purchaser.

The Commission is now applying for a grant that would enable it to extend the "solar envelope" concept to cover more than one-and-two-family homes. But presently, the emphasis is on getting the amendments passed first by the Planning and Zoning Commission and then by the City Council.

Critique/analysis: Thus far, the Commission has run into concern and opposition from some city staff people. However, according to Pat Kelly, "We have been encouraged by the attitude of the City Manager and the Utility Subcommittee, who see this as a beginning of organization to solve some other problems they have had with standardization."

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	CO
Project Name	Colorado Migrant Council
Organization	Colorado Migrant Council at Alamosa
Address	528 9th Street Alamosa, CO 81101
Contact	Cathy Buhr, Acting Director: Jose Martinez, VISTA Volunteer
Telephone	(303) 589-4332
Funded By	Colorado Migrant Council
Cost	n/a
Congressional District	III
Compilation Date	February 1980

The Colorado Migrant Council focuses on programs for long-time farm, seasonal, or migrant workers.

The Council has sponsored a number of programs to provide their clients (many of whom are elderly and disabled or retired on low-incomes) with solar heating. "North" type solar collectors have been retrofitted on several homes. The first ones were completed in 1977. Since then, community greenhouses have been built in Alamosa and Center, Colorado. Both are tended by elderly people.

Funding comes from various programs. Each collector costs about $500 and each greenhouse from $1,500 to $1,700. Several large solar food dryers have also been built. These are made available to people during the harvest season for drying food.

VISTA volunteers, in conjunction with people from the San Luis Valley Solar Energy Association (see Community Projects) are responsible for carrying out the programs of the Migrant Council. This is done as an adjunct to other programs and is not a separate or highly visible program.

Critique/Evaluation: Funds available for this work are very limited, although there has been considerable interest expressed in collectors and greenhouses. Money for materials would enable the program to help the elderly and low-income people in the community.

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	CO
Project Name	El Valle Solar Project

Organization	El Valle Solar Demonstration Project
Address	Center for Rural Development P.O. Box 36 Adams State College Alamosa, CO 81102
Contact	Walt Gomez
Telephone	(303) 589-7262

Funded By	CETA/Colorado Division of Employment
Cost	n/a
Congressional District	III
Compilation Date	February 1980

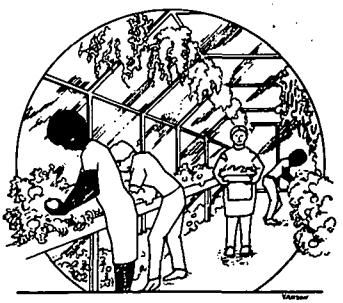
The El Valle Solar Project of the Center for Rural Development has generated much interest among persons throughout Colorado. The purpose of the project is to increase the use of solar technology in the San Luis Valley by installing low-cost units in the buildings of owners who qualify for project assistance.

In the summer of 1979, three solar training teams working under this grant moved to the San Luis Valley and started work on liquid air systems for solar water heaters. Thus far, a half a dozen units have been completed in Antonito. These include a low-profile daytime collector, a Trombe wall on a cinderblock wall, and two adobe Trombe walls. The average cost for new materials has ranged from 104 sq. ft to 208 sq. ft. for the Trombe walls. Cost depends on collector size and material type.

The training phase of the Solar Project terminated in Alamosa in late summer of 1979 with the construction of a solar greenhouse. The teams then relocated in three counties and continued constructing solar units throughout the Valley.

Akira Kawanabe, the solar consultant-coordinator, was responsible for the entire training phase of solar construction. The Alamosa architect and solar expert has been delighted with the teams' progress, saying that this ə of training is the next step in solar energy ələpment in the Valley. He sees an increased ınterest in solar heating in this Valley,where sunshine is abundant and fuel bills are high.

The Solar Demonstration Project is open to the public. Anyone meeting one of three guidelines can be considered for a solar system if he or she furnishes or pays for the materials. The project pays for the expertise, design, and labor. All selections are made by the El Valle Housing Corporation in conjunction with the Center for Rural Development.



Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	CO
Project Name	Peoples Alternative Energy Services

Organization	Peoples Alternat Energy Services (P.A.E.S.)
Address	Rt. 1, Box 3-A San Luis, CO 81152
Contact	Arnie A. & Marie Valdez, Co-Directors
Telephone	(303) 672-3602

Funded By	Private Foundation Grants: Carolyn Foundation 1977-79; ARCA 1979; In-kind management, office space from Co-Directors.
Cost	n/a
Congressional District	III
Compilation Date	February 1980

Peoples Alternative Energy Services (P.A.E.S.) is a non-profit community based alternative technology project, designed to address the needs of low-income Spanish speaking people in Costilla County. The project concept grew out of the private commitment of energy-conscious native residents and was coupled with a 10-month grant -- "Future Power Project" at San Luis. At the end of the grant period, P.A.E.S. became a non-profit organization in San Luis. The office space is a retrofitted Trombe wall and clerestory adobe structure at the Valdez homestead.

P.A.E.S. recently obtained a grant from the ARCA Foundation to make grants available for low-income people to utilize low-cost passive solar applications to help meet their energy needs. This program is being coordinated by P.A.E.S., and the New Mexico Solar Energy Association. It is designed to fit special needs of the rural community.

To complement "people's needs" the P.A.E.S., - ARCA grant will help to publish a "Poor Peoples Alternative Technology Energy Guide" (bi-lingual, to be printed by early 1980). Other no-cost services include technical assistance to low-income families to encourage do-it-yourselfers to use native materials and appropriated technology to become more self-reliant.

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	CO
Project Name	Rural Housing Development

Modified Trombe wall solar systems for low-cost, self-help houses were installed in twelve homes in the Aragon Subdivision in Milliken, Colorado. The Trombe wall system was able to supply 37 percent of the annual heating requirements of the homes.

Interviews were conducted with three of the twelve residents of solar houses in the Aragon Subdivision to gather information regarding their attitudes toward the solar wall system. Satisfaction with the system appeared to be based on the residents' perception of the utility savings attributable to the system.

One of the major problems was how to live in these solar homes. The owners were not properly educated and needed more information on the operation of the system in order to realize maximum gains.

Critique/analysis: The collector was approximately 25 percent efficient in converting incident solar radiation into useable household heat. The overall thermal demands of the dwellings (twelve houses) were minimal, and analysis showed that the demands differed by a factor of 20 percent. Because the houses were constructed to identical specifications, excess internal heat gain in one of the houses was the probable cause for this difference.

Organization	Colorado Rural Housing Development Corporation
Address	P.O. Box 898 Brighton, CO 80601
Contact	Al Gold
Telephone	(303) 659-1044
Funded By	Community Services Administration and Colorado Division of Housing
Cost	$1,950/house
Congressional District	IV
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

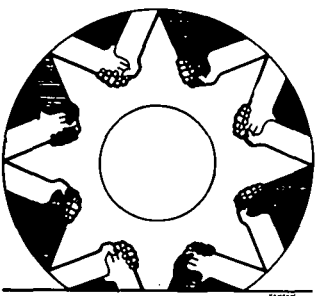
Category	Outreach
State	CO
Project Name	Boulder Energy Conservation Center
Organization	Boulder Energy Conservation Ctr.
Address	929 Pearl Street Boulder, CO 80302
Contact	Stan Zemler
Telephone	(303) 443-8942
Funded By	CO Office of Energy Conservation
Cost	$16,800 per year
Congressional District	II
Compilation Date	February 1980

The Boulder Energy Conservation Center is a non-profit information and coordination center for energy conservation and appropriate technology. Among other activities, the Center for the past 3 years has hosted an annual Appropriate Technology Fair.

The Center provides a place in the community where people can find information and other materials relating to alternate sources of energy and energy conservation.

The City of Boulder recently established an Energy Office. According to the Center's Director, "We are currently working to define our different roles in the community in order to work together and avoid duplication of efforts."

Critique/analysis: Funding has been difficult to obtain. The Center is assured of its financial backing for only a few months at a time.



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	CO
Project Name	Colorado Gasohol Promotion Committee

The State of Colorado has set up a Gasohol Promotion Committee, the purpose of which is to serve as a clearinghouse for information on gasohol. Its four main functions include:

Research -- To identify and provide for necessary scientific research and special studies.

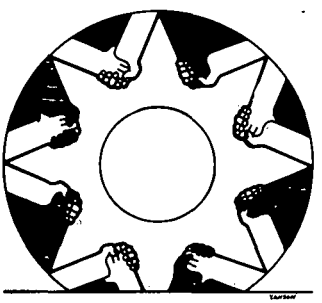
Information -- To assemble, analyze, and disseminate reliable information on gasohol to the legislature, local and state government agencies, developers, farm organizations, and the general public.

Legislation -- To study state and federal legislation with respect to gasohol, alcohol and related industrial hydrocarbons derived from Colorado farm and forest products.

Coordination -- To cooperate with local, state and national organizations and with governmental agencies engaged in similar activities.

Organization	Colorado Gasohol Promotion Committee
Address	1525 Aherman, 4th Floor Denver, CO 80203
Contact	Robert W. Merton
Telephone	(303) 839-3219

Funded By	State
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	CO
Project Name	Colorado Public Interest Research Group, CoPIRG

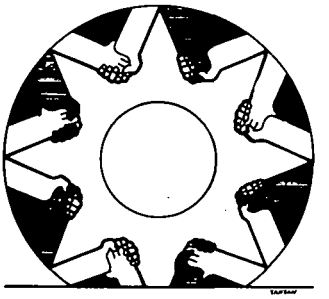
In order to raise money, as well as to increase the level of community awareness of solar energy early in 1979, a Solar Walk--athon was held.

Using $375 from the Solar Walk—athon Fund and with the help of a Solar Energy class, a 7' 8' thermosiphoning solar collector was built that will provide supplementary heat to an industrial arts shop at the University of Northern Colorado. The collector will be monitored as part of the solar program.

At present (fall of 1979), the CoPIRG Board of Directors and staff are actively formulating a three-year program to promote solar energy. As part of the plan, a CETA project is being proposed to help accomplish CoPIRG's goals, which are to promote solar energy and to provide skills to persons interested in solar energy-related employment.

Organization	Colorado Publ. Interest Resch. Group, (CoPIRG)
Address	University Ctr. University of Northern Colorado Greeley, CO 80639
Contact	C. B. Pearson
Telephone	(303) 351-4504

Funded By	Students activities fees
Cost	n/a
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	CO
Project Name	Energy Conservation/ Alteratives Center (ECAC)

Organization	Energy Conservation/ Alternatives Center for Commerce and Industry
Address	1576 Sherman Street Denver, CO 80203
Contact	JoAnne Phipps
Telephone	(303) 861-1719

Funded By	Colorado Office of Energy Conservation
Cost	n/a
Congressional District	I
Compilation Date	February 1980

In 1979, the Colorado Office of Energy Conservation created the Energy Conservation/Alternatives Center for Commerce and Industry. Its purpose is to help commerce and industry in the state achieve the goal of saving a minimum of 30 trillion BTU of energy in calendar year 1980.

ECAC plans to reach this goal with a five-pronged approach. It will:

1) Inform commerce and industry about the economic wisdom of energy conservation;

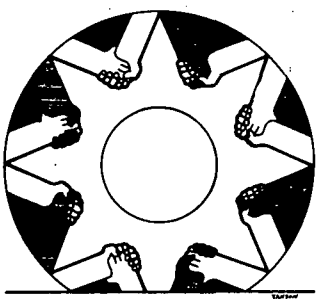
2) Demonstrate the techniques of conservation and energy alternatives;

3) Provide information;

4) Act as a liaison between government and business; and

5) Create energy-conservation programs for commerce and industry.

ECAC identifies specific target groups and develops energy-management programs. With the assistance of the ECAC Technical Advisory Board, it also designs workshops and programs to assist the target groups in energy-management programs.



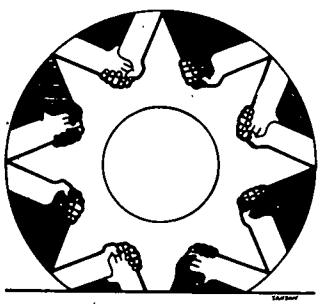
Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	CO
Project Name	League of Women Voters of Colorado
Organization	League of Women Voters of Colorado
Address	1600 Race St., Denver, CO 80206
Contact	Joyce Jenkins
Telephone	(303) 242-7536
Funded By	Exxon, Colorado Office of Energy Conservation
Cost	Exxon, $3,000; COEC, $10,000
Congressional District	State-wide
Compilation Date	February 1980

The Colorado Energy Education Project grew out of a 1976 DOE grant to the LWV/United States. State League organizations were free to meet the goals of the project as they saw fit. In Colorado, a major activity was ensuring that local libraries had on hand a spectrum of energy information materials. Basic energy publications were distributed to public libraries throughout the State. A display on energy conservation in transportation was created and is available upon request. In addition, various local Leagues helped set up energy fairs in their localities. This activity is ongoing.

In Durango, the interest in energy education led the local League to set up and sponsor an energy information office. The Durango LWV, whose office is the OEC's regional energy center, works with the Colorado Office of Energy Conservation on programs. Under contract from the OEC in 1978 and 1979, the LWV/Colorado was able to sustain and increase the energy-education activities begun during the Energy Education Project described above.

Currently, the LWV/Colorado is scheduling an energy puppet show throughout Colorado schools. The puppet show, developed by the Montana LWV, is designed for grades K through 3. The theme "Take That, You Energy Monster!" is energy conservation and renewable energy. The puppet show was acquired with OEC funding.



Critique/analysis: Even though nationally the League takes a strong position on energy ~~~servation, local Leagues may have other ɔrities in terms of programs at the ɜl level. Therefore, coverage is not complete in every instance.

A very rough estimate of Colorado citizens reached via all LWV energy projects is 10 to 15 percent, according to Ms. Jenkins.

Renewable Resources— A National Catalog of Model Projects

Category	State
State	CO
Project Name	Colorado EES, Office of Energy Conservation
Organization	Colorado EES, Office of Energy Conservation
Address	1600 Downing St., 2nd Fl., Denver, CO 80218
Contact	Robert Brown
Telephone	(303) 839-2507
Funded By	Federal: Energy Conservation Policy Act, Energy Extension Service
Cost	$1,100 per center per month
Congressional District	State-wide
Compilation Date	February 1980

In October of 1977, the Colorado Office of Energy Conservation decided to create a "model" Energy Extension Program based on the same concept as the national EES pilot program. The underlying and overriding theme of the Community Center program was to provide information to small energy users through a locally based and locally sponsored office in several test communities.

Communities were selected on the basis of existing organizations, climate, population, community resources, diversity of income, and location. Groups to sponsor the community work were selected on the basis of existing involvement in energy work, non-profit status, interest and willingness to offer support, and contacts and credibility within the community. Eight communities were selected and staffed. Funds for these centers were from the Energy Conservation Policy Act funds for public information and education. In anticipation of national involvement in the EES program, ECPA funds for 1979 were reduced. But the national EES program did not make funds available, so two community centers were closed down for 1979.

Some services offered by the Community Centers were the provision of the Energy Scorecard, a do-it-yourself home energy audit, printed materials supplemental to the audit, films, educational materials, library materials, and media assistance. A full-time director and a part-time assistant to the director provided the point of contact for the directors of the Community Centers. The Director of the Community Programs utilized the talents of nearly all branches of the Office of Energy Conservation and attempted to encourage working relationships with other state-wide and local organizations for support services.

Renewable Resources—A National Catalog of Model Projects

Category	State
State	CO
Project Name	Colorado Energy Research Institute

The Colorado Energy Research Institute provides incentives in the form of scholarships, fellowships, and internships to encourage Coloradoans to pursue energy-related educational programs and careers. Each award provides tuition and fees, and fellows and interns receive a $550 monthly stipend. Over 120 awards are given annually, and research indicates that a high percentage of recipients have remained in Colorado and are pursuing energy-related careers

"With this program, we feel we are developing a core of well-trained energy professionals who can help Colorado form an enlightened energy policy," said Gloria Farler, Director of the program.

Critique/analysis: "We would like to encourage greater minority student involvement."

Organization	Colorado Energy Research Inst.
Address	2221 East St. Golden, CO 80401
Contact	Gloria Farler
Telephone	(303) 279-2881
Funded By	State General Fund
Cost	$208,000 per yr.
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	State
State	CO
Project Name	Colorado Office of Energy Conservation

Organization	Governor's Office
Address	c/o Colorado Office of Energy Conservation, 1600 Downing Denver, CO 80218
Contact	Peggy Wrenn, Director, of Solar/Renewable Energy Programs
Telephone	(303) 839-2507

Funded By	Governor Lamm's Discretionary Budget
Cost	$3,000
Congressional District	I
Compilation Date	February 1980

Governor Lamm sponsored A Sun Day solar design contest in the spring of 1978 to promote solar energy use. There were three parts to the contest and activities:

1) A solar design contest for the best Port of Entry Building (a highway weigh-station where trucks are weighed for the purpose of state taxation).

2) A solar and renewable energy poster contest for entrants up to eighteen years of age.

3) A Solar Fair and display on the grounds of the state capitol.

The Colorado Office of Energy Conservation co-sponsored the event and provided staff support.

The poster contest had several hundred entries from around the state and was judged by a group of school teachers and solar experts.

The design contest was oriented toward students of architecture and engineering rather than toward professionals, both because of limited funding and for the purpose of stimulating solar education.

Critique/analysis: Experience with this contest leads to the following conclusions:

1) A budget of more than $3,000 is needed, particularly if professionals are to be lured into the competition.

2) Widespread publicity is essential to accomplish the public education goals; schools and teachers should be involved in announcing contests for children.

3) A full-time staff person is required for the period of the contest.

Renewable Resources—A National Catalog of Model Projects

Category	State
State	CO
Project Name	Community College Solar System

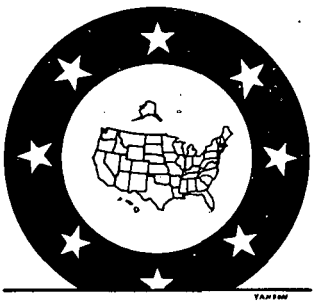
Organization	Community College of Denver, North Campus (CCD-North)
Address	3645 W. 112th Ave., Westminster, CO 80030
Contact	Bill Moore, Physical Plant
Telephone	(303) 466-8811

Funded By	State of Colorado
Cost	$793,000 for solar
Congressional District	V
Compilation Date	February 1980

The natural gas shortage experienced in Denver during the winter of 1972-73 was a major influence in the decision to make the Community College of Denver's North Campus a solar-heated facility. When the Public Service Company issued the news that new gas taps would be connected only if some severe time restrictions were met, John Anderson, a principal of the architectural firm designing the community college building, started exploring alternative energy sources. "There's a happy combination of conditions in Denver that gives us an abundant supply of solar energy when it's most needed; it became increasingly apparent to me that the sun offered the greatest long-term promise as a viable alternative to natural gas.

Economics also played a role in making the commitment to go solar. Although the solar system raised the initial cost of the project by $793,000 (the total cost was over $11 million), the cost of operating the solar structure over its lifetime -- the life cycle cost -- was shown to be much lower. A study done by engineers for the project revealed that the taxpayers of Colorado would save money on fuel bills every year, and that by 1990 an annual savings of at least $90,000 would be achieved.

Armed with this feasibility study and the endorsement of the Governor, John Anderson and others involved with the project went to the Joint Budget Committee of the Colorado General Assembly and convinced them that it was in the best interest of the state's citizens to use the sun to heat CCD-North. As a result, the college now stands as one of the largest solar-heated buildings in the world, using over 35,000 sq. ft. of collectors to provide warmth for up to 3,500 students.



Renewable Resources—A National Catalog of Model Projects

Category	State
State	CO
Project Name	Community Solar Planning

Organization	Colorado Office Energy Conserva (COEC)
Address	1600 Downing Street 2nd Floor, Denver, CO 80218
Contact	Peggy Wrenn, Director, Solar/Renewable Energy Programs
Telephone	(303) 839-2507

Funded By	Western Solar Utilization Network (Western SUN)
Cost	$5,000 plus in-kind staff support
Congressional District	I
Compilation Date	February 1980

The COEC used solar planning funds to give small grants to four communities ($1,000 each) and to five existing COEC-funded Community Energy Conservation Centers ($500 each) for solar planning projects. The monies were awarded to principal investigators involved with non-profit solar groups or the local municipal government. The task description was flexible enough to accomodate different needs and different levels of solar activity in each locale.

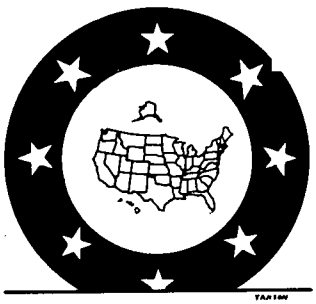
The investigators were to meet with local representatives to discuss their perceived roles in a community solar action plan. They were also to discuss the community's priorities and opportunities for local funding. A solar directory of key individuals and businesses also was written.

Critique/analysis: Although the Community Solar Planning program is ongoing, some conclusions reached so far include:

1) Flexible funds are most useful to local conservation offices and solar energy associations; some local determination of needs to promote solar has usually been thought out by key solar advocates in the community.

2) Great sensitivity must be exercised in dealing with existing groups in local communities. Vital is a thorough understanding of their local institutional, socioeconomic, and political structures.

3) Reports and directories published from such efforts can be extremely useful to a broad audience; funds should be allocated for sharing the results of solar planning efforts.



Renewable Resources—A National Catalog of Model Projects

Category	State
State	CO
Project Name	Geothermal for Pagosa Springs

The geothermal well in Pagosa Springs, will soon be supplying the surrounding buildings with their heating needs.

The proposed project will heat twelve public buildings, twenty-five commercial/business buildings, and fifteen homes. There is a possibility of an additional project that would heat forty low-income homes. By some estimates there is enough geothermal energy to heat another twenty homes.

The new district space-heating system will connect many structures to the same geothermal source, thereby using energy efficiently and reducing the amount of energy wasted. The system will replace about $60,000 a year of natural gas and propane (Winter, 1978/79 prices).

The water comes out of the ground at 130° F to 150° F. The "top" 25° or so of the temperature will be used and the water will then be dumped in the San Juan River. This water is clean and is used downstream for irrigation. The Completion date of the project is the summer of 1980.

Organization	Coury and Associates
Address	7400 14th Street, Suite 2, Lakewood, CO 80214
Contact	Ken Garing
Telephone	(303) 232-3823
Funded By	75% DOE, 25% local
Cost	$1,003,000
Congressional District	III
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

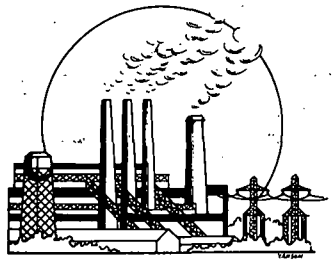
Category	Utility
State	CO
Project Name	Arvada Anaerobic Digestor

The purpose of this project is to produce methane gas through anaerobic digestion, utilizing manure from 50,000 feedlot steers as a feed source.

The proposed facility will utilize manure to produce methane gas to be consumed in the Lamar Utilities Board's electrical generation plant. The full-scale plant will have four major parts: (1) mixing and grit removal facilities to produce a manure slurry and remove sand particles; (2) a digestion complex consisting of anaerobic digestors and cleaning facilities; (3) de-watering and drying equipment to process the digestor solids for cattle feed; and (4) aeration ponds to treat the effluent from the de-watering equipment for partial recycling and discharge. The solids-handling capability of the bioconversion facility will be comparable to that required to handle the solids for a city of approximately one million people.

There is now operating a pilot facility consisting of a heated 6,000-gallon main reaction vessel. A slurry of manure is fed into the plant on a daily basis. Approximately 163 pounds of organic solids per day are processed, and 570 standard cubic feet of methane per day are produced. The facility provides as byproducts anaerobic residue used for cattle feed.

Organization	Bio-Gas of Color Inc.
Address	5611 Kendall Ct., Arvada, CO 80002
Contact	Fred Varani, Shelly B. Don, Bill Carahan (Lamar Utilities Board)
Telephone	(303) 422-4354
Funded By	Four Corners Regional Commission (FCRC for R&D, Farmers Home Loan Administration loan to city
Cost	FCRC $500,000, FMHA up to $14.2 million
Congressional District	III
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Utility
State	CO
Project Name	Home Energy Audit

Organization	Public Service Co. of CO
Address	550 15th Street Room 624 Denver, CO 80203
Contact	Frank Oliver
Telephone	(303) 571-7200

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

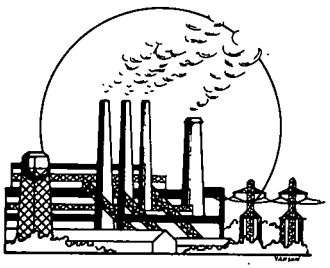
The Home Energy Audit prepared by the Public Service Company of Colorado, is designed to provide an on-site analysis of a home's thermal envelope and to provide the consumer with specific recommendations for saving energy. Many of the suggestions made as a result of the Home Energy Audit will cost nothing, while others will require an investment on the part of the homeowner. A method for prioritizing needed improvements helps the customer decide what to do first.

The Home Energy Audit is tailored to the individual needs of each customer. There are, however, three basic parts to the Audit as it is conducted in the home: the introduction of the Audit to the customer, the walk-through, and the summary with the customer.

The introduction includes an explanation of the components of the Audit and instructions on how to use the Energy Conservation Reference Guide for taking notes on specific information provided by the representative, which will not appear on the Home Energy Audit form.

During the walk-through of the home with the customer, a complete analysis is made of the home's thermal envelope and the customer's usage habits.

The final part of the Audit is the summary when the findings are discussed with the customer and all options with specific suggestions and methods for correction of deficiencies are given to the customer. Those areas needing improvement are prioritized on the Home Energy Audit form. The customer's past consumption history and the components of the utility bill are also discussed at this time.



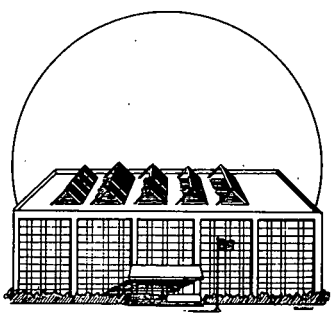
Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	CO
Project Name	Denver Community College, North Campus
Organization	Community College of Denver
Address	North Campus, Westminster, CO 80030
Contact	William J. Moore
Telephone	(303) 466-8811
Funded By	Colorado State Legislature
Cost	$11,500,000
Congressional District	IV, V
Compilation Date	February 1980

Built to serve the needs of 3,500 full-time students, the Community College of Denver now has a new college building with a 1,000 foot long water-type collector and a 200,000 gallon-storage system.

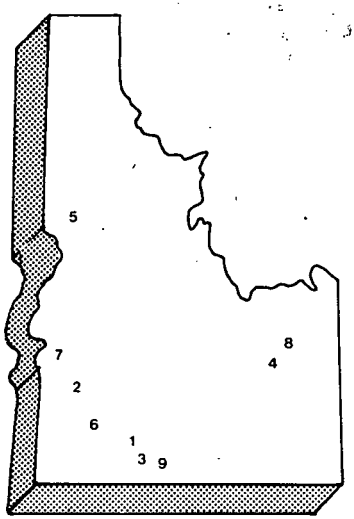
The building has excellent insulation and, in addition, features many energy-conserving and energy-redistribution systems and designs.

In summer, water is heated by the solar heating system. In the winter, an auxiliary gas heater heats water as well. A chiller-heat pump is used to cool in summer, when rejected heat is sent to a conventional cooling tower.



IDAHO

1. Bliss
2. Boise
3. Buhl
4. Idaho Falls
5. Lewiston
6. Mountain Home
7. Payette
8. Rexburg
9. Twin Falls



IDAHO

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Category	Agricultural
State	ID
Project Name	Solar Hog Farrowing House

William Dishman built a solar heated hog-harrowing house and crop dryer. The system consists of a well-insulated building with collectors built into the south wall and roof. The wall and roof, both painted black, were glazed with two layers of fiberglass.

Upon a signal from a differential thermostat, air is forced through the collectors via fans, with the hot air ducted from the top of the collectors to either the rock-storage bins, or the solar crop dryer. Air from the storage bins can also be ducted to the interior of the building.

The warm air ducted to the crop dryer is used to dry harvested grains that are too damp to store.

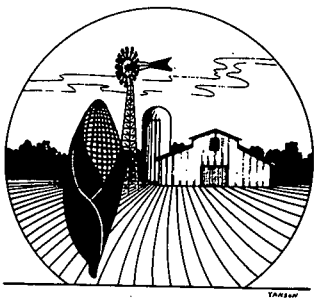
A solar water-heating system was also built into the wall to provide water for washing the sows and cleaning the building.

Critique/analysis: This project was designed to use a maximum of local materials and labor. It is simple and could be easily built by many of the farmers in the state. No special tolls or techniques are required and the design is easily adapted to a multitude of applications.

The dual capability of this project is particularly efficient: the demand for energy for crop-drying is concentrated in the summer [illegible]all, while the demand for heat in the [illegible]wing house is concentrated in the winter and spring.

Organization	William T. Dishman
Address	Route 1, Box 70-A Pingree, ID 83262
Contact	William T. Dishman
Telephone	(208) 684-3122

Funded By	DOE Appropriate Tech. Small Grant ($7,500) Personal sources ($20,000)
Cost	$27,500
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	ID
Project Name	Boise Geothermal System

The Boise geothermal system is planned to address residential, commercial, and state heating needs.

The Boise Warm Springs Water District will renovate and expand its system to enable it to serve an additional 500 homes. The City will construct a system to serve the downtown business district--as many as 40 commercial establishments, including a planned downtown shopping mall. The State will retrofit the state buildings in the State Capitol Mall to utilize geothermal energy. The Statehouse heating system was recently remodeled, and the heating system of the State Office Tower was designed to allow for conversion to geothermal heat as soon as geothermal water is provided to the site. The State has not yet decided whether to wait for the City to construct lines in the Capitol Mall area or to build its own system.

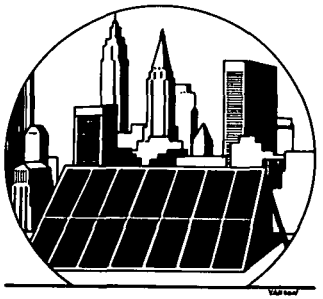
When completed, the Boise geothermal system could displace an estimated 1,750 X 10^9 BTUs of fossil fuels per year.

Boise has a long history of utilizing geothermal energy. The first production wells, drilled in the 1890s, served the Natatorium, a swimming and recreation center. The system was soon expanded to serve residences in the area and was eventually extended to serve establishments in the downtown area.

In the 1950s, the system began to lose customers to cheap fossil fuels, primarily natural gas. With the loss of customers and the deterioration of the pipelines (many of the original wooden pipes had never been replaced) the system was sold in the early 1970s for $1 to the Warm Springs Water District, a cooperative formed by the remaining customers.

Organization	Idaho State Energy Office
Address	P.O. Box 500 Boise, ID 83701
Contact	Phil Hanson, Project Director
Telephone	(208) 384-4013

Funded By	DOE ($6 million)
Cost	$8 to $10 million
Congressional District	I & II
Compilation Date	February 1980



In 1976, the State converted its agriculture/ health laboratory to geothermal heating, purchas- hot water from the Boise Warm Springs Water trict. It demonstrated the technology and economic feasibility of retrofitting an existing gas-fired hot water space heating system to a geothermal system using flat-plate heat exchangers. This system has been expanded to include the new State Department of Agriculture building, which was built to utilize geothermal energy.

With a renewed interest in geothermal energy, the City of Boise began in 1975 to study the potential for utilizing geothermal energy. It joined with the Boise Warm Springs Water District to form Boise Geothermal, a coalition that was awarded $6 million from DOE to demonstrate the economic viability of a geothermal district-heating system.

Critique/analysis: This project is promising and viable. Test drilling has been very successful, the geothermal water is of high quality (low corrosion or scaling problems) and the economics appear to be quite favorable. A good example of utilizing local resources to meet local needs, the project is, however, an example of excessive study and bureaucratic delay. After more than six years of very positive study and talk, the only actions to date are those of the State and the refurbishing of two Boise Warm Springs Water District wells. Debate over who should own the system and where further money can be found has caused much delay.

Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	ID
Project Name	Idaho Falls Low Head Hydroelectric Project
Organization	City of Idaho Falls
Address	Electric Division P.O. Box 220 Idaho Falls, ID 83401
Contact	Steve Harrison Manager
Telephone	(208) 529-1444
Funded By	DOE
Cost	$43.8 million
Congressional District	II
Compilation Date	February 1980

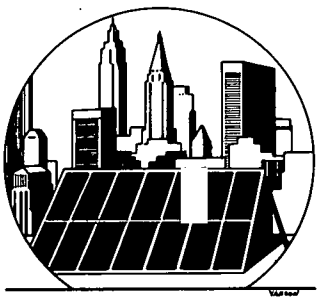
The Idaho Falls Low Head Hydoelectric Project is aimed at renovating three low-head dams and powerhouses on the Snake River at Idaho Falls. The three dams were built early in this century by the City of Idaho Falls for its municipal electric utility.

Over the years the facilities have deteriorated, and the system was almost completely destroyed by the flooding that followed the collapse of the Teton Dam. The project entails renovating the dams and replacing inefficient kaplan turbines with more efficient bulb turbines.

One 7.2-megawatt bulb turbine will be installed in each of the three dams. The lower dam has two kaplan turbines, which will be retained and used when water or demand is high. The total capacity of the system will be 24.6 megawatts (21.6-MWs from the new turbines and 3-MWs from the old turbines). In an average year the system capacity will be 19 megawatts, with an average annual generation of 162 million kilowatt hours. The electric cost is estimated to be about 2¢ per kilowatt hour.

Construction is now under way. Generation is expected to begin in late 1981, and the project is scheduled for completion in early 1982.

Critique/analysis: The voters of Idaho Falls overwhelmingly approved the sale of revenue bonds for this project. However, the Idaho State Legislature carefully controls the ability of cities like Idaho Falls to develop their local energy resources.



Idaho Falls is interested in at least ee additional sites on the Snake River r Idaho Falls for potential low-head dams. However, it only has the authority to issue revenue bonds to "rehabilitate existing structures."

A proposal that would have given cities the authority to issue revenue bonds for energy developments came under fire by the investor-owned utilities and was killed in committee in the 1979 Legislative Session. The proposal is expected to meet the same opposition in 1980.

Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	ID
Project Name	Geothermal Potato-dehydration Plant
Organization	Madison County Energy Commission
Address	c/o Dr. Kent Marlor Chairman P.O. Box 396 Rexburg, ID 83449
Telephone	(208) 356-3431
Funded By	DOE, American Potato and Madison County
Cost	n/a
Congressional District	II
Compilation Date	February 1980

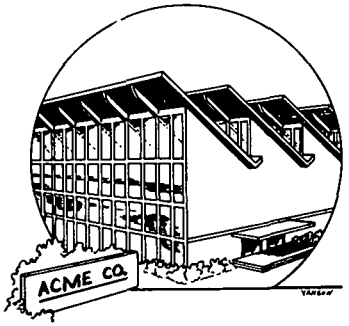
The American Potato Company, with the help of the Madison County Energy Commission and DOE, has plans to tap geothermal energy to provide process heat for the company's potato-dehydration plant. The system's waste heat would then be used to provide space heat for the project's host town, Rexburg.

Engineering and test wells were drilled in 1979. The site selection for the proposed 6,000' production well is scheduled for early 1980; operations are to commence in 1983.

If adequate temperatures are obtained, the Madison County geothermal system could save the equivalent of 4.7×10^{11} Btu of fossil fuel annually. The project cost is shared by DOE, Madison County and American Potato. The majority of federal funds are used for high-risk costs like well drilling. The majority of local funds will be used to construct the system after the resource has been tapped and proven adequate.

Prime recipients for the secondary space-heating energy are city and county buildings, the high school, a new hospital, commercial buildings, and the Ricks College campus.

Critique/analysis: Institutional problems have obstructed progress. The County Energy Commission had to ask the state legislature to change state laws to allow the county to plan, build, or operate such a geothermal system. Reportedly, an attempt to obtain



authority to finance the project through revenue bonds was defeated in committee, [illegible] investor-owned utilities applied [illegible]sure. While the Commission is seeking this authority again this year, an alternative financing mechanism may be used if the legislature rejects the request a second time.

Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	ID
Project Name	Scrubby's Smokehouse Restaurant
Organization	Scrubby's Smokehouse Restaurant
Address	West of Mtn. Home on Airbase Road Mountain Home, ID 83467
Contact	Jim (Scrubby) Birchfield
Telephone	(208) 832-9989
Funded By	Private
Cost	$5,500
Congressional District	II
Compilation Date	February 1980

Scrubby's Smokehouse Restaurant was the first solar-heated commercial building to be constructed in Idaho. The building and its solar system were designed and built by the owner/manager, Scrubby Birchfield, in 1975.

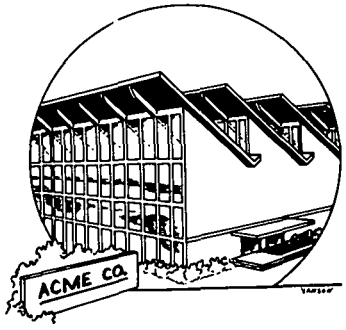
Water is pumped from a 2,500-gallon storage tank in the basement to the collectors on the south-facing sections of the 1032 sq. ft. roof. The collectors are constructed of blackened aluminum roofing glazed with a single layer of fiberglass. The water is heated as it trickles down the collectors; it then flows to the hot water preheat system (an oil tank with an old water heater liner in it) before returning to the storage tank.

The storage tank is surrounded with 36 cubic yards of rock, which are heated by the hot tank. Air is circulated from the restaurant through the rocks and back to the restaurant. The rocks and tank store about two days' worth of heat. A gas furnace provides back-up heat.

For cooling, the pump circulates water to the roof at night. This water trickles down the north-facing sections of the aluminum roof, which are unglazed and unpainted.

Having lost its heat via radiation and evaporation, the cooled water flows into a sediment tank (a recycled 55-gal. drum) and back into the storage tank. The water cools the tank, which cools the rocks, which in turn cools air piped into the restaurant.

The total system cost was $5,500 in 1975. It saves the owner about $1,200 per year in



utility costs at today's prices.

Scrubby used many recycled and/or locally obtained materials. Technically, his system could be improved; however, it was designed so that it could be built and operated by the owner. In his care, the system works well, has more than paid for itself, and helps him provide good food at reasonable prices.

Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	ID
Project Name	Snake River Pottery Hydro Project
Organization	Snake River Pottery
Address	Bliss, ID 83314
Contact	Aldrich Bowler
Telephone	(208) 837-6379
Funded By	Aldrich Bowler
Cost	Orig. system - $3,000 Expansion - $8-10,000
Congressional District	II
Compilation Date	February 1980

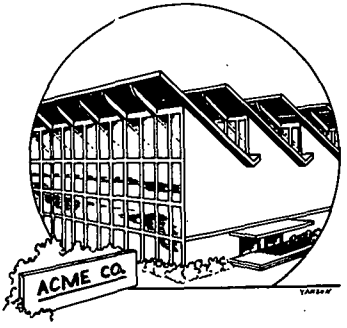
In 1952, Mr. Bowler constructed a small hydro system to provide electricity for his home heating and his pottery business. The system uses water from a spring-fed stream that flows through his property. About one-half of the flow is diverted into a 207' penstock, providing about 55 feet of head. Under optimum conditions, this amounts to a flow of about 8 cubic feet per second.

The original penstock was made by Mr. Bowler using recycled hot water tanks. The 20-inch pipe reduces to 16 inches at midpoint and to 8 inches at the impeller. The homemade impeller is a modified fixed-blade kaplan design. The original generator, also built and wound by Mr. Bowler, was replaced with a used 25-KW generator in 1956.

Electricity from the system is used to run the pottery equipment, including six furnaces, a hammermill, a large ball mill, and a crusher. It also heats his home. Bowler purchases some commercial electricity for his electric range and other household appliances.

The system cost about $3,000 to build (replacement cost at current prices is about $50,000). It provides about $100 to $150 worth of electricity each month (at Idaho prices of 2¢/kwh).

Bowler is expanding the system by extending the penstock to a length of 550 feet and a head of 85 feet. The impeller will be replaced with a turbine pump; a second turbine and generator will be added for periods of low stream flow. He intends to design the renovations so that he can test turbine units for others interested in utilizing small hydro systems. The system expansion will cost between $8-10,000.



Critique/analysis: Bowler is heavily involved with appropriate technology. He received an Appropriate Technology Small Grants Program award of $1,000 to demonstrate a method of recycling used automotive batteries. He has converted a Volkswagen to run on electricity, and has purchased the blades and generator for a windmill that he will install.

Bowler's system could be twice as efficient, particularly in the summer months when the stream flow is low, if he would use all the water he has water rights to. However, Bowler shares his water with the trout in the stream, maintaining a minimum streamflow at all times.

Renewable Resources—A National Catalog of Model Projects

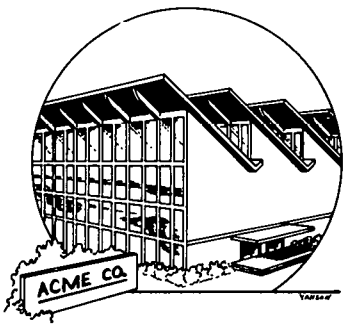
Category	Commercial
State	ID
Project Name	Water-powered Refrigeration System

Fish Breeders of Idaho, Inc. received an Appropriate Technology Small Grants Program award to demonstrate the use of a turbine pump installed on a geothermal artesian well to provide power.

Fish Breeders of Idaho operates a commercial fish farm utilizing geothermal water for space-heating and for heating the catfish ponds. The geothermal well has an artesian flow of 1,500 gal./min. and a pressure of 60 pounds per square inch. Water flows through, turning the shaft of a six-inch turbine pump. The pump shaft powers a compressor that provides refrigeration for the cooling and storage of fish.

Critique/analysis: The company could have rigged the turbine to produce electricity. However, direct mechanical energy is more efficient, and electrical generation equipment is costly.

Organization	Fish Breeders of Idaho, Inc.
Address	Rte. #3, Box 193 Buhl, ID 83316
Contact	Leo E. Ray
Telephone	(208) 543-6645
Funded By	DOE AT Small Grants Program ($9,050)
Cost	$33,000
Congressional District	II
Compilation Date	February 1980

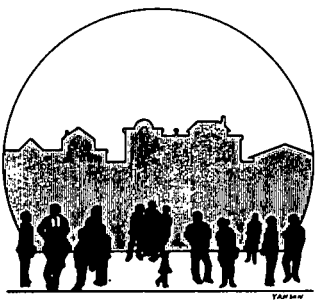


Renewable Resources—A National Catalog of Model Projects

Category	Community
State	ID
Project Name	Western Idaho Community Action Program
Organization	Western Idaho Community Action Program
Address	3rd Avenue North Payette, ID 83661
Contact	Mary Jane Mateer - or - Monty Bullock
Telephone	(208) 642-9086 Mary Jane (208) 642-4436 Monty
Funded By	Federal Energy Administration
Cost	$500 each
Congressional District	I
Compilation Date	February 1980

The Western Idaho Community Action Program (WICAP) is one of the Community Action Agencies in the state to build passive solar greenhouses. Funded by the now-defunct Federal Energy Administration through the Idaho State Office of Economic Opportunity, these greenhouses averaged about $500 for construction and serve as both a source of heat and as a source of food. WICAP built four greenhouses in four separate communities.

WICAP is now involved in the construction of passive window heaters. The window boxes are built by the weatherization crews. The first priority is weatherization, and fulfilling this aim has kept the crews too busy to build many of the window heaters.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	ID
Project Name	Amity Elementary School

The new Amity Elementary School of the Boise Independent School District is a model of energy-efficient design. Its most obvious features are the solar collectors and the earth covering, but there is more to this school than meets the eye. Everything about the building, including the construction materials, was chosen with energy conservation in mind.

The 26 classrooms for 780 students were sited along the outside walls of the structure. Each classroom features floor-to-ceiling insulated-glass windows. Only 6 percent of the buildings gross wall area is glazed, but each classroom will receive the benefits of daylight, helping to alleviate the negative psychological effects of an earth-covered building.

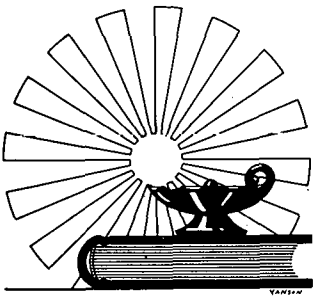
The multi-purpose gymnasium, the offices, and the other support facilities are located in the center of the building. By grouping the teaching areas around the support facilities, the overall size of the building was reduced, resulting in less volume to heat and cool.

The ventilation system will use outside air whenever it is at the desired temperature for heating or cooling.

The fluorescent lights are in a grid extracts excess heat for use in other spaces. Parabolic-louvered luminaires, which require only one-third as many builbs for an equal light level, were utilized. Lighting levels in the classrooms may be set at 30, 55, or 70 foot-candles, depending upon the amount of daylighting available. A multi-level switching system was chosen as it requires the teacher to make a conscious decision on the level of light in the classroom.

The solar space-heating system employs 1830 square feet of liquid cooled flat-plate collectors with a 3,500-gallon storage tank. An electric

Organization	Amity Elementary School
Address	10,000 West Amity Rd. Boise, ID 83709
Contact	Herm Steger, Principal
Telephone	(208) 362-0434
Funded By	DOE (65 percent) District (35 percent)
Cost	$2,341,400 (building) $122,000 (solar)
Congressional District	I & II
Compilation Date	February 1980



boiler serves as the backup. The domestic hot
system consists of 370 square feet of
ctors and a 500-gallon storage tank.

The energy savings is expected to reduce the annual operating costs by 70 percent (design 60 percent, solar 10 percent). At todays energy prices, this amounts to a savings of $22,000 per year.

Critique/analysis: While bond elections in other area school districts were being defeated, over 76 percent of voters of the Boise Independent School District approved the bond election for the Amity School. Even though the initial costs of the school were estimated to be $3.75 more per square foot than conventional construction costs, the voters elected before the federal funds for the solar system were approved.

The building will also be used as a teaching tool. Besides the normal inclusion of energy-conservation material in the curriculum for each grade level, special projects will feature the students' own building. Even the mechanical room will be used as a teaching tool. Each piece of equipment will be color-coded with arrows and lettering explaining functions and directional flows.

Renewable Resources— A National Catalog of Model Projects

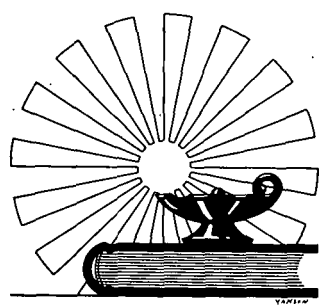
Category	Education
State	ID
Project Name	Energy Ant Puppet

The Idaho League of Women Voters transformed Energy Ant, a character developed by the Federal Energy Administration (now DOE), from a one-dimensional character on paper to a puppet with an script and companion puppet characters. Energy Ant Puppet Kits were madeby various volunteer organizations and distributed to libraries throughout the state. The kit included puppets and accompanying multi-media materials that the library staff and volunteers can use to present puppet shows on to young people energy conservation. A publication explaining how to develop and conduct Energy Ant puppet programs, and a videotape with similar information (available at no cost to the Office of Energy or the libraries) is also being distributed.

A survey taken late in 1978 indicated that more than 4,000 persons had viewed an Energy Ant puppet show.

Critique/analysis: This program relied heavily upon volunteers to sew the puppets, conduct the puppet shows, and distribute the materials. This kept the cost very reasonable and also involved a number of individuals. The enjoyable format and easily recognizable character appeal to a large audience.

Organization	Idaho Office of Energy
Address	Statehouse Boise, ID 83720
Contact	Kathleen Tinker
Telephone	(208) 334-2222
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	ID
Project Name	Space Heating with Geothermal Energy
Organization	College of Southern Idaho
Address	315 Falls Avenue Twin Falls, ID 83301
Contact	Dr. James L. Taylor President
Telephone	(208) 733-9554
Funded By	n/a
Cost	Est. $1.3 million
Congressional District	II
Compilation Date	February 1980

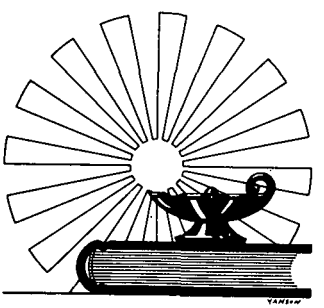
The College of Southern Idaho intends to develop a geothermal energy system to reduce its electric costs. Current plans call for drilling a production well on campus. Hot water from the well would be used to provide space heating and domestic hot water heating for the seven major buildings on campus. Conceivably, as much as 80 percent of the space-heating needs of the campus could be met with geothermal energy.

Plans also include the use of the effluent from the space-heating system for secondary applications. Possible uses include heating a proposed swimming pool, animal facilities, walkways, and concrete slabs.

The well drilling has already begun. Temperatures monitored in the well to date have shown promise for the project's success.

CSI would also like to establish a demonstration center that would, in conjunction with existing vocational agriculture facilities, demonstrate the use of geothermal water for agricultural purposes. Such a center could also serve as a training and research center for the growing aquaculture industry.

itique/analysis: Dr. Taylor has demonrated an uncanny ability to get things done. When funding applications for the test well were rejected, Dr. Taylor revised the school's budget to come up with enough money to start drilling the first well. While there is almost no way that the school could fund the



construction of this system from its existing budget, with Dr. Taylor's leadership, they will obtain funding somehwere.

Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	ID
Project Name	Wood-waste Process Energy

Organization	Potlatch Corporation
Address	Two Embarcadero Center, 20th Floor P.O. Box 7864 San Francisco, CA 94120
Contact	William J. Nicholson, Corporate Energy Coordinator
Telephone	(415) 981-5980

Funded By	Nez Perce County, Potlatch
Cost	$90 million +
Congressional District	I
Compilation Date	February 1980

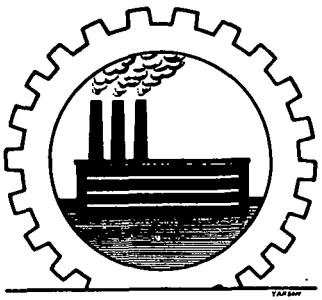
At its own expense, the Potlatch Corporation is installing a co-generation system consisting of a new high-pressure boiler, and a 30-megawatt electrical generation turbine at their Lewiston complex.

The new boiler, which will replace two older boilers, is designed to operate on bark and other mill wastes and will utilize wastes from the Lewiston complex and other mills in the area. Much of the wood waste in the area is burned or landfilled now. The new boiler can produce 175 percent as much energy as the two older boilers could from the same amount of wood. It will produce six times as much steam as the two older boilders did, and reduce the amount of particulate matter released to the atmosphere.

Steam from the boiler can be used for co-generation or process energy. Steam would first be routed through the new turbine, generating electricity. The exhaust steam from the turbine, which contains a substantial amount of energy, would be used for industrial process heat at the mill. The Lewiston complex, one of the largest energy users in the state, uses steam for process energy in the manufacture of lumber products, tissue, pulp and paperboard.

The installation of the new boiler is now under way, with operation expected to n late in 1980. The co-generation turbine ld be added by mid-1981.

Critique/analysis: Funds for the boiler, electrostatic precipitator, and other related equipment for reducing air pollution were raised by Nez Perce County through the sale of Revenue bonds. This project will benefit the County by reducing air pollution in the valley.



Renewable Resources—A National Catalog of Model Projects

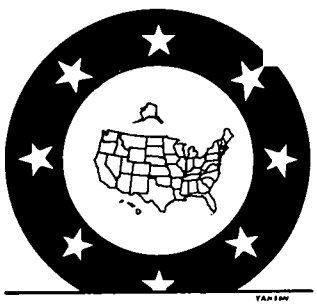
Category	State
State	ID
Project Name	Idaho Office of Energy
Organization	Idaho Office of Energy
Address	Statehouse Boise, ID 83720
Contact	Jeannette Brinch Assistant Dir.
Telephone	(208) 334-3800
Funded By	State Through Federal Government
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Among all the states applying for federal Energy Administration Energy Conservation Plan funding, Idaho alone chose to contract with a state citizens organization to obtain public input. Rather than develop a plan with "in-house expertise", the office contracted with the Idaho Conservation League (ICL) to travel throughout the state and find out what the citizens wanted. The organization's staff held group and individual meetings in communities throughout the state. Community leaders, businessmen, elected and appointed officials, students, teachers and farmers were polled.

In addition to the ICL outreach program, informal group meetings were held with state and local officials, and agriculture, utility, transportation, and construction interests throughout the state. Seven informal regional meetings were held, at which local elected officials expressed their views.

Critique/analysis: The important point is that the plan was developed after the extensive public input was obtained. Contracting with a citizens organization and having them develop a program of public input resulted in obraining opinions from many who are not reached through the normal state mechanisms.

This contract has been criticized greatly by those politically opposed to the conservation efforts contained in the plan. It has been audited more closely than usual, and has resulted in some justified criticism of the office. However, the Idaho Energy Conservation Plan is a better, more appropriate plan because of the information the Idaho Conservation League was able to gather. Ms. Brinch indicated that she intends to contract with citizens organizations for public input again.



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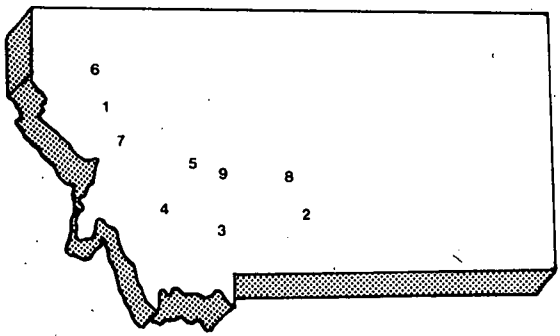
MONTANA

1. Arlee
2. Billings
3. Bozeman
4. Butte
5. Helena
6. Kalispell
7. Missoula
8. Roundup
9. White Sulphur Springs



MONTANA

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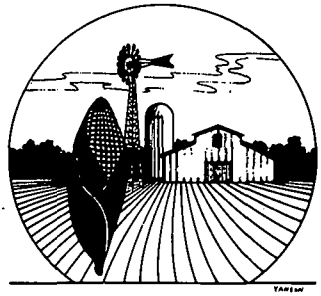
Renewable Resources— A National Catalog of Model Projects

Category	Agricultural
State	MT
Project Name	Methane Gas Research Project

For the past three years Jack Robbins, a professor at MSU, has experimented with various biological, biochemical and chemical techniques to increase the efficiency of bioconversion of waste materials to methane gas.

His work places him among the leading experts in the chemistry and biology of methane gas production.

Organization	Montana State University (MSU)
Address	Chemistry Department Montana State Univ. Bozeman, MT 59717
Contact	Jack Robbins
Telephone	(406) 994-4123
Funded By	Montana Renewable Energy Grants Program
Cost	$51,787 (two grants)
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Cities
State	MT
Project Name	Billings Community Energy Program (BiCEP)

The Billings Community Energy Program was organized by the Alternative Energy Resources Organization's Billings-based Local Energy Organizer, Margie Gough. Modeled loosely on the Helena Energy Program, the Billings program is a cooperative effort of city residents and city and county government. The program is sanctioned by a joint resolution of the City Council and the County Commissioners.

The resolution proposes to make Billings the most energy-conscious and energy-conserving community in the state by 1982.

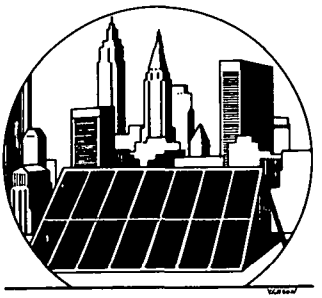
The Community Energy Program is run by four committees consisting of both citizens and local government employees. The Building and Operations Committee is now assessing city energy use. The Planning Committee is studying energy conservation projects in other cities of comparable size to Billings. The Building and Finance Committee is studying energy-conserving building techniques and possible financing schemes for solar buildings. The Public Information Committee is surveying city residents who have conducted energy conservation and renewable energy projects. Anyone can join the committees, which meet bi-monthly.

As a result of the BiCEP Program, Billings was invited by the American Planners' Association to speak at its annual meeting in Baltimore on Community Energy Planning. Of the four cities represented at the seminar, only Billings' program was not federally funded.

Critique/analysis: Considering the volunteer nature of this project, the Community Energy Program has been highly successful to date. Funds are now being sought to help BiCEP be as successful in 1980.

Organization	Community Energy Program
Address	AERO 435 Stapleton Building Billings, MT 59101
Contact	Margie Gough
Telephone	(406) 259-1958

Funded By	Donations
Cost	$100 (materials) $400 (travel)
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Cities
State	MT
Project Name	Helena Energy Project

Organization	Helena Energy Program
Address	Box 1050 Helena, MT 59601
Contact	Jim Nybo
Telephone	(406) 442-9873

Funded By	City General Fund
Cost	$10,000
Congressional District	I
Compilation Date	February 1980

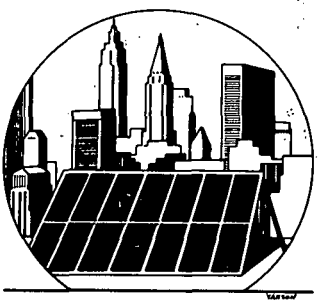
In June of 1977, the Helena City Commission adopted an energy policy responsible for forming an eight-person Energy Advisory Board with a two-year mandate. In 1978, the EAB formed the Helena Task Force, a volunteer citizen group that now plays an active role in developing municipal energy policy. Because Helena is the state capital, many government people are represented in both groups.

The City staff reports to the EAB on matters of city energy use, which is then relayed to the Task Force. The latter has four major areas of responsibility and activity. First, the Force has developed an energy conservation program to be used in city buildings. Although reviewed and adopted by the city commission, no money was allocated to implement the program.

Second, a Task Force committee has developed an Energy and Community Planning packet for the city's Comprehensive Plan, which is expected to be adopted.

Another committee provides energy conservation and renewable energy information/education for developers and contractors. Finally, a public information group is working with Alternative Energy Resources Organization's (AERO) Local Energy Organizers to present an "Energy Option Series" of seminars, which will address a wide variety of topics, including energy-efficient transportation to solar greenhouse workshops.

he Helena Energy Task Force meets when- a specific task or issue requires it. The City has been quite cooperative. The Public Library, for instance, has provided $2,500 for energy books and materials.



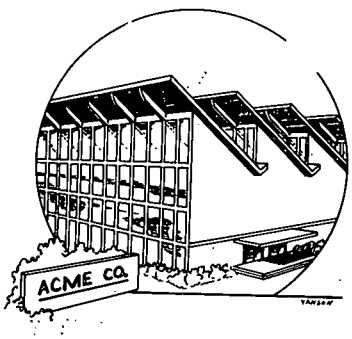
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	MT
Project Name	Geothermally Heated Bank

The First National Bank commissioned the digging of a test well to determine the nature and extent of the geothermal resource. The well now delivers hot water for space heating in the Bank's newly-constructed offices. Heat coils transfer heat from the geothermal water to the forced-air heating system of the bank.

The temperature and strata profile logs resulting from this project provide the detail needed to estimate the potential for broader geothermal development in the White Sulphur Springs area.

Organization	First National
Address	White Sulphur Spgs. MT 59645
Contact	Michael Grove
Telephone	(406) 547-3331
Funded By	Montana Renewable Energy Grants Program
Cost	$53,500
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	MT
Project Name	Jocko Hollow Alternative Energy Effort
Organization	John Fisher
Address	Jocko Hollow Campground Arlee, MT 59821
Contact	John Fischer
Telephone	(406) 726-3336
Funded By	Montana Renewable Energy Grants Program
Cost	$20,000
Congressional District	I
Compilation Date	February 1980

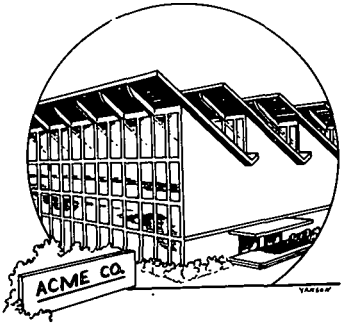
John Fisher and his family own and operate a campground in Western Montana. In 1976, with a grant from the 'Bill 86' Program (see: Montana State) they undertook four separate projects. They equipped the showerhouse with manufactured solar collectors to preheat the hot water used by the campers. During the off-season, they use the same collectors to preheat the hot water for an adjacent cabin.

The Fishers added a passive retrofit to a cabin with a large south-facing window. They placed black-painted, water-filled barrels inside and fitted reflective shutters to the outside. A woodstove heats the barrels during cloudy weather.

A south-facing greenhouse with active air heating collectors was added to another cabin. A homemade hot water heating system on this cabin has been very cost-effective. For a $300 investment the hot water costs have dropped 50 percent. An attached greenhouse was also added to the main house.

In addition to these projects, the Fishers used some of the money to purchase books and pamphlets. This offers a small renewable energy library for the campers.

The Fishers feel that their project has been quite successful. At least 5,000 people have had first-hand exposure to the hot water ystem on the showerhouse. Many casual visitors ave seen the systems in operation. And, because of the demonstration projects and the renewable energy literature, local people have undertaken at least ten renewable energy/conservation projects.



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	MT
Project Name	AERO-West

AERO-West was formed in 1976 as an affiliate of AERO (Alternative Energy Resources Organization). It has a lending library and serves as an energy information clearinghouse.

AERO-West's projects include a class at the University of Montana, monthly seminars given by energy conservation/renewable energy experts, hands-on workshops, and conferences. Recent workshops included solar food dryer construction, building a rammed-earth wall, and building a windmill. AERO-West sponsored an earth-sheltered workshop and co-sponsored a Women and Appropriate Technology conference in 1979. AERO-West is located in the Horizon House, is weatherized and retrofitted with a solar water space heating demonstration project.

Organization	AERO-West
Address	323 West Alder Missoula, MT 59801
Contact	Marta Porter
Telephone	(406) 549-0756
Funded By	MT Renewable Energy Grants Program; Library Fees; Memberships; Proceeds from Class & Workshops
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	Community
State	MT
Project Name	Local Energy Organizers Project
Organization	Alternative Energy Resources Organization (AERO)
Address	435 Stapleton Building Billings, MT 59101
Contact	Kye Cochran
Telephone	(406) 259-1958
Funded By	State CETA Program ATR Foundation
Cost	$84,000
Congressional District	I, II, V
Compilation Date	February 1980

AERO's Local Energy Organizer Project (LEO) began in February of 1979. It sought to catalyze citizens and local governments in Montana to analyze present energy use, to learn about energy conservation and renewable energy alternatives, and to take some steps toward the transition from fossil fuels to renewables.

Funded primarily by CETA, the LEO program relied on the existing AERO staff for a director and administrative back-up (Montana does not allow money for administration in its CETA programs). A CETA-funded coordinator was hired to facilitate communications among LEO's and the director. The coordinator also organized training sessions and helped gather data to answer LEO's technical questions. In July of 1979 the ATR Foundation provided about $300 per LEO to fund local projects.

Seven LEOs were hired, one each for the towns of Miles City, Roundup, Billings, Bozeman, Hamilton, Helena and Havre. Halfway through the program it became apparent that Billings, Bozeman and Helena could each use a second LEO. AERO subsequently hired three "assistant LEOs" through CETA.

An initial ten-day training session in March of 1979 focused on community-organizing techniques and basic renewable energy technologies. Rather than give specific projects to do, LEOs choose n a list of recommended projects.

Additional three-day training sessions were held approximately every 45 days. AERO brought in one or two resource people to talk about particular technologies and strategies of interest to all the LEOs. For instance, the fourth training session, from September 24-27, was coordinated so that the LEOs could attend a week-long seminar with physicist Amory Lovins. The seminar discussed energy strategies for implementing a 'Soft Energy Path' in communities and in the country. All training costs were paid by the CETA program.

The chief method of communication among LEOs was the weekly LEO Bulletin. Every LEO submitted a weekly report on projects, problems, successes, and contacts that the Director compiled, xeroxed and sent to all LEO's. Several other people doing renewable energy and energy conservation work in the state also contributed to the LEO Bulletin.

Despite minimal funding and direction, many of the organizers initiated and catalyzed successful activities and programs. These include organizing a citizens' renewable energy group in their community, writing weekly energy columns in the local newspaper, producing a weekly radio program on renewable energy, teaching classes at the local college, working with low-income groups, conducting hands-on solar food dryer workshops, and creating solar exhibits for fairs, and holding solar greenhouse construction workshops.

Critique/analysis: The program is a good idea and a good start. Future programs should include better direction, funding,and technical back-up. AERO suggests that the organizers be regularly paid staff (not CETA-funded). CETA workers would learn the job from the permanent staff.

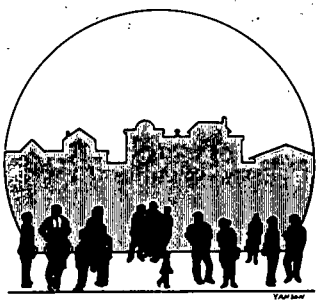
Renewable Resources—A National Catalog of Model Projects

Category	Community
State	MT
Project Name	Low-cost Solar

Six high school dropouts were trained to produce solar collectors and installed them on low-income homes. NCAT funds were matched by $23,500 from the Governor's Employment and Training Council.

It is estimated that the solar systems will lower heating bills by 15-20 percent.

Organization	District IX Human Resource Development Council
Address	15 South Tracy Ave. Bozeman, MT 59715
Contact	Mike Fieldman
Telephone	(406) 587-4486
Funded By	National Center for Appropriate Technology (NCAT), State.
Cost	$10,955
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	MT
Project Name	Roundup Energy Self-Help Group

The Roundup Self-Help Group formed in September of 1978. With a core group of ten, it includes as many as 18 people. It consists mostly of couples in their 20's and 30's, who are interested in energy conservation and renewable energy. They usually want to have some retrofit work done on their own homes to improve the building's energy efficiency.

The group has no regular meetings; they meet when there is a project to do. Two of the members are teachers. The group has encouraged several school projects dealing with renewable energy and conservation.

At least half of the group are natives of Roundup. They have built, over the past year, a free-standing backyard solar greenhouse, insulated shutters, a hearth for a woodstove, and a solar food dryer. They have also sponsored an informational slide show on solar energy.

Organization	Roundup Energy Self-Help Group
Address	c/o Jan Larsen 305 First Street West Roundup, MT 59072
Contact	Jan Larsen
Telephone	(406) 323-2136
Funded By	Project owner
Cost	The group passes the hat for special projects.
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

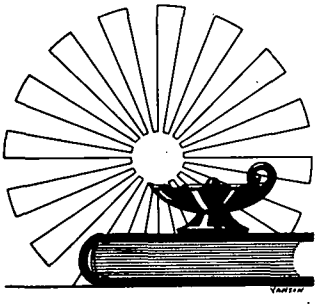
Category	Education
State	MT
Project Name	Chautauqua

Until the fall of 1979 Bruce McCallum was the Cooperative Extension Agent in Chester, Montana. A very active renewable energy enthusiast, he issued a monthly renewable energy newsletter, built an attached solar greenhouse onto his home, and the past three years has organized a renewable energy "Chautauqua." This informal and down-home affair highlights state programs dealing with renewable energy.

Program activities were varied, and included a group of school kids who built a solar cooker and a resident of a nearby town who took slides of all the solar buildings in that town.

Organization	Montana Cooperative Extension Service
Address	Box 638 Kalispell, MT 59901
Contact	Bruce McCallum
Telephone	(406) 755-5300
Funded By	Human Resource Development Council, Energy Extension Service, & Cooperative Extension Service
Cost	Second year, $100 Third year, $1,000
Congressional District	I
Compilation Date	February 1980

Critique/analysis: Each year the Chautauqua brings the townsfolk up to date on important renewable happenings. It's an enjoyable and unpretentious event that has a stronger sense of reality and applicability than do many larger conferences.



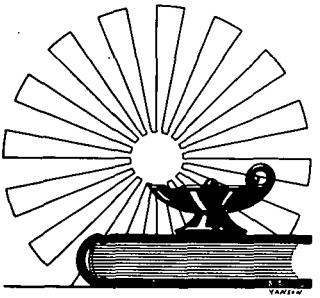
Renewable Resources— A National Catalog of Model Projects

Category	Education
State	MT
Project Name	The Energy Adventures of Ernie & Bud

Loren Schultz is a rare combination of artist, designer, and technician. He has created a unique read about and construct tool to teach 4th-6th graders about various renewable energy devices and systems. Each comic book in the series tells a story about Ernie (the eagle) and Bud (the earthworm) as they learn about a specific renewable energy device. At the end of the comic book is a cut-out, color-and-put-together model of the device on which the story is based.

Seven "energy adventures" have been completed so far. They focus on wind-electric generators, passive solar homes, solar water heaters, dutch windmills, waterwheels, woodstoves, and solar greenhouses. AERO hopes to publish them by spring of 1980.

Organization	Alternative Energy Resources Organization (AERO)
Address	435 Stapleton Building Billings, MT 59101
Contact	Loren Schultz or Kye Cochran
Telephone	(406) 259-1958
Funded By	CETA (Schultz' salary)
Cost	$513
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	MT
Project Name	Get Your Hands on Energy

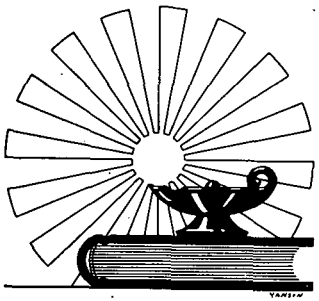
This 100-page book is a teaching guide on energy conservation and renewable energy. The curriculum demonstrates that the most convincing and vivid lessons come from direct experience with the subject. Over 100 "hands-on" activities help students learn about 'The Good Old Sun,' 'The Answer is Blowing in the Wind,' 'Webs, Chains and Pyramids' (which shows that everything is connected to everything else), 'Keeping Cool,' and 'What's in a Package?'

A list of concepts at the beginning of each chapter helps the teacher know what to stress. Liberal illustrations throughout make Get Your Hands on Energy enjoyable to read and show how to run the experiments.

Many of the activities in this book were developed by the NWES during their school tours in the spring and fall of each year. The original Get Your Hands on Energy was financed by Community Services Administration as part of the NWES spring school tour of 1979 on the Northern Cheyenne and Crow Indian reservations. A new, improved version will be published by NWES in spring of 1980.

Organization	New Western Energy Show (NWES)
Address	226 Power Block Helena, MT 59601
Contact	Maureen Shaunessey or Chris O'Brien
Telephone	(406) 443-7272

Funded By	Community Services Administration
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	MT
Project Name	MSU Summer Institute on Energy Policy
Organization	Montana State University
Address	Department of Political Science, Montana State Univ., Bozeman, MT 59717
Contact	Lauren McKinsey
Telephone	(406) 994-0211
Funded By	Department of Energy
Cost	$18,900 in 1978 $24,581 in 1979 $20,000+ projected '80
Congressional District	I
Compilation Date	February 1980

A unique two-to-three week course designed specifically for high school and college teachers, the Summer Institute on Energy Policy offered by Montana State University, presents experts in energy policy who lecture and discuss various problems of decision-making in energy policy. Considerable attention is given to renewable energy and conservation.

The first year, 1978, enrollment was limited to 30 Montana high school teachers. In 1979, 38 teachers from colleges and high schools around the country attended. In 1980, McKinsey expects to have 25 college teachers from around the country.

In the summer of 1980, Dr. McKinsey will produce a bibliography on energy policy.

Renewable Resources—A National Catalog of Model Projects

Category	Education
State	MT
Project Name	New Western Energy Show

Organization	Alternative Energy Resources Organization (AERO)
Address	226 Power Block Helena, MT 59601
Contact	Robin Leenhouts or Carol Hyman
Telephone	(406) 443-7272

Funded By	MT Renewable Energy Grants Program; donations; contributions CSA, DOE; et al
Cost	$24,000 $30-80,000 (to tour)
Congressional District	I
Compilation Date	February 1980

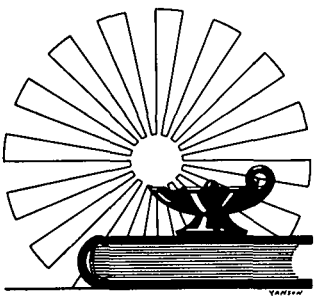
AERO's traveling New Western Energy Show (NWES) has brought working renewable energy devices, literature, exhibits, workshops, theater and music to towns in Montana, the Northwest and Canada since the summer of 1976. Three separate grants from the state renewable energy grants program have enabled AERO to build the show, to prove that it is a viable and very successful education medium, and to establish it as a year-round educational center in Helena.

The Show no longer receives money from the state grants program. It doesn't need to; communities now pay to have the Show visit them.

The New Western Energy Show has taught and influenced many people. While a precise head count for these free, open air shows is impossible, we do know that over 60,000 people have visited the Show; over 300 people have learned solar panel and solar greenhouse construction techniques through participation in the Show's hands-on workshops; the Show has visited 36 schools, presenting information to 20,000 children; and an average of ten people a week visit the Show's public library and resource center in Helena, to browse and discuss renewable energy with the Show staff.

And the Show has reached, and continues to reach, many people in indirect ways. Articles about the NWES have appeared in the local newspapers of each town the Show has visited. Radio and TV reporters around the state have ublicized the Show both in interviews and with ublic service announcements.

NWES produces and distributes fact sheets, brochures and construction plans. They have published a 45-page book with an entire script of one of their renewable energy plays. They have written a 100 page curriculum guide called Get Your Hands on Energy.



A half-hour color/sound 16mm film about NWES is, according to RAIN Magazine, "the best way to teach about energy use and the potentials of the good life. This film captures the spirit of the group so well that you'll smile all the way through it."

The NWES has, like a stone tossed into a pond, created an ever-widening circle of projects and activities.

The first summer the Show was on the road, it stopped in Havre. In addition to the regular show production, NWES organized a workshop to build two water-heating solar panels. Wayne Cross, program director of the District 4 Human Resources Development Council, took the show to the Devlin School. There he conducted 12 sessions on solar fundamentals with sixth grade classes and helped them install the water-heating system in a classroom.

From January to March of 1977, the system heated water to an average of 188 degrees F.

Later, the system was removed, refurbished by the students in the Sunnyside School, and installed in an HRDC weatherization client's home.

Cross says the Energy Show's visit was instrumental in getting Havre-area people involved in renewable energy use. "I think the New Western Energy Show's visit and subsequent school involvement was a breakthrough in public involvement," he says. "It was a stepping stone."

Since the problem of dwindling fossil fuel supplies will be more profound for our children than for us, the Energy Show focuses much attention on schools. Last spring they received a $30,000 contract from the Community Services Administration to conduct energy education projects in schools on the Northern Cheyenne and Crow Indian Reservations. This tour was so successful that CSA will fund a second tour of Native American schools in the spring of 1980.

The New Western Energy Show has employed 40 people. Each receives a thorough training in the technical, social, economic, and environmental aspects of renewable energy development. And almost all have continued working with renewable energy.

Critique/analysis: The New Western Energy Show is large, cumbersome, and expensive to take on the road, but it has a commensurately large impact. Effective but cheaper alternatives might include a small theater troupe without displays, a "guerilla" theater troupe, a very small version with three or four people and a pickup truck or van, or a large theater production.

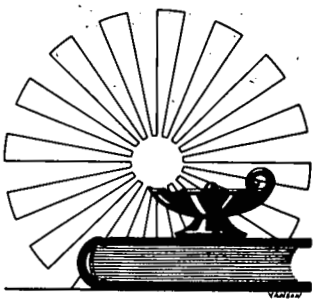
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	MT
Project Name	Puppet Show: Take That, You Monster!

Take That, You Monster is a puppet show which introduces energy conservation and renewable energy to children ranging in age from five to eight. The main characters of this successful show are the energy monster, insulator man, sun princess and a family. Puppet show kits consisting of the six hand puppets, a script, a cassette tape, a teacher's guide and a variety of energy songs are available through the League for a nominal fee.

Organization	Montana League of Women Voters
Address	5555 Black Bear Road Bozeman, MT 59715
Contact	Jenny Younger
Telephone	(406) 587-2300

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	MT
Project Name	Rammed-Earth Workshop

Organization	AERO: Lewy Evans, Architect; Dist. 9 Human Resource Development Council
Address	435 Stapleton Bldg. Billings, MT 59101
Contact	Joy Coombs
Telephone	(406) 259-1958

Funded By	Participant fees, donations and sale of books
Cost	$1,225
Congressional District	II
Compilation Date	February 1980

The Rammed-Earth Workshop sought to re-introduce an ancient method of construction which uses free, local, materials, is energy-efficient, and requires little skill.

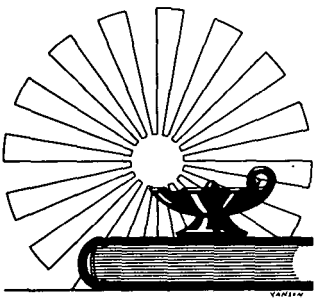
Two experienced workshop leaders, David and Lydia Miller, were brought from Greeley, Colorado. AERO found a local family that wanted the front wall of a root celler built of rammed earth. The family purchased the door framing and materials for the foundation and provided the tools. AERO organized three one-day workshops in which all participants had an evening of slides, lecture and discussion followed by a day of hands-on construction. Participants saw how the foundation, wall, door opening, wall corners, and top plate (for roof attachment) were built.

The job was completed in the course of three work days. AERO prepared a small work-book describing the rammed earth process for the 65 participants. AERO reproduced several standard references on the subject which are out of print, and is selling them.

Publicity for this workshop was aimed at the general homeowner, though quite a number of architects and contractors attended. With broader co-sponsorship more low-income people could attend.

Participants discovered that the best way to ᴋ and moisten the soil was right on the ground ing a rototiller, rather than in a cement mixer. A lighter form for ramming the earth would be easier to use.

The participants of this workshop gained enough experience to conduct another workshop with local leadership.



Renewable Resources—A National Catalog of Model Projects

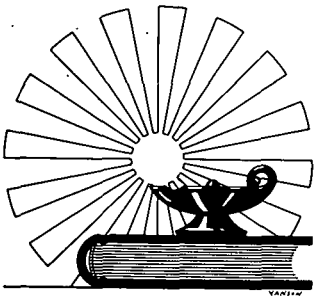
Category	Education
State	MT
Project Name	Solar Insulation Measurement
Organization	Fowlkes Engineering
Address	31 Gardner Park Drive Bozeman, MT 59715
Contact	Charles Fowlkes
Telephone	(406) 587-3779
Funded By	Montana
Cost	n/a
Congressional District	I
Compilation Date	February 1980

In 1979, Charles Fowlkes of Bozeman received $29,790 to place a solar radiation instrument measuring at 20 high school across Montana. The solar radiation data is collected at a 60 degree angle facing due South.

Science teachers and students gather the solar radiation data on strip chart recorders. Fowlkes records the data on a computer. In early 1978 ten more schools were added to the program. In addition, 15 manual solar recording stations were set up. The volunteers at the manual stations make at least one reading of the solar intensity around noon each school day. No data is taken on weekends or during the summer vacation. The solar radiation measurements are made using a silicon cell-based strip chart recorder.

In June of 1979 Fowlkes produced the Montana Solar Data Manual. This excellent reference lists the solar stations, reviews the data base and solar design procedures, and provides an economic evaluation of solar systems.

This has been a very successful program, both for the data it has produced and for the opportunity it has provided students and teachers around Montana to become involved and familiar with solar energy.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	MT
Project Name	Youth Energy Workshop
Organization	Montana Cooperative Extensive Service
Address	Montana State University Bozeman, MT 59717
Contact	Sandy Dellinger
Telephone	(406) 994-3451
Funded By	Department of Natural Resources and Conservation, Energy Division
Cost	$6,000
Congressional District	II
Compilation Date	February 1980

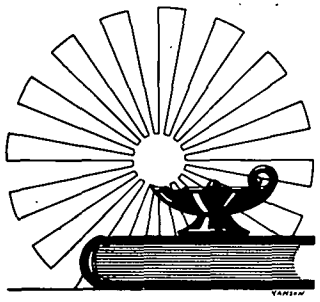
During the week of August 20-24, 1979, 49 young people from all around Montana gathered at Westminster Spires Camp near Red Lodge to participate in the nation's first energy workshop for junior and senior high school students.

The workshop, the brainchild of Extension Agents Bruce McCallum and Don Peterson, was sponsored by the Montana Cooperative Extension Service, the Energy Division of the Montana Department of Natural Resources and Conservation. The "I Make A Difference" Camp examined energy problems in depth and explored solutions emphasizing community action.

The campers learned about wind power, solar energy, the chemistry of energy, and home energy conservation. Many 4-H extension agents were involved as camp counselors. Other interested people simply offered their time.

Each participant built and took home a miniature solar air heater, an insulated shutter, and a caulking sample. Some took home solar dehydrators. All took home memories of the solar oven they helped build, and of the "exquisite" solar cookies that were baked in it.

Campers were selected on the basis of prior interest and abilities in energy. They remained extremely interested and involved throughout the week. At one point they engaged in a lively debate about nuclear power. One day the campers went to Red Lodge to interview members of the community about energy problems and opinions and to offer suggestions about how to conserve energy.



An Energy Camp Notebook is being developed which will explain and include examples of all workshop activities, evaluations, and a short slide presentation.

The U.S. Department of Energy selected the Youth Energy Workshop as one of five outstanding energy projects in the western region. Planning is already underway for a second workshop in the summer of 1980. Follow-up activities for those campers who attend the first youth Energy Workshop are also being planned.

Renewable Resources— A National Catalog of Model Projects

Category	Legislation
State	MT
Project Name	Energy Conservation and Alternative Sources

Organization	Department of Natural Resources
Address	32 South Ewing Helena, MT 59601
Contact	Kitty Kvinge
Telephone	(406) 449-3780

Funded By	not applicable
Cost	not applicable
Congressional District	I
Compilation Date	February 1980

Individuals and corporations can deduct from their income tax a portion of any capital investment made in a building to conserve energy. The maximum deduction allowed for improvements in a residence is $1,800. The ceiling for a non-residential building is $3,600. The Department of Revenue receives applications for the deduction and may consult with the Department of Natural Resources and Conservation for advice.

The law allows a public utility to install energy conservation materials in a customer's home or business. The customer pays the utility back in installments added to the monthly utility bill. The utility may charge no more than seven percent interest. But the utility can claim the difference between interest received and the prevailing market rates as a credit against its electric energy producer's tax or its corporation license tax (Title 84, Chapter 15).

Section 84-7409 established an alternative energy research and development account funded by a portion of the coal severance tax (2 1/2 percent). The Department of Natural Resources administers grants from this fund. DNR can appoint an Alternative Energy Advisory Committee composed of Montana citizens with expertise in alternative energy matters. Any person may apply to DNRC for a grant to support research, development or demonstration of alt ive energy systems. Grants are awarded f e year. Preference may be given to i ndent research centers or to projects which can match DNRC money. All information resulting from funded research is public property. DNRC will make a report to each legislative session on the conduct of the fund program. A 58-page "Report to the Montana Legislature, January 1979" is available from DNRC.

A Montana resident can receive an income tax credit equal to a portion of the installed cost of a recognized non-fossil form of energy generation (i.e. solar heat, wind, solid waste, decomposition of organic wastes, or small water power systems). The credit allowed is ten percent of the first $1,000 and five percent of the next $3,000 expended. The maximum credit allowed is $250. The percentages were halved when the federal government initiated a similar incentive in the National Energy Act of 1978. The program will remain in effect until 1982.

Renewable Resources— A National Catalog of Model Projects

House Bill 534 adds passive solar systems to those eligible for income and property tax exemptions. But the Department of Revenue is having difficulty defining 'passive' in its promulgation of this legislation.

Category	Legislation
State	MT
Project Name	House Bill 534
Organization	Montana House of Representatives
Address	Capitol Station Helena, MT 59601
Contact	Katherine McBride
Telephone	n/a
Funded By	not applicable
Cost	not applicable
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	MT
Project Name	Section 15-6-201(3) Section 15-32-107 MCA

Section 15-6-201(3), MCA, enacted in 1979, exempts renewable energy systems from property taxation for ten years. Exemptions are limited to $20,000 for single-family residences and $100,000 for larger structures.

Section 15-32-107, MCA, passed in 1979, gives tax incentives to banks and utilities making low-interest loans for alternative energy and energy conservation materials.

Organization	Montana House of Representatives
Address	Box 8687 Missoula, MT 59807
Contact	Daniel Kemmis
Telephone	(406) 721-1835

Funded By	not applicable
Cost	not applicable
Congressional District	I
Compilation Date	February 1980

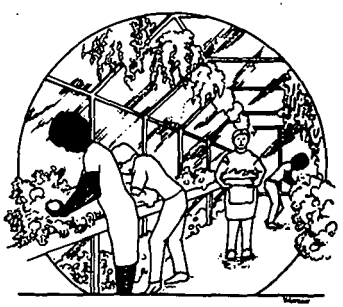
Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	MT
Project Name	Energy Advocacy Project
Organization	Community Action Asso. Region VIII (CAA)
Address	Box 721 Helena, MT 59601
Contact	Jim Smith
Telephone	(406) 443-1137
Funded By	Community Services Administration
Cost	$250,000 yearly
Congressional District	I
Compilation Date	February 1980

About 40 Community Action Programs (CAPs) belong to the Region VIII CAA. In October of 1978, the Association began its Energy Advocacy Project. It involves low-income energy consumers in energy decisions that affect their lives and unifies local CAP's around common energy issues. The Advocacy Project advocates the commercialization of appropriate technologies. Its information describes the real-life examples of energy-active CAPs.

In 1978 the Project focused upon utility rate advocacy. In Montana it provided expertise for a citizen group intervening in Montana Power Company's proposed rate increase hearing.

In 1979 the Project worked with the CAP in Great Falls to ensure the completion of the Great Falls Community Energy Park. The energy park, known as "Project Karambi," will feature two solar greenhouses and a bio-digestor and will employ low-income residents.



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	MT
Project Name	Alternative Energy Resources Organization (AERO)

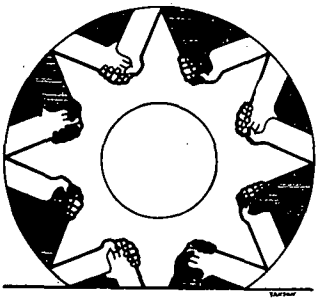
Since 1974 AERO, a citizens' membership, non-profit organization has helped educate Montanans about renewable energy. AERO initiated the New Western Energy Show and the Local Energy Organizers (LEO) Program.

AERO produces a monthly solar magazine, AERO Sun-Times, plus many educational fact sheets, pamphlets and publications.

AERO, a central participant in state and regional solar planning efforts in the past few years, also sent a lobbyist to the 1979 Montana Legislative Session.

Critique/analysis: As a result of its continuous research, information compilation, and educational efforts over the past six years, AERO is one of the best sources of information about renewable energy in the state.

Organization	Alternative Energy Resources Organization (AERO)
Address	435 Stapleton Building Billings, MT 59101
Contact	Joy Coombs or Kye Cochran
Telephone	(406) 259-1958
Funded By	Memberships, donations, grants, benefits, sale of books
Cost	$20,000/year
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	MT
Project Name	National Center for Appropriate Technology (NCAT)
Organization	National Center for Appropriate Technology (NCAT)
Address	Box 3838 Butte, MT 59701
Contact	Ed Kepler
Telephone	(406) 494-4572
Funded By	Community Services Administration (CSA)
Cost	$3 million annually
Congressional District	I
Compilation Date	February 1980

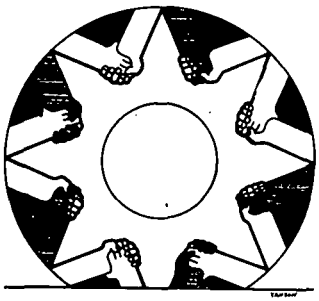
NCAT, formed in 1976, is headquartered in Butte, Montana. The organization's 72 staff members in Butte and 13 field representatives are governed by a 23-person board of directors. The board represents community action and low-income groups, consumers, the elderly, special interest groups and appropriate technologists from across the United States.

NCAT's charter pledges it to develop viable short and long range appropriate technology solutions to energy and energy-related problems experienced by low-income communities; create an awareness of appropriate technology opportunities; provide financial and technical assistance to the poor to encourage their use of small-scale, community-based technologies; and to research, develop and refine the appropriate technology data base in order to assure that the poor are afforded high-quality and cost-effective options.

NCAT also works to encourage the public and private sectors to adopt legal, programmatic and financial measures which promote and overcome barriers to the widespread use of small-scale technologies by the poor. These goals are addressed through research and development, field operations, grants, and information activities.

NCAT publishes pamphlets on its research in insulating curtains, solar greenhouses, weatherization training, cellulose insulation, furnace maintenance, building energy performance stan- , low-energy cooling, urea-formaldehyde ation, passive solar energy, active solar, waste recycling and micro-hydro power. Single copies are available free of charge.

NCAT's library is one of the best in the nation on renewable energy and conservation. It is open to the public.



Each year NCAT, with the approval of local Community Action Programs, awards grants to individuals and groups for research, development and demonstration of appropriate technologies. Many of these deal with renewable energy. Early in the year NCAT solicits grant proposals in particular areas. Copies of these RFPs are available from NCAT.

Renewable Resources— A National Catalog of Model Projects

Category	State
State	MT
Project Name	Alternative Energy Grants Program (Bill 86)
Organization	Department of Natural Resources and Conservation (DNRC)
Address	32 South Ewing Helena, MT 59601
Contact	Dana Gunderson
Telephone	(406) 449-3940
Funded By	From 2 1/2% of the state coal severance tax.
Cost	$700,000 approx./year
Congressional District	State-wide
Compilation Date	February 1980

In July of 1976, when the Alternative Renewable Energy Sources Program began its first funding cycle, renewable resources (except for large-scale hydro) were considered a novelty. Few states were developing renewables as an alternative to conventional fuels, even though an energy crisis had been declared and the prices of oil and natural gas were on the rise.

When the program began, the biggest challenge was determining the effectiveness of renewables in Montana's climate. This program answers that question by funding a vast array of projects in all parts of the state. The idea is to develop the technology by putting it to use. The program is open to applications from groups or individuals from Montana for any renewable energy project that will"" lessen reliance on non-renewable energy sources." The installations must be within the spending range of all Montanans. DNRC emphasizes projects of practical use in the home.

The technologies assessed under Bill 86 include biomass, geothermal (for heating, not electricity), small-scale hydro, solar, wind and wood. Projects incorporating the direct use of the sun's energy make up more than half of the total number of applications. Consequently, 70 of the 134 projects initiated under Bill 86 involve solar energy. Preliminary results from these projects indicate that solar systems are technically and economically practical for homes in ana. Although technology development ha n the most rapid in solar, projects incorporating the other renewable energy resources also demonstrate success.

To avoid duplication and to insure that needed projects and programs are developed, in 1979 DRNC began offering Request For Proposals. Sole source contracts have been let where one organization or entity is clearly the most capable contractor or grantee. DNRC still accepts unsolicited proposals and reviews and funds them once a year.

Critique/analysis: There can be no doubt that Bill 86 has allowed Montana to mobilize its renewable energy base quickly and become a national leader in renewable energy development. Since 1976, Montana's renewable energy grants program has accomplished much. It has also faced some criticism. In 1979 some legislators tried to terminate it, claiming that the program lacked adequate information dissemination, employed too many staff, funded too many demonstrations and not enough research, and funded too many solar projects. They claimed the project awarded too many large grants, repeated grants to a few individuals and organizations, and duplicated work that the Federal government was doing.

In response, a coalition of citizen groups mounted an education campaign in support of Bill 86. AERO devoted an entire edition of its newsletter to an evaluation of the program. Through this campaign the legislature realized that some of these charges were ridiculous and others easily remedied. As a result, the program remained intact.

Renewable Resources—A National Catalog of Model Projects

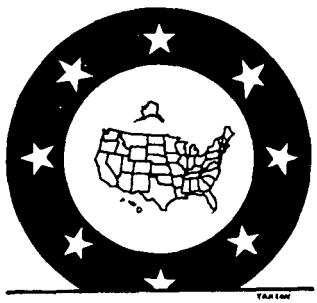
Category	State
State	MT
Project Name	Food and Fuels Program

The Food and Fuels Program, created by Senate Bill 520 of the 1979 Legislative, takes 1/4 cent per bushel of the wheat/barley tax and uses it for grants, and for projects involving research, development, production and marketing of fuels (gasohol, ethanol) and foods from wheat and barley.

Rules promulgated in October of 1979 include the following objectives: to get the most R&D for the money spent and to attract federal and/or private matching funds; to give funding preference to development and demonstration projects; to give all grants to Montanans for projects conducted in Montana; to grant no funds over $100,000 for a single project; to fund projects relating directly to the food and fuel needs of Montana; and to fund either all or just part of a proposal.

The Department of Agriculture hopes to raise five-to-one matching funds from the federal government for this program. As of the end of October, $450,000 in grant proposals had been submitted to the Department of Agriculture.

Organization	Department of Agriculture and Livestock
Address	6th and Roberts Ave. Helena, MT 59601
Contact	Jack Gunderson
Telephone	(406) 449-3144
Funded By	Wheat Research and Marketing Tax
Cost	$200,00 approx./year
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	State
State	MT
Project Name	Renewable Energy Viability Study: Design Report
Organization	Montana Department of Natural Resources and Conservation (DNRC)
Address	Energy Division 32 South Ewing Helena, MT 59601
Contact	Bob Anderson
Telephone	(406) 449-3780
Funded By	Department of Natural Resources, DOE
Cost	$15,000
Congressional District	I
Compilation Date	February 1980

The Introduction to the Design Report states: "In order to facilitate public and private choices for the appropriate mix of energy solutions, it is essential to look at all potential energy sources in a rigorous and consistant manner. Recent economic history has provided information about costs, benefits and impacts of using conventional forms of energy. But as Montana and the nation move into a period of uncertain fossil fuel supplies, rising real prices, changing relative prices, and uncertain health and environmental risks, competent information about energy alternatives becomes important to government and private decision-making alike."

What are the renewable technologies? How well do they perform in a harsh northern climate? What do they cost? What else do they require (space, southern exposure, wood...)? How do they compare with traditional energy supplies? What are the local social, economic and environmental effects?

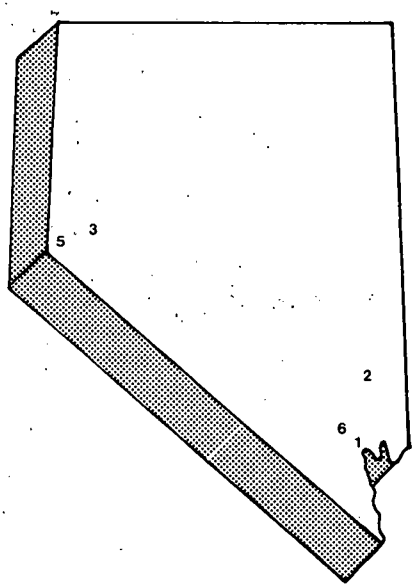
The Montana Renewable Energy Viability project will develop information regarding a possible energy future which is more reliant on energy conservation and renewable energy sources. Using a range of technical disciplines, the REV project examines conditions at the state, local and private levels. The project does not presuppose that some level of Montana's energy needs should come from renewable energy sources. Its task is to develop information in a framework which will permit conventional and renewable energy to be compared, using the same criteria.

The REV Design Report teamed up a prime consultant with private and academic specialists and a broad-based citizens' advisory group to write up the Design Report. (DNRC policy and technical staff members were involved in the project from the beginning)

The state of Montana has applied to the Department of Energy for the approximately $350,000 needed to complete the Renewable Energy Viability Study. As of this writing, DOE had not yet agreed to fund this study.

NEVADA

1. Boulder City
2. Caliente
3. Carson City
4. Cold Springs
5. Incline Village
6. Las Vegas
7. Sutcliffe



NEVADA

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Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	NV
Project Name	Geothermally Heated Trailer Park

Fifty mobile homes on a tract in Caliente, Nevada, are heated by a single geothermal well.

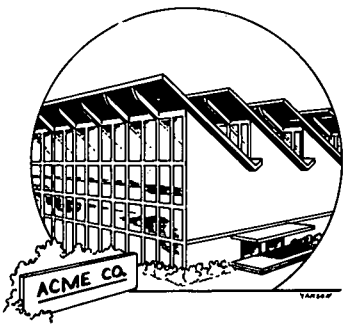
The application of the system is remarkably simple. The hot water is pumped from the well to a storage tank, which is fitted with a copper pipe heat exchanger. The heated water is moved from the exchanger to the individual mobile homes by copper pipes, and then to a surplus car radiator located in a box in the home. A small box fan then blows the air across the heating coil.

The system has proven to be so cost-effective and simple that the homeowners themselves have been installing the system to their own satisfaction.

Savings figures are not available; however, since the source is constant, it is apparently supplying the major portion of the heating requirements necessary for the development.

Critique/analysis: The small town of Caliente (600 population) has not been able to attract new small industry; non-availability of electricity has been a factor. The city is now studying the prospects for using this resource for additional industrial and domestic resources.

Organization	Agua Caliente Trailer Park
Address	P.O. Box 173 Caliente, NV 89008
Contact	Fergus Wallis
Telephone	(702) 726-9274
Funded By	Small scale technologies grant program
Cost	$30,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	NV
Project Name	Passive Solar Home Track
Organization	Neuffer Constructi Company
Address	3405 Brant Street Cold Springs, NV
Contact	Paul Neuffer
Telephone	(702) 972-0701
Funded By	Private
Cost	n/a
Congressional District	I
Compilation Date	February 1980

A 300-home tract of passive solar housing is nearing completion in Cold Springs. One hundred-fifty solar homes have been sold and another 200 planned, making this one of the largest solar tract sections in the country.

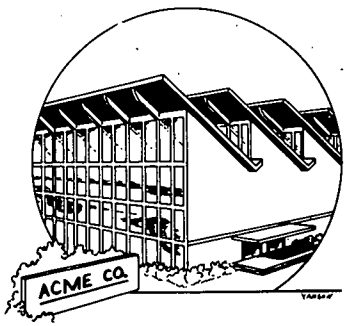
The passive homes each cost $1,000 to $1,500 more than a regular house because of the extra thermal mass and the large south windows. The two- to four-bedroom houses range in size from 1,056 square feet to 1,624 square feet and in price from $50,000 to $72,000.

The key feature of the passive design is a six-foot high, one-foot thick concrete wall that stores the solar energy gained from a ten-foot high double-glazed window, which covers the entire south side of the home. Between the glass and the wall is a four-foot wide tiled concrete walkway that runs the entire length of the south side and is dropped 2.5 feet below the living areas of the house. The cool floor air from the living area flows into the walkway to be rewarmed and recirculated over the wall and into the back of the house. The wall itself supplies a radiant source through the night while keeping the southern view open throughout the home. As much as 90 percent of the space heating is provided passively.

A thermosyphon (passive) hot water package is available as an inexpensive option.

A wood stove supplies the back-up for the home.

Critique/analysis: The homes are receiving well-deserved attention from trade circles, as the simplicity and price of the homes bring them firmly into the middle-bracket tract-home market.



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	NV
Project Name	Alternative Energy Sources Curriculum

Sierra Nevada College offers a Bachelor of Science degree in Alternative Energy Sources. The college is a private school that serves the Lake Tahoe region with a range of Liberal Arts and environmental classes.

One of the founders of the school, who teaches there now, had been experimenting with solar and appropriate technology for several years before the school opened. As the interest in appropriate technology increased, the school developed a lecture curriculum on associated energy experiments tied directly to the operation of the school.

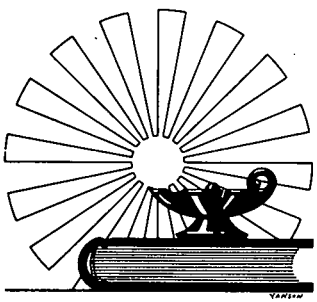
One of the first projects undertaken by the school was the design and construction of a home, that in the fierce mountain weather of Lake Tahoe, could maintain comfortable temperatures on renewable resources. The home now gets all of its space-heating and water-heating requirements from hand-built solar collectors, a greenhouse, and a water-heat exchanger located on a wood stove.

One of the key features of the greenhouse is the use of stored, solar heated water, which is run through coils in the cement floor of the greenhouse to keep it from freezing when it is cold outside.

The school presently has 12 alternative energy sources courses integrated with its General Sciences curriculum. The college to date has graduated only four people with degrees; however, many of the local residents and trades people have upgraded their skills through the school.

Organization	Sierra Nevada College
Address	800 Campbell Road Incline Village, NV 89450
Contact	Benjamin Solomon
Telephone	(702) 831-1314

Funded By	Private
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

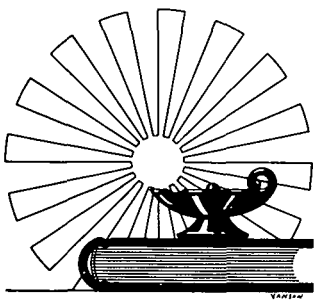
Category	Education
State	NV
Project Name	Passive Solar Builders Conferences

Nevada has taken a significant step toward solar implementation by organizing a series of Passive Solar Builders Conferences. The first will be held in early 1980.

The Nevada Department of Energy and the Energy Systems Center of Boulder City, under a Solar Energy Research Institute grant, designed an informational forum to address builders' questions. The forum is being held with the cooperation of the Nevada Home Builders Association. To establish a basic frame of reference, one of the Association's homebuilders has given the Energy Systems Center a typical house plan. The Center is conducting a simulation of the design and and will analyze the construction effect of including various passive techniques. The contractor will then estimate the additional costs of adding these design features. The Center will also develop various tract-lot orientations that make the most of the lot and the lot's solar potential.

The day-long forum will feature two main presentations: one from a financial representative and one from a market specialist. The other members of the forum are local and government officials, a local FHA representative, a utility representative, and a State Building Code Engineer.

Organization	Nevada Department of Energy
Address	1050 E. William Suite 405 Carson City, NY 89710
Contact	Bob Loux
Telephone	(702) 885-5157
Funded By	Solar Energy Research Institute
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

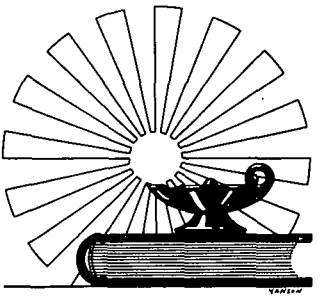
Category	Education
State	NV
Project Name	Solar Technology Training

Organization	Clark County Community College
Address	3200 N. Cheyenne Ave. No. Las Vegas, NV 89030
Contact	David Comarrow
Telephone	(702) 643-6060

A significant step in solar technology training for the State of Nevada has been undertaken at the Clark County Community College facility in North Las Vegas. The program is a one-year, 30-credit curriculum leading to a "Certificate of Achievement in Solar Energy Technology." The course attempts to impart a fairly broad-based technical and economic awareness, while developing marketable skills related to specific applications and problems found in the Las Vegas area. The courses offered through the "Solar Energy Technology Program," in addition to the basic college requirements are: Introduction to Solar Technology; Advanced Solar Technology; Passive Solar Energy Systems; Blue Print Reading, Industrial Electronics; Energy and Society; and Practicum in Solar Technology.

Funding for the courses has come through several sources. The first monies were attained from the college itself. In 1978, the Science Instructor and the developer of the Solar Technology class gave the community college a list of energy-saving concepts they would apply to the facility. Some of these concepts were instituted, and over the next year the school saved $70,000 on its energy bill. The administrator, in appreciation, turned over $50,000 of this savings to institute the Solar Technology classes. The remaining funding came from federal vocational-training funds.

Funded By	State and Federal vocational funds
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	NV
Project Name	Solar Assisted Fish Hatchery

Members of the Pyramid Lake Paiute Tribe have installed a solar water-heating system on their Lahontan Cutthroat Trout fish hatchery.

The system consists of 1200 square feet of unglazed collectors and a 95,000-gallon storage tank.

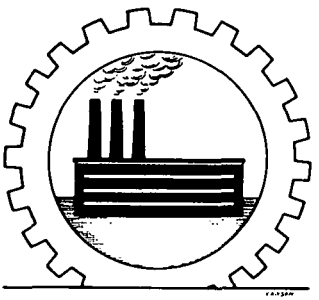
Future plans for the hatchery include installing an evaporative/radiative cooling system to cool the hatchery water during the hot summer months.

Critique/analysis: With a ten year lifetime, the system will realize energy savings approaching 6530 million Btu of fuel oil.

Tribe members believe that installation of this solar system will increase the output of the hatchery and cut down on energy consumption. The system has created new jobs within the tribe, and its success has inspired several tribe members to install solar hot water units in their own homes.

Organization	Pyramid Lake Indian Tribal Enterprise
Address	Star Route, Sutcliffe, NV 89510
Contact	Pyramid Lake Indian Tribal Enterprise
Telephone	n/a

Funded By	DOE
Cost	$46,874 (DOE Grant)
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

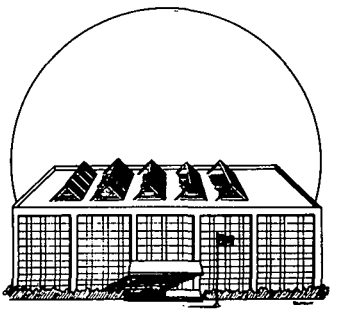
Category	Institutional
State	NV
Project Name	Solar Heated Firehouse
Organization	Diamond Valley Volunteer Firehouse
Address	Eureka, NV 89316
Contact	Diamond Valley Volunteer Firehouse
Telephone	n/a
Funded By	DOE
Cost	$13,390
Congressional District	I
Compilation Date	February 1980

The Diamond Valley Volunteer Fire Department is installing a custom-designed solar space-heating system.

In designing the system, the Fire Department had to meet specific requirements. It had to make sure the firehouse would be kept at a temperature of 50 degrees F, that the volunteers could install and maintain the system themselves, and that the system could provide a source of emergency water for the trucks.

The Fire Department met these requirements by designing an on-the-ground hydronic array of 18.6 square feet of collectors, with a thermosiphon system that delivers heated water to uninsulated storage pipes under the firehouse eaves. Warm air circulates to the trucks below, and in emergencies a gravity-feed system delivers water to the trucks.

Critique/analysis: Firemen are adding additional insulation to the firehouse. F-chart calculations show a primary energy savings of 34.4 MWh of electricity. With a twenty year life for the project, total energy savings will be 688 MWh of electricity. The system is scheduled for completion in June of 1980.



Renewable Resources—A National Catalog of Model Projects

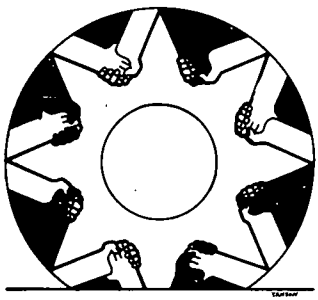
Category	Outreach
State	NV
Project Name	Energy Systems Center

The Desert Research Institute has established a solar research facility in Boulder City. The Energy Systems Center since its inception as a "not-for-profit" corporation has proven itself to be an asset to local and state agencies trying to integrate solar and conservation into their program plans and building plans.

The Energy Systems Center has helped bring about some of the most important solar work done in Nevada. A Nevada Solar Handbook was prepared mostly by Energy Center staff. The Center staff has also been instrumental in developing a Passive Solar Builders Conference, an important educational forum for southern Nevada builders.

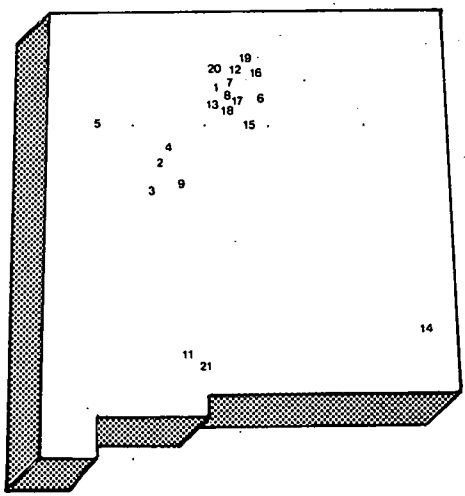
The Energy Systems Center staff designed an innovative modular solar training package that is used by Clark County Community College, and has been used extensviely by the State Attorney General to help establish consumer-protection guidelines for solar products.

Organization	Energy Systems Center
Address	1500 Buchanan Blvd. Boulder City, NV 89005
Contact	Chuck Miller
Telephone	(702) 292-4217
Funded By	Private and research grants
Cost	n/a
Congressional District	I
Compilation Date	February 1980



NEW MEXICO

1. Abiquiu
2. Albuquerque
3. Belen
4. Bernalillo
5. Brimhall
6. Cleveland
7. El Rito
8. Espanola
9. Estancia
10. Galisteo
11. Las Cruces
12. La Madera
13. Los Alamos
14. Lovington
15. Pecos
16. Ranchos de Taos
17. San Juan Pueblo
18. Santa Fe
19. Taos
20. Tierra Amarilla
21. University Park



NEW MEXICO

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Renewable Resources—A National Catalog of Model Projects

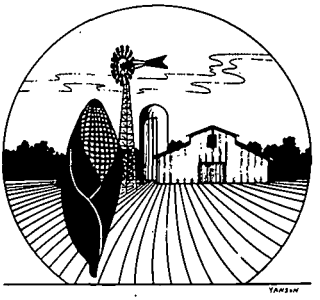
Category	Agricultural
State	NM
Project Name	Agricultural Energy Awareness

This two-year program begun in 1977 was a broad educational project intended to explain energy problems through media, talks, and workshops. The subjects discussed were energy and fertilizer, irrigation, and alternative energy. Most workshops on gasohol, methane, and solar energy were attended by more than 100 people. The primary result of this project was the knowledge people acquired on the need to conserve and use solar energy, and their ability to do so. Approximately 9000 residents were reached.

Besides the existing staff of the Extension and Indian Affairs offices, this project required one half-time agricultural engineer.

Critique/analysis: In general, the strength of the project was the use of the existing Extension network: projects reflected the actual needs and conditions of the people involved.

Organization	Cooperative Extension Service/New Mexico St. Univ.
Address	105 5th Street Albuquerque, NM 87102
Contact	John Loll
Telephone	(505) 243-1386
Funded By	U.S. Dept. of Agric., County Governments, State of NM
Cost	$28,606
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	NM
Project Name	Appropriate Technology Farm
Organization	Ghost Ranch Conference Center
Address	Abiquiu, NM 87510
Contact	Aubrey Owen
Telephone	(505) 685-4333
Funded By	Presbyterian Hunger Fund for Materials
Cost	n/a
Congressional District	II
Compilation Date	February 1980

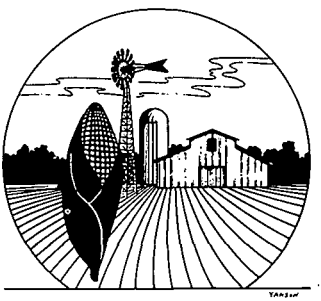
Ghost Ranch Conference Center has begun a program of testing and developing agricultural implements and practices that are appropriate to the region's economic, climatic, and cultural needs. The intent is to try out on the 5-acre farm at the ranch, several applications, ranging from greenhouses to pedal-powered threshers. If successful or promising, these applications will become demonstration installations in the region.

Recently two solar greenhouses were installed on area homes to provide heat and increase local food production. The greenhouses were built in two-day, open-to-the-public, construction workshops co-ordinated by the New Mexico Solar Energy Association. Association staff designed the sites, held a public slide show on greenhouse construction, and supervised construction. The cost of materials was provided by Ghost Ranch, half as a grant to the home owners and half as a one-year interest-free loan.

Water heaters and a solar crop dryer presently in use on the Ranch may also become the focus of similar community-demonstration workshop programs.

In another small farm project, the Ranch installed a small photovoltaic array on a chicken coop. If the array works well during the short-sun winter months, it will be moved to an area residence. Mountainous terrain and long, sparsely populated distances makes utility hook-up too expensive for many; in such cases photovoltaics often prove cost-effective.

A pedal-powered thresher is also being used and tested with the help of the University of New Mexico's engineering department. Since the northern New Mexico climate doesn't lend itself to large-scale cash crop agriculture, harvesting by the typical machinery and methods is very uneconomical and out of scale. The farm project is trying to find implements that



use energy frugally, that can be manufactured and maintained locally, and that are in scale with the small, home-use plots most area residents cultivate.

Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	NM
Project Name	Irrigation Pump Audit

Fifty percent of farming in New Mexico requires irrigation, so pumps are vital to successful farming. Using research and development work on pumps done at NMSU, project staff (two full-time investigators) visit farms to test pumps, motors, and wells. The two-year project begun in 1977, was very successful since it provided many farmers with practical, economic information on the efficiency of their irrigation systems.

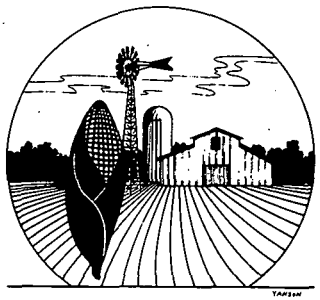
Many farmers are now paying greater attention to their machinery, and the energy saved by these audits has reduced the cost of farming in the arid parts of New Mexico.

A slide show was developed that can be borrowed from the NMSU Film Library, (P.O. Box 3 A1, New Mexico State University, Las Cruces, New Mexico).

Critique/analysis: In general, the strength of the project was the use of the existing Extension network, which meant that the projects reflected the actual needs and conditions of the people in different communities.

Organization	Cooperative Extension Service/ NM State Univ.
Address	105 5th Street Albuquerque, NM 87102
Contact	John Loll
Telephone	(505) 243-1386

Funded By	U.S. Dept. of Agric. County Governments State of New Mexico
Cost	$60,250 for two years
Congressional District	I
Compilation Date	February 1980



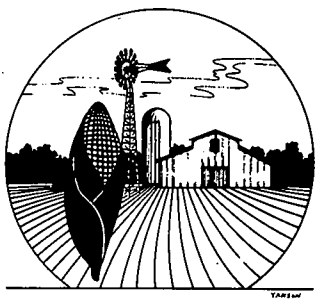
Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	NM
Project Name	Solar Warmed Water for New Mexico Cattle
Organization	Engineering Experiment Station
Address	New Mexico State Univ. University Park, NM 88003
Contact	Professor A.M. Lukens
Telephone	n/a
Funded By	n/a
Cost	$1,250/collector
Congressional District	I
Compilation Date	February 1980

Floyd Lee, owner of the 250,000-acre Fernandez Ranch in San Mateo, New Mexico, approached the Engineering Experiment Station at NMSU about an economically feasible idea for the use of solar energy in stock tank freeze protection. In this early and pioneering study during the years 1960-61, C.E. Rose and F.A. Hughes, under direction of Professor Lukens, researched the potential of using active solar collectors both to prevent freezing and to reduce the amount of energy cattle spent in internally warming the water they drink.

Although not widely publicized, the project was successful and in 1962 resulted in a functioning solar-heated stock tank for the Fernandez Ranch. The project used about 144 square feet of collectors per water tank and, in 1960, cost approximately $1,250 per collector. It was found that cattle drinking warm water from the solar-heated stock tanks experienced greater weight gains than other cattle drinking from conventional tanks. With the solar collectors, costly electric or gas heaters were not needed, and it was not necessary to have a ranch hand break up ice that formed on winter mornings.

Critique/analysis: Though by no means is the use of solar energy for stock tank-heating widespread at present, this early research laid the groundwork for efforts that are only getting started on a large scale. The technical system had some problems, but the project has potential and the New Mexico Cooperative Extension is looking into it.



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	NM
Project Name	First Village
Organization	Communico, Inc.
Address	Route 3, Box 81-D, Sante Fe, NM 87501
Contact	Wayne and Susan Nichols
Telephone	(505) 983-1600
Funded By	n/a
Cost	Approximately $100,000 per home
Congressional District	I
Compilation Date	February 1980

In 1976, Wayne and Susan Nichols formed Communico, Inc., and began work on First Village, a solar home subdivision that they developed, designed, and built. It not only sold; but it also got them on their way to a second solar development in the same town, while their original and innovative designs advanced the field of passive solar heating systems.

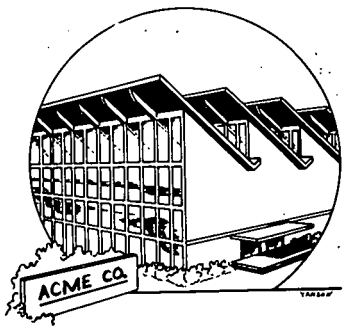
The Nicholses chose to develop a 40-acre tract outside of Santa Fe as a planned solar village. So far, about twelve houses have been built; they plan a total of 35. Each house in the Village has a different solar design that integrates aesthetics and function, the home and its site. Each site was planned to fit into the landscape with minimal impact on vegetation, soils and views. The distinctiveness of living in an attractive solar home in a solar subdivision is what the homeowner buys.

All the homes in First Village are designed to take advantage of the natural site's characteristics. Features such as earth-berming, ample insulation, and profiles that shed north winter winds all help to make the homes energy-conserving.

The Nicholses were aware that solar systems were only one element of a mix of factors in selling a house. Solar homes generally look different and this distinctive look in a conventional subdivision can be troublesome.

Also aware of the conservative nature of the real estate business, Communico did as much of the design, financing, development and construction as possible themselves. This control over all parts of the process enhanced the overall quality of the package offered to the buyer.

Unit #1, the first built, has been monitored for thermal performance by the Los Alamos



Scientific Laboratories and has been an important source of data on how passive systems work. It is a two-story, well-insulated frame house with a two-part solar system. The primary source of heat comes from a two-story greenhouse and mass wall to which all the house rooms are adjacent. About 25 percent of the solar heat comes from hot air collected at the top of the greenhouse and stored in under-floor rockbeds. These then radiate heat directly through the floors to the living space above. The interior of the house rarely varies year-round from a 70 degree F temperature. The fact that the heat is delivered by radiation through the mass wall and floors makes it especially comfortable to live in, and the greenhouse makes a pleasant winter sunspace. It is a prime example of good solar design coupled with good looks.

Another house at First Village pioneered a solar system that combined two related systems that had not been used together before. Based on the concept of using a south-facing, glazed wall with thermal mass as the combination collection, storage, and distribution unit, the Nicholses fabricated a combined water and concrete storage wall. Precast concrete "tanks" contain sealed vinyl bags filled with water. The concrete surface of the tank provides a solar collection surface on the exterior of the wall. The water inside the tank stores the heat and distributes it to the interior of the wall. On the inside, the homedweller sees a normal-looking wall that can get as hot as 100 degrees F after a succession of two sunny days.

The other houses in the development use a combination of direct gain through southing windows and clerestories, concrete be walls, and greenhouses as their heat----ection and distribution systems. These combinations make for versatile house plans, and, as stated before, provide complementary heating of a house through changing weather conditions. The houses vary in size from about 1,000 square feet to over 2,000 square feet. They make use of regional styling and construction details and are contributing to the development of a style beginning to be labeled as "solar adobe."

Renewable Resources—A National Catalog of Model Projects

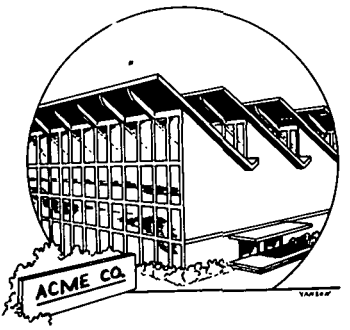
Category	Commercial
State	NM
Project Name	The Herb Shop

The Herb Shop, usually run single-handedly by the owner Joan Loitz, is a small wholesale and retail commercial nursery specializing in herbs. Two major approaches distinguish it from most commercial nurseries in the state: the use of solar energy to heat the greenhouse; and the use of solely organic growing techniques in the greenhouse.

The design of the 1700 square foot solar greenhouse, with 1800 square feet of south-facing double glazing and 900 gallons of water for storage, was based on work done at the Brace Research Institute. Built by Joan and friends in 1974 with mostly recycled and donated materials, it is basically a large triangle: the north side is totally opaque and painted white on the inside, the south side all glazing. Joan adapted the design to this climate; she added to the south face a cold frame that acts as a preheater in the winter, an air-lock, and perimeter insulation. The greenhouse runs at 90 percent efficiency, with average annual heating bills of $150.00 (January 1978 heating cost was $25-$30, compared to $150 for a standard commercial greenhouse.) It takes another $150.00/year to run a fan that exhausts hot air and, by doing so, provides the plants with a lot of carbon dioxide.

The Herb Shop is run totally as a private business, receiving no subsidies--just a lot of inquiries from home gardeners and greenhouse owners around the state. Surprisingly, few commercial growers, probably because they have a long-term investment in standard growing practices, are interested in the way the Herb Shop operates. Joan, however, is very pleased with the results of her efforts, and is looking forward to moving south of Santa Fe by the end of the year. At that time the wholesale and retail components will be split up, the former to be run out of Belen, N. M., the latter to be located in Albuquerque.

Organization	The Herb Shop
Address	R.R. 1, Box 57 A Belen, NM 87002
Contact	Joan Loitz
Telephone	988-4232
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980



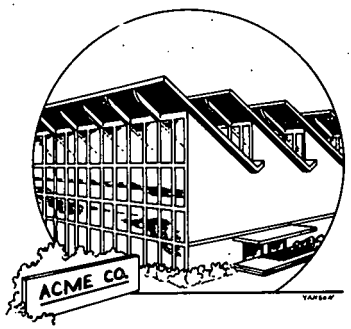
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	NM
Project Name	Zomeworks

Zomeworks is a diverse and well-established solar business organized in 1969 as a privately owned corporation. Its head officers are Holly and Steve Baer, solar pioneers and advocates.

Zomeworks has incorporated some of its solar systems into its headquarters in Albuquerque. The building, a renovated old adobe structure, has skylights and reflectors; a fan blows the hot air down into the rooms with the equipment on display. All in all, Zomeworks provides proof that innovation doesn't necessarily have to start in the back yard.

Organization	Zomeworks
Address	Box 712 Albuquerque, NM 87103
Contact	Holly Baer
Telephone	(505) 242-5354
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	The Affiliates Program

Organization	New Mexico Solar Energy Association
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Anne Cicero
Telephone	(505) 983-1006

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

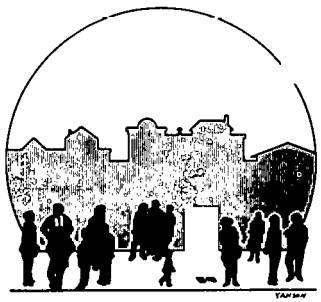
The Affiliate Program is a joint program between the NMSEA and six local solar energy associations around the state. NMSEA helps provide staff to the affiliates and the affiliates provide support and supervision. The goal of both is to develop strong, lasting solar activity and expertise. The field liaisons work to select and adapt the available technology to the community's particular culture, economics, and natural environment through such activities as demonstrations, lectures, short courses, workshops, and newspaper articles. The NMSEA central office has also provided the Affiliates with grantsmanship assistance, a valuable service to small local groups getting started.

There are three affiliates. One is the Taos Solar Energy Association. Incorporated in 1974, it has been responsible for a dramatic increase in solar home starts: 160 solar buildings have been documented around Taos, which represents almost 3 percent of all structures in the area. In addition to its monthly lectures and construction workshops, the Taos SEA currently offers assistance to the Swiss government in a joint solar demonstration project in Tribhuvan, Nepal.

The Solar Energy Association of Albuquerque hosted the NMSEA annual meetings in 1977 and 1979. It works closely with the NMSEA in generating symposia, tours, and informal workshops in Albuquerque (the major urban area of the state).

The Alamogordo SEA provides a southern focus for disseminating NMSEA materials via seminars, lectures, and regular meetings. It also sponsored the 1978 NMSEA annual meeting.

The San Miguel Solar Energy Association, formally named in June of 1977, has a long history of determined volunteerism preceding that date. It has been responsible for an increase in solar installations (from two to eighteen) in the past eight months. With Mora County per capita incomes averaging $2,786/year, this



group has found retrofit greenhouses and a solar information service powerful tools for alleviating the inherent hardships ...ldered by the poor with respect to ...and fuel.

The Dona Ana Energy Association and the Roswell Solar Energy Association have recently affiliated. Their activities include library services, regular meetings, guest lectures and the coordination of public events.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Agua Caliente del Sol

In November of 1979, the Concilio Central, which serves the poor population of Torrance County through a wide range of programs, began the Agua Caliente del Sol project, with the help of a grant from the Department of Energy Small Scale Appropriate Technology Program. The project is a small, community-based corporation that focuses on the need for hot-water service to the county's rural poor.

The grant will support the construction and installation of five closed-system solar hot water heaters—four on private homes and one on a public building. None of these buildings has previously had hot water. The project uses local materials and labor. It thus helps to promote local awareness and acceptance of the solar principles involved.

Both members of those households receiving the solar water heater units and the construction workers benefit directly from the project—the workers through the special training, and the households through the 20 to 25 percent reduction of fuel consumption and the acquisition of hot water.

In its role as a public education demonstration project, Agua Caliente del Sol has helped show that solar energy retrofits can be effective, economical, and practical for the residents of the county. Encouraged by this success, the project plans to expand its efforts to increase energy autonomy for rural New Mexicans.

Organization	Concilio Central
Address	P.O. Box 506 Estancia, NM 87106
Contact	Eric Berg
Telephone	n/a
Funded By	DOE
Cost	$4,101.65
Congressional District	II
Compilation Date	February 1980

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Category	Community
State	NM
Project Name	Community Outreach

In the last two years, NMSEA has given introductory and technical talks to audiences varying from the Kiwanis Club to professional solar builders and designers. This program also includes training workshops, classes, and materials development. Another of its functions is providing a link to its Affiliates.

NMSEA's educational work has been basic to its operations since its inception. Currently, classes are being taught at the University of New Mexico and the College of Santa Fe. In 1978-79, teacher training workshops were conducted for 85 teachers in vocational-technical schools around the state. The model training consisted of 2.5-day intensive workshops on heat loss and gain, solar energy applications, and curriculum development.

Follow-up evaluations show 74 teachers have already incorporated, or are planning to incorporate, the fundamentals of solar energy application in their classes. Nine have or are planning to incorporate solar in their homes.

The Outreach Crew plans to develop activities for and work with elementary through secondary students in the coming year. The result will be educational materials and aids for teachers. To date, members of the crew have helped develop the six passive solar slide sets that NMSEA sells.

Finally, this crew is responsible for supplying the Affiliates and NMSEA field liai- with the technical information they need ırry out their programs.

Organization	New Mexico Solar Energy Association
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Anne Cicero
Telephone	(505) 983-1006

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

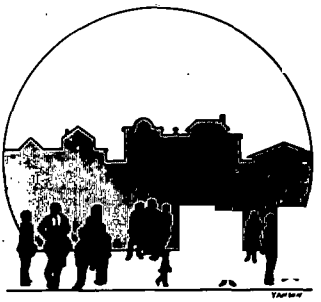
Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Community Self-Help Housing Project
Organization	Sangre de Cristo Housing Corporation, Inc.
Address	P.O. Box 655 Ranchos de Taos, NM 87557
Contact	Larry Hoover
Telephone	(505) 758-3930
Funded By	Nat. Counc. de la Raya; Misc. Grants, Community Fundraising
Cost	$75,000
Congressional District	II
Compilation Date	February 1980

The Sangre de Cristo Housing Corporation (SCHC), incorporated in August of 1978, was formed by local people in a small town outside of Taos, in response to a critical need for housing for low-income families. The self-help housing models to be used are all passive solar in design. The impact of the project extends beyond providing housing to helping families decrease their energy consumption.

The self-help project, scheduled to begin early in 1980, will involve construction of forty homes during the first year. The houses will be made primarily of locally-produced adobe and will be constructed by each family with the help of friends and relatives. The SCHC helps families in getting low-interest FHA loans. After the family receives the loan, SCHC then provides assistance in planning and home site preparation. Two SCHC contruction supervisors provide direct assistance while the homes are being built.

The homes will incorporate a number of passive solar techniques--attached solar greenhouses, trombe walls, and optimal use of south-facing windows. The Taos and New Mexico Solar Energy Associations will be involved in the planning and follow-up phases of the project and also hope to involve a greenhouse-management specialist who can help families make efficient use of greenhouses in energy- and food-production.



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Federal Photovoltaics Usage Program

Organization	Indian Health Service (of the HEW & DOE funded U.S. Public Health Service)
Address	505 Marquette, N.W. Albuquerque, NM 87102
Contact	Salvador Reyes
Telephone	(505) 766-6565

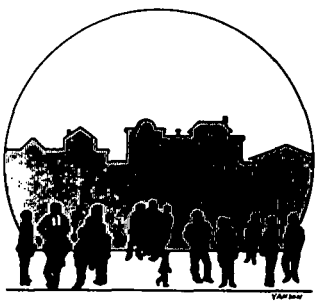
Funded By	DOE, HEW
Cost	$5.5 million
Congressional District	I
Compilation Date	February 1980

Salvador Reyes, who works in the Albuquerque area office of the Indian Health Service, is the primary force behind the well-known and innovative Federal Photovoltaics Usage Program, which has been operating since about 1977.

Through photovoltaic arrays, electricity will be provided to 400 families on remote Indian reservations of Southwestern states. Thirty pilot installations have been operating successfully for one to two years in Arizona. The electricity powers water pumping, laundry, refrigeration, lights and other health-related facilities never before available to most remote Indian villages. In the project, D.O.E. supplies the photovoltaic equipment, the U.S. Public Health Service provides the sanitary equipment, and the Indian Health Service field office engineers carry out the installations. Because the villages being reached through the program are remote from power lines, the use of photovoltaics is cost-effective today. Thus, the project represents not only a demonstration but also a much-needed service to some of the poorest people in the United States.

As well as helping Native Americans by providing power for such needs as water pumping and lights, the project is a tremendous boon to the photovoltaics industry. It is projected that photo cells will rapidly drop in price once mass-production is expanded. This can only happen when photo cell markets open up. Projects such as this are promoting just that.

Critique/analysis: The project has been functioning well with a few minor problems, mostly related to the use of non-solar equipment such as pumps and refrigerators. Most of these problems in the pilot installations reflect a lack of experience--a problem being rapidly remedied.



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	HUD 701 Indian Community Planning

Every year since 1970 HUD has provided Pueblo tribes $50,000 as an incentive to do planning on issues such as land use, housing, utilities, etc. Santo Domingo Pueblo was the first to undertake energy planning.

As part of this program, the Santo Domingo Pueblo received money in 1978 to review energy usage and alternative housing on Pueblo land. A tribe member was trained to conduct energy audits under the Energy Extension Program. On return to the Pueblo, he audited about two-thirds of the houses and educated people on weatherstripping and other ways of conserving energy. Also, there was a public meeting on solar energy that was for many an introduction to solar and energy conservation.

Critique/analysis: The educational materials now available on solar energy do not address themselves to the specific needs and conditions of the Pueblos, and there is not enough good material on low-cost retrofitting schemes. This slows down the acceptance process quite a bit. However, the interest has been sparked, and the Pueblos are planning to continue investigating solar and energy conservation.

Organization	State of New Mex Planning Office
Address	550 Don Gaspar Santa Fe, NM 87501
Contact	Dave Martinez
Telephone	827-5191
Funded By	HUD
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

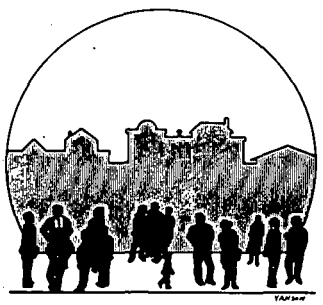
Category	Community
State	NM
Project Name	Lumberton Water-purification Plant
Organization	Lumberton Water-purification Plant
Address	408 Maddox Loop Belen, NM 87002
Contact	Victor Kollman John Turner
Telephone	(505) 864-4681
Funded By	Four Corners Regional Commission
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The 60 residents of Lumberton have cleaner water thanks to Dr. Victor Kollman, a biochemist with the Los Alamos Scientific Laboratories, who designed a revolutionary plan for water purification, and to John Turner of Belen, who implemented these ideas between 1976 and 1978. Prior to this, Lumberton had obtained water from wells drilled into a coal seam underlying the town. The water, saturated with methane and hydrogen sulfide, was unhealthy and nearly unpalatable.

In the purification system, impure water is held for four days in large solar-heated pools supporting a culture of a certain blue-green algae species. The algae metabolize the methane and hydrogen sulfide, removing them from the water. Following this algae-treatment process, the water is passed through settling tanks, filtered, sterilized with ozone, and delivered to the Lumberton water system. To allow optimal algae growth, the algae ponds must be kept to within 2 degrees C of the ideal fairly warm temperature. Temperatures are maintained with a solar greenhouse over each pool (double-layer of Filon in a quonset hut shape) and with back-up active solar collectors circulating a propylene glycol solution. Additional back-up is provided with conventional heaters. The entire system is carefully designed and computer-controlled so that an on-site control person is not necessary.

As a by-product, the algae, when collected and dried, have a very lucrative market: they can be sold for pharmaceutical uses when absolutely pure for about $140/lb. and as cattle feed unpurified for 50¢/lb. As cattle feed, one ounce supposedly provides all the protein and most of the minerals a cow needs per day.

Although the water-purification plant was initially designed to provide 20,000 gallons per day, Lumberton water consumption has reportedly increased to 60,000 gallons per day as water



quality has improved. The plant so far seems able to handle the added capacity. The project, though largely experimental, is working well and will no doubt serve as a prototype for other such systems around the country.

Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	New Mexico Solar Energy Association
Organization	New Mexico Solar Energy Association
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Steven Meilleur Alex Wilson
Telephone	(505) 983-1006
Funded By	McKnight Foun., ARCA Foun., DOL, ACTION, VISTA, NM Energy Ext., NM Ener. & Mineral Dept.
Cost	Close to $85,000
Congressional District	I
Compilation Date	February 1980

The New Mexico Solar Energy Association (NMSEA), formally incorporated as a non-profit tax-exempt membership organization in 1974, works "to further solar and related arts, sciences and technologies with concern for the ecologic, social and economic fabric of the region." NMSEA has developed a diverse set of programs to give people the intellectual tools and practical skills they need to explore and use technological innovations. Among them are programs for technical assistance, technical back-up, publications, outreach, and affiliates.

The NMSEA has a multi-based funding strategy, receiving federal and state money from the Department of Labor, the New Mexico Energy Extension Service, and New Mexico Energy and Mineral Department. Private contributions total over $100,000. Much of NMSEA staffing comes from ACTION/VISTA and CETA, and NMSEA's program efforts directly generate a substantial portion of NMSEA's budget.

Throughout its development, the NMSEA concentrated on three elements crucial to any successful educational endeavor: accurate data, effective translation, and community participation (the hallmark of an effective solar energy technology-transfer program). The NMSEA, through the expertise of its members and the data flowing in from research laboratories, backyard experimenters, and private companies, has access to and publishes technical papers in advance of other publishing groups. Yet accurate information is not enough. Also necessary is the translation of the technical work into homes and lives. That translation cannot be effective unless it is responsive to community needs. Insistence on local resources for local needs not only guarantees community participation in (and therefore support for) local solar energy applications, but it also suits the nature of the solar resource itself.

Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Passive Solar Community Center

In the winter of 1978-79, the Galisteo Community Corporation, a volunteer organization begun in 1974 to provde and coordinate community activities such as rodeos, dinners, dances, and other special events, built a special community center using passive solar construction principles.

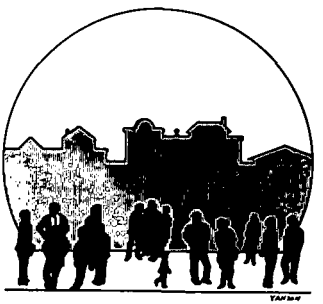
The building uses passive space heating with energy-conserving thermal mass walls, thermopane south windows, and north earth berms. The building is extremely energy-efficient, and can maintain a temperature of 65 degrees F when the outside temperature is -16 degrees F.

Aside from its direct benefits, an energy-efficient Community Center demonstrates the effectiveness of passive solar principles in a practical way, contributing to the public's awareness and acceptance of solar energy. In addition, eleven local construction workers were trained in basic passive solar construction techniques, thereby developing useful trade skills.

Critique/analysis: GCC suggests that volunteers' efforts must be closely supervised and clearly planned out so that the project does not drag out. GCC also maintains that "the original architect's plans proved to be too complicated and expensive. The GCC developed the finished design with assistance from the New Mexico Solar Energy Association, so the $4,300 initially spent on the architect's plan was actually an unnecessary expense." Other than that, the project has proven to be very cost-effective, both in terms of initial construction and the energy costs of operation.

Organization	Galisteo Community Corporation
Address	General Delivery Galisteo, NM
Contact	Rod Hall
Telephone	(505) 988-5375

Funded By	Community Action Program, CETA, Local Fundraising
Cost	$23,000 materials Labor paid through CETA
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Project Verde

Organization	La Cooperacion y la Clinica del Pueblo
Address	Box 104 Tierra Amarilla, NM 87575
Contact	Valentina Valdez
Telephone	(505) 588-7601

Funded By	Donations, Fees (clinic), grants (seed $)
Cost	
Congressional District	II
Compilation Date	February 1980

First formed in 1969, La Cooperacion y La Clinica del Pueblo represents the efforts of a group of community individuals to redevelop the rural life and agriculture-based economy of the high mountain areas of northern New Mexico.

The people of La Cooperacion feel it is important to short-circuit the flow outside the region of cash and goods. The community must develop tools and know-how to feed and provide for themselves when possible, and to sell extra products for cash. Solar-heated greenhouses and growing frames are seen as holding great potential for production of fresh vegetables in this region and for improving the diets and health of area residents at very low cash costs to consumers. Low-cost protein sources such as eggs and poultry are also being considered.

Project Verde was begun to couple the building of several greenhouses and growing frames in the area with the possible development of a producers' marketing network that would emphasize local food sales.

The intention is to find local, established gardeners who will use a growing frame or a greenhouse to bolster their food production. If they choose a greenhouse, as two families already have, they also get a cheap source of home heating. Participating families provide the labor for construction, some of the materials, and some of the cash. A demonstration greenhouse and growing frame on the grounds the Cooperacion serve to develop growing skills and plant varieties appropriate to the area. As experience and ability accumulate, extra produce can be marketed locally and inexpensive fresh food can be sold at local markets.

La Cooperacion also wants to develop other inexpensive solar options for house and water heating, extending and improving local egg production. starting tree farms for reforesta-

tion projects, and planting varieties of apple trees that can produce in the harsh mountain climate.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Publications Program

Organization	New Mexico Solar Energy Association
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Michael Shepard
Telephone	(505) 983-1006

Funded By	Sales
Cost	n/a
Congressional District	I
Compilation Date	February 1980

The Publications Program publishes the Southwest Bulletin*(a nationally respected compendium of articles, research reports, news items, and how-to-do-it instructions for interested laymen), as well as construction and design manuals, conference proceedings, short courses, and fact sheets. This program transmits the experience of other staff members, NMSEA members, and other solar practitioners to the general public.

The Southwest Bulletin, now in its 4th year, has published articles on subjects ranging from economics and net energy, to comparisons of different building materials and solar systems, to reports on grassroots solar activity in the state. NMSEA's membership has grown from 55 to 2, 00, spanning all 50 states and 55 foreign countries.

To date, the Publications Program has also published "How to Build A Solar Crop Dryer," "A Window-Mounted Solar Collector," "A Thermal Storage Wall Design Manual," "Grassroots Technology Transfer Manual," and various hand-outs. The crew is currently working on Greenhouse Blueprints. Last, the crew supplies graphics-related support to the rest of the programs and has helped on displays and the like. The sales of NMSEA Publications and slides has contributed roughly $50,000 to the NMSEA budget for 1979.

ɔon to be called The Sunpapers.

Renewable Resources— A National Catalog of Model Projects

Category	Community
State	NM
Project Name	San Miguel Solar Demonstration Projects
Organization	Centro Comunal de Agua Negra
Address	P.O. Box 219 Cleveland, NM 87715
Contact	Ida Sandoval
Telephone	(505) 387-2969
Funded By	The Presbyterian Church
Cost	$50,000
Congressional District	II
Compilation Date	February 1980

In the early 1970s, several residents conceived the idea of a community learning model utilizing the advantages of appropriate technology. It was felt that if appropriate technology applications were to affect the consciousness of the community, there was a need to: conduct demonstration projects in the small towns of Northern New Mexico; affect the consciousness of children through educational programs in the schools; teach appropriate technology courses at the university level; initiate training programs for vocational-technical schools; develop a rural demonstration program; demonstrate the advantages of appropriate technology by building solar greenhouses and other hardware on the homes of local interested residents; disseminate information about appropriate technology.

In 1974, with the help of Bill Yanda's Solar Sustenance Project, local residents constructed demonstration solar greenhouses in Las Vegas and Anton Chico. Later that year, a contract was let to do a demonstration training program at Luna Technical Vocational Institute; 15 trainees were trained in solar greenhouse technology and later retrofitted a 12' x 40' solar greenhouse on the vocational agriculture building.

In 1975, contact was made with El Centro Cultural Comunal de Agua Negra, an organization of farmers and ranchers on the Agua Negra irrigation ditch in Mora County, New Mexico, about doing a solar demonstration project.

El Centro's objectives include maintaining the self-sufficient farming and ranching lifestyle that has been passed down for hundreds of years; using a "nuclear family" concept to accomplish common objectives of a group; preserving self-determination by including all members in decision-making; utilizing appropriate technology to maintain their lifestyle; organizing around the oldest established institutions (the irrigation ditch district and the

church); and maintaining the integrity of Ditch District, whose decentralized decision-making organization has been in existence since feudal times.

The Presbyterian Church funded a two-ıse/two-year project. The first phase ($30,000) was to accomplish the first-year goal of constructing ten attached solar greenhouses and ten solar food dryers. The second phase ($20,000) involved the construction of three large (30' x 60') family greenhouses.

Organization for the demonstration project followed a four-part collective design. First, the analysis, design, and developmental stages were contracted out to technical experts. Second, a community coordinator acted as the link between technical assistants and the community. Third, ten families were paid for their participation in the program. Fourth, a crew leader and three construction workers were to be paid for construction of the hardware.

Technicians were contracted to perform a functional analysis of the project. The developmental phase involved choosing recipients of hardware, as well as preliminary training of the construction crew and participants. The participants were taken out of their communities on a field trip to other communities to see solar hardware applications.

Social events and bi-lingual orientation sessions were held as a method of getting families together to work toward a common goal.

Using a three-dimensional graphic design, the construction crew and participants con-ructed one greenhouse and a food dryer with chnical assistance. After that, the crew pervised its own work on all other sites. The local high school Industrial Arts Shop was used for prefabricating many components.

A local horticulturist was hired under contract to teach greenhouse management to the participants.

Construction of 10 greenhouses and food dryers took four months. Periodic follow-up has helped participants with any problems that have arisen.

Critique/analysis: Ten greenhouses built in 1977 have resulted in the construction of approximately thirty more greenhouses, including three large greenhouses in the second year of the project. Greenhouse participants have lowered their heating bills by as much as 50 percent.

The construction crew now has a marketable skill and can provide technical expertise to people who want to build solar greenhouses. El Centro Cultural Comunal de Agua Negra demonstrates to other small rural communities that appropriate technology applications are a viable means of reducing today's high food and energy costs.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Solar Greenhouse, Convective Air Collector and Trombe Wall Retrofits
Organization	Coyote Canyon Rehabilitation Center
Address	Box 158 Coyote Canyon Trading Post Brim Hall, NM 87310
Contact	Matt McCue
Telephone	(505) 735-2261
Funded By	BIA, DOE
Cost	$1,400 - Greenhouse $3,961.33 - Convective Air/Trombe Walls
Congressional District	I
Compilation Date	February 1980

The Coyote Canyon Rehabilitation Center, a center for teaching mentally retarded Navajo youths how to live and work effectively, is employing passive solar retrofits on their central building. The purpose of solar retrofits is to cut down operating expenses by reducing heating needs, to provide an activity for the clients, and to provide solar demonstrations for Navajos elsewhere on the reservation, which is near Gallup.

The 10' x 28' greenhouse was built in February of 1979 in a workshop conducted by NMSEA. The convection air collector and trombe wall were scheduled for construction in December of 1979 in similar workshops. These types of retrofits are not as well known as solar greenhouses, so the demonstrations are badly needed. The convective air collector and Trombe Wall retrofits will be built onto 80 feet of south-facing wall (on both sides of the greenhouse), a portion of which is made of sandstone. The sandstone parts will become a Trombe wall, and the rest of the wall (a typical insulated frame wall) will be turned into convective air collector sections. Calculations done by the New Mexico Solar Energy Association show that these solar components should provide 15 to 22 percent of the total heating load of the large building.

Critique/analysis: So far the projects seem uccessful. Clients participated in all phases f greenhouse construction and operation, and hey seem excited about the upcoming project. Additionally, the project has spurred excitement about solar energy in nearby Navajo settlements and will continue to catalyze the rapid adoption of low-cost passive solar technologies in the area.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Southwest Border Region Solar Demonstration Project

In early 1979, through funding from the Southwest Border Commission, the Nex Mexico Solar Energy Institute administered a project to bring low-cost residential solar retrofits to low-income people of the five New Mexico border counties (Otero, Dona Ana, Luna, Hidalgo, and Grant) through the efforts of three sub-contractors: The Dona Ana Solar Energy Society, Tierra del Sol, and the Public Housing Authority of Las Cruces.

The Dona Ana Solar Energy Society, working with its affiliate NMSEA, conducted 15 workshops in the five counties during 1979. These workshops covered the construction of Trombe Wall retrofits, solar water heaters, and window-box collectors. Tierra del Sol (a non-profit corporation specializing in low-income rural housing) has been instrumental in teaching low-income homeowners about solar retrofits. The Public Housing Authority of Las Cruces has been working on performance evaluations of structures built through the project.

Critique/analysis: This on-going project has so far seemed overwhelmingly successful. Perhaps most exciting is the cooperative involvement of three diverse organizations in the southern part of the state and the tremendous spin-off that involvement will engender.

Organization	New Mexico Solar Energy Institute
Address	P.O. Box 3 SOL La Cruces, NM 88003
Contact	David Miller
Telephone	(505) 867-2385
Funded By	Southwest Border Commission
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Technical Assistance Program

The Technical Assistance Program crew provides information for all design assistance and technical information requests, with emphasis on energy systems that can be constructed from common "backyard" materials. This crew also maintains and updates a resource library that includes papers and books on heat transfer, current research, solar energy applications, climatological data, resource allocation and conservation, agriculture, land use, renewable sources of energy, and policy. The crew offers assistance through consultations at the office and over the phone, bi-weekly design critiques, legislative assistance, and public speaking. The results of this service can be seen in many ways.

Community response is enthusiastic. The information center receives 3,900 visitors a year and over 30 phone calls a day. The mail brings 280 queries monthly. In the past two years the NMSEA staff has grown from three to nineteen in order to meet the demand for information.

Building starts are up. In June of 1976, 40 solar homes were documented in New Mexico. In June of 1977, the NMSEA had 250 citations on file, a conservative estimate of the actual number throughout the state. (There are 170 solar homes in Taos alone.)

Public awareness has increased markedly. The most commonly asked question in 1976 was hat is the difference between active and passive systems?" The current most commonly asked question is on the availability of glazing materials, reflecting a major shift from questioning to practicing.

Loans for solar homes are growing more numerous. Local bankers send solar plans to the NMSEA for feasibility reviews. Consequently, the number of successful solar home loan applications at one bank in Santa Fe totaled 17

Organization	New Mexico Solar Energy Association
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Randy Sweat Ellen Morris
Telephone	(505) 983-1006

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

in December of 1978.

Pro-solar legislation is also being enacted. The New Mexico state tax credit has now been joined by a landmark "solar rights" bill. This law was the subject of the NMSEA's recent Solar Rights Symposium, in which legislators, planners and representatives of the state and the NMESA considered the law's implications, possible shortcomings, and implementation.

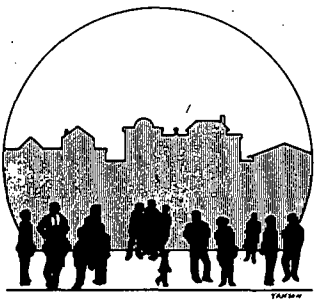
Renewable Resources—A National Catalog of Model Projects

Category	Community
State	NM
Project Name	Technical Back-Up Program

A recent spin-off from the Technical Assistance Program, this program ensures the quality of NMSEA's work by supplying information, updates, and technical support to the rest of the staff. To serve this function, a staff crew has begun doing applied research and testing on various low-cost solar systems. The information generated will be used to produce educational materials the NMSEA can sell, as well as to help the staff in their work.

To date, the crew has installed an active hot water system on the NMSEA office building, drawn up plans for two convective air loop collectors to be retrofitted on the office, and performed most of the research and writing of NMSEA's recent publication.

Organization	New Mexico Solar Energy Association
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Bristol Stickney
Telephone	(505) 983-1006
Funded By	Research Grants, Donations
Cost	$35,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category Community

State NM

Project Name Workshop Program

The Workshop Crews (consisting of one NMSEA staff member and three VISTA volunteers) help community groups organize public demonstration construction workshops at low-income sites (homes as well as schools and other institutions). At these workshops, low-cost, passive retrofits--such as greenhouses, thermal storage walls, water heaters and crop dryers--are built.

The procedure generally followed begins with crew members' choice of a site, a choice based on community requests and such factors as good visibility and solar orientation. They then design the retrofit and draw up a materials list. The recipient of the workshop is responsible for purchasing materials and preparing the site for the workshop, as well as publicizing the event. The workshop itself usually lasts 2.5 days, with a slide show and the actual construction done like a barnraiser with 10 to 50 people. To date, the crew has done more than 55 such workshops around the state. Each has an approximate spinoff of 10 new solar construction starts in the surrounding community.

This program is also expanding to include training construction workshops that will be run for a specific audience (vs. the general public) and will be more extensive in scope.

Organization New Mexico Solar Energy Association

Address P.O. Box 2004
Santa Fe, NM 87501

Contact Anne Cicero

Telephone (505) 983-1006

Funded By ACTION/VISTA
NMSEA General Funds
Training Fees

Cost $45,000 for crew

Congressional District I

Compilation Date February 1980

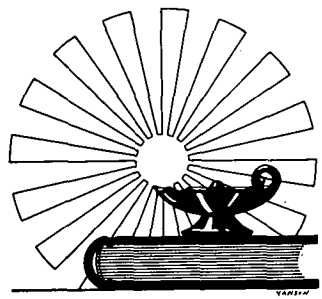
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Adult Education Classes & Workshops
Organization	Ghost Ranch Conference Center
Address	Abiquiu, NM 87510
Contact	Aubrey Owen
Telephone	(505) 685-4333
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

In 1955, the Ghost Ranch lands were donated to the United Presbyterian Church, which has since transformed the ranch into a versatile conference, demonstration, and adult-education center. With a staff of eight, it is supported approximately 80 percent through room, board, and tuition fees, and the rest through donations.

Ghost Ranch serves as a national education center for people of all faiths from all over the country. The ranch also serves the northern New Mexico community around it via a variety of community projects. Located in a high desert climate, the area has a rural population, generally money-poor and tied to a land that offers a substantial living to few. Its centuries-old cultural traditions of independence and family-land ties have become increasingly economically fragile.

Ghost Ranch is clearly a center for solar activity in the region. Besides classes, farm, and demonstration center, the Ranch hosts the annual Life Technics Conference, sponsored by the New Mexico Solar Energy Association, which brings together researchers, practitioners, and the inquisitive from the region to address regional environmental energy and economic problems. This conference has long been an important vehicle for the solar community to share, debate, and generate new advances and applications in the appropriate technology field.



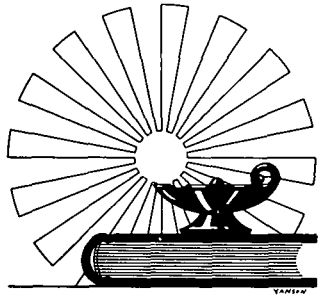
Renewable Resources— A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Community Solar Cooperative Project
Organization	New Mexico Solar Energy Association "Youthworks"
Address	P.O. Box 2004 Santa Fe, NM 87501
Contact	Michael Coca
Telephone	(505) 983-1006
Funded By	Dept. of Labor Subcontract through Youthworks, Inc.
Cost	$185,000
Congressional District	I
Compilation Date	February 1980

The overall goals of the Community Solar Cooperative, an ongoing project that started in June of 1979, are to provide solar technology training and management experiences for 30 to 35 Santa Fe youth to enable them to manage solar products and service businesses (or independent contractors); to work as existing licensed contractors or to become students pursuing a higher degree in the same general area. The Santa Fe Public School system (through its Vo-tech facility and staff) is a major sub-contractor. The students are individually instructed with a programmed sequence curriculum. The training program covers solar theory and fundamentals, retrofit options (including hydronics), space heating (design and construction/installation), and a review of the economic and legal aspects of such business/personal undertakings. The interdependent curriculum includes business, management, accounting, and math courses. Students who are on a stipend (minimum wage) study from 3:00 to 5:00, Monday-Friday, under the guidance of two instructors who explain material, conduct seminars, counsel students, and evaluate daily student progress.

Instructional sequences utilize a variety of media: book and manual readings, seminars, handouts, exercises, film strips, and the design and construction of small models that exemplify solar principles. Field trips to local solar sites give students a sense of the validity and relevance of their training studies.

The program uses an individualized approach that assumes that the skill level, and needs and goals of every entrant are different. Each student proceeds at his/her own pace through the program components: outreach, recruitment, certification, orientation, program operation, placement and follow-up.



Placement and follow-up involve helping students set objectives and find a job in one of the four employment areas stressed. At regular intervals, efforts are made to determine congruency of the student's "exit plan" and objectives.

Objectives of the Community Solar Cooperative training program are multi-dimensional. Cooperative management is a major goal of the program; throughout the program, students will be phased into ever greater levels of self-management and responsibility. The program is designed not only to train youth, but also to create positive self-concepts in chronically unemployed, low-income youths. It is hoped that insights into the problems attendant to youth employment and training success will grow out of this program too.

Renewable Resources—A National Catalog of Model Projects

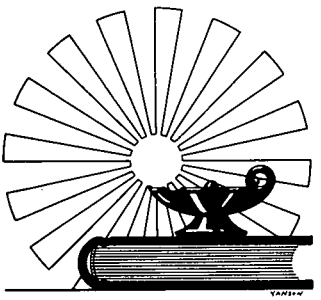
Category	Education
State	NM
Project Name	4-H Energy Conservation
Organization	Cooperative Extension Service/New Mexico State University
Address	105 5th Street Albuquerque, NM 87102
Contact	John Loll
Telephone	(505) 243-1386
Funded By	U.S. Dept. of Agric. County Governments State of New Mexico
Cost	$18,000/2 years
Congressional District	I
Compilation Date	February 1980

Funded in 1977, this two-year educational project was directed at the youth in rural and urban communities. (4-H involves kids between the ages 9-19, including Boy Scouts and school youth groups.) The New Mexico Solar Energy Association's manuals on the crop dryer and on window box collectors were used in construction workshops at which these systems were built. The NMSEA staff helped with the workshops.

About 20 crop dryers and six window box collectors have been built on people's initiative to date. Over 200 4-H meetings on energy have been held.

The main result of this program is the heightening of awareness of energy and its issues created in New Mexico's youth, tomorrow's problem-solvers. Many parents and 4-H leaders were also affected, and have requested additional information on solar systems. This project reached an estimated 6,000 residents.

Critique/analysis: The chief strength of the project was the use of the existing Extension network, which meant that the projects reflected the actual needs and conditions of the people involved.



Renewable Resources—A National Catalog of Model Projects

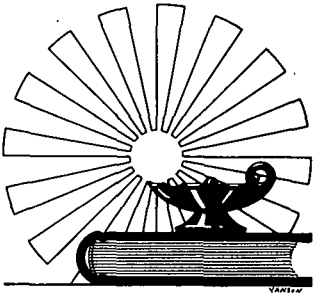
Category	Education
State	NM
Project Name	Home Weatherization Project

This two-year Home Weatherization Project, funded in 1977, had two parts. One was research and development in solar cooking. It consisted of an extensive study done at New Mexico State University in the safety of solar cooking in terms of its effect on the food being prepared. The second part involved using the home economist in each county office, an additional half-time home economist for this weatherization project, as well as home economic groups and/or clubs, to distribute information on weatherization, insulation, heat loss, landscaping to all who requested it. Classes were held on food preservation and solar crop drying. The project has reached over 15,000 people, many on a one-to-one basis, over the two years (three times the original objective of the program) and an estimated 40 percent of the homemakers have weatherized their homes.

Critique/analysis: The main strength of the project was the use of the existing Extension network, which meant that the project reflected the actual needs and conditions of the people in different communities.

Organization	Cooperative Extension Service/New Mexico State University
Address	105 5th Street Albuquerque, NM 87102
Contact	John Loll
Telephone	(505) 243-1386

Funded By	U.S. Dept. of Agric. County Governments State of New Mexico
Cost	$28,000/2 years
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

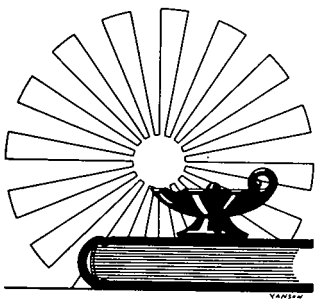
Category	Education
State	NM
Project Name	Laguna Pueblo Solar Demonstration Project & Tawa Bahanne Solar Education Project
Organization	National Indian Yo Council (NIYC)
Address	Native Amer. Approp. Tech. Action Council 203 Hermosa, N.E. Albuquerque, NM 87108
Contact	Rudy Poleahla or George Gorosbe
Telephone	(505) 268-6739
Funded By	CETA and DOE
Cost	$13,500 $10,867
Congressional District	I & II
Compilation Date	February 1980

The NIYC/Native American Appropriate Technology Action Council (NAATAC) took form during the summer of 1978 when National Indian Youth Council staff members sensed the immediate need for a resource and communications network among Indians with interests in or needs for appropriate technology.

Under the sponsorship of NIYC-CETA staff, NAATAC's first meeting was a three-day appropriate technology conference that featured talks, reports of ongoing projects, demonstrations, and discussion groups. In New Mexico, this conference resulted in the development of the Laguna Pueblo Solar Demonstration Project and the Tawa Bahanne Solar Education Project.

The purpose of this first project, conducted in the fall of 1978, was to demonstrate the feasibility and practicality of using solar retrofit devices in rural Native American villages. The project covered two phases--training and construction. Native American CETA workers received both classroom and on-the-job training to develop skills in solar construction and design techniques. They then constructed a 44' x 10' solar greenhouse on a preschool, and several batch water heaters on residences that previously had no hot water. The greenhouse was unique in design--bottom vents all along the perimeter, skylight vents with heat motors, front heat storage, and a self-irrigation mechanism. Workers also learned greenhouse management.

The Tawa Bahanne Solar Education Project began operation in September of 1979. It offers a training program for rural Native Americans in the design, construction, and



construction of solar ovens, solar water heaters, greenhouses, and Trombe walls. The program stresses community participation and the sharing of learned skills within the community. As an outreach/educational program, it aims to develop an interest among rural Indians in the applications of low technology based on solar energy principles.

Renewable Resources— A National Catalog of Model Projects

Category	Education
State	NM
Project Name	National Solar Greenhouse Workshop Training Program (SST)

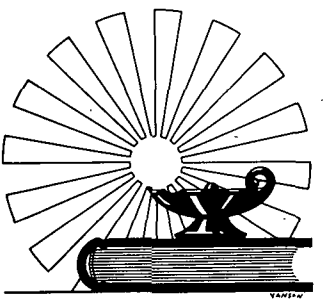
The Solar Sustenance Team is a private, non-profit organization incorporated in 1974 by Bill and Susan Yanda and others. Responsible for starting solar greenhouse workshops in New Mexico that were eventually taken over by the New Mexico Solar Energy Association, the group has been one of the country's principal proponents of attached solar greenhouses.

In the National Solar Greenhouse Workshop Training Program (SST), funded by DOE through the New Mexico Energy Extension Service, twenty teams from all over the country learned how to lead solar greenhouse workshops. The teams, trained over six months, were composed of three or four people representing diverse organizations, from non-profit community groups to state weatherization agencies. The training process involved attending one of two 3.5-day seminars held in New Mexico, and then returning home to conduct at least one community solar greenhouse workshop. Members of SST attended and helped with the coordination of the first such workshop for each team. The workshop content included technical data and theory, solar applications, and information on how to hold a workshop.

Within six months, 175 attached solar greenhouses had been built by groups trained by SST and 1,500 people in over 20 states had been exposed to solar greenhouse technology through lectures and slide shows by the trained groups. Based on work SST did in 1975-76, which resulted in the construction of 11 greenhouses per demonstration workshop, it is probable that over 1,000 greenhouses have been built so far as a result of this project.

Organization	Solar Sustenance Team
Address	Box 733 El Rito, NM 87530
Contact	Leslie Davis
Telephone	(505) 581-4454

Funded By	DOE, through the NM Energy Ext. Service
Cost	$68,000
Congressional District	II
Compilation Date	February 1980



While the project ended in March of 1979, trained teams are still training others. Even more important is the fact that this project took a technology that had previously existed primarily in the Southwest and applied it in diverse geographical areas and climatic zones, clearly demonstrating the tremendous adaptability and national potential of attached solar greenhouses.

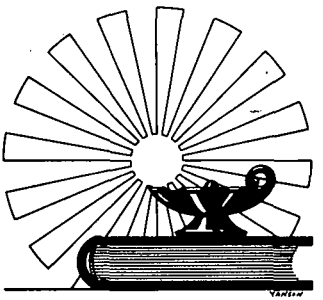
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	NM
Project Name	New Mexico Solar Greenhouse Study
Organization	Morris, Reiniger Associates
Address	Rt. 1, Box 108 D Santa Fe, NM 87501
Contact	Scott Morris Clair Reiniger
Telephone	(505) 455-2645
Funded By	Office of Technology Assessment
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Through funding from the Office of Technology Assessment, Scott Morris and Clair Reiniger conducted during 1979 a comprehensive and useful solar survey. Since the early 1970s, between one and two thousand solar greenhouses have been built around the state. These structures are providing both food and heat to thousands of people. Until recently, however, little was known about how successful these greenhouses are.

In the study, several hundred solar greenhouse owners were interviewed and the results of those interviews compiled in useful form. Actual data now exist on average solar greenhouse costs, heat production, performance under different conditions, etc. The study concludes that as a heating system, an average attached solar greenhouse has a payback period of five to ten years.

Along with the survey analyses, a great deal of additional information is presented in the 150-page study: a history of solar greenhouses in New Mexico, a discussion of attached solar greenhouse technology, economic analysis of solar greenhouses relative to heat production, net energy analysis, legal and public policy issues, and a discussion of community workshops as a way of furthering the use of solar greenhouses. The study provides a very useful model for other states not as far along with solar greenhouse utilization, as well as a totally convincing argument in favor of this type of passive solar energy system.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Passive Design Research

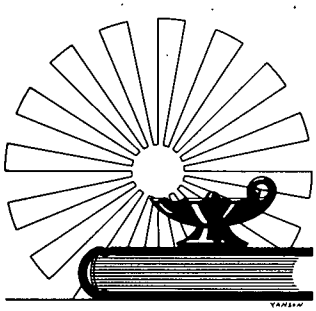
Los Alamos Scientific Laboratories (LASL) started a Passive Research program in 1973, the first national laboratory to recognize the need for information on passive design performance.

The staff of 27 conducts research on a range of passive design techniques using both computer simulations and experimental data. The data comes from test cells at the Laboratory and from existing buildings being monitored--many in New Mexico. Staff members are comparing computer simulations with actual field data to come up with simple design rules for the general public. However, the research most directly benefits the building industry--architects, builders, designers, and homeowners.

LASL distributes the information mainly by publishing papers in various journals (such as the NMSEA's Southwest Bulletin) and conference proceedings. Information published is free. "A Comprehensive Passive Solar Design Handbook," soon to be published by DOE, contains a compilation of all the design information produced by the group and should be an invaluable reference on the subject.

The LASL has provided sound technical backup for grassroots citizens' educational efforts (such as the New Mexico Solar Energy Association) as well as government programs (such as the New Mexico tax rebate system). The utilization of a new technology such as passive design rests -- the combined efforts of many different sec- of society, and the Laboratory's involve- in this area reflects this reality.

Organization	Los Alamos Scientific Laboratories - Solar Group Q-11
Address	MS 571, LASL, P.O. Box 1663 Los Alamos, NM 87545
Contact	Don Neeper
Telephone	(505) 667-2242
Funded By	DOE, Office of Solar Applications
Cost	$1,000,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

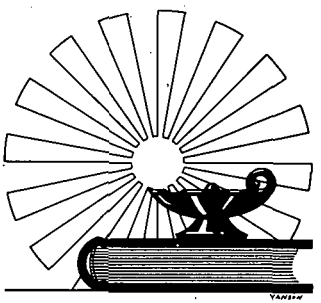
Category	Education
State	NM
Project Name	Passive Solar Adobe Design and Construction Classes

In a week-long workshop, participants learn passive solar design principles, particularly as applied to adobe construction. Adobe, an inexpensive, locally available and indigenous material, is ideally suited to solar home construction. Learning about its use is, to many, at least as important as learning about solar.

The workshops are held in New Mexico, Arizona, and other nearby states by one or several members of a team consisting of: Quentin Wilson and Associates, a solar design and consulting team; Earthbuilders School, affiliated with the monthly Adobe News; and an associated group of specialists that come together as needed. The cost to the participants ranges from $25 for a week-long workshop at Ghost Ranch, to between $150 and $195 at other locations. Similar 4 to 8-week classes are conducted through local community colleges.

The effect has been substantial. Twenty to fifty percent of the participants are either building or will be building passive solar homes. They will take the knowledge home to areas where the technology is still not known or trusted.

Organization	Quentin Wilson & Earthbuilders of Adobe News
Address	Rt. 2, Box 46 La Madera, NM 87539
Contact	Quentin Wilson
Telephone	(505) 583-2356
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

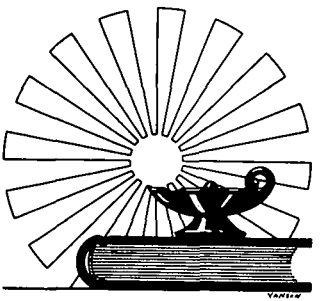
Category	Education
State	NM
Project Name	Sch. of Arch & Planning Dept. of Mech. Engin. College of Engineering
Organization	University of New Mexico
Address	University Hill, NE Albuquerque, NM 87131
Contact	M. Hoppenfeld (505)277-2903
Telephone	W. Baker (505)277-2605 W. Gross (505)277-5521
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

In the fall of 1979 the University of New Mexico School of Architecture and Planning initiated a program of classes in solar architecture at the graduate level. The curriculum is being evaluated and revised during the first year so that a comprehensive series of courses on solar design and design applications of appropriate technology can be offered. The courses take advantage of New Mexico's numerous appropriate technology resources, using guest lectureres and making site visits to existing solar structures, etc.

The University of New Mexico Department of Mechanical Engineering conducts courses for non-engineering majors. One of these courses, Solar Energy Use, familiarizes students with solar theory and design. Approximately 100 students have attended this course every semester since its inception several years ago. This course also partially fills requirements for an energy certificate offered by the Masters of Public Administration program at the University of New Mexico.

The College of Engineering sponsors the Village Technology Program, with funding assistance from the Methodist and Episcopal Churches. The Village Technology Program provides education and information. It also develops appropriate technology devices and other systems useful in New Mexico and in other arid lands around the world. The project was developed on the basis of student and faculty interest in [illegible]opriate technologies: windmills, pedal po[illegible] devices, solar cookers, collectors, heat [illegible]s, and others. Recycled materials are used extensively.

The project, based primarily at Ghost Ranch in northern New Mexico, is open to students, teachers, and anyone interested in contributing ideas, time, money, etc., to demonstrating such technologies.

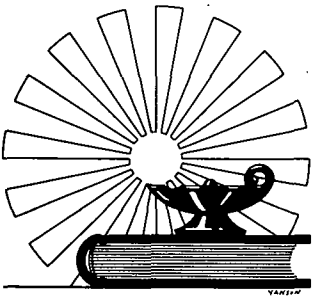


Renewable Resources—A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Solar Adobe Drying Project
Organization	Solar Adobe Drying Project
Address	Espanola, NM 87532
Contact	Carolyn & Ralph Rivera (505) 753-4628
Telephone	Harold Martinez (505) 753-7181
Funded By	S.E.R.I.; H.E.L.P., National Farmworkers' Association
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Begun in the fall of 1978, the Solar Adobe Drying Project, an ongoing project being monitored by the Riveras, is investigating the use of solar energy to dry adobe bricks year-round and to prevent freezing of the bricks in the winter. The Solar Energy Research Institute of Golden, Colorado, assisted with the initial design, which incorporates direct gain passive solar energy. Since completion, the large solar-heated room has been operating as a successful prototype. The building is open to the public and has served as a great demonstration of this innovative use of solar energy and of basic passive solar principles. People have come from all over the country and world to visit the project and to learn to apply the concept elsewhere.

Although the project is quite successful, a few problems related to having a number of agencies involved in decision-making arose. It was felt that the project could have moved more rapidly if it had been operated as a business all along, with direct lines of communication and decision-making. This aside, the project will no doubt spawn much additional work on low-grade solar energy applications.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Solar and Adobe Construction Training Project

The Governing Board of the Eight Northern Indian Pueblos Council has developed a Vocational Education Program with three skill-training components, one of which focuses on solar energy. In the first project year, which began in September of 1979, twenty-four construction workers will develop marketable job skills in the areas of solar and adobe construction techniques and the application of passive solar and energy-efficient designs to existing housing.

Beyond increasing employment skills of youth, each Pueblo will be able to reduce energy costs to the members of its community by utilizing alternative energy sources and solar retrofit designs on existing housing. The trainees will all be from the Pueblos and will be learning construction techniques using materials and principles that are culturally and historically appropriate.

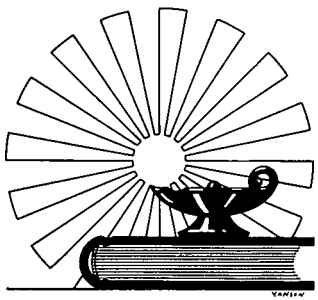
The Solar and Adobe Construction Training activities are divided into two sections--On-the Job Training (OJT) Instruction and the OJT Work Experience.

OJT instruction will total 260 hours. Course content covers basic theories and concepts of solar energy; solar collection, storage and distribution systems; passive and active solar designs; seasonal variation of the sun; solar house orientation; greenhouses; window boxes; trombe walls; hot water heater; photovoltaic cells; adobe characteristics; adobe construction designs; and retrofitting r designs to adobe houses.

Additional classroom instruction will be provided on an "as needed" basis by the Indian Action Program. It will cover plumbing, electricity, and carpentry, and will be oriented to adobe construction.

OJT work experience for this project will fall into two areas: Adobe Contruction Techniques and Passive Solar Techniques.

Organization	Eight Northern Indian Pueblos Council (ENIPC)
Address	P.O. Box 969 San Juan Pueblo, NM 87566
Contact	Bernie Teba
Telephone	(505) 862-4265
Funded By	HEW - Vocational Education Act
Cost	$70,000
Congressional District	II
Compilation Date	February 1980



Adobe Construction Techniques will be linked with the ENIPC Research and Demonstration Project on the thermal characteristics of adobe bricks. The research and development (R&D) project, funded by Department of Energy, CSA, and the N.M. Department of Energy and Minerals, will construct ten adobe test units beginning the summer of 1979. This experience will relate to the making of stabilized and unstabilized adobes. The trainees will be supervised by engineers from the Los Alamos Scientific Laboratories and the R & D architects.

Passive Solar Construction Techniques will be specifically linked to the building of solar greenhouses, solar trombe walls, and solar hot water heaters. This construction experience will take place at each of the Eight Northern Pueblos on a community building, such as a tribal administrative office. Workshops will involve actual construction of a greenhouse in two days, and will include other community members as well as the trainees.

Trainees will help construct at least four greenhouses and four trombe walls. The Solar/Adobe Instructor will supervise the projects directly, with consultation and assistance from the Solar Sustenance Project and the N.M. Solar Energy Association.

The initial construction and retrofitting of the greenhouses and trombe walls at each of the Pueblos will be geared towards the whole community's participation in and awareness of the project. It is expected that requests for additional greenhouses and trombe walls will be generated by this project, providing the trainees with additional experience and employment.

Renewable Resources—A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Solar and Appropriate Technology Workshops
Organization	Ghost Ranch Conference Center
Address	Abiquiu, NM 87510
Contact	Aubrey Owen
Telephone	(505) 685-4333
Funded By	Fees
Cost	$425/January term
Congressional District	I
Compilation Date	February 1980

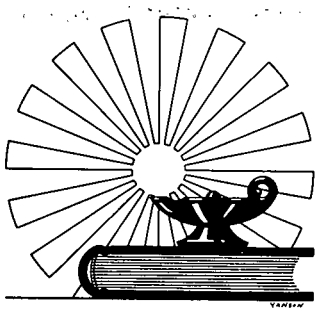
The Ghost Ranch Conference Center takes advantage of its natural setting and solarized facilities to get the solar word out in a more formalized, educational format via classes and workshops.

For $425 (including room and board) college students can attend Workshops for credit in January. (A few scholarships are always reserved for area students.)

Students get four weeks of intensive training and exposure to solar principles and design, studying the Ranch's solar projects. They build different models of solar collectors and compare them for ease of construction, cost, and efficiency. They go to the Los Alamos Laboratories and solar homes and installations in the area.

The program also includes a visit to nearby ancient Pueblo cliff dwellings. These ruins carefully incorporated passive into the design and construction of whole settlements of buildings, the exact principles of design that are now used in modern solar homes.

Also, every summer the Ranch plays host to thousands from all over the country, who come to hike its trails and study everything from archeology to pottery to current social issues. In the past, these summer sessions have included a class on energy and ethics, and one on solar principles and adobe construction. The solar class is an unusual opportunity for a non-professional, non-student to learn solar energy design and construction techniques. Participants spend time both in classroom theory work and in actually building solar applications on the Ranch.



Renewable Resources— A National Catalog of Model Projects

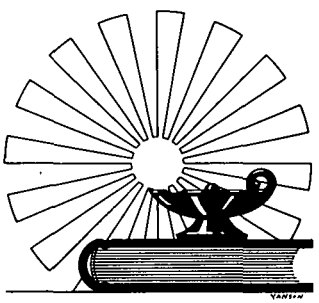
Category	Education
State	NM
Project Name	Solar Design Assistance

The Design and Planning Assistance Center (DPAC) was formed in 1969 by the University of New Mexico School of Architecture to provide some architectural design services to low-income families and community groups around New Mexico. These services include design assistance, feasibility studies, preliminary architectural plans, building evaluations, planning, and related technical assistance. When contacted, DPAC works with clients to identify their needs. Where appropriate, passive solar design features and retrofits are incorporated into the design plans, consisting mostly of retrofits such as trombe walls, greenhouses, and hot-air convection systems. The staff draws from the New Mexico Solar Energy Association, University of New Mexico, and other specialists for assistance in solar design accessible to communities that want to incorporate it.

Since its inception, DPAC has grown to a staff of more than ten, including both VISTAs and architectural students. The advisory board consists of twenty people from around the State - 50 percent are professional/technical people, and 50 percent are former clients and community representatives.

Critique/analysis: An Annual Report is available, providing detailed information on the range of projects and services provided through DPAC. "The success of the project is hard to estimate. Essentially, the service is a technical one and its success often depends on external factors, such as a group's ability to obtain funds for the building project. We do reach many people who would otherwise not get help."

Organization	University of New Mexico School of Architecture
Address	120 Yale, S.E. Albuquerque, NM 87106
Contact	Ed Norris
Telephone	(505) 277-3806
Funded By	Univ. of New Mexico VISTA, Donations
Cost	$45,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

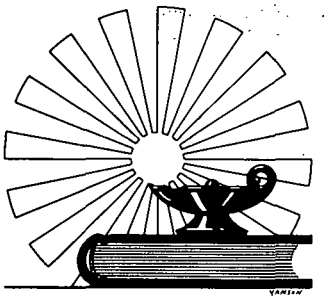
Category	Education
State	NM
Project Name	Sundwellings Demonstration Center
Organization	Ghost Ranch Conference Center
Address	Abiquiu, NM 87510
Contact	Aubrey Owen
Telephone	(505) 685-4333
Funded By	Four Corners Regional Commission, CETA , Ghost Ranch
Cost	
Congressional District	I
Compilation Date	February 1980

The Sundwellings are four identically-sized buildings; three have passive solar heating, and one is a control unit. It provides the only opportunity in the region to compare functioning solar systems side-by-side. Funded in 1974 by the Four Corners Regional Commission, a technical team of local architects, engineers and members of the New Mexico Solar Energy Association met for over two years and came up with plans for four 20' x 40' dormitory units. The design goals were to respect traditional New Mexico building techniques; use locally-available, low-energy-use, indigenous materials; and involve non-professional, owner-builders in construction.

Each building has the same south orientation and is hewn from the same materials. One is heated by a trombe wall, one by an attached greenhouse, and the third by direct gain through south-facing windows. Temperature-sensing instruments and separate meters for the back-up heaters were installed as the units were constructed.

Ghost Ranch estimates that 70 to 80 percent of the winter heat requirements are supplied by the solar systems.

Thermal performance is monitored by the Los Alamos Scientific Laboratories, and the performance data is used in the design of passive solar systems.



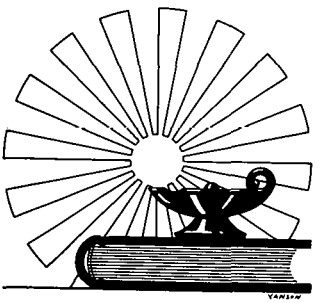
Renewable Resources— A National Catalog of Model Projects

Category	Education
State	NM
Project Name	Various Projects Studying Native Americans & Appro. Tech.
Organization	Clair Reiniger
Address	Rt. 1 Box 108 D Santa Fe, NM 87501
Contact	Clair Reiniger
Telephone	(505) 455-2645
Funded By	Syracuse Res. Corp., Nat. Endow for Arts, Rockefeller Foun., Mott Foun., Center for Community Change
Cost	n/a
Congressional District	I
Compilation Date	February 1980

From April 1976 through June 1978, Clair Reiniger worked on the Navajo Reservation in New Mexico and Arizona assessing Navajo housing problems and needs. Solar energy was an important focus of this work and her suggestions have been incorporated through passive solar buildings built on the Reservation over the past few years. Results and conclusions of this project have been published in the NMSEA Southwest Bulletin (October 1978) and in a report, Navajo Housing: Environment in Transition (June, 1978).

From January 1979 through November 1979, Ms. Reiniger conducted a national survey on how appropriate technologies are being used by Native Americans. This project, funded by the Syracuse Research Corporation, resulted in several articles and an in-depth report, "Native Americans and Appropriate Technology: Notes On The Present State of the Art" (October, 1979). The information provides a very useful frame of reference for appropriate technology projects on reservations around the country. It should demonstrate to Native American groups the tremendous potential solar energy and other appropriate technologies offers.

Currently Ms. Reiniger is preparing a slide set/tape that will document several Native American groups around the country who are involved in appropriate technology. The groups included are the Navajos of Arizona and New Mexico, Pueblo Indians of New Mexico, Six Nations-Mohawks of New York, and Chippewa-Cree of Montana. Areas covered include small-scale farming, owner-built homes, and passive solar energy.



Renewable Resources—A National Catalog of Model Projects

Category	Financing
State	NM
Project Name	Solar Loans

Organization	Southwest Savings and Loan Association
Address	813 St. Michael's Dr. Santa Fe, NM 87501
Contact	Ava Williams
Telephone	(505) 988-9701

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Southwest Savings and Loan Association, itself in an active solar, self-sufficient building, has been making construction and permanent financing loans on solar homes since 1975. Its grant process is fairly straightforward. The head loan officer gathers information on the house, frequently using the New Mexico Solar Energy Association as a consulting resource for the solar component. The rate is the same as a conventional loan, but the bank does require that the home have a conventional back-up heating system. Finally, the officer evaluates the loan application in committee with three officers of the corporation. This bank, more than any other in Santa Fe, has been willing to back solar homes as long as the design is sound. They have never received any incentive from government or other outside sources, but have responded on an individual basis to the request of builders and designers in the community.

The first solar loan was for the construction of Karen Terry's passive solar home, the first built in Santa Fe, designed by David Wright. Since then, the bank has made loans on many passive solar homes and some active solar homes. At present, they have permanent financing loans on five homes, three construction loans to individuals, and have entered into an agreement on a construction loan of over $1 million to a development company building 17 passive solar homes. All these homes have been pre-sold; seven are completed. The homes will be monitored extensively to record energy usage.

Southwest Savings and Loan is pleased with the loans made to date. The bank feels solar homes, especially passive solar, are viable alternatives to conventional housing and have resale values that are comparable. The bank feels that more performance data on solar homes will help establish their validity and provide the incentive for other banks to make solar loans. As Ava Williams said, "The Southwest is ideal for the use of solar energy, and the bank was

not afraid to back solar building, a sound concept and a good investment for the future."

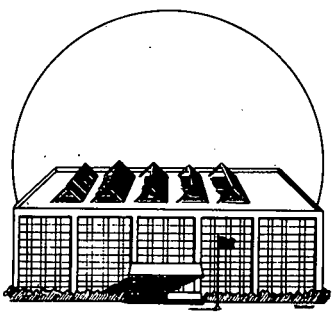
Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	NM
Project Name	Sandoval County Solar Energy Demonstration Project
Organization	Sandoval County Economic Opportunity Corporation
Address	P.O. Box 757 Bernalillo, NM 87004
Contact	Stephen Garcia Paul Santistevan
Telephone	(505) 867-2385
Funded By	Community Services Administration
Cost	$46,261
Congressional District	I
Compilation Date	February 1980

The Sandoval County Economic Opportunity Corporation is a private, non-profit corporation incorporated in 1967. In November of 1978, it began the Sandoval County Solar Energy Demonstration Project, a one-year CSA-funded project, to teach people about solar energy through demonstration projects. Six solar greenhouses, thirty convective air-loop window-box collectors, one solar water heater, one solar cooker, and one solar crop dryer were built through the project. In most cases, public schools of Sandoval County were chosen for placement of the structures so that extensive visibility would be ensured, as well as educational benefits.

Several different designs were used, including the standard NMSEA/Yanda-style attached solar greenhouse, the solar room system, and a freestanding design. In addition to a talk by Alex Wilson on solar greenhouse orientation, a follow-up talk on greenhouse management was given by Joan Loitz of Santa Fe for people who will be involved in taking care of the greenhouses.

Critique/analysis: The project was successful. An extension is expected, and there were an average of ten greenhouse spin-offs per workshop. It was felt, however, that greater impact would have resulted from greater community participation in the actual construction work. Through "hands-on" construction workshops, the information could better reach residents of the county. Also, because of some problems and complications with the CETA Program, it was felt that some other funding source would be preferable.



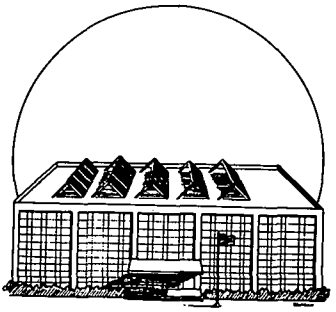
Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	NM
Project Name	Various Solar Building Retrofit Projects
Organization	Benedictine Monastery
Address	Pecos, NM 87552
Contact	Brother Dennis Mike Hansen (505) 255-4072
Telephone	(505) 757-6415
Funded By	Benedictine Monastery
Cost	Less than $10,000
Congressional District	II
Compilation Date	February 1980

The Benedictine Monastery in Pecos gets thousands of visitors each year and serves as a demonstration center for the innovative use of solar energy. Through the efforts of designer/builder Mike Hansen, with assistance from Steve Baer of Zomeworks Corp., solar energy (primarily passive) has been used extensively at the Monastery since 1973.

Most notable among the solar installations at the Monastery is the 7,700 square foot Dove Publications Building. The combination office/warehouse building utilizes direct gain and a Zomeworks-style drum wall. Completed in 1975, the "solar portion" of the building cost has already been paid back through fuel savings! With rare exceptions, the building has been heated 100 percent by passive solar energy.

Other solar projects at the Monastery are varied; in general, though, all are innovative and successful. A passive thermosiphoning hot water heater has been operating successfully for four years. Several different types of Zomeworks skylights are used on different buildings at the Monastery. An air-to-water heat exchanger heats 500 gallons of water for the laundry facility. Several buildings have been retrofitted with Trombe walls. And two new dormitory buildings are being completed--each using combination drum wall, Trombe wall, direct gain, skylights, thermosiphoning water heaters, and photovoltaic-powered hot air distribution systems.



Renewable Resources— A National Catalog of Model Projects

Category	Legislation
State	NM
Project Name	Solar Rights Act
Organization	Bureau of Taxation and Revenue
Address	Manuel Lujan Building St. Francis Drive Santa Fe, NM
Contact	n/a
Telephone	(800) 432-5511
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

New Mexico's novel approach to solar access is based on an analogy to western water law: sun rights may be appropriated on a first come, first served basis. The Solar Rights Act defines the property right as "an unobstructed line-of-sight path from a solar collector to the sun, which permits radiation from the sun to impinge directly on the solar collector." Disputes are to be resolved by applying the water law concepts of beneficial use and prior appropriation.

Beneficial use is declared the "measure and the limit" of the solar right, which may vary seasonally. The solar right is created by the intent to appropriate and use sunlight, and "priority in time shall have the better right" in disputes. The state and political subdivisions may further declare the right if a proposed collector site is blocked from the sun.

In the opinion of some legal scholars, the statue is clearly controversial, perhaps unconstitutional, probably impractical. It is inconsistent, contains unnecessary provisions, and reflects fallacious assumptions concerning water law. In brief, one fear is that the permit system might become unmanageable if every landowner (even just those from densely-built areas) applied, especially if conditional decrees pending future beneficial use were granted. But similar criticisms may apply to programs of state certification of solar devices or tax exemptions requiring individual application. A second primary problem is inconsistency. The Act purports to promote the use of solar energy primarily for economic benefits, when the practical result of the Act could be otherwise if it allowed, say, a small collector at the base of a north-facing hill to block a large and valuable construction project to the south along the top of the hill. The easy answer is that the solar right could be purchased, but this could be at an exorbitant price, assum-

ing that the solar right owner chose to sell.

The third concern is that the drop in the values of "up-sun" (cf. upstream) lands might violate the due process and equal protection clauses of the U.S. Constitution. The scheme could be construed as a taking without compensation instead of as a regulation if the diminution in value is great enough and if alternative uses are nonexistent.

And why distinguish between citizens on the basis of prior appropriation when sunlight is not all that scarce? Unless conditional decrees for future use are granted, a premature rush to erect collectors or potentially distracting structures could result. The riparian rights model, which compares the reasonableness of competing uses, might be a more cost-effective system in the case of solar rights.

In effect, an instant or even prospective right to light is purportedly created. In the time required to properly assess the administration of the system, a court case testing the constitutionality of the statute will probably be brought by a pre-empted developer. Even if the statute survives such a test, it is evident, in the words of the authors of the Environmental Law Institute study, that "a simpler, more certain, and more equitable approach is necessary."

(See Solar Law Reporter, Volume I, Number 1, pages 120-121, by Stephen B. Johnson.)

Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	NM
Project Name	Solar Tax Credit Act
Organization	Bureau of Taxation and Revenue
Address	Manuel Lujan Bldg. St. Francis Drive Santa Fe, NM
Contact	n/a
Telephone	(800) 432-5511
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

The Solar Tax Credit Act--passed by the 32nd State Legislature in 1975--allows a "tax credit not to exceed one thousand dollars ($1,000) in an amount equal to twenty-five percent of the cost of equipment used in the taxpayer's principal residence for solar heating, cooling, or heating and cooling". If the allowable tax credit exceeds the homeowner's state tax liability, the Solar Tax Credit Act provides for an actual cash refund for the amount in excess of taxes owed.

To qualify, the applicant must be a non-dependent resident of New Mexico, the home must be the taxpayer's principal residence and be located in New Mexico, and the claim can be filed only once during a taxable year and only once for a given principal residence.

The only portions of active solar systems that are eligible for the tax credit are those that are exclusively solar and distinct from the home's conventional heating system.

More difficult to assess are the passive solar heating and cooling systems. Therefore, the Bureau of Taxation and Revenue has developed regulations that attempt to isolate--for solar tax credit calculation—that portion of a passive solar design which is uniquely solar.

For example, a direct-gain solar home is considered eligible for the tax credit only to the extent to which additional glass has been employed for solar collection. To determine this quantity, the homeowner is asked to calculate the percentage of window area within the total ceiling-to-floor area for the north, west, and east walls of the house; the percentage of window-area within the south-facing solar walls; the percentage of solar (south) window-area in excess of non-solar window area; and the net percentage times the cost of materials. The object is to determine the allowable materials cost for actual solar window area--i.e., the materials cost

for south-facing windows beyond what would have been installed in a non-solar house.

An additional tax credit is also granted for moveable insulation to limit night-time heat losses, skylights (50 percent of costs if equipped with moveable insulation), and any other specifically solar features included with the solar system. Twenty-five percent of this final allowable cost--up to $1,000 limit--can be credited against state income taxes owed.

For a Trombe wall, the full tax credit is allowed for non-load-bearing storage walls, provided that the wall is used solely for thermal storage. If the Trombe wall is a load-bearing wall, 20 percent of the materials are considered to be structural, and 80 percent are considered to have a strictly solar function. The full credit is allowed for glazing materials.

When properly equipped with insulation against night-time heat losses, solar greenhouses are eligible. The maximum credit is for 50 percent of their material costs (assuming a 50 percent plant-growing function).

With the diversity of possible solar heating and cooling designs available to the citizens of New Mexico, the Bureau of Taxation and Revenue clearly has had to adopt a flexible posture in the evaluation of solar tax credit applications. In an effort to encourage solar tax credit applications, they have established a toll-free telephone number (1-800-432-5511) to answer questions that taxpayers may have regarding their eligibility under the Act. According to the Bureau, some 192 solar tax credit applications were approved for 1977 (37 percent for passive greenhouses; 36 percent active water systems; and 13 percent direct gain and other), and another 400 are being processed for 1978.

Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	NM
Project Name	Taos Solar Energy Association

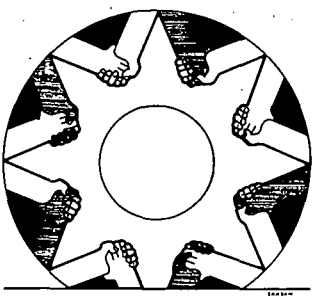
The Taos Solar Energy Association (TSEA), a non-profit organization begun in 1973, is largely responsible for the fact that Taos County has 170 solar homes. Located in Taos, one of the poorest areas in the country, TSEA has a staff of two paid workers and two volunteers and is a NMSEA affiliate. TSEA has used a wide range of activities to introduce people to passive designs: newspaper articles, monthly or bi-monthly meetings, slide shows in local theatres, radio shows, lectures, tours, workshops, and simple word-of-mouth.

The efforts of the TSEA do not stop at passive solar usage. The staff at TSEA has done "backyard" research on a number of innovative systems as well as on the appropriate use of salvaged and recycled materials. Throughout all their work, a strong emphasis is placed on low-cost, easily constructed, and regionally appropriate technologies.

TSEA's success has taken the group to other countries with economic, ecological, and social conditions similar to those in Taos County. Fred Hopman has brought passive design concepts to India, Mexico, and Nepal, where he helped write a manual on passive principles for the government. He was recently funded by the Save the Children Federation to go to Tunisia to conduct training workshops in passive solar construction.

Critique/analysis: The TSEA is very interested in continuing its international and local efforts, although funding is always an obstacle.

Organization	Taos Solar Energy Association
Address	P.O. Box 2334 Taos, NM 87571
Contact	Fred Hopman
Telephone	(505) 758-3126
Funded By	NM Energy Ext. Serv., ARCA, CETA, Private Foundations
Cost	$26,000/yr.
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	NM
Project Name	Clayton Wind Energy Conversion System

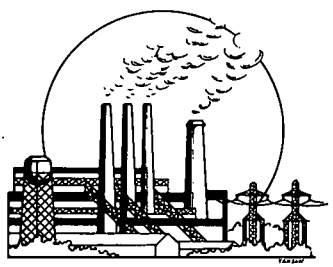
Wind-powered electricity meets some of the electrical needs of citizens in Clayton. Funded by DOE, NASA's Lewis Research Center in Cleveland, Ohio, designed, built, and installed the wind turbine generator. It is capable of generating enough kilowatts to provide approximately 15 percent of the town's electric power.

The Clayton windmill has two aluminum rotor blades that span 125 feet. The propeller-like rotor that turns the blades reponds automatically to changes in wind speed and direction.

Feasibility studies conducted by the Southwest Research Institute in Santa Fe found windspeeds adequate. Clayton receives winds in excess of 28 mph 20 percent of the time. On the average, winds of 16 mph occur in the area of the wind generator.

The power produced by the machine feeds directly into Clayton's power grid when it is operating. The generators at the pwer plant "sense" a decrease in deman for conventional power and so burn less fuel.

Organization	City of Clayton
Address	1 Chestnut Street Clayton, NM 88415
Contact	Robert Johnston City Manager
Telephone	(505) 374-2711
Funded By	DOE
Cost	$1,000,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Utility
State	NM
Project Name	La Vereda Passive Solar Community Project

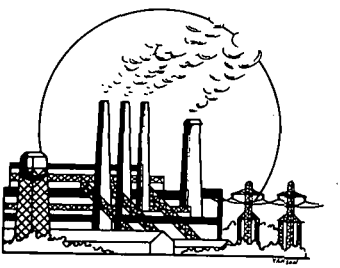
The objective of the La Vereda Passive Solar Community Project is to demonstrate that passive solar design can reduce conventional energy consumption for space heating and can be interfaced with the electric utility to the benefit of both the customer and the utility.

The project will quantify energy and water savings made by using passive solar design. The homes use direct gain design and water-saving fixtures. These designs are expected to meet 40 to 80 percent of their space heating and domestic water-heating requirements. This displaces natural gas, oil, and electricity in the monitored area. This project was initiated in the fall of 1978 by PNM (the utility), Communico (the builder-developer), and Los Alamos Scientific Laboratories as joint participants.

Overall, the project is a design, implementation, and analysis of an advanced load-managed system incorporated into a structure that derives its primary heating from the sun.

Organization	Public Service Company of New Mexico
Address	P.O. Box 2267. Albuquerque, NM 87103
Contact	Stephen E. Pyde
Telephone	(505) 848-2982

Funded By	PNM, Dept. of Energy, Electric Power Research Institute
Cost	n/a
Congressional District	I
Compilation Date	February 1980

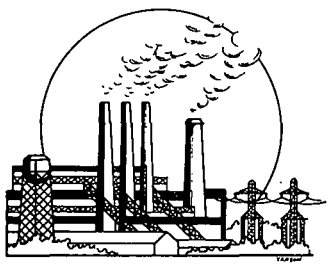


Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	NM
Project Name	150-KW Photovoltaic Project for Lovington Shopping Center
Organization	Lea County Electric Co-op
Address	P. O. Box 1447 Lovington, NM 88260
Contact	Mike James
Telephone	(505) 396-3631
Funded By	DOE, Lea County Electric Co-op
Cost	$2.7 million
Congressional District	I
Compilation Date	February 1980

The Lea County Electric Co-op is one of New Mexico's 17 rural electric cooperatives that non-profit utility companies set up in the 1930s to get electricity to rural areas. Because they serve large, sparsely populated areas, interest is growing in the use of decentralized alternative energy sources and the Lea County Electric co-op has taken the lead. Along with its interest in passive solar energy, it is now embarking upon a large photovoltaic project that will provide power to a shopping center in Lovington.

The 150-kilowatt photovoltaic system will span three to four acres and provide 30 to 50 percent of the power needed for the shopping center. A team from the Lea County Co-op, the New Mexico Solar Energy Institute in Las Cruces, the Solar Power Corporation, and Webster Engineering Corporation has been planning and designing the system. They expect the $2.7 million project to be completed by the end of 1980. The primary benefit of this project is its demonstration value. People using the shopping center will be exposed to solar energy and will come to realize its potential in electricity generation, and the rural electric co-ops will learn the value of solar energy within an economic framework. At the same time, the project will serve as a valuable research tool on photovoltaics and their application. It will also boost the photovoltaics industry by reducing per-unit manufacturing costs.



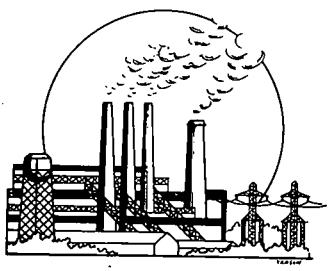
Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	NM
Project Name	Passive Solar Home Monitoring

The objective of the Passive Solar Home Monitoring Program is to monitor the electricity consumption of ten passive homes to determine the impact of the design on electricity use. An ongoing project begun in the fall of 1978, PNM hopes the results will help it better advise passive solar homeowners on how to properly utilize off-peak energy for back-up heating systems.

The privately owned homes selected for this monitoring were chosen for their exceptional passive solar design. PNM will provide to the customer metered data, including estimates of the passive solar contribution toward energy conservation. The metered data will be used to fine-tune a computer program developed by Doug Balcomb of Los Alamos Scientific Laboratory to yield a more accurate and efficient passive solar home design model.

Organization	Public Service Company of New Mexico (PNM)
Address	P.O. Box 2267 Albuquerque, NM 87103
Contact	Stephen Pyde
Telephone	(505) 842-4545
Funded By	PNM, DOE, Electric Power Research Institute
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

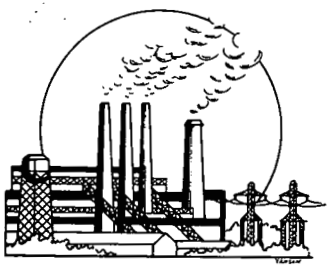
Category	Utility
State	NM
Project Name	Solar Water Heating Experiment

The objectives of the Solar Water Heating Experiment are to determine the cost-effectiveness of solar domestic water heating using an electrical back-up system and to estimate the impact of this type of system on the utility's residential load profile.

PNM will monitor thirty solar hot water systems (24 have been installed or contracted for to date), most of which are conventional flat-plate collectors. It is expected that the solar hot water systems will reduce electric consumption attributable to water heating by 50 to 80 percent. This project will quantify those results so that PNM will be able to provide recommendations on the design and installation of domestic solar hot water systems.

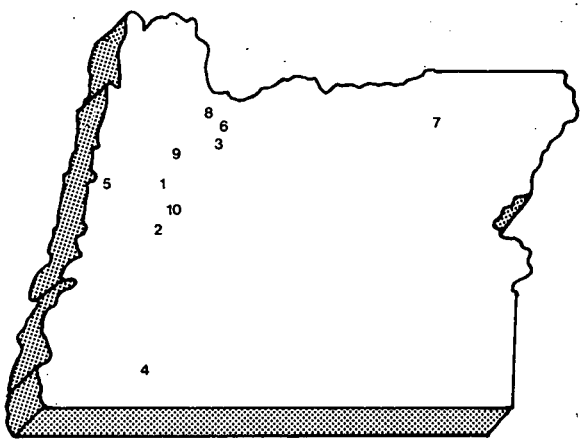
The project began in the fall of 1978, and is on-going. PNM will soon publish an information packet and distribute it to the general public as well as to select audiences such as contractors and builders.

Organization	Public Service Compa... of New Mexico (PNM)
Address	P.O. Box 2267 Albuquerque, NM 87103
Contact	Stephen Albright
Telephone	(505) 848-4602
Funded By	PNM
Cost	n/a
Congressional District	I
Compilation Date	February 1980



OREGON

1. Corvallis
2. Eugene
3. Marylhurst
4. Medford
5. Newport
6. Oregon City
7. Pendleton
8. Portland
9. Salem
10. Springfield



OREGON

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Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	OR
Project Name	Aquaculture Projects

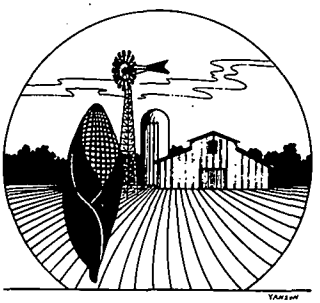
Amity Foundation is a non-profit research and education organization working in the areas of waste-water use, urban agriculture, aquaculture, solar design and greenhouse management. It also has a tool library.

Amity is operating an experimental aquaculture greenhouse for research on both fish and plant production. Recent work includes the study of combined hydroponics and fish production. (A garden produces food for the fish.)

Recently, Amity produced a comprehensive "how-to" manual for small scale fish farming. The manual is geared to the lay person who has no background in aquaculture.

The community is periodically invited to fish harvests and aquaculture workshops. Other projects include developing a solar and aquaculture curriculum with the Whiteaker School and coordinating workshops for various community self-reliance groups in Eugene.

Organization	Amity Foundation
Address	P.O. Box 7066 Eugene, OR 97440
Contact	Bill Head
Telephone	(503) 484-7171
Funded By	ODOE Small Grants, DOE Small Grants, CSA, City of Eugene, Handbook Sales
Cost	$32,000 (approx.)
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	OR
Project Name	The Urban Farm

Organization	The Urban Farm
Address	University of Oregon Eugene, OR 97401
Contact	Richard Britz, Linda Smiley
Telephone	(503) 686-3647 (503) 686-3625

Funded By	University of Oregon, The Lynn Mathews Fund, CETA
Cost	$10,000 (approx.) (1979 Budget)
Congressional District	IV
Compilation Date	February 1980

The University of Oregon Urban Farm is a 1.5-acre demonstration project of mixed zoning (agriculture, residential, commercial, industrial, and educational land use) that provides a working model for intensive raised-bed gardening, continuous building of organic fertility through compost techniques, irrigation, fruit and nut-orcharding, animal husbandry, crop rotation, and biological pest control. The Farm integrates recycling and renewable energy technologies into school life.

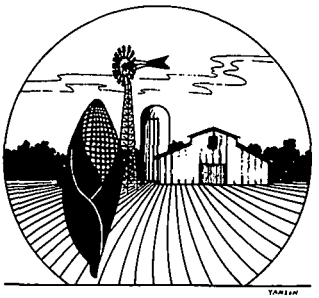
The process and goal of the Farm is to transform under-used urban land to productive and energy-saving neighborhood resource-conservation districts.

The Farm provides a "hands-on" classroom in which students can learn the natural rhythms and processes of food production. Classes in the spring plant the gardens and work on construction projects. During the summer, low-income CETA youthworkers maintain and harvest the crops and in the fall, students continue the harvest and prepare the grounds for winter weather and some winter crops.

Organic wastes for composting are provided by a local recycling corporation, an organic restaurant and animal wastes. A 25-tree orchard will soon bear fruit and continued pollination is assured by the local bee colonies.

Plans for the near future include a small solar greenhouse and more cold frames. Next spring irrigation will be powered by a windmill built as a class project.

Information is available to the community through the farm library and meeting space is provided in the farmhouse.



Critique/analysis: The Urban Farm demonstrates that community building need not destroy the life-support capabilities of the soil and water, and that intensively managed agriculture can be the backbone of an urban community.

The project has been a success as a student and community enterprise. Many people have changed their thinking as a result of the experience.

Perhaps the greatest problem is coordinating the various transient work forces so that the project maintains continuity. This has been a large burden for the one resident "urban farmer."

Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	OR
Project Name	Mission Mill Museum
Organization	Mission Mill Muse
Address	260 - 12th S.E. Salem, OR 97301
Contact	Anthony Reid, Museum Director
Telephone	(503) 585-7012
Funded By	Pacific Northwest Regional Commission
Cost	$30,000, plus donated labor
Congressional District	II
Compilation Date	February 1980

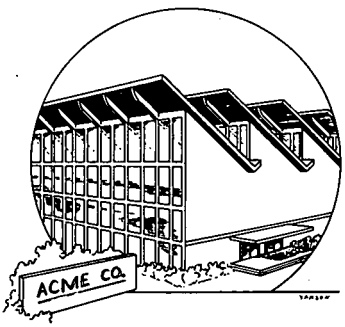
Mission Mill is an historic and technical museum built in the 1880s as a woolen mill. Today, the museum includes a wool warehouse, a raghouse, and picking and dye-room buildings from the original mill. The museum staff has refurbished much of the old machinery and will soon be producing yarn, which will be sold commercially to help finance museum operations.

High utility bills led the museum's director to seek other ways to heat the high-ceiling wood and brick buildings. With the help of the local utility, PGE field representative, the original water power system, which dates back to 1887, was restored. The low-head hydro system uses a 15-ft. water drop to turn a Sampson 45 turbine. The original two turbines are still in the bay, but only the newer one (1914) could be rebuilt. The rebuilt turbine has two main bearings made of a dense South American hardwood, Lignum Vitae. The wheel house and the wooden parts of the penstock (the enclosure around the turbine) have been completely rebuilt.

The turbine powers a belt-and-pulley system that turns a 50-Kw generator, which was converted from a 50-HP induction motor used by the mill for auxiliary power. Some alterations were made to channel power from the main drive shaft to the shaft that drives the motor, but the original leather belts from the mill operation are still in use.

The turbine generates 35 Kw of electricity per hour, and runs for four to six hours per day. Eventually, the turbine will be run 12 hours per day. During months of sunny weather, the power generated is being fed into the utility grid.

The project required bringing together a variety of state agencies and private corporations. Boise Cascade joined with the Water



Resources Board in restoring the water rights to the mill, and the utility donated many urs of labor, as well as technical advice.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	OR
Project Name	House Construction Demonstration
Organization	Springfield Demonstration House Construction Project
Address	426 S. 37th Place Springfield, OR 97477
Contact	Sabin Lamson
Telephone	(503) 687-3999
Funded By	Lane City Housing and Community Development, Eugene Emergency Housing, Bank, donated labor.
Cost	$42,000
Congressional District	IV
Compilation Date	February 1980

This project involves alternative energy applications, field experience for students of construction technology, and materials conservation through use of recycled lumber. The program is not intended as a prototype for action; however, the building itself is a model for future projects.

Planned as a possible solution to the low-income housing shortage, this project was designed to build and monitor a house that minimizes energy use by maximizing the use of cost effective appropriate technologies. The project is equally committed to designing a dwelling that is completely accessible to handicapped persons, providing worksite experience for students of construction technology and for skilled trade apprentices, and increasing the availability of low-cost housing.

The 1,800 ft^2 building is designed for occupation by a family of up to seven persons. The house is heavily insulated and incorporates numerous passive solar features. The south side of the long, thin structure is 90 percent glass; it comprises vertical and clerestory windows and a greenhouse space.

The home's water is heated by collectors built and installed in a workshop conducted by the University of Oregon's Solar Energy Center and the Lane County Housing and Community Development Department. A concrete slab, a masonry wall, and a sub-grade rock bin provide thermal storage for the building.

The home is also outfitted with a greywater treatment system, the output of which will be used to irrigate the greenhouse, lawn and garden. The residence also has a compost toilet that, like the rest of the structure, is accessible

to handicapped persons. Widened doors, specially designed bath and kitchen units, and no-skid floor coverings are part of the home's design.

Project participants include the Lane Community College Construction Technology Program (labor), the University of Oregon Solar Energy Center, Central Inside Electrical Joint Apprenticeship and Training Council, CETA School Gardens Project, and the Springfield Utility Board.

Critique/analysis: As a training project, the house has taken longer to complete than it would under normal circumstances. The building required special zoning and code variances.

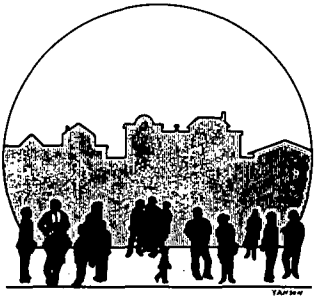
The project is only replicable where housing subsidies exist.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	OR
Project Name	Inskeep Environmental Program (I.E.P.)
Organization	John Inskeep Cer...
Address	19600 S. Mollala Ave. Oregon City, OR 97405
Contact	Jerry Herrmann, Director
Telephone	n/a
Funded By	CETA (labor)
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Faced with the prospect of seeing an industrial settling lake (Smuckers) converted into a parking lot, a group in Oregon City formed the Inskeep Environmental Program (IEP) to recycle the land back into a natural setting. Started five years ago, labor provided by CETA workers, felons, National Guardsmen, and volunteers helped turn the lake into its present natural reserve for wildlife. The layout allows humans to observe the animals without disturbing them.

To house labs, office space and teaching rooms, IEP has constructed a pavilion incorporating active and passive solar space heating and a composting toilet.



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	OR
Project Name	Portland Recycling Team (PRT)

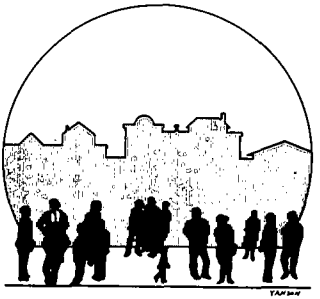
The Portland Recycling Team (PRT), established in 1970, is one of the first grassroots, non-profit recycling teams in the country. PRT's main emphasis is in house-hold recycling (paper, cans, glass & oil). It is the country's largest "full line" recycling group (meaning it will accept all recycleable materials).

PRT is now experimenting in making insulation from recycled styrofoam and finding additional markets for household plastics.

PRT is about 85 percent self-sufficient, supplementing part of its work force with CETA trainees.

Organization	Portland Recycling Team (PRT)
Address	1801 N.W. Irving Portland, OR 97209
Contact	Lee Barrett
Telephone	(503) 228-5375

Funded By	Sale of materials (85 percent); Work-study students; CETA (15 percent)
Cost	$400,000/yr. (Budget)
Congressional District	I, III
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Community
State	OR
Project Name	Project Self-Reliance

Project Self-Reliance is a neighborhood self-help program for Whiteaker residents who want to work together to conserve fuel and electricity, produce their own food, and to use solar energy in their homes.

Free educational "hands on" workshops and community demonstrations are a major part of the program. An attached solar greenhouse at a local home and a "breadbox" solar water heater at a neighborhood restaurant are two ongoing demonstrations. Next year's plans are for a variety of demonstration sessions to help neighbors become more self-reliant: fruit tree care, food drying, greenhouse horticulture, weatherizing and storm windows, passive solar heating, planning home remodeling, and local Appropriate Technology tours.

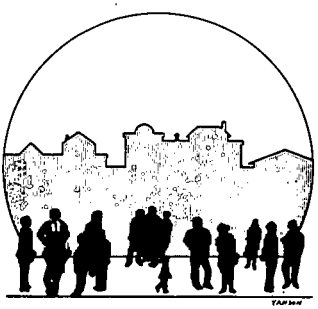
The project makes cash awards of up to $200 monthly to Whiteaker residents who want to create some form of "appropriate technology" where they live. Grants have already been awarded for constructing solar greenhouses, food dryers, and intensive-growing and composting beds. Other projects include a multi-household recycling center, and a monitoring kit for solar water heaters. All grants are awarded by the Appropriate Technology Advisory Committee, which meets monthly.

The Project's reference library contains books, periodicals, pamphlets, and bibliographies on solar energy, gardening, owner-building and energy conservation.

A free tool-lending library is open for residents. It contains gardening and landscaping tools, food-preserving equipment and carpentry tools. A shop with saws, work tables and storage is also open to the public.

Organization	Whiteaker Project Self-Reliance
Address	315 Madison Eugene, OR 97402
Contact	Larry Parker (Coordinator)
Telephone	(503) 343-2711

Funded By	City of Eugene Community Development Block Grants (HUD)
Cost	$15,855 (1979 Budget)
Congressional District	IV
Compilation Date	February 1980



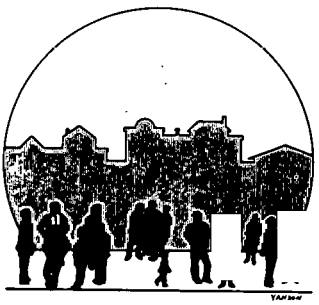
Critique/analysis: Active participation on the part of those most in need is a problem. Since the project was originally organized a small committee of the neighborhood council, some difficulties continue to surround efforts to reach the larger neighborhood. Orignially, a lack of sufficient resources hindered aggressive outreach. The Block Grant funding mechanism has allowed a large amount of flexibility in the program.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	OR
Project Name	Responsible Urban Neighborhood Technology (RUNT)
Organization	RUNT House
Address	3116 N. Williams Portland, OR 97227
Contact	Phil Conti
Telephone	(503) 281-1378
Funded By	n/a
Cost	n/a
Congressional District	III
Compilation Date	February 1980

The Responsible Urban Neighborhood Technology (RUNT) organization was established prior to Sun Day 1978 to provide a viable example of appropriate technologies applied to a city home. Since the organization has now obtained an abandoned house in North Portland, the actual work of installing active/passive solar heating, solar greenhouses, composting systems, etc., is now taking place. RUNT incorporates recycled material when available and relies heavily on advice and technical assistance from other appropriate technology groups.

In many respects similar to the Farallones House in Berkeley, the RUNT group is open to the public and stresses group decision making.



Renewable Resources—A National Catalog of Model Projects

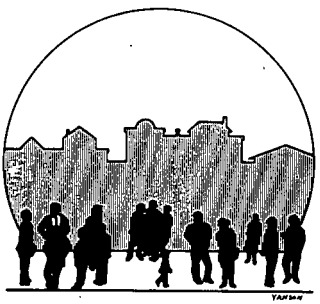
Category	Community
State	OR
Project Name	Solar Subdivision

The SHC Solar Subdivision was started three years ago by 15 local families who wanted to create a tight-knit energy-efficient community.

Planning and design emphasis was on creating a small, socially cohesive community, complete with a common recreation facility. Energy-efficient, passive solar heated housing and efficient land use (minimizing the need for roadways) were also given priority.

Now in the final stages of construction, the SHC Solar Subdivision ranks among the most energy-conserving mini-communities in the country.

Organization	Sunlight Holding Company
Address	6454 S.W. Barnes Rd. Portland, OR 97221
Contact	Barbara Church
Telephone	(503) 292-6213
Funded By	Local Bank Loan
Cost	$1.4 Million
Congressional District	III
Compilation Date	February 1980

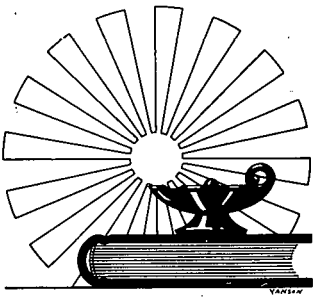


Renewable Resources—A National Catalog of Model Projects

Category	Education
State	OR
Project Name	RAIN - A Journal of Appropriate Technology
Organization	RAIN - A Journal of Appropriate Technology
Address	2270 N.W. Irving Portland, OR 97210
Contact	John Ferrell
Telephone	(503) 227-5110
Funded By	$15 Subscription ($7.50 if "living lightly")
Cost	$45,000 (Annual Budget)
Congressional District	I
Compilation Date	February 1980

RAIN magazine was created in 1974 as a general environmental information and access source. In the process of evolving, it has focused on promoting the use of alternative technology. Defined by E.F. Schumacher as "simple, substainable, small and non-violent," these technologies (like decentralized solar power, recycling, small farming, small businesses, close knit communities) promote self-sufficiency.

The magazine appears 10 times per year.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	OR
Project Name	Solar Demonstration Building
Organization	Solar Energy Community, Inc.
Address	P.O. Box 1055 Corvallis, OR 97330
Contact	R.W. "Hok" Holcomb
Telephone	(503) 967-7326
Funded By	CSA
Cost	$10,480
Congressional District	I
Compilation Date	February 1980

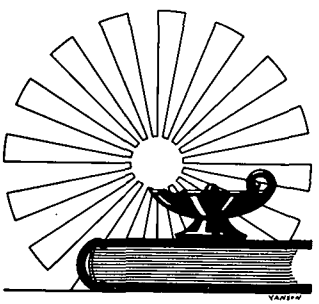
Solar Energy Community, Inc. has worked out an arrangement with Linn-Benton Community College to finish the solar demonstration building on the L.B.C.C. Campus and to furnish it as a solar information center. The building is currently being used for this purpose, but there remains finishing work to be done and some improvements are necessary.

The Solar Energy Community has mailed out a monthly newsletter and has held monthly meetings in which speakers raised alternative energy issues.

During the period of the grant (May through November of 1979), the organization held three solar water heater workshops. Two "bread box" water heaters and one "draindown" system were installed on homes that have qualified for the Community Services Administration weatherization program. The workshop instructor discussed the basic principles of solar water heating, then helped the students fabricate and install them in the homes. Most workshop participants plan to install a solar device on their own home in the near future. The workshops can be taken for credit at L.B.C.C.

Critique/analysis: The program seems to have reached an active stage at the end of five months. The organization receives a constant stream of requests for information, speakers, and permission to attend the workshops. Many people also express interest in sponsoring workshops.

The program fills an existing need and could be duplicated almost anywhere.



Renewable Resources—A National Catalog of Model Projects

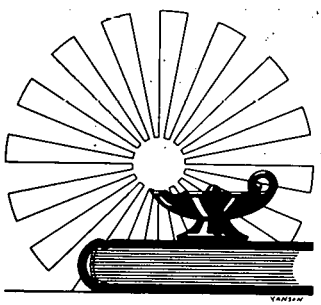
Category	Education
State	OR
Project Name	Solar Technician Training

Clackanas County's CETA program gives 16-19 year-old drop-outs skills in producing, installing and maintaining residential solar systems.

Twenty-six pre-heat solar units have been installed successfully on low income housing in Clackamas County by 8-12 young adults at a time over a three-year period. The use of recycled materials (wood, glass and lithograph plates) is practiced whenever possible, so the average cost per unit is only $550.

Where needed, these retrofitted houses are weatherized by the installers to maximize energy savings. Instruction manuals on the design of the panel are available by mail.

Organization	Clackamas County CETA Solar Techician Training Program
Address	P.O. Box 215 Marylhurst, OR 97036
Contact	Tim Wood
Telephone	(503) 636-5101
Funded By	CETA
Cost	$550/unit
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	OR
Project Name	Student-built Solar Home
Organization	Lincoln County School District
Address	P.O. Box 1110 Newport, OR 97365
Contact	Jack E. Peters, Larry G. Clark
Telephone	(503) 336-2411
Funded By	Lincoln County School District
Cost	$72,125
Congressional District	I
Compilation Date	February 1980

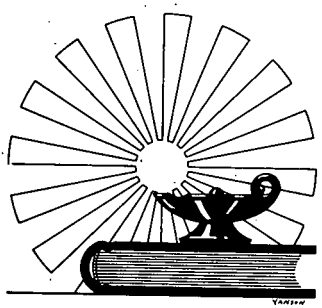
Students in construction and science classes at Toledo and Siletz High Schools are planning and constructing a single-family dwelling equipped with a solar energy system. The system should be capable of producing 50 percent of the energy required for water and space-heating.

Since 1977, the Lincoln County School District has provided funds to high school classes for construction of single-family residences within the community. Subsequent sale of the homes has made the program self-supporting. Recently, the district purchased two unobstructed hill-top lots appropriate for solar home construction.

The solar-powered dwelling, funded by the school district, and a proposed model curriculum to be funded through the Oregon Department of Energy 1979 Local Energy Conservation Grant Program, will be completed during the 1979-1980 school year.

During the planning and construction stages, a written manual (instructional text), videotape and slide presentation will be developed to describe the project and serve as a guide for instructors in other schools who would like to replicate the program.

Critique/analysis: This project will promote ergy conservation awareness by serving as a iel education project for the general public, the 28 students involved, and for those in other high school construction programs. The entire project may also serve as a catalyst for additional solar energy projects and for the adoption of solar-related construction codes in the Lincoln County area. Support for the



project has been voiced by the manager of the United States National Bank of Oregon (Toledo Branch), the City Manager of Toledo, city planners, and other community members.

Renewable Resources— A National Catalog of Model Projects

Category	Education
State	OR
Project Name	Sun Day

A collection of several agencies, private businesses, schools, professionals, and interested citizens came together to produce "Sun Day" for eastern Oregon May 19, 1979. As a major provider of community education in the Pendleton area, the Pendleton Community Schools took responsibility for gathering a group of people together who were interested in solar energy.

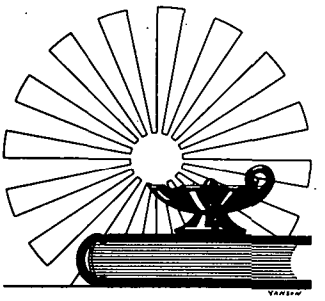
The main purpose of the event was to organize an educational workshop in Eastern Oregon that would introduce to the community some new and important concepts in solar energy and conservation. Between 250 and 300 participated in the workshop, in addition to the 20 members of Eastern Oregon Solar Group who put the sessions together.

The Community Schools was a "co-sponsor," and it provided the buildings and organized a poster contest in schools. The Blue Mt. Economic Development Council provided funds for materials to build the passive window collectors. TECSET CO. provided both the plans and the labor for construction of the passive collectors. They also provided technical assistance to the teams participating.

The Eastern Oregon Solar Group, which decided not to disband, now meets on a monthly basis. It has planned further workshops for bankers, builders, schools, and the general public.

Organization	Pendleton Community Schools /EOS6
Address	1901 S.W. 44th Pendleton, OR 97801
Contact	David Burns
Telephone	(503) 276-7580 (off.) (503) 276-8017 (home)

Funded By	Community Schools; Blue Mountain Economic Development Council, et al.
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	OR
Project Name	SUNERGI
Organization	SUNERGI
Address	10 N. Central Suite 2 Medford, OR 97501
Contact	Scott Cummings
Telephone	(503) 772-5678
Funded By	CETA, Private Foundation
Cost	$53,000 (approx.)
Congressional District	IV
Compilation Date	February 1980

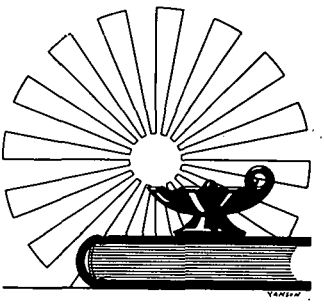
SUNERGI is a private non-profit regional energy-information clearinghouse in southern Oregon. It was formed in early 1977 by a grass-roots coalition of people interested in energy problems and committed to conserving our scarce natural resources. Its formation was given impetus by the excitement and dedication of the over 100 people involved in planning the First Southern Oregon Energy Fair. The great success of the fair (attendance 5,000) provided added evidence that such an organization was badly needed.

Since its formation, SUNERGI has become a leader in energy-related programs for Southern Oregon and Northern California. With the help of volunteers and other citizen-based groups, it presented eight energy fairs in Jackson County. Each stressed conservation, the necessity for a transition to revewable resources, and the construction and use of small-scale alternate energy systems.

SUNERGI sponsors an annual Investors Day Conference at which persons with energy problems consult with people with solutions. The published proceedings are made available to the public.

The organization has developed a diverse collection of energy-related materials which are stored in SUNERGI's lending library in Medford. Many of the federal and state energy handouts are stocked for public distribution.

It is in Medford also that the staff consults with the public to answer specific questions and provide technical advice about the use and design of alternate energy systems. From their urban headquarters, the staff implements the energy outreach program in which it shows energy-related slide presentations to



various community groups. The staff also coordinates Sun Day Activities.

In order to be responsive to community needs, SUNERGI's board of directors was chosen to represent a broad spectrum of local interests. Initially, the staff was volunteer; later staff funding came from CETA. Overhead costs were funded in part by proceeds from the fair and complemented by memberships and donations. A recently received grant from a private foundation provides salary for a staff director.

SUNERGI programs recently funded by CETA include the development of low-cost attached solar greenhouses that will be placed and monitored within the community, the development of inexpensive solar water-heating systems, and the design of an air type solar space heater. Grant requests for a wide variety of energy programs have been submitted to various funding sources.

Public response to SUNERGI has been very positive. For example, 100 people attended the Solar Homeowners Roundtable. A local government official, after seeing one of the energy fairs, was so enthused that he donated $50 and encouraged the staff to keep up the good work.

Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	OR
Project Name	EWEB-Weyerhaeuser Cogeneration Facility

Organization	Eugene Water & Electric Board (EWEB) with Weyerhaeuser Co.
Address	Weyerhaeuser Plant Springfield, OR 97477
Contact	Tom Santee P.O. Box 10148 Eugene, OR 97440
Telephone	(503) 484-2411

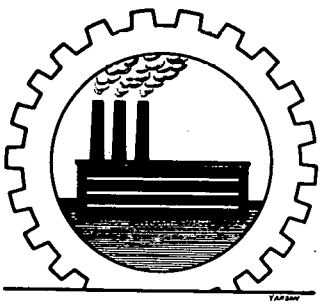
Funded By	Private Operating Capital, Revenue Bonds
Cost	$7.4 million
Congressional District	IV
Compilation Date	February 1980

The Weyerhaeuser Company has joined with the Eugene Water & Electric Board (EWEB) to capture from Weyerhaeuser's boilers steam that would otherwise be reduced directly to process heat pressures with considerable waste. Instead, the steam is run through a turbine-generator owned by EWEB to produce 33 MW of electrical energy. The used lower-pressure steam is then used for process heat by Weyerhaeuser.

Weyerhaeuser began providing the steam in 1976. Annual generation has averaged 240 million KWH per year.

In 1974, EWEB executives realized that after 1983, new electric sources would have to be developed. A plan was then laid to use the excess heat from Weyerhaeuser's boilers. The boilers are fueled with a by-product of the company's pulp and paper process.

EWEB doesn't need the power until 1983. Therefore, it sells the power to three municipal utilities in California, where it can get a higher price than competing with local hydroelectric rates. Having the facility as a potential backup system for local peak demand, EWEB pays a lower peak-capacity charge to the Bonneville Power Administration. This results in a lower rate for its customers.



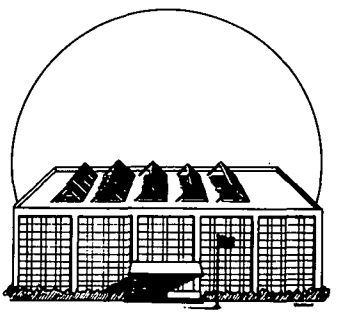
Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	OR
Project Name	St. Paul Center, United Methodist Church
Organization	St. Paul Center, United Methodist Church
Address	332 N. 58th Street Springfield, OR 97477
Contact	Artemio Paz, Jr., AIA
Telephone	(503) 747-8823
Funded By	Local donations, foundations and United Methodist Church
Cost	$155,000 Total
Congressional District	IV
Compilation Date	February 1980

The Springfield United Methodist Church has built a 4,800 ft^2 center that is totally heated by solar energy. The building houses a 2,600 ft^2 sanctuary with seating for 250 to 275, offices, a conference room, a nursery, bathrooms, and a mechanical room. The desire to use solar heating in this facility arose out of the congregation's concern for the environment and its limited resources.

The congregation received the first grant ever from the National United Methodist Church to assist in the design and construction of new or retrofitted solar energy systems. The specific system employed here is an innovative collector-reflector arrangement utilizing forced air to deliver heat to the rock storage bin. As of this writing, it is the largest collector-reflector installation in the Northwest. The heat provided from this system primarily heats the sanctuary, while passive principles heat the offices and conference room.

The congregation donated most of the labor, cleaning and sizing the 32 tons of rock for the heat storage system, installing insulation, and providing site labor. This participation, in combination with the parishioners' original commitment, has contributed to the strong support for solar energy among the members, who now have a solar covenant. The covenant has a checklist that includes the following activities: church carpooling, staffing information booths about Christianity and energy stewardship, sharing gas ration coupons with church members, recycling items by bringing them to the church, sharing church garden produce, sharing tools and equipment with other church members, helping monitor church heating, assisting in weatherizing, and making energy-efficient personal



homes and other church buildings.

The people that adhere to these goals are by no means a uniform section of society. Instead, the congregation is made up mostly of blue-collar workers from the Springfield area, some blacks, some hispanics, some young professionals, and some university students.

The public is introduced to solar principles whenever there is a public event at the church, which is frequently.

Critique/analysis: The architect would have liked to use more passive systems because of the difficulty matching donated labor to the skills necessary to handle the mechanical element of an active system.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	OR
Project Name	Community Planning

Organization	City of Portland
Address	1220 S.W. 5th Street Room 406 Portland, OR 97204
Contact	Marion Hemphill Office of Planning and Development
Telephone	(503) 248-4579

Funded By	City of Portland
Cost	$62,000
Congressional District	I, III
Compilation Date	February 1980

The Portland City Council recently passed an Energy Conservation policy with the intended goal of reducing the city's energy consumption a full 30 percent by 1995. This should save the Portlanders $162 million based on current prices. The plan is being used nation-wide as a model by other cities to reduce their consumption of non-renewable resources.

The policy was formulated by a group of citizen volunteers representing business, labor, industry, government, neighborhoods, and environmental groups.

Put in simple terms, the main goals of the PECP are to make buildings in the city as energy efficient as is cost-effective through voluntary actions initially and through mandatory actions after five years (if and when the property changes ownership). The policy promotes the development of land-use practices that support mass transit and efficient space heating in buildings. Renewable and alternate energy sources will be encouraged to replace part of the remaining use of non-renewable energy sources.

The city bureaus will reduce energy consumption by investing in energy-conservation opportunities and changing operational procedures to the extent that such investments are energy- and cost-effective.

Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	OR
Project Name	Solar Easement Law

The 1979 Oregon Legislative Assembly has enacted model legislation that upholds the "right to light", by actively supporting solar easements regulations at the city and county levels. The law also prohibits restrictions of solar energy in all real property conveyances written after October 5, 1979.

County planning commissions in the past have had the authority only to recommend to the governing body that solar ordinances be contained in a comprehensive plan. City planning commissions and city or county-governing bodies may now recommend or adopt solar access ordinances and standards. Citizens who want to retrofit solar energy technologies on their homes are provided legal avenues by which to obtain access to the sun. (The law does not, however, provide absolute "solar rights" for every citizen or building.)

Development of the solar easement legislation has been supported by funding recently received by the city of Albany and by Multnomah County to develop solar ordinances. Deschutes County is also considering writing solar access provisions into its comprehensive plan.

Organization	Oregon State Legislative Assembly
Address	Salem, OR 97310
Contact	Oregon Department of Energy
Telephone	(800) 452-7813
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category	Low Income
State	OR
Project Name	Salem S.U.E.D.E.
Organization	Midwillamette Valley and Community Action Agency
Address	Energy Office, 2035 Davcor St., Salem, OR 97302
Contact	Paul Sansone
Telephone	(503) 585-8491
Funded By	Dept. of Labor, Dept. of Energy, & Community Services Administration
Cost	$250,000
Congressional District	II
Compilation Date	February 1980

Project SUEDE (Solar Utilization, Economic Development, and Employment was designed to demonstrate energy conservation and solar usage, to create jobs and training programs, and to assist households in need.

The project has extended the CSA's Weatherization Program for low-income households into the next logical step: the building, installation, and maintenance of energy systems utilizing renewable energy sources. The weatherization crews receive training as solar technicians from Ecotope Group, an alternative energy consulting firm in Seattle. They learn how to install solar water heaters and solar greenhouses. SUEDE continues to sponsor workshops for the public to teach community members to install the solar devices by having them participate in the actual installation on the home of a low-income community resident.

Participating households were selected by the Energy Program's Citizen's Advisory Board to insure fair and equitable standards. All houses considered had to have been previously weatherized, and households had to meet CSA income guidelines to be eligible for work.

Labor for the Weatherization and Solarization projects was supplied by CETA Title VI participants. The employees learned skills that are increasingly in demand. In fact, a few employees were lured away by businesses prior to the end of the project, and five of them have now found jobs with solar-related projects.

Critique/analysis: SUEDE is noteworthy for its problems as well as its successes. SUEDE entered a new territory as solar designs impacted city and state building and plumbing codes, resulting in delays and incorrect information from code officials. Finally, state plumbing officials required SUEDE to redesign its thermosyphon water system to a more expensive pumped system, three-quarters of the way through the project.

Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	OR
Project Name	Columbia Solar Energy Association (CSEA)

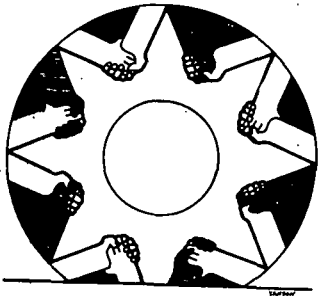
The Columbia Solar Energy Association (CSEA) is the Northwest Oregon branch of the International Solar Energy Society.

Created initially to help in the organization of Solar '78, CSEA offers informative talks on solar related topics. CSEA also provides a forum at its monthly meetings for discussion on solar energy. There, lay people meet others already working in the solar energy field (manufacturers, architects, engineers and installers).

CSEA also provides information and outreach at local energy events.

Organization	Columbia Solar Energy Association
Address	P.O. Box 11122 Portland, OR 97211
Contact	John Owen (503) 289-3945
Telephone	(503) 248-5920

Funded By	Dues, Annual Conference
Cost	$450
Congressional District	I, III
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	OR
Project Name	Oregon Fair Share (OFS)

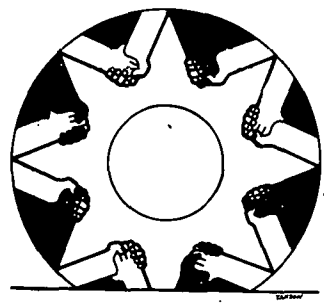
Oregon Fair Share is a statewide grassroots organization working to encourage officials to be more responsive to the needs of Oregonians.

A non-profit group incorporated in 1976, OFS has about 100 members from churches, labor unions and other community groups.

OFS works to achieve its objectives by researching and publicizing issues selected by the members. OFS staff and officers then mobilize the members and others to lobby political representatives. Issues addressed by the organization include utility rates, power production methods, pollution control and employment, all of which can be improved significantly by the use of renewable resources.

Organization	Oregon Fair Share (OFS)
Address	519 S.W. Third Ave. Suite #409 Portland, OR 97204
Contact	Cary Schaye
Telephone	(503) 223-2981

Funded By	Membership and Fundraising; Private Foundation Grants
Cost	$207,000
Congressional District	I, II, III, IV
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

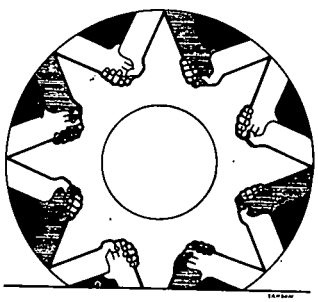
Category	Outreach
State	OR
Project Name	OMSI Energy Center

The Oregon Museum of Science and Industry (OMSI) Energy Center disseminates energy information to the general public.

The Energy Center's extensive energy library and information clearinghouse offers energy conservation advice and solar energy "hands on" labs to students. Monthly evening lecture programs cover specific energy related topics. Finally, exhibits are offered at OMSI in conjunction with tours of the utility sponsored TERA 1 solar home located nearby.

The organization also puts out a monthly newsletter.

Organization	OMSI Energy Center
Address	4015 S.W. Canyon Rd. Portland, OR 97221
Contact	Shanna Reed, Jo Brooks
Telephone	248-5920
Funded By	Battelle Memorial Inst.; Collins Foundation, Junior League, et al.
Cost	$45,000 (Total OMSI Budget: $2 M)
Congressional District	III
Compilation Date	February 1980



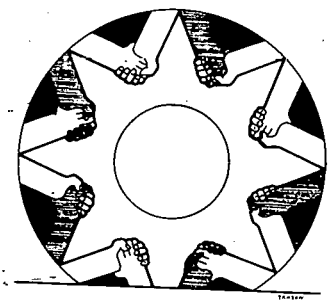
Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	OR
Project Name	Oregon Solar Institute (OSI)

Oregon Solar Institute (OSI) is an outgrowth of the Coalition for Safe Power. It's primary purpose is to help develop an alternative to nuclear energy. Incorporated in March of 1975, OSI focuses primarily on photovoltaics; it is now developing it own concentrating photovoltaic unit.

OSI offers "hands on" workshops in the theory and construction of photovoltaic cells and panels. It has a monthly newsletter and keeps in touch with other groups with similar goals.

Organization	OSI
Address	637 S.E. Harrison Portland, OR 97214
Contact	n/a
Telephone	(503) 232-4741
Funded By	n/a
Cost	n/a
Congressional District	I, III.
Compilation Date	February 1980.



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	OR
Project Name	Portland Sun

Organization	Portland Sun
Address	628 S.E. Mill Portland, OR 97214
Contact	Lynn Youngbar Anthony Stoppiello Marnie McPhee
Telephone	(503) 239-7470

Funded By	Grants & Donations; Workshop & Seminar Fees; Design & Consulting Fees
Cost	n/a
Congressional District	III
Compilation Date	February 1980

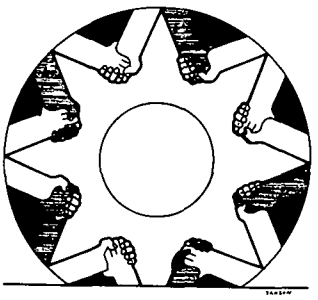
Portland Sun is a non-profit, tax-exempt corporation that provides educational and architectural services on solar technologies for Oregon.

Its goals are to promote solar technologies appropriate to Oregon, to sponsor practical small-scale solar projects in the Portland area, to educate the public about the design, construction, and use of solar applications, and to provide technical and design consulting help on solar projects of any scale. The organization is committed to laying the groundwork for increased local and small-scale commercialization of solar energy for those who cannot install their own solar energy systems.

Portland Sun's programs are educational and architectural, with emphasis on solar technologies that provide basic living needs --shelter, heat, hot water, and food--rather than electrical and industrial solar applications.

The organization has led solar water-heater and solar greenhouse-construction workshops, teaching 300 people how to design, build, and use these systems. It has held solar greenhouse design classes at Portland Community College and solar survey classes at Chemeketa Community College, ...signed a dozen passive solar installations ...eenhouses, additions, and new homes) that ...l soon be built, visited at least 30 sites to determine solar feasibility, and has consulted with people on individual solar projects.

The organization is a clearinghouse for information on solar technologies, and it has received an Energy Conservation Grant from the Oregon Department of Energy.



A group of skilled tradespeople (carpenters, plumbers, electricians) is now forming a collective to work on solar projects. Many of these people have wanted to work with others, but not in the confines of traditional working relationships.

Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	OR
Project Name	Utilities' Energy Conservation Program

Spurred by a growing concern over projected power shortages in the Northwest, Portland General Electric (PGE), North West Natural Gas (NW Nat. Gas), and Pacific Power and Light (PP&L) have taken actions to increase residential energy efficiency.

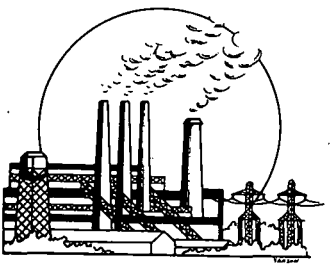
PGE and PP&L offer a no-interest loan to be used for weatherization (insulation, caulking, etc.) of residential housing. PGE (in certain applications) and NW Natural Gas offer low-interest loans for the same purpose.

This loan service includes a home-energy audit and access to a list of recommended insulation contractors. Payback of the loan must be made when the house is sold or at the end of seven years, whichever comes first. Estimated energy savings will range from 40 to 50 percent of space-heating bills.

PP&L has insulated 4,900 homes in the first year. Its goal is 10,000 homes per year.

PGE has implemented an Energy Purchase Policy for those individuals who produce their own electricity. The utility will buy back the energy produced by the individual at the same unit cost as it charges for electricity. This allows the individual the option of using the power grid for storage, obviating the need to have batteries or a mechanical storage unit.

Organization	PP & L Weatherization Program
Address	700 N.E. Multnomah Portland, OR 97232
Contact	Marcia Henry
Telephone	(503) 238-3098
Funded By	Rate Base
Cost	$8 Million Total (no time limit)
Congressional District	III
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	OR
Project Name	Wood Waste Steam Plant

Organization	Eugene Water & Electric Board (EWEB)
Address	P.O. Box 10148 Eugene, OR 97440
Contact	Owen D. Brown Chief Engineer
Telephone	(503) 484-2411

Funded By	Utility Rates, Municipal Bonds
Cost	$1.7 million (1951)
Congressional District	IV
Compilation Date	February 1980

Eugene's Water and Electric Board annually burns approximately 275,000 tons of wood waste to produce electricity and steam heat for Eugene and neighboring communities. The utility has thus significantly reduced local air pollution, which was considerable when "wig-wam" wood incinerators were in use.

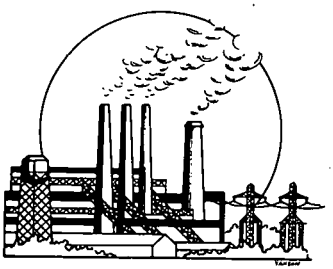
Located on the south bank of the Willamette River, EWEB's steam-electric plant first began burning wood waste in 1940. Today, the plant's three boilers hourly produce 450,000 pounds of steam, which is heated to a temperature of 835 degrees F (at 600 pounds/in ^{2}). During 1977, the steam plant produced 544 million pounds of steam for heat and generated 87,500 kwh of electricity.

The basic fuel used for 70 percent of the plant's operation is Douglas fir bark waste and wood residual. Analysis shows that the material, when dry, has a heat value of 9,840 Btu per pound.

Without the plant, the waste would have to be incinerated or landfilled, the latter of which results in leaching of the soil, spontaneous combustion, land settling and a widespread, and unpleasant odor.

The utility is also investigating the possibility of burning municipal wastes for energy generation. EWEB has cooperated with Lane County, the State Department of Environmental Quality, and the Federal Environmental Protection Agency on such proposed projects.

Critique/analysis: EWEB is a partner with Weyerhaeuser Company in what is recognized as the first successful public-private cogeneration venture in which the steam byproduct is used to generate electricity.



Renewable Resources—A National Catalog of Model Projects

Category	Legislation
State	OR
Project Name	OR Solar Laws
Organization	Oregon State Legislature
Address	Salem, OR
Contact	Oregon Department of Energy
Telephone	(800) 452-7813
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

There were various key solar-related bills passed by the 1979 Oregon Legislature. Active citizens' participation is responsible for the gains made this session and in the future.

SB 337 extends Oregon's residential alternative energy tax credits (25 percent of cost, up to $1,000 per dwelling) to anyone (i.e., renters, landlords, homeowners, and builders who can pass it on to homeowners) who invests in solar, wind, water and geothermal devices. Credits are effective January 1, 1979, to January 1, 1985. These devices will also receive a property tax exemption from January 1, 1980, to January 1, 1998. The bill expands the definition of an alternative energy device to include solar energy systems supplying at least 50 percent of a dwelling's hot water.

SB 517 is Oregon's "solar bank" bill, which authorizes low interest loans (6 1/2 percent) for residential solar/alternative energy devices. The state will grant a tax credit to commercial lending institutions to make up the difference between 6 1/2 percent and the commercial lending rate (or 12 percent whichever is lower). The bill establishes a $10,000 loan limit per dwelling, and is effective January 1, 1980, until January 1, 1985.

SB 299, the solar easement bill, is enabling legislation that allows local jurisdictions to require protection for access to sunght and to encourage the use of solar systems their planning and zoning ordinances. The bill standardizes the content of solar easements.

SB 611 establishes a state "small scale" local energy project loan fund, administered by the Dept. of Energy and with input from an Advisory Committee. It authorizes individuals, small businesses, non-profit groups, and municipalities to apply for loans to develop small scale renewable energy projects. It will be effective upon approval of the bonding by Oregon voters.

SB 638 requires utilities to buy back excess power generated by a person operating a cogeneration or small power facility. The power must be purchased at fair and reasonable rates, while giving due consideration to the requirements of other utility customers, and to the safety and operating requirements of utility systems.

HB 2843 authorizes 35 percent tax credits, spread over 5 years, to businesses that conserve energy through a renewable resource or energy conservation facility. It became effective January 1, 1980.

HB 2780 provides a property and state income tax exemption for commercial gasohol plants. At least 75 percent of the methanol, ethanol, or other substitute fuel produced must be used to make gasohol. Property tax exemption is effective from January 1, 1980 to January 1, 1986. Income tax credits are effective January 1, 1980 to January 1, 1985.

SB 570 defines "cost-effectiveness", and requires that it be considered in energy decision making by state agencies. Life-cycle costs resulting in lower cost power delivered to the ultimate consumer will be considered in the definition of cost-effective.

SB 747 requires state agencies to conduct life-cycle cost analysis and energy-consumption analysis, including the consideration of using alternative energy systems prior to the construction or renovation of major facilities. Designs shall provide for efficient energy systems based on the economic life of the building.

SB 927 creates an Oregon Alternative Energy Commission and individual task forces for solar, wind, water, geothermal, biomass, and gasohol planning. The bill requires task forces to present resource-specific energy plans to the Commission by June 30, 1980, and requires the Commission to present a comprehensive state alternative energy plan to the Governor and the Legislature by January 15, 1981.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	OR
Project Name	Whiteaker Energy Project

In 1979, the Whiteaker Neighborhood in Eugene received from the National Center for Appropriate Technology a $146,843 grant titled Urban Integrated Community Development (UICD). The project is geared toward neighborhood self-reliance in housing, energy, food, recycling, and health.

The Whiteaker Energy Project, part of that program, focuses on planning for the most efficient use of energy in the neighborhood and for the maximum feasible production of energy from renewable resources. To accomplish this aim, it has developed four projects.

The Energy use analysis group is compiling data from a residential survey that was sent out to the neighbors. This data, along with figures on commercial and industrial consumption, will give a picture of the amount and types of energy imported into the neighborhood. Survey data will also be used to determine the degree of insulation and weatherization undertaken to date. With this information and studies of renewable energy available in the neighborhood, an effective strategy can be outlined for reducing energy cost and dependence.

A financial plan is being prepared for the phased development of an Energy Services company to provide insulation, storm windows and other conservation devices and solar hot water systems. The intent is to create a structure that balances neighborhood ownership and worker management. It anticipated that this company will start as a nt venture with an existing company but still be able to capture some of the outgoing capital by keeping a percentage of the sales income in the neighborhood.

The Renter Weatherization Program at present is an advocacy operation working closely with the City of Eugene to ensure that renter weatherization is included in its energy policy.

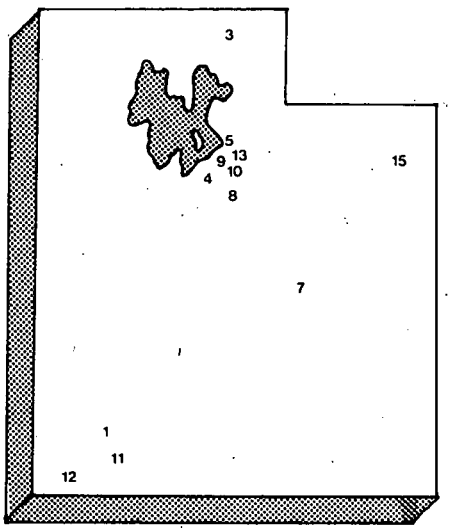
Organization	Whiteaker Community Council, Neighborhood Econ. Dev. Corp.
Address	341 Van Buren Eugene, OR 97402
Contact	Maureen Good
Telephone	(503) 343-7712
Funded By	National Center for Appropriate Technology
Cost	$146,843
Congressional District	IV
Compilation Date	February 1980

Since a mandatory program will probably be necessary, the group is working on ways to make the idea more palatable to landlords (i.e., provide low interest loans for landlords to weatherize, etc.) and equitable to renters. It will also publicize the availability of assistance from the local Community Action Weatherization Program,and with Whiteaker's Project Self-Reliance make available low-cost plastic for windows.

Last, but integral to the Energy Project, is the organizational and educational efforts of the outreach workers. A citizen's committee (WEPAC) has been formed to advise and assist the aforementioned efforts and to help stimulate neighborhood participation. Literature on conservation, weatherization and solar energy is being distributed to the neighbors to help them work toward the neighborhood goal of energy self-reliance.

UTAH

1. Cedar City
2. Erda
3. Logan
4. Midvale
5. Murray
6. Natural Bridges
7. Price
8. Provo
9. Salt Lake City
10. Sandy
11. Springdale
12. St. George
13. Taylorsville
14. Tickaboo
15. Vernal



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Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	UT
Project Name	Underground Solar Greenhouse

Dan Geery raises vegetables and rabbits in a 14' x 30' underground greenhouse he contructed in his backyard. The structure sits 6½' to 9' into the ground and is covered with a corrogated fiberglass roof.

Geery rented a machine to excavate the building site. The upper three feet of exposed earthen walls were sprayed with a lime water mixture to reflect light to the bottom of the greenhouse where the plants are located. Geery also sprays the top of the roof with a lime in the summer to prevent excessive heating inside.

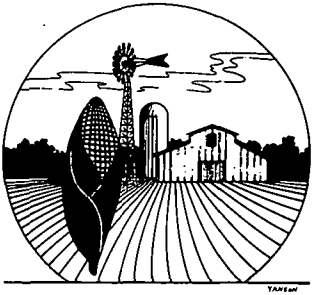
A cooling chimney provides ventilation. It is supplemented by a tunnel/water trap system for evaporative cooling.

Geery's rabbits reportedly help balance the greenhouse atmosphere, consuming the plant-produced oxygen. In turn, the animals provide the vegetables with essential carbon dioxide.

Critique/analysis: Winter heating needs should be helped in part by the ground temperature: a warm 54 degrees Farenheit.

Organization	Dan Geery
Address	447 N. Pugsley St. Salt Lake City, UT 84103
Contact	Dan Geery
Telephone	(801) 359-1454

Funded By	Private
Cost	under $800
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

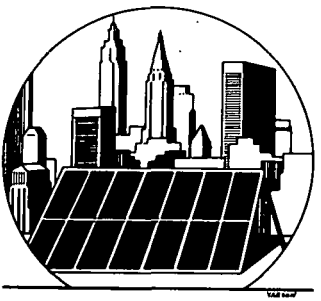
Category	Cities
State	UT
Project Name	City Experiment with Geothermal

Monroe City will soon receive a portion of its energy needs from a low-temperature geothermal system located along the Sevier fault. A production well is now being tested, which, if successful, could be expanded into an operational system by fall 1980. The South Sevier High School would be the initial recipient of the energy.

Energy savings for the school will run around $10,000 annually, experts estimate. Savings for residents will also be substantial.

The utility will be owned and operated by the Monroe City Corporation. A private firm is coordinating the project in conjunction with the University of Utah Geology Department.

Organization	Monroe City Corp
Address	c/o Bruce Saskashita 420 Wakara Way Salt Lake City, UT 84108
Contact	Bruce Saskashita
Telephone	(801) 582-2220
Funded By	DOE & Terra-Tek, Inc.
Cost	$1 million (DOE) $500,000 (Terra-Tek)
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

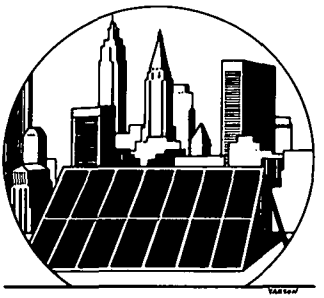
Category	Cities
State	UT
Project Name	Community Development Associates

Community Development Associates recently completed a comprehensive city master plan for Midvale, UT, that strongly recommended development of local geothermal resources for the municipality's energy needs. Approximately 700 acres of prime commercial and industrial properties would be suited to utilize the energy.

Critique/analysis: Although Midvale is technically a suburb of Salt Lake City, the use of these geothermal resources would distinguish and benefit the community.

Organization	Community Development Associates, Inc.
Address	4300 South Main Murray, UT 84107
Contact	Jack E. Willis
Telephone	(801) 268-4134

Funded By	City Government
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Commercial
State	UT
Project Name	La Quinta Motor Inn

August of 1978 brought to completion one of Utah's more extensive applications of solar energy to date. La Quinta Motor Inn, located in Midvale, was built with a large active solar energy system in order to heat its 122 guest rooms and two meeting rooms during cold weather. Solar also supplies about 75 percent of the hot water needed for rooms and laundry all year round. During hot weather the percentage of hot water supplied can be as high as 90 percent due to clearer skies and higher summer temperatures.

The $250,000 system was jointly funded by La Quinta and the U.S. Department of Energy, which contributed $133,000.

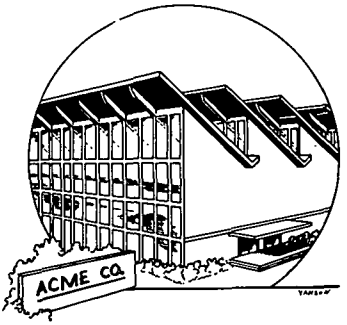
The La Quinta Solar System operates in conjunction with conventional water-to-air heat pumps located in each room. Although these heat pumps perform both heating and air conditioning functions- only the heating system is solar assisted.

In cold weather, the heat pumps transfer heat from water circulating in a closed loop collector to the air in the rooms. In warm weather the process is reversed.

The collector system consists of 144 flat plate collector panels, 3,024 square feet in area. The heat absorbed from the sun is transferred to a solution of water and antifreeze. This solution then becomes a heat exchange medium, warming water in a 2,500 gallon insulated storage tank. The hot water in this storage tank preheats the regular water supply for the rooms and laundry facilities. The tank will store enough hot water to last for three sunless days after which time the electric back-up system is automatically engaged.

The system also has an auxiliary 750 gallon storage tank. This tank stores excess heat until it can be returned to the atmosphere

Organization	La Quinta Motor Inn
Address	I-15 and 7200 South St. Midvale, UT 84047
Contact	Jerry Kimbro
Telephone	(512) 349-1221
Funded By	DOE ($133,000) La Quinta Corp. Funds ($117,000)
Cost	$250,000
Congressional District	II
Compilation Date	February 1980



through cooling towers at night, reducing the energy load during the day.

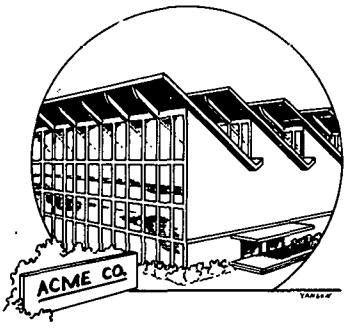
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	UT
Project Name	Neighborhood House Elderly Day Care Ctr.

The Neighborhood House Elderly Day Care Center was designed under a program arranged by the Board of Directors of Neighborhood House. The facility is a result of intensive research by various committees to meet the day care needs of the elderly community.

The framed masonry veneer structure incorporates R-20 insulation in the walls and R-38 insulation in the ceilings. A large wall of double-glazed, wood-framed windows with louver-type blinds faces southwest in order to gain needed winter sun. A forced air furnace system conditions the air and splits the north and south zones effectively. The north side of the building has an air lock vestibule. Glazing on this side is minimal.

Organization	Neighborhood House Elderly Day Care Ctr.
Address	423 South 1100 West Salt Lake City, UT 84104
Contact	Tom Hamacher, Tios Corp.
Telephone	(801) 363-3661
Funded By	Private
Cost	$300,000
Congressional District	II
Completion Date	February 1980



Renewable Resources—A National Catalog of Model Projects

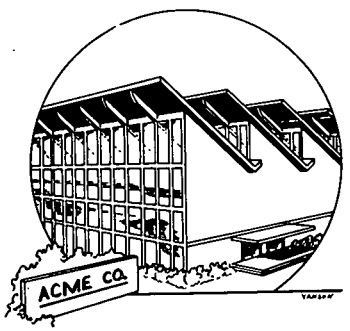
Category	Commercial
State	UT
Project Name	Solar Office Building

As part of a recent remodeling project, the Gardner Partnership Architects added a solar heating system to their office. It consists of 360 square feet of water cooled stainless collectors with black chrome selective coating and single low iron tempered glazing. The collectors are of the automatic draindown type and fluid is carried to a 1,000 gallon storage tank. The entire system is monitored by thermometers and recording clocks.

The system is connected to the existing oil-fired boiler and hot water radiator system.

The system was sized by computer to provide 70 percent of the building's heating requirements. Since its start-up in March of 1978, it has performed as designed. All involved are pleased.

Organization	The Gardner Partnership, Architects
Address	173 South 200 West P.O. Box 549 Cedar City, UT 84720
Contact	Ray Gardner
Telephone	(801) 586-9494
Funded By	Private
Cost	Approx. $9,000.00
Congressional District	II
Compilation Date	February 1980



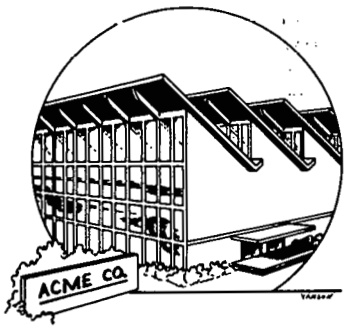
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	UT
Project Name	Swimming Pool-Zion's Motel

The Zion's Park Market and Motel uses sun energy to heat a 21' by 41' swimming pool. Lawrence and Alma Young, owners of the motel are very pleased with the solar system, which on hot days heats the water approximately 90 degrees Fahrenheit.

The system consists of 14 collectors, and was installed in July, 1979.

Organization	Zion's Park Market and Motel
Address	Box 365 Springdale, UT 84767
Contact	Lawrence Young Alma Young
Telephone	(801) 772-3902
Funded By	Private
Cost	$5,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Commercial
State	UT
Project Name	Trolley Square Co-Generation

Trolley Square, a unique center of stores, theaters, restaurants, and a main attraction of Salt Lake City, is soon to implement a plan that will significantly reduce fuel costs, conserve enormous amounts of natural gas and efficiently dispose of a substantial portion of the city's trash.

Tom Smith, director of operations at Trolley Square, has been instrumental in laying the groundwork for the project, which would have Trolley merchants purchase a boiler that would produce heat from urban waste.

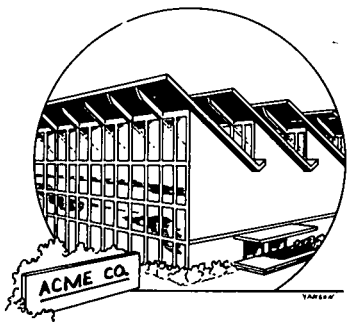
The project is beneficial for several reasons. Firstly, savings for the Square, would be substantial, almost $49,000 in the first year alone. The trash is free and its supply would be guaranteed for 10 years. During that time, with a conservation projection of an annual 12 percent increase in fossil fuel costs, net savings are projected to reach $346,000.

In addition, almost $3 million in natural gas would be conserved by the Square. Up to 40 tons of city trash would be consumed daily in the boiler.

The Trolley Square Associates began to explore the trash-burning project after being turned down on a $600,000 grant request by DOE to install a solar system in the center.

itique/analysis: A feasibility study is not underway. With positive results, work will begin immediately to install the boiler, which will be a landmark for the city of Salt Lake.

Organization	Trolley Square
Address	199 Trolley Square Salt Lake City, Ut 84102
Contact	Tom Smith
Telephone	(801) 521-0988
Funded By	Trolley Square
Cost	$500,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	UT
Project Name	CAP Energy and Conservation Workshops
Organization	Southern Utah Community Action Program
Address	109 S. Carbon Ave. Price, UT 84501
Contact	Mary Slama Al Hamann
Telephone	(801) 637-3491
Funded By	Comm. Serv. Admin Off. of Navajo Eco. Opport. Action Grant; Western Sun; Dept. of Hum. Res.
Cost	n/a
Congressional District	I
Compilation Date	February 1980

The Community Action Agency in Price, UT, is demonstrating to state residents that solar energy is reliable and cost-effective.

The agency's successful programs include an energy workshop conducted on the San Juan Indian Reservation, a training program for Navajo citizens in solar installation, and several greenhouse construction projects.

The greenhouse workshops are designed, coordinated and taught by Al Hamann of the Southeastern Utah Community Action Program. Hamann, an experienced carpenter, has built several greenhouses that demonstrate the effectiveness of retrofitting structures with passive solar technologies.

Hamann plans to hold several greenhouse workshops in the near future, including six scheduled for the San Juan Indian Reservation through a grant from the Office of Economic Opportunity.

The agency also plans to hold two hot-water system workshops, a solar dehydrator workshop, a water purification class, and several workshops on energy conservation. A number of participants in the conservation workshop will be invited to attend a solar contracting training program for Navajo Indians in northeastern Arizona. Job counselling and subsequent job placement will be available to these students.

Critique/analysis: It is largely through the enthusiastic effort and hard work of Al Hamann and Mary Slama (both from SEUCAP), the Office of Navajo Economic Opportunity, and Action grants that the projects have been initiated.

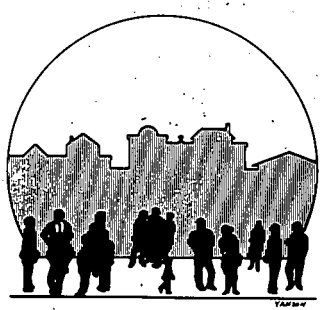
Renewable Resources—A National Catalog of Model Projects

Category	Community
State	UT
Project Name	Southeastern Utah Community Action Program

In 1977 the Community Action Program Agency held a greenhouse workshop in Blanding. Participants built a self-standing solar greenhouse on the grounds of a local nursing home. Residents of the home now cultivate plants and vegetables in the structure.

Critique/analysis: Funded by the Community Services Administration, the Blanding greenhouse was slightly more expensive to construct than anticipated due to higher material costs. Heat generated by the greenhouse is not used in the nursing home.

Organization	Southeastern UT Community Action Program
Address	109 S. Carbon Ave. Price, UT 84501
Contact	Mary Slama Al Hamann
Telephone	(801) 637-3491
Funded By	Community Services Administration
Cost	$3,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	UT
Project Name	Tikaboo: New Solar Community

Solar energy may be the primary energy source for a proposed uranium mining community, Tikaboo, to be located in a remote canyon in southeast Utah.

After researching diesel power and coal gasification plants, the Colorado-based owner of the mine, Plateau Resources, is now investigating the feasibility of harnessing solar power for Tikaboo's energy needs. The area's isolation precludes other forms of electric and/or heat generation.

DOE, Four Corners Regional Commission, Plateau Resources, and Tikaboo Developers, Inc., have conducted a study of the various solar option open to the proposed community. As a result, contracts were established with the Solar Energy Research Institute (SERI) in conjunction with its Modular Passive Solar Home Design Contract held by Boise Cascade.

Additionally, SERI, through its International Solar Data Exchange Program, has expressed interest in working with Israel in the construction of a solar brine pond for the community. The pond would provide hot water for the town's laundry, restaurants, and fast-food operations. Information collected from the project might result in construction of ponds for other community needs.

Plateau Resources, based in Grand Junction, CO, and owned by Michigan's utility, Consumer Power, is developing the uranium mine in Shootaring Canyon.

Organization	Tikaboo Developers, Inc.
Address	Tikaboo Developers, Inc. Tikaboo, UT
Contact	Ken May or Roy May
Telephone	(801) 521-6539 Salt Lake City (801) 564-8626 Green River
Funded By	DOE: Four Corners Regional Comm; Plateau Resources; SERI
Cost	$40,000 (feasibility study)
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Building and Energy Laboratory

The University of Utah School of Architecture recently installed a testing device that students and faculty will use to study the effect of sun radiation on building orientation.

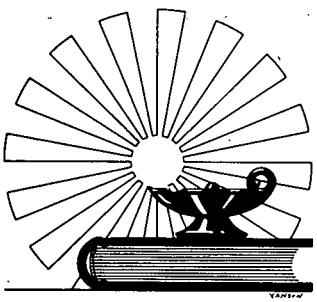
A 20' x 20' x 12' building, equipped with three solar collector systems, is mounted on a moveable foundation. By rotating the building students can determine the effectiveness of sun-shading devices, various combinations of natural and artificial lighting systems, and optimum sun angles for various solar collectors. Heat transfer in building materials will also be studied in the project.

The structure, called the Building and Energy Laboratory, is fitted with a 130-gallon storage tank, a water-to-air heat pump, plumbing, and an auxiliary electric resistance heating element. It also contains a data logger, an electronic footcandle meter, and a pyranometer.

The laboratory was developed by the Graduate School of Architecture, and the Department of Mechanical Engineering. The project is jointly directed by Drs. Robert Boehm and Kurt Brandle. The lab was constructed by students and faculty of the Architecture School and Engineering School in cooperation with the Utah Technical College Skills Center, Salt Lake City.

Organization	University of Utah, School of Architecture
Address	University of Utah Salt Lake City, UT 84112
Contact	Dr. Kurt Brandle & Dr. Robert Boehm
Telephone	(801) 581-6347

Funded By	Weyher Construction Co., Amer. Iron & Steel Institute The State of Utah
Cost	n/a
Congressional District	II
Compilation Date	February 1980



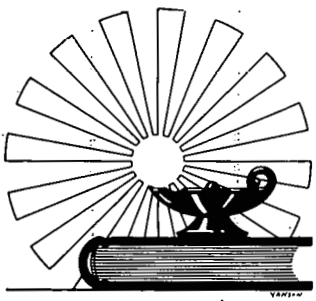
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Dixie College Solar Program

Dixie College in St. George, Utah has implemented a two year solar energy program designed to teach students how to install and maintain a solar energy system. A domestic hot water system was built by faculty and students as a demonstration project for interested students and community residents.

Critique/analysis: Located in the sunniest part of the state, Solar technology has great potential in St. George. With continued efforts and assistance, Dixie College could become a center for vocational training in the field of solar energy for all of Utah.

Organization	Dixie College
Address	St. George UT 84770
Contact	Don Tate
Telephone	(801) 673-4811
Funded By	UT St. Voc. Dept. Dixie College, Local Don. from Indiv. & Businesses
Cost	$5,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Energy and Man's Environment

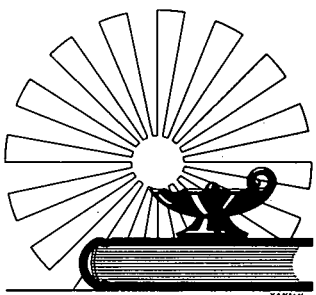
Energy and Man's Environment is a program providing educational materials and training for schools in the areas of energy and conservation.

Among the projects jointly developed by the organization is a puppet show, "Take That, You Monster," in which the antagonist, "energy monster," battles, and finally succumbs to, the heroic "Captain Insulation." The Salt Lake League of Women Voters has presented the show to schools, libraries, meetings and at special activities throughout the intermountain region. The puppet show was created by the Montana League of Women Voters.

Energy and Man's Environment also produces a newsletter, the "Energist," which is distributed to schools and teachers. The program has also developed instructional materials relating to various energy and conservation topics for grades K-12.

The organization has an index of energy-related films and an annotated bibliography of pertinent published materials. Energy and Man's Environment also produces posters, school energy calendars, and several grade-level kits that deal with energy.

Organization	Energy and Man's Environment
Address	c/o Dr. Edward Dalton 1323 Bryan Rd. Erda, UT 84074
Contact	Dr. Edward Dalton
Telephone	(801) 359-8571 882-5582
Funded By	EME National Headquarters & others
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

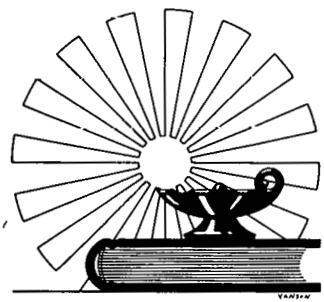
Category	Education
State	UT
Project Name	Geothermal Research

The Mechanical and Industrial Engineering Department of The University of Utah received a grant from DOE to develop direct contact heat exchangers for geothermal energy. The project is underway in various areas throughout Utah and Idaho.

Use of geothermal energy in heat exchangers has been a problem in the past because of the amount of corrosive minerals in geothermal water. In this particular study freon is injected directly into the geothermal source, where it vaporises. It is then transported to a turbine to generate electricity. Afterward, the freon is condensed and used again.

Organization	Mechanical & Industrial Engr. Dept. University of Utah
Address	University of Utah Salt Lake City, UT 84112
Contact	Dr. Robert Boehm
Telephone	(801) 581-6441

Funded By	DOE
Cost	Approx. $80,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

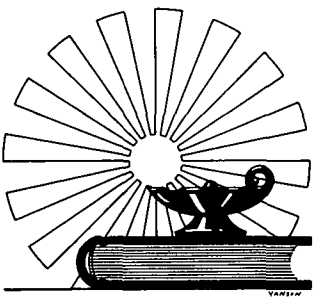
Category	Education
State	UT
Project Name	ICPA Energy Conservation Program

A survey conducted by the Utah Energy Office last year described most Utahans as uninterested in conservation. As a result, the Intermountain Consumer Power Association (ICPA) has created a forty minute slide presentation designed to increase the public's awareness of simple conservation techniques and wise energy decision-making.

The main thrust of the program is to provide conservation as a viable and advantageous energy alternative for low income groups.

The program also includes a chalkboard explanation of power loads and low-cost energy conservation methods. The presentation has been shown to members of the ICPA, to Latter-Day Saints (LDS) Church Relief Society Women's groups, and in several school districts.

Organization	Intermountain Consumer Power Assoc. (IPCA)
Address	8722 South 300 West P.O. Box BB Sandy, UT 84070
Contact	David S. Porter
Telephone	(801) 566-3933
Funded By	ICPA
Cost	$100.00
Congressional District	II
Compilation Date	February 1980



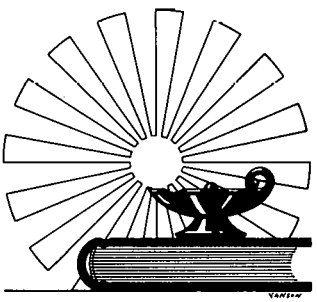
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Naples Energy Fair

Students at Naples Elementary School have begun construction of a solar greenhouse, a windmill and a gasohol still in preparation for their school's energy fair, to be held in March, 1980.

Each grade is responsible for presenting displays of a specific type of energy. Conservation methods will also be presented by students. In addition, the school will display commercial exhibits and energy workshops for fairgoers. Utah's governor and a state senator are scheduled to speak at the event. The fair is one of a series of projects planned for the school's Energy Week, March 23-28.

Organization	Naples Elementary School Vernon School Dist.
Address	1971 South 1500 East Vernal, UT 84078
Contact	John Childs
Telephone	(801) 789-3412
Funded By	Community, Private, Oil Companies
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

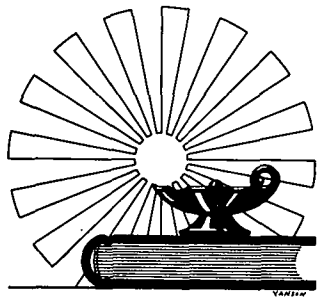
Category	Education
State	UT
Project Name	Solar Elementary School

Millville School, located in the Cache Valley School District just south of Logan, Utah, demonstrates an efficient use of solar energy in passive design. Having been prepared to install an active solar system, the designers ran into problems with the local utility, and therefore decided not to install it. However, results are nonetheless impressive with a very meticulously designed passive school facility.

Included in the school's design are a hydronic heat recovery system, a greenhouse-type structure on the building's south side, and a variety of conservation measures. All windows in the building are double-paned, and comprise 14 percent of the total exterior wall area (all northern windows were eliminated). All sides of the facility are earth-bermed, and deciduous trees exist along the southern window exposures for summer cooling and winter warmth.

Summer temperatures in 1979 never exceeded 70 degrees F, despite the lack of an internal cooling source and outside temperatures of up to 100 degrees F. Winter monitoring has not been conducted.

Organization	Millville School
Address	c/o Richard Clyde Architect Design West 95 South 100 West Logan, UT 84322
Contact	Richard Clyde
Telephone	(801) 752-7031
Funded By	State Property Tax
Cost	$1.4 million
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Solar Elementary School

The relatively warm climate of southern Utah recently inspired officials of the Santa Clara Elementary School to incorporate both active and passive solar systems into blueprints for a new school.

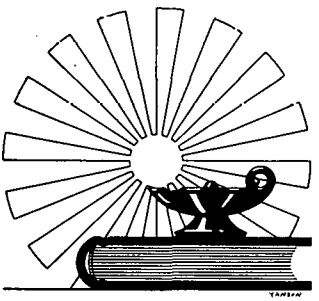
Used mainly for air conditioning, the 120-collector system, which drives a 125-ton lithium bromide chiller unit, reportedly kept the school's interior temperatures below 85 degrees during the summer of 1979.

The Santa Clara Elementary School is built of concrete and concrete block, which provides great interior thermal mass. Exterior walls are covered with a 4" stucco that provides an R-24 insulation and is capable of substantial flexibility.

The entire structure is bermed to eight feet on all sides, with a two-foot window band all around the building providing natural light. Hot water is stored in a 7,000 gallon tank covered with ten inches of urethane and earth.

Critique/analysis: School officials expect the system will provide 100 percent of the school's heating, hot water and cooling needs throughout the school year.

Organization	Santa Clara Elem.
Address	c/o Richard Clyde Architect Design West 95 South 100 West Logan, UT 84322
Contact	Richard Clyde
Telephone	(801) 752-7031
Funded By	State Property Tax
Cost	$1.15 million (Solar System: $80,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Solar Energy Course

"Orange Clockwork," "Blowing Wild," "Hot Stuff" and "Move It" are lecture titles for a University of Utah undergraduate course in solar energy. The class, "Solar Energy, Our Greatest Resource," was introduced fall quarter, of 1979.

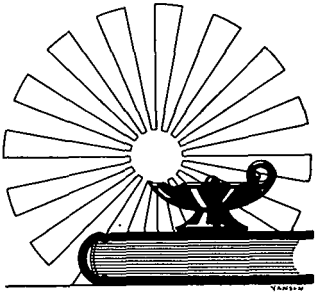
Dr. Robert F. Boehm, professor of Mechanical Engineering at the University, developed the course proposal last May. SERI gave the project approximately $5,000 in financial assistance.

Biomass, solar physics, wind energy, solar architecture, photovoltaics, solar thermal systems, and passive and active solar systems are among the topics the course will address.

The University proposal was among eight projects that received SERI funding from a field of 54 applications. This is the first solar energy course to be offered at the school.

Organization	Mechanical and Industrial Engineering Dept.
Address	University of Utah Salt Lake City, UT 84112
Contact	Dr. Robert Boehm
Telephone	(801) 581-6441

Funded By	Solar Energy Research Institute (SERI)
Cost	Approx. $5,000
Congressional District	II
Compilation Date	February 1980



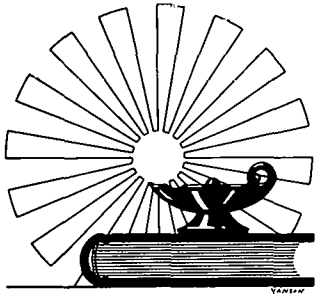
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Solar Energy Test Facility

A 16' x 20' solar collector and rock storage system is being installed on the Engineering Building at Utah State University in Logan. The air-type system, built by Engineering Department students and faculty, will be used for various heating, cooling and storage experiments. It was also constructed to serve as an explicit demonstration device.

Heat from the system will be channeled into a hallway inside the building. Students plan to monitor the project.

Organization	Mechanical Engineering Department
Address	Utah State University Logan, UT 84322
Contact	Dr. Russell Holdredge
Telephone	(801) 752-4100
Funded By	Utah State University Engineering Experiment Station
Cost	$25,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Solar Home Performance Study

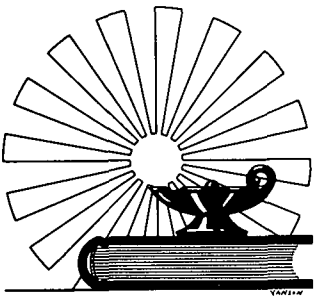
The University of Utah Mechanical and Engineering Department is receiving funds from the Utah Power and Light Company to conduct two computer studies of solar energy technology and its potential effect on utility peaking.

One study is presently recording the hourly energy requirements of several residences, using a computer to simulate weather and climate conditions. The data received represents the fluctuations and gradual changes in utility peaks.

The second study investigates the impact of a solar-powered irrigation system on utility peaks. Normally, a major peak that is attributed to irrigation demands occurs in the summertime.

Critique/analysis: Results of the project, not yet available, will demonstrate the cost-effectiveness of constructing a new power plant in terms of projected regional electricity demands.

Organization	University of Utah Mech. & Indus. Engr. Department
Address	University of Utah Salt Lake City, UT 84112
Contact	Dr. Robert Boehm Dr. Steve Swanson
Telephone	(801) 581-6441
Funded By	Utah Power & Light Co.
Cost	$40,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

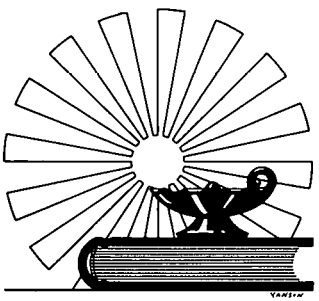
Category	Education
State	UT
Project Name	Solar Pond Research

On the southwest side of the Great Salt Lake lies a solar pond, built in the summer of 1979 by the University of Utah Mechanical and Industrial Engineering Department. The university is now completing a computer analysis of the collection and storage capabilities of the pond. Its durability and efficiency with respect to weather variations are also being studied.

Critique/analysis: Salt-stratified ponds are useful and efficient thermal storage systems; and with Utah's abundance of salt, the ponds may prove to be a very practical and realistic means of energy storage throughout the state.

Organization	University of Utah Mech. & Indus. Engr. Dept.
Address	University of Utah Salt Lake City, UT 84112
Contact	Dr. Robert Boehm
Telephone	(801) 581-6441

Funded By	Utah Energy Consortium Funds, assistance by N. L. Magnesum
Cost	$10,000
Congressional District	II
Compilation Date	February 1980



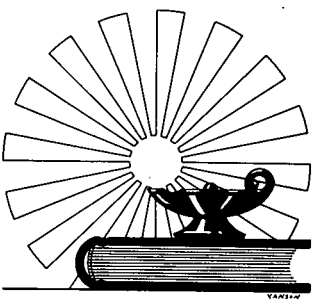
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Solar Turkey Roost

The Utah State University Experiment Station at Ephraim has plans to construct a 1,680 ft^2 airtype solar collector system to be used in a turkey coop. The system, will provide for all winter heating and summer cooling of the building.

The project's construction date has not been determined.

Organization	Utah State University
Address	Mechanical Engineering Department Logan, UT 84322
Contact	Dr. J.C. Battey & D.A. Bell
Telephone	(801) 752-4100
Funded By	Utah Turkey Growers U.S.U. Agricultural Station
Cost	$20,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Solar Window Collectors

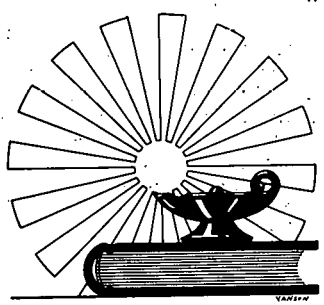
The Building Environment and Energy Lab is presently testing a set of triple-panel windows manufactured in Europe and reportedly very efficient.

The windows receive exhaust air from enclosed room, and heat it between the double panes. The warmed air is then vented back into the building. In addition, the windows are fitted with adjustable Venetian blinds that control the amount of solar radiation captured by the system.

Critique/analysis: Europe is already familiar with these windows, which, though more expensive, are reportedly more energy efficient.

Organization	Univ. of Utah, M____ & Indus. Engr. Dept. Sch. of Architecture
Address	University of Utah Salt Lake City, UT 84112
Contact	Dr. Robert Boehm Dr. Kurt Brandle
Telephone	(801) 581-6441

Funded By	Lawrence Berkeley Laboratory
Cost	$60,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Students Build Solar Homes

Students at Utah Technical College have built one passive-solar home and are just completing a second active-passive solar residence. The two houses stand side-by-side in a subdivision south of Salt Lake City.

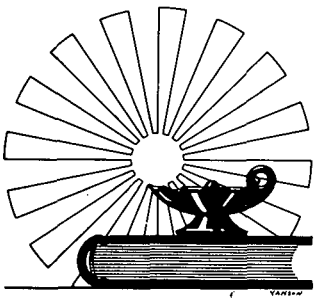
Special features of the passive house include a trombe wall with an insulated roll-down shade, roof overhangs to maximize seasonal heating and cooling, and double-glazed windows. The 1,650 square foot house also has an energy-efficient fireplace.

The five-bedroom active solar-passive home features a 38-collector system that will provide space and hot water heating. Storage is provided by a 1,500-gallon, insulated fiberglass tank.

The home's other features include a trombe wall with roll down insulation, and triple-glazed windows. Two energy-efficient fireplaces with airfeed from the outside and vents inside allowing heat to circulate from the fireplace back into the room.

Critique/analysis: The significance of this project is three-fold. First, the homes were built by students, who may later use the skills to enter the building profession. Second, the State Building Board granted a $15,000 project subsidy to aid in the purchase of solar hardware. This support will help promote solar homes among other government agencies and offices. Thirdly, the residences will be used to publicize solar energy before they are sold on the private market. Review of the homes by the general public will hopefully generate a positive attitude in the state regarding solar energy, and will alleviate the mysticism which currently surrounds solar/renewable designs.

Organization	Utah Technical College
Address	4600 South Redwood Dr. Taylorsville, UT 84107
Contact	Eugene Overson Bill Ingram
Telephone	(801) 967-4111
Funded By	Utah Technical College State Building Board
Cost	Appraisal: Passive home $90,000; Active/Passive $132,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

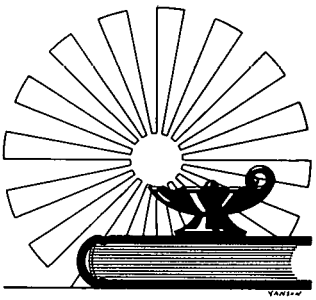
Category	Education
State	UT
Project Name	Sun House Association

The Sun House Association is a non-profit educational organization committed to the development of energy-efficient and cost-effective home construction.

The association is intended as a forum for educating and informing building professionals, architects and homebuilders about energy-efficient construction design.

The organization, which awaits legal incorporation, will deal largely with single-family houses. Concerned citizens will be welcome as associate members.

Organization	Sun House Association
Address	761 Roosevelt Ave. Salt Lake City, UT 84105
Contact	Don Brooke
Telephone	(801) 466-7708
Funded By	Membership/Possible federal (Western SUN)
Cost	$15.00 yearly membership fee
Congressional District	II
Compilation Date	February 1980



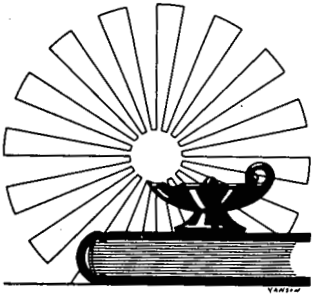
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Undergraduate Research on Energy Topics

The National Science Foundation awarded the University of Utah Mechanical and Industrial Engineering Department a grant allowing undergraduate students to research individual projects over a 12-week period. The "Undergraduate Research Participation Grant" projects to date include work on a trombe wall, a focusing photovoltaic device project, and a fluid-type collector using black fluid and clear tubes.

Organization	Mechanical & Indus. Engr. Dept. University of Utah
Address	University of Utah Salt Lake City, UT 84111
Contact	Dr. Harold Jacobs Dr. Robert Boehm
Telephone	(801) 581-6441

Funded By	National Science Foundation
Cost	Approx. $10,000
Congressional District	II
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Education
State	UT
Project Name	Utah Solar Energy Society

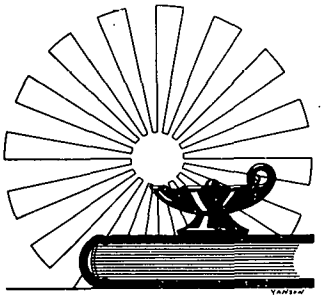
The Utah Solar Energy Society (USES) is a nonprofit educational and scientific corporation founded in 1975. The society meets monthly and has begun publishing a newsletter entitled "The Heliotrope" (meaning "sun follower").

The organization sponsored the 1978 Sun Day and co-sponsored the 1979 Sun Day. It's members teach community education classes on solar energy and give solar greenhouse workshops. They are planning to co-sponsor a workshop on underground houses.

Membership has ranged from 25 to 75 persons. The society was incorporated in the spring of 1976 and achieved a fully non-taxable status in 1977.

Critique/analysis: It is expected USES will make a very significant impact in the state within the next year. The organization expects to receive federal funding (Western Sun) to aid in mailing and publication of their newsletter.

Organization	Utah Solar Energy Society (USES)
Address	P.O. Box 6032 Salt Lake City, UT 84106
Contact	Norm Barnes Don Grey
Telephone	(801) 485-8648
Funded By	Priv. memberships/ Federal-West. Solar Utilization Network (expected)
Cost	$5.00 yearly membership fee
Congressional District	State-wide
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	UT
Project Name	"The Hydrogen Homestead"

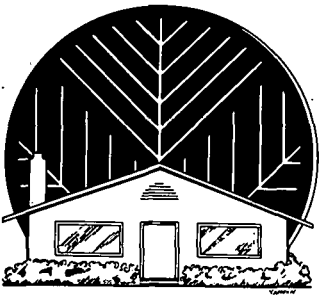
Billings Energy Corporation has constructed a hydrogen-powered home, "The Hydrogen Homestead," that utilizes solar collectors to provide heat for its hydride storage tanks. The Homestead demonstrates residential uses of hydrogen as a replacement fuel for natural gas, propane and gasoline. Gas appliances and vehicles operate on the clean-burning hydrogen. The home serves as a test facility for new prototypes and is a forerunner of a planned 30-home development scheduled to use hydrogen fuel.

The Hydrogen Homestead is intended to demonstrate the possibility of near-term use of the hydrogen/electricity/solar concept for residential use. The best available prototypes have been incorporated into three demonstration areas: production of hydrogen (or electricity), hydrogen storage, and hydrogen usage.

Critique/analysis: The Homestead serves as a test facility for evaluation of hydrogen systems and their interface with electric and solar systems. It is believed that test operation of available hardware will serve to promote interest in hydrogen application and to speed development of hydrogen technology.

Organization	Billings Energy Corporation
Address	2000 E. Billings Ave. Provo, UT 84601
Contact	Jim Dangerfield
Telephone	(801) 375-0000

Funded By	Intern. Funding, pub. Corp., contracting research, gov. cont.
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	UT
Project Name	Solar Residence

Dr. Robert Griggs, a veterinarian in Price, UT, has installed active solar heating systems in his home and office building.

Both systems employ similar solar principles; however, the house is much more elaborate and unique in its design.

Attached to the home's garage is a wall of flat-plate collectors capable of simultaneously heating both air and fluid conductors. Antifreeze is heated by a copper collector plate; and air is piped under the collector's glazing, where it is warmed.

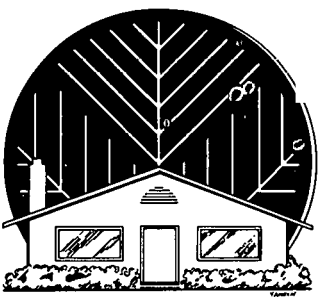
Energy from the heated air is stored in a rock bed until needed. By simple manipulation of dampers, hot air is channeled into the house from the storage bin. Hot water is stored in a 110-gallon tank.

The collectors reportedly capture between 63-66 BTUs per square foot of collector area. This supplies about 50 percent of the home's total heating needs.

Payback for the air heat system is estimated to be between 11 and 13 years. The hot water system is expected to pay for itself in five years.

Critique/analysis: Dr. Griggs is willing to share his enthusiam and experience with those interested. He is an active leader in solar energy in southeastern Utah.

Organization	Dr. Robert Griggs
Address	Rt. 1, Box 141H Price, UT 84501
Contact	Dr. Robert Griggs
Telephone	(801) 637-4256
Funded By	Private
Cost	$7,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	UT
Project Name	Solar, Wood heated Home

George Larson has retrofitted his home with a relatively low-cost heating system that utilizes solar, wood and gas energy.

The system comprises 42 ft^2 of solar collectors, connected in series, that use antifreeze as a conduction fluid. The solar-heated water is stored in an 80-gallon tank, which is also connected to a gas-fired heater and a woodstove.

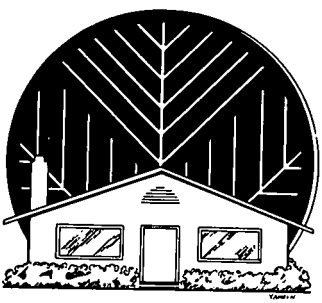
According to one report, the solar and wood heaters, when operating together, are capable of providing 100 percent of the home's domestic hot water needs.

The system is powered by a 300 gallon-per-minute centrifical pump fitted with a thermally-protected magnetic drive and an automatic timer.

Critique/analysis: Monthly hot water savings thus far amount to $10-$15.

Organization	George Larson
Address	577 West 350 South Vernal, UT 84078
Contact	George Larson
Telephone	(801) 789-6150

Funded By	Private
Cost	$1,000 (minus $500 for tax and insulation rebate)
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	UT
Project Name	Underground-geodesic Residence

As one of the few underground houses in the state, this private residence is unique. But what makes it even more special is its design: two geodesic domes, one built within another, that provide a greenhouse and 2,000 ft^2 of living space.

The larger bubble measures 46 feet in diameter and acts as a solar collector for a 12-foot dome below that contains three bedrooms, a living room, bathroom and kitchen.

By April, 1978, the building's only supplemental source of heat was a small electric mobile-home heater.

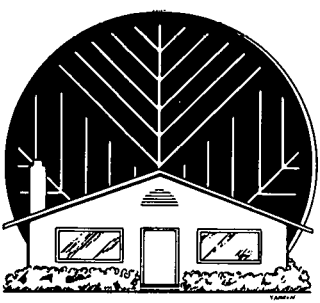
"A fair percentage of our home's heating load is provided directly by the sun," former owner Paul Isaccson said. "It shines through the two domes onto the dark-brown tile-on-concrete floor of the solarium. This heats the tiles, the space above them and to an extent the rooms that surround the atrium."

Isaccson estimated the home will need only 200 ft^2 of flatplate solar collectors for its energy needs. A unique residential environmental control center operates 17 air duct dampers to maintain interior temperatures.

The home has received much publicity, most noteworthy being an article in "Mother Earth News," in April, 1978.

Critique/analysis: The house has experienced leakage problems, resulting in the VA's cautious attitude in continuing guaranteed loans for underground dwellings.

Organization	Paul Isaccson Former owner
Address	4115 N. Foothill Dr. Provo, UT 84601
Contact	n/a
Telephone	n/a
Funded By	VA-Guaranteed Mortgage
Cost	$62,000
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

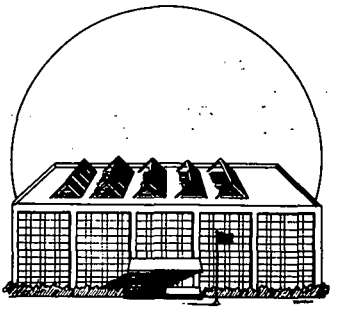
Category	Institutional
State	UT
Project Name	L.D.S. Church Offices Used Geo-thermal

The L.D.S. Church Building, one of the taller structures in Salt Lake City, has implemented a unique heating and cooling system using the area's 60 degree groundwater temperature.

Three 800-ton heat pumps together with a well-water heat exchanger to provide a certain percentage of the building's heat and air-conditioning needs. Figures are now being compiled on the system's performance and cost effectiveness.

Critique/analysis: The important aspect of this system is the warmth of the water when extracted from the ground. The 60 degree liquid is optimal for either space heating or cooling. In spring and fall, when both heating and cooling are necessary, the heated water rejected from the chiller unit can be used for space heating during cold spells, thereby reducing waste heat. This results in obvious savings in the spring and autumn seasons.

Organization	Church of Jesus Christ of Latter Day Saints
Address	50 East North Temple Salt Lake, UT 84150
Contact	n/a
Telephone	(801) 531-3303
Funded By	Church
Cost	$750,000 (estimate)
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

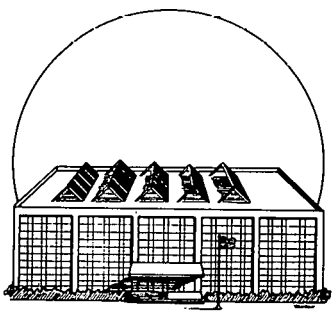
Category	Institutional
State	UT
Project Name	Solar Collector Testing Facility

A solar testing pad located on the roof of the Engineering Building at Utah State University is available for testing of solar collectors on contract basis. The testing facility will handle both water and air collector systems.

In its two years of operation, six to seven collectors have been tested.

Organization	Mechanical Engineering Department Utah State University
Address	Utah State University Logan, UT 84322
Contact	Dr. W.A. Phillips Dr. Russel Holdredge
Telephone	(801) 752-4100

Fundod By	Utah State University Division of Research
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	State
State	UT
Project Name	Geothermal Heat for Utah State Prison

The state of Utah, in cooperation with DOE, the Utah Department of Social Services, the Utah Geological and Mineral Survey, and Terra-Tek, Inc. has initiated the first phase of a project to demonstrate the economic and technical viability of using low-temperature geothermal technologies at the Utah State Prison. The system will provide low-cost space heating and culinary water heating for the prison's minimum security block.

Future expansion of the project may include the use of thermal water for a variety of applications at the prison dairy and slaughterhouse. Where possible, the geothermal energy may be used to heat other buildings and greenhouses, and to irrigate crops.

Critique/analysis: Geothermal resources have significant potential as an alternative energy source in Utah. Low temperature geothermal energy can be used directly, while high temperature geothermal can be used for electrical generation. Utah ranks high in the nation in abundance and optimal location of geothermal resources, which are clean and inexpensive.

Organization	Terra-Tek Inc. & The Utah Energy Office
Address	Utah Energy Office 231 East 400 St. Salt Lake City, UT 84111
Contact	Bruce Saskashita-Terra-Tek Jeff Burks-UT Energy Office
Telephone	(801) 533-5424
Funded By	DOE ($400,000) State ($200,000)
Cost	$600,000
Congressional District	II
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	UT
Project Name	Solar Cells for Natural Bridge Monument
Organization	National Park Servic
Address	Natural Bridges, UT
Contact	Pete Parry (Canyonlands National Park)
Telephone	(801) 259-7165
Funded By	DOE National Park Service
Cost	$400,000 N.P.S. $2.7 million DOE
Congressional District	I
Compilation Date	February 1980

The National Park Services headquarters at the Natural Bridges Monument in southeastern Utah will soon receive all of its electricity from the sun. A project is now underway to install solar cell arrays on a one-acre site just south of the visitors' center. The system will provide electrical power for the entire headquarters area; the existing diesel electrical system will remain as a back-up.

Dedication of the project is scheduled for June, 1980.

While not intended to be a cost effective installation compared to diesel or commercial power, the solar cell system will benefit the area by reducing noise and by contributing to the Service's goal of reducing fossil fuel consumption.

The Massachusetts Institute of Technology, through DOE, is responsible for fabrication of all equipment, including the solar cells, array racks and electronics. The National Park Service is preparing the site.

Critique/analysis: The presence of a solar array at a National Monument is a strong statement for solar energy, especially for this area of Utah. Although extremely expensive at this time, photovoltaics will bring about a conservation of fossil fuels, and clean energy for all the electric needs of Natural Bridges. In addition, visitors from both inside and outside the state will view solar energy at work.

Renewable Resources—A National Catalog of Model Projects

Category	State
State	UT
Project Name	State Energy Conservation

The National Energy Conservation Policy Act (NECPA) of November 1978 includes a grant program to promote energy conservation in certain public and private, non-profit buildings. The school, hospital, local government and public care building grants program is voluntary, provides 50 percent in matching federal funds, and is administered by the Utah Energy Office (UEO).

The grant allows each participating institution to conduct technical assistance audits. It also provides financial assistance to schools and hospitals for implementing energy conservation measures.

To date, five energy auditor training workshops have been held by UEO in Salt Lake City to instruct participating institutions in conducting energy audits on their own building, evaluating operation and maintenance procedures, and developing energy consciousness. About 200 individuals, representing a total of 79 of 400 eligible institutions initially contacted by UEO, received training.

At the time of grant notification for the first cycle of this program, 131 buildings from 19 institutions received TA matching funds, and 14 buildings from four institutions received ECM matching funds. These funds amounted to approximately $100,000 for TA and $1,200,000 for ECM.

Grants for the second grant cycle will be announced on August 29, 1980; grants for the third cycle will be awarded in late 1980 or early 1981.

Organization	Utah Energy Office (UEO)
Address	231 East 400 South Salt Lake City, UT 84111
Contact	Mike Glenn
Telephone	(801) 533-5424
Funded By	DOE
Cost	$12 million
Congressional District	I & II
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	UT
Project Name	UEO Solar Demonstration

The Utah Energy Office Solar Division began preparing a solar energy demonstration last year in an effort to sidestep a major obstacle to acceptance of solar and renewable energy technologies in the state: lack of energy awareness.

Project research first identified the past and present solar programs in the state. Not long afterward, armed with fresnel lenses and orange peels (biomass), among other demonstration items, program coordinators Debbie Doan and Maggie Beers visited classrooms in the Salt Lake area in order to educate students about solar energy. The course was prepared for 4th through 6th graders, but has also been presented to 7th and 8th graders. The presentation attempts to help students understand the distinction between non-renewable and renewable energy, and passive and active systems. Slides, charts, and demonstrations help to clarify these concepts.

Organization	Utah Energy Office
Address	231 East 400 S. Suite 101 Salt Lake City, UT 84111
Contact	Debbie Doan and/or Maggie Beers
Telephone	(801) 533-5424

Funded By	State funds
Cost	Under $100.00
Congressional District	II
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	UT
Project Name	Utility Monitors Solar Systems

The Utah Power and Light Company (UP & L) has monitored residential solar systems since 1973 to study solar energy and its effect on the utility system.

In one monitoring project, UP & L is researching the total energy use of 60 state homes fitted with solar equipment. The project is being conducted for the Public Service Commission.

UP&L is also conducting a more detailed study of six homes, four of which possess solar hot water systems, and one that used solar space heating equipment. The sixth house contains both space and hot water technologies, and is being monitored for HUD.

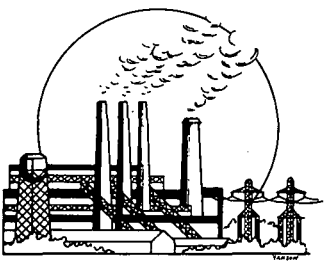
Cost of the two monitoring projects to date is $187,300.

The utility has also funded studies in solar load management ($11,000) and solar irrigation ($7,426).

Critique/analysis: The effects of this research will play a part in defining the utility's attitude toward solar energy, including solar's potential for offsetting peak electricity demand periods.

Organization	Utah Power and Light Company
Address	1407 W. North Temple Salt Lake City, UT 84110
Contact	Dr. Val A. Finlayson Dr. S. Kent Evans
Telephone	(801) 535-2000

Funded By	UP & L
Cost	$205,000
Congressional District	II
Compilation Date	February 1980



WASHINGTON

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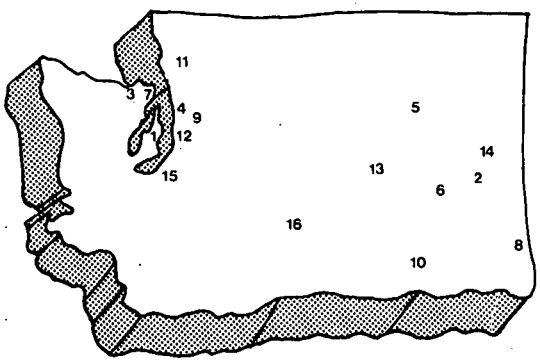

WASHINGTON

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Outreach

Utility

Renewable Resources—A National Catalog of Model Projects

Category	Agricultural
State	WA
Project Name	Solar Assisted Hops Drying

Organization	Washington State University, Dept. of Agricultural Engineering
Address	Pullman, WA 99154
Contact	G.A. Kranzler
Telephone	(509) 335-3243

Funded By	DOE grant
Cost	$6,137
Congressional District	IV
Compilation Date	February 1980

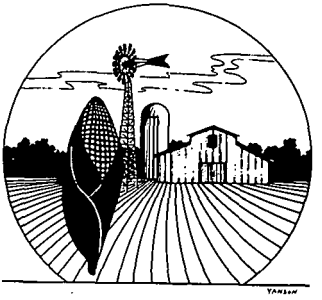
During the fall of 1978, the Department of Agriculture at Washington State University initiated a field project to evaluate the feasibility of using solar energy to dry hops.

A conventional multi-floor hop-drying kiln located in Washington's Yakima Valley was utilized. The two primary reasons for selecting the Yakima Valley kiln were the similarity of the kiln to others in the area and the fact that almost 70 percent of the nation's hops are grown in the Yakima Valley.

Approximately 1300 square feet of collector was constructed, utilizing the existing metal roof as the collector surface. The collector was painted black and covered with corrugated fiberglass glazing. Kiln-dried 2" x 6"'s were used for the collector framing. A small fan was used to move the air through the collector. This air was then circulated and fed into the inlet of the existing drying system for one floor of the kiln. The roof, the actual collector surface, was not insulated. As a result, an estimated 40 percent of the collector heat was lost through the metal roof.

Without the roof insulation the collector operated at an efficiency of approximately 23 percent, supplying approximately 2.5 percent of the load. During the fall of 1979, the roof was insulated, and the collector size was tripled.

Samples of the hops from both the solar-assisted and the normal drying floor indicated no difference in quality. These tests were conducted at the Experiment Station at Prosser, Wa.



The system, if used 30 days a year, will have a pay-back period of less than 13 years. With multiple use of the kiln, and doubling its yearly use to 60 days, the payback period is then just over 6 years.

Renewable Resources— A National Catalog of Model Projects

Category	Cities
State	WA
Project Name	"Energy 1990"

Organization	Seattle City Light
Address	1015 Third Avenue Seattle, WA 98104
Contact	Peter Henault
Telephone	(206) 625-3109

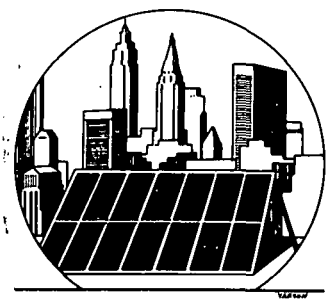
Funded By	City of Seattle
Cost	$500,000
Congressional District	VII
Compilation Date	February 1980

In a 1976 landmark case, the City of Seattle opted for meeting an additional electric demand of 230/megawatts by providing the needed energy through energy conservation.

The history of this program dates back several years. Early in 1975 Seattle City Light requested authority from the Seattle City Council to reserve an option for purchasing power from three as yet unbuilt nuclear plants. The Washington State Environmental Council threatened to bring suit against City Light for failing to conduct an Environmental Impact Statement on the purchase. In response to this citizen action, Seattle City Council funded an independent study, the "1990 study," to assess the City's future electrical demands and the options for meeting them. The potential social, economic, and environmental impacts of these options were also covered in the study.

The study was completed before final approval was made to enter into the purchase of nuclear generated power. The initial report was submitted in February of 1976, the final report in July of 1976. A thirty-member Citizen Overview Committee monitored the study for completeness and validity. The committee included college administrators, environmental planners, nuclear engineers, lawyers, real estate managers, building trade unionists, economists, businessmen, community council ɔers, voter action groups, and public ɜirs consultants.

The general public was kept informed via newspaper articles, radio and television announcements, and programs. In addition, questionnaires were regularly included in all customers' electric bills to provide two-way communication on some basic energy issues. Feedback from the community was tremendous. The broad spectrum of public



involvement led to expansion of the original study to include the development of an energy policy for Seattle's future.

"Energy 1990" attempted to identify the possible consequences of a number of conventional and unconventional strategies for meeting future energy demands.

"Energy 1990" created a conservation plan for the City Light. It was hoped that the use of this plan could save 230 megawatts of electrical generating capacity by 1990. One phase of the plan was to develop an energy-conscious building code. This code is now before the City Council. The plan also created a City Energy Office to deal with all non-electric problems. "Energy 1990" also recommended the development of a contingency energy plan, and encouraged the City Council to establish the following priorities for meeting electrical energy needs: conservation, renewable energy resources, and thermal generation.

Critique/analysis: Although citizen participation was high during the study, it has dropped to a whisper now. There has not been enough public impetus to get the programs working.

Renewable Resources— A National Catalog of Model Projects

Category	Cities
State	WA
Project Name	Neighborhood Technology Program
Organization	Neighborhood Technology Program Metro-Center YMCA
Address	909 Fourth Ave. Seattle, WA 98104
Contact	Lucy Gorham
Telephone	(206) 447-3625
Funded By	HUD
Cost	$167,000
Congressional District	I
Compilation Date	February 1980

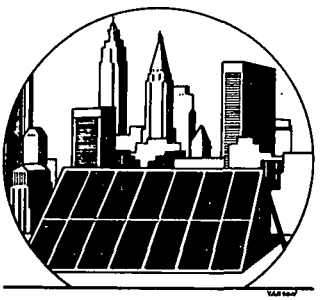
In 1978, a group of citizens in Seattle formed the Neighborhood Technology Coalition, joined forces with the Seattle Department of Community Development, and secured a Community Development Block Grant to perform appropriate technology demonstration programs in low-income neighborhoods. The program is known as the Neighborhood Technology Program.

A steering committee consisting of members of the Coalition reviews proposals and sets priorities. It helps the community develop ideas, shows what outreach is needed, helps disseminate technical information, and works on funding in a cooperative community manner. Its major goals are to give technical assistance to community groups developing demonstration projects; to implement demonstration projects in which neighborhoods are involved; and to sponsor education efforts within the affected communities, the city, and the Coalition itself.

In 1979, the Program used funds to undertake seven projects designed to lower the cost of food, energy, housing, waste disposal, and storm water run-off through the use of appropriate technologies.

Three of the Coalition's projects involve community applications of solar energy.

The first is a solar greenhouse and ssive solar skylight system built at the uth Park Community Center. Excess heat, from this greenhouse and this skylight, is vented to a rock storage bin in the basement of the building. The South Park Senior Citizen's Club will be using the greenhouse to grow food for the senior meals program and to grow seedlings for a nearby community garden.



In the second project twelve windowbox greenhouses and approximately 80 insulated shutters were built. The shutters are a fold-out design consisting of a wood frame covered with two sheets of thermoply.

The project is being conducted by the Active Mexicanos organization, which will be working with a youth employment crew in the workshops. Bilingual instruction booklets for both projects have also been completed for use by Hispanics.

The last project is the contruction of eight solar hot water heaters for the Madison/Jackson Ecomonic Development Council and the Capitol Hill, Madrona, Leschi and Judkins/Rejected Community Councils.

The water heaters were built at community workshops during the summer and fall of 1979.

All projects will be carefully monitored for their technical and ecomonic feasibility, with results expected mid-year 1980.

The Neighborhood Technology Program has been recommended for increased Block Grant funding in 1980

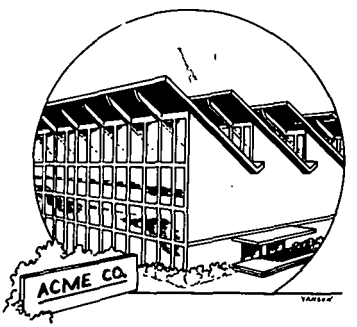
Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	WA
Project Name	Colville Indian Reservation-Tree Seedling Solar Greenhouse
Organization	Colville Confederated Tribes
Address	P.O. Box 150 Nespelem, WA 99155
Contact	Gale Thompson
Telephone	(509) 634-4591 Ext. 243
Funded By	n/a
Cost	$29,000
Congressional District	V
Compilation Date	February 1980

Colville Tribal Forestry (CTF) has a newly constructed, 2,880 ft^2 solar greenhouse. CTF is a non-profit organization formed to raise seedlings for the reforestation of the reservation and to create tribal employment. It sells seedlings to the Forest Service and other tribes.

The new greenhouse incorporates the latest solar heating features to provide an optimum growing environment. The design, which is becoming a standard for new greenhouse construction, utilizes a two-layer, air-supported polyethylene membrane with a supporting metal rib structure. Solar components in the new greenhouse include a reflective insulated northwall to bounce sunlight on the seedlings near the wall and to offset the loss of diffuse radiation, which would normally occur from the north. The thermal blanket consists of two layers of metalized polyester vinyl. laminate with two layers of polyethylene "aircap" sandwiched in between. The blanket achieves an R-value of 6, compared with an R-value of 2 for the conventional double-poly surface.

The perimeter of the 30' x 96' greenhouse is insulated with a 2 inch closed-cell polystyrene, filled to the edge of the membrane h wood chips. Two heat-syphon tubes have n installed in the building to draw hot , which would normally drift to the top of the enclosure, and be lost through the membrane. Thermal storage mass of 6,600 gallons of water, stored in 55-gallon drums, is distributed evenly under the growing beds. Two electric heaters similar to those in the adjacent greenhouses provide a back-up heating source.



The new greenhouse is oriented on an east-west axis approximately 20 feet west of two existing greenhouses, which are oriented on a north-south axis. This change increases the southern exposure and the effectiveness of the solar heating system.

Colville Tribal Forestry has received another grant of $52,000 from the National Center for Appropriate Technology and DOE for the construction and one-year operation and monitoring of two more solar greenhouses for vegetable production. The soon-to-be-built greenhouses consist of a lower greenhouse sunk into the ground and designed to be a cool house and an upper house (which will reach higher temperatures from the ducting of excess heat from the lower greenhouse). Crops such as lettuce will be grown in the lower greenhouse, and tomatoes will be grown in the upper greenhouse.

Renewable Resources—A National Catalog of Model Projects

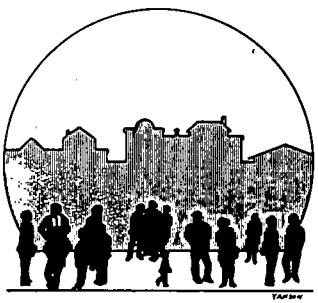
Category	Community
State	WA
Project Name	Highline Senior Citizen's Center

Residents from the community around the Highline Senior Citizen's Center recently constructed and attached a solar greenhouse to the Center. The purpose of the greenhouse is to help heat the Center, as well as to provide an activity center. One of the Center's goals in sponsoring the project was to involve the immediate community in the project. About sixty persons, ranging in age from nine to 83 years, participated in the three-day workshop. Local groups assisting were Ecotope, the Highline Youth Service Bureau (a work-training program), the Burien Telephone Pioneers, the Burien Jay-Cees, neighbors, and Senior Center members.

The 330 ft^2 greenhouse features ten 55-gallon water-filled drums, which act as a heat sink. At present, heat flows in only in the mornings. A fan is to be installed to move heat rapidly into the Center. The greenhouse is expected to reduce the Center's heating bill by 70 percent. The greenhouse will be used for growing flowers, seedlings, and vegetables.

Critique/analysis: Besides heat, the greenhouse is providing activity and social opportunities for the Center members.

Organization	Highline Senior Citizen's Center
Address	1210 SW 136th, Seattle, WA 98166
Contact	Nancy Copeland
Telephone	(206) 244-3638
Funded By	King County-Federal Revenue Sharing
Cost	$5,000.00
Congressional District	VII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	WA
Project Name	Jefferson County Comprehensive Plan
Organization	Jefferson County Planning Commissic
Address	County Courthouse Port Townsend, WA 98368
Contact	David Goldsmith
Telephone	(206) 385-1427
Funded By	n/a
Cost	n/a
Congressional District	III
Compilation Date	February 1980

The Jefferson County Board of Commissioners has adopted the Jefferson County Comprehensive Plan, which states that utilizing renewable resources is the preferred method of producing energy for the county and the only method consistent with the plan.

Jefferson County has a tradition of citizen participation. As far back as 1965, the Jefferson County Board of Commissioners appointed a voluntary citizen advisory group to help shape the county's development. In cooperation with a consulting firm, the Commission prepared the First Jefferson County Comprehensive Plan.

In June of 1979, the Planning Commissioners completed a revised Jefferson County Comprehensive Plan, which the County Board of Commissioners approved and adopted. Intense citizen input was key in all public hearings that led to the adoption of the plan and the resulting set of guidelines. Designed in general to direct growth in the best physical, social, and economic interests of County Citizens, the plan emphasizes energy conservation and resource conservation and enhancement. Its drafters' goals are to assure an adequate supply of energy for County residents, businesses and industries; and to assure that energy production, transmission, and distribution do not adversely effect Jefferson County's people or natural resources.

The energy section of the plan contains 11 policies. Among them are those aimed at encouraging improved design and construction of buildings, encouraging energy conservation and the use of renewable resources, designing programs to renovate and rehabilitate older buildings; designing transportation systems with energy conservation in mind; and encouraging resource recycling.

Renewable Resources—A National Catalog of Model Projects

Category	Community
State	WA
Project Name	West Central Area Community Center
Organization	West Central Area Community Center
Address	Pettit Dr. & Mission Ave., Spokane, WA 99205
Contact	Kathy Reid
Telephone	(509) 328-5104
Funded By	HUD-Community Development Block Grant (CDBG)
Cost	$ 1,252,000 (total) $30,000,000 (Solar)
Congressional District	V
Compilation Date	February 1980

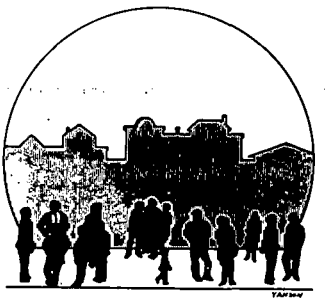
A 20,000 sq. ft. "passive" community center, funded through HUD's Community Development Block Grant (CDBG) Program, was recently completed in a low-income neighborhood in Spokane.

The project and design grew out of over three years of collaborative efforts of the architect and a task force. The task force, composed of six people chosen by the neighborhood steering committee and five people chosen by the City Planning Commission, made low maintenance cost rather than initial costs, the primary consideration.

The building was built from a modular design. It uses direct solar gain, a new Trombe wall, and a retrofit Trombe wall as part of the original structure. In addition, earth-berming, landscaping, and heavy insulation have been added.

The Community Center is expected to meet a large portion of its operating expenses from tenant rents. Included are a day-care center, a gymnastics school, a post office, a health clinic, a youth center, and both recreation and service areas. In addition, the proceeds of Bingo games are expected to generate additional funds to meet operating expenses.

Annual solar contribution is projected o be 30 percent for the areas adjacent to the direct gain and new Trombe wall. Washington Water Power Company will equip the building with instruments for recording performance data.



Critique/analysis: The building may require some adjustments by users, particularly in the direct gain area, which will house a day-care center.

The solar system analyst believes the building could have been designed better. In particular, the use of a courtyard means great heat loss since the exterior surface is relatively great. In addition, a central mechanical system instead of separate mechanical systems for each module would have allowed excess heat to be drawn from solar areas for use in non-solar areas.

Renewable Resources—A National Catalog of Model Projects

Category	Education
State	WA
Project Name	Adams County Workshops

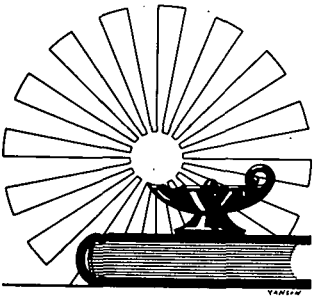
Organization	Adams County Planning Department
Address	P.O. Box 334 Othello, WA 99344
Contact	John Taylor
Telephone	(509) 488-9441

Funded By	Washington State Energy Office
Cost	$18,000
Congressional District	V
Compilation Date	February 1980

In January of 1979, the Adams County Planning Department organized a series of ten weekly workshops on weatherization, energy conservation, and solar applications. The workshops, designed for homeowners and builders, were free. The goal of the program was to educate people about energy conservation and solar energy prior to building construction.

Besides sponsoring the workshops the Planning Department set up a library of resource materials on energy conservation and renewable resources. The library contains articles, reports, books, floor plans for active and passive solar homes, and manufacturer's information sheets. Information on solar retrofits, weatherization methods, wind energy, and other topics is available, as well as some audio-visual aids.

Critique/analysis: The workshops met with limited success. Attendance varied from five to twenty. However, the sessions stimulated community interest in conservation and solar energy as evidenced by the increase in the number of building permits issued for buildings that incorporate more than the minimum required solar-or energy-conservation measures.



Renewable Resources—A National Catalog of Model Projects

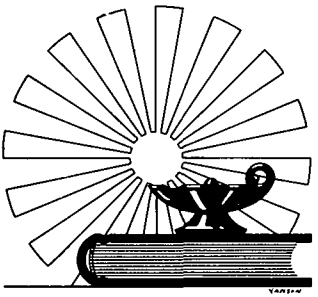
Category	Education
State	WA
Project Name	Antioch West Universit Appropriate Technology Program
Organization	Antioch West Ur...ist
Address	1729 17th Avenue Seattle, Washington
Contact	Theodore Gage
Telephone	(206) 323-2270
Funded By	Antioch West Univeristy
Cost	Depends on Tuition; $550 half-time
Congressional District	III
Compilation Date	February 1980

Antioch West University offers a Master of Science program in "Appropriate Technology and Community Self-Reliance." Students earn 35 to 39 self-designed credits and take six non-elective core courses to attain the degree. The courses are geared not only to engineers, but also to energy planners.

One of the core courses, "Community Self-Reliance," focuses on community organizations and development concepts in which appropriate technology functions as both a vehicle and a desirable end-state. Another course, "Design Application," focuses on applying appropriate technology to specific project applications.

Two other core courses focus on energy planning. In the first section, students are introduced to energy planning and to the concept of Ends-Use matching. The second section brings in information on the economic, transportation, and food production/distribution implications of energy use.

A fifth core course in the program, "Appropriate Technology," examines the scientific basis of several appropriate energy technologies.



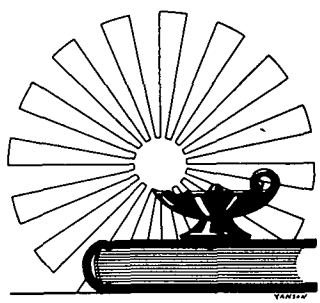
Renewable Resources—A National Catalog of Model Projects

Category	Education
State	WA
Project Name	Energy Management Program
Organization	Edmonds Community College
Address	20000 68th Ave. W. Lynnwood, WA 98306
Contact	Elaine Weitz
Telephone	(206) 771-1507
Funded By	Edmonds Community College
Cost	n/a
Congressional District	II
Compilation Date	February 1980

With the assistance of regional energy experts, Edmonds Community College has developed a curriculum program to train people as Energy Management Technicians.

The Associate of Technology Arts Degree carries a minimum 35-credit requirement. The full course has a 50-credit minimum, and Electives are 10 credits. Fees are $10.20 per credit ($20.00 per credit for out-of-state students).

Courses include an Introduction to Energy, Materials and Design in Conservation, Solar Energy Concepts, Renewable Energy Systems, Practical Thermodynamics, Energy Electronics, Auditing and Calculation, Commercial Buildings, Lighting and Acoustics, Advanced Solar Energy Concepts, and Energy Building Codes.



Renewable Resources—A National Catalog of Model Projects

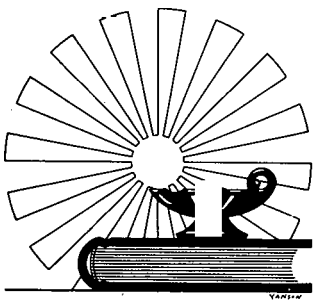
Category	Education
State	WA
Project Name	Micro-Environment Research Group
Organization	Micro-Environment Research Group
Address	6549 Palatine North Seattle, WA 98103
Contact	Bjorn Lunde
Telephone	(206) 789-4058
Funded By	Seattle City Light Education Grant, private income
Cost	$5,000
Congressional District	I
Compilation Date	February 1980

"Heliark" is a 200-foot salvaged barge that serves as an appropriate technology, research, education, and demonstration center for the Micro-Environment Research Group (MERG). MERG was founded in 1973 by a small group of concerned individuals involved in the University of Washington Experimental College.

The "Heliark" has on board a passive-heated deck greenhouse and workshop with a wood-heated back-up system, a 300-watt windmill made from recycled materials, an anaerobic composting system, a unit producing methane from recycled sewage, a rainwater collector and distillery, a 10-foot tracking parabolic collector, a microprocesser, an experimental garden and an algae pond. A geodesic dome over a solar heated classroom has been proposed.

With a $5,000 grant from Seattle City Light, MERG developed a renewable energy study program for elementary schools. This program features classroom displays of various renewable resource gadgets, renewable-energy equipment, and daily lesson plans.

The "Heliark" has had between 500 and 1000 visitors at its off-shore location. Tours or visits are available with prior arrangement.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	WA
Project Name	Passive Solar Heating Seminars

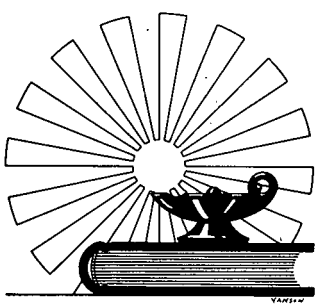
Over the past couple of years, Battelle Pacific Northwest Laboratories has conducted passive solar heating seminars throughout the Northwest. The seminars have been attended by hundreds of people from all walks of life. The seminars, each approximately seven hours in length, are presented with ample visual aids and in a non-technical manner.

The cost of the workshops have been held down by using complementary community facilities arranged for by the host sponsors. The host sponsor also does most of the advertising for each seminar.

Organization	Battelle Pacific Northwest Laboratories
Address	P.O. Box 999 Richland, WA 98352
Contact	Laird Parry or Ellwood Werry
Telephone	(509) 375-2345

Funded By	DOE
Cost	$2,500
Congressional District	IV
Compilation Date	February 1980

Critique/analysis: To provide an avenue for audience input to the project, attendance surveys are filled out by the audience following each session. Response to the program has been extremely positive.



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	WA
Project Name	Seattle Opportunities Industrialization Center

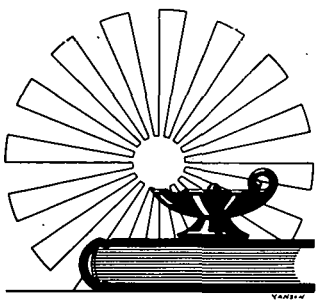
Economically disadvantaged residents of Seattle and King County now have an opportunity to be trained in the energy-conservation and solar energy field through the Seattle Opportunities Industrialization Center (S/OIC). S/OIC is a private, non-profit community-based organization incorporated in 1966 as a "manpower" training organization in Seattle.

In June of 1979, a staff-training program was offered to provide vocational instructors and curriculum planners with training and "hands on" experience in solar technology.

A solar water heater installation training program will be available starting in spring 1980. Cost of tuition and fees are covered by Comprehensive Education and Training Act (CETA) funds or Basic Education Opportunity Grants (BEOG). Job-development and placement services are offered along with the course.

Organization	Seattle Opportunitie Industrialization Center (S/OIC)
Address	315 22nd Ave., S, Seattle, WA 98144
Contact	Tom Eckman
Telephone	(206) 223-2805

Funded By	National Center for Appropriate Technology WA Commission for Vocational Education
Cost	$24,000
Congressional District	VII
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

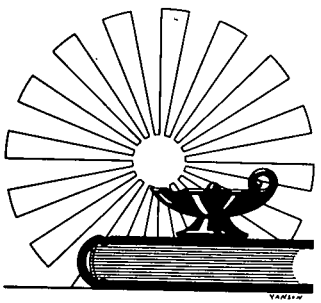
Category	Education
State	WA
Project Name	Solar/Conservation Courses at Washington State University
Organization	Washington State University (WSU)
Address	Dept. of Mechanical Engineering, Pullman, WA 99164
Contact	Professor James Englund
Telephone	(509) 335-3220 (509) 335-8654
Funded By	n/a
Cost	n/a
Congressional District	V
Compilation Date	February 1980

Washington State University (WSU) has a number of solar and energy-conservation research courses.

James Englund, who is responsible for teaching many of these courses, established a solar testing and research laboratory at WSU. The laboratory is primarily, although not exclusively, directed towards research and testing on active solar components.

Among Englund's energy courses is "Thermal Systems," a senior level class for mechanical engineers. This highly technical course covers solar heating and heat-storage systems, as well as various aspects of energy economics. Another course taught by Englund, the "Design of Thermal Systems," is also a senior mechanical engineering design class. A course on "System Design" is geared both to students majoring in engineering and those concentrating on other areas. One-quarter of this course is spent looking at energy studies, with solar installation, heating, and power covered during the class.

Englund reports that the subject matter and courses may vary from semester to semester.



Renewable Resources—A National Catalog of Model Projects

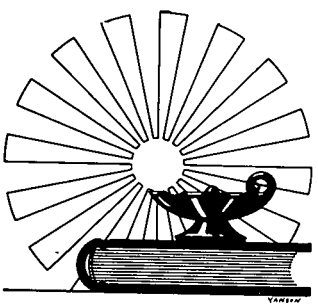
Category	Education
State	WA
Project Name	Solar 1979 Contest

Model solar panels are being developed for efficient water heating by students and staff in a project at Eastern Washington University.

The students and staff built two types of collectors. Their aim was to compare the efficiency of the two designs in a two-hour time period. The flat-plate collector took honors for efficiency. The parabolic concentrating collector caught and passed the flat-plate collector after 2½ hours of operation.

Organization	Eastern Washingto Univ., Dept. of Industrial Education & Technology
Address	Cheney, WA 99004
Contact	W. Dean Martin
Telephone	(509) 359-7003

Funded By	Eastern Washington University
Cost	Minimal (due to recycling) both projects $500
Congressional District	V
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	WA
Project Name	Washington State Environmental Education Programs
Organization	Washington State Environmental Education
Address	Shoreline District Offices, NE 158 & 20th Ave. NE, Seattle, WA 98155
Contact	Claire Dyckman Christina Peterson
Telephone	(206) 365-0433
Funded By	Safeco & USDA
Cost	$10,000
Congressional District	VII
Compilation Date	February 1980

The Washington State Environmental Education Office has developed various programs designed to educate students and teachers about energy problems.

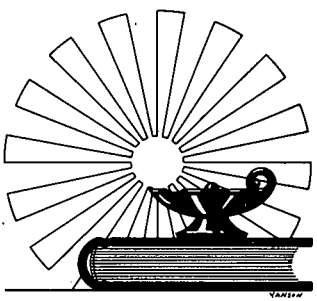
In 1978, the Office developed a curriculum entitled "Your Energy Future-Energy 2000." Students in the sciences, social studies, and humanities classes, in 28 private and public schools, were asked to submit energy-efficient projects in a competition. Selection and presentation took place at an Energy Fair in May 1979. Forty-nine projects were submitted.

The projects were on display at the Seattle Center in conjunction with an awards ceremony. Juanita High School took the grand prize for a greenhouse design.

A second energy curriculum developed by the Office is "Energy, Food and You," which grew out of a model farm project conducted in 1975 with an emphasis on gardening.

"Energy, Food and You" offers elementary and secondary level curriculum guides that outline activities on global food problems, energy and resource use in the United States food system, and energy-efficient nutrition. One-or two-day workshops for teachers who use the program are conducted. Yet another solar curriculum is "Children of the Sun".

Energy workshops have been held for four years now, with attendance of up to 70 teachers per quarter. The classes are offered for college credit.



The coordinators believe that instructors must fully understand energy to teach courses about it, so "hands on" workshops are held each quarter. The trained teachers subsequently hold in-service training for other teachers in their schools. In this way, the program has spread throughout the state; along the way, it is refined and updated continually by the participants and coordinators.

Renewable Resources—A National Catalog of Model Projects

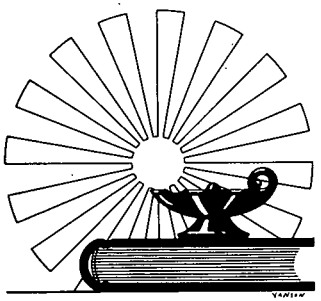
Category	Education
State	WA
Project Name	WSU-Passive Research Project
Organization	Washington State Univ., School of Architecture
Address	Pullman, WA 99164
Contact	Robert Allen
Telephone	(509) 335-1737
Funded By	Washington Power
Cost	n/a
Congressional District	V
Compilation Date	February 1980

In the fall of 1977, the School of Architecture at Washington State University (WSU), began a research project designed to test the viability of passive solar design principles in Eastern Washington State.

Two identical 169 ft^2 structures were located near campus. Renovated and mounted on rotating bases, the buildings are of a standard wood-frame construction. They are insulated with six inches of fiberglass batt in the ceiling and three inches in the walls. One wall in each building is mostly double-pane glass. The units were heated with three-kilowatt electric baseboard heaters, which were monitored with kilowatt-hour meters. Both buildings were fully instrumented.

During the 1977 heating season, data was gathered on the effects of orientation and thermal mass on passive design. In the 1978 heating season, a few tests on the effects of moveable insulation were conducted. During the 1979 heating season, more comprehensive tests on the combined effects of orientation, thermal mass, and moveable insulation were run.

Test results indicated that orienting the building toward the south saved 19 percent more energy than did orienting it northward. Without thermal mass, overheating occurred with temperatures reaching 108 degrees F. In another test, both buildings faced south and one contained four 55-gallon drums filled with water. A 19 percent energy savings was achieved in the building containing the mass.



The final test faced the unit with mass south and the unit without mass north. A 30 to 60 percent energy savings was indicated for the south-facing unit. Movable foam panels installed at night saved another 14 percent.

Critique/analysis: Approximately 50 students and faculty members have been involved thus far in this research project. Most work was done by the undergraduate students of the Department of Architecture with the aim of demonstrating the nature of the research process, as well as producing usable data. Continued research on passive solar design concepts are planned. As is disemenation of the information gathered by the classes at the University.

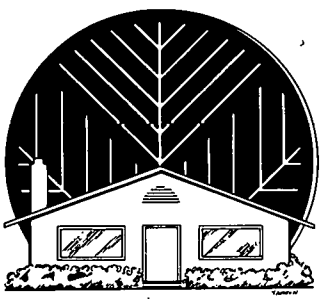
Renewable Resources—A National Catalog of Model Projects

Category	Housing
State	WA
Project Name	Otis Orchards - Passive Solar Home Development

Incorporating passive solar energy and water-conservation devices, twelve solar homes will be built in Otis Orchards, near Spokane, Washington. One home with an active solar energy system has already been constructed, while the rest will be built in the spring of 1980.

The passive solar systems incorporated into the homes cost about 5 percent of the total purchase price for the house, or about $3,000-$4,000 each. It is expected that the passive systems will provide 25 to 50 percent of the energy needed for each home.

Organization	R.H. Mayer Corporation
Address	3403 Euclid Ave., Spokane, WA 99207
Contact	John Zeller
Telephone	(509) 535-4192
Funded By	Conventional financing; mortgage from Spokane lending institution
Cost	$60,000-$80,000 per home (Five percent is solar portion)
Congressional District	V
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Industrial
State	WA
Project Name	Rocket Research Company

Rocket Research Company is involved in a five-phase program to test the feasibility of using waste heat recovery from the aluminum industry for district heating.

In the first phase of a five-phase program, a team has conducted a detailed technical and economic evaluation of thermal energy storage from process heat and waste-heat recovery in the aluminum industry. Phase two of the program will detail pilot-plant design, phase three will be the construction and testing of the pilot facilities, phase four will include full-scale demonstration of the project design, and phase five will consist of building and monitoring the demonstration project.

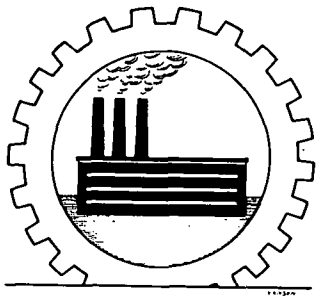
In the preliminary study, a system was identified to recover large amounts of the low-grade waste heat from the Intalco plant at Ferndale. The proposed system design incorporates heated water storage of 100 million gallons in above-ground, insulated, unpressurized steel tanks.

DOE is currently funding phase two of the program. At this stage, the goals are to complete design details of the pilot plant taking both technical and economic aspects into account and to use the pilot plant model developed to re-evaluate the original program concepts. Key in this re-evaluation is recalculating the economic impact.

There are no apparent technological barriers associated with the implementation of this type of waste-heat recovery system.

Organization	Rocket Research Company
Address	York Center, Redmond, WA 98502
Contact	Ron Stryer
Telephone	(206) 885-5000

Funded By	DOE
Cost	$1,090,000
Congressional District	III
Compilation Date	February 1980



Estimates of system performance from the Intalco facility, when coupled to district heating in the nearby cities of Ferndale and ellingham, show a possible displacement of $.37 \times 10^{12}$ Btus/year of fossil fuel energy. his is enough to provide for the space-and water-heating requirements for a mix of large and small commercial and single-family residential users, equivalent to 12,000 homes. Average cost of the recovered energy, spread over the proposed system's 30-year expected lifetime, is predicted to be one-third the average cost of fossil fuel during the same period.

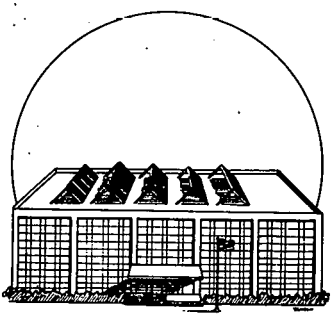
Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	WA
Project Name	Kitsap Regional Library

The new Kitsap Regional Library in Bremerton, Washington, has been designed for energy efficiency. The structure features subterranean construction, and a hot-water and radiant space-heating system designed for conversion to a solar water-heating system at a later date.

Critique/analysis: The library has dropped plans to convert to solar energy in the near future since sunshine seems to be inadequate for the post-conversion system.

Organization	Kitsap Regional Library
Address	1301 Sylvan Way; Bremerton, WA 98310
Contact	Irene Heninger
Telephone	(206) 377-3955
Funded By	n/a
Cost	$2.1 million
Congressional District	VI
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Institutional
State	WA
Project Name	Soap Lake High School Greenhouse
Organization	Grant County Community Action Council, Inc.
Address	604 West Third Ave. Moses Lake, WA 98837
Contact	Greg Higgins Soap Lake, WA
Telephone	(509) 246-0261
Funded By	Grant County Community Action Grant, School District #151
Cost	$4,800
Congressional District	IV
Compilation Date	February 1980

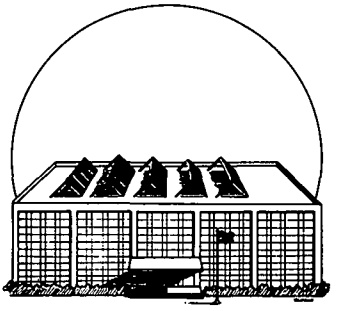
Students, faculty and the community of Soap Lake have access to a solar greenhouse. This greenhouse project, planned jointly by the school board, science faculty, and an architect, is designed to function as a learning environment for the school and surrounding community interest groups. Reduced operating costs of the greenhouse and supplemental heat for the adjacent classrooms were factors in choosing solar.

The greenhouse is attached to a classroom. It uses the existing roof overhang and brick end-abutments as part of its roof and end walls. Total floor area is 580 ft^2, with 25 ft^2 in each of two shaded entry ways. The upper portion of the south glazing consists of about 100 ft^2 of exterior glass with an inner glazing of clear acrylic to allow visibility. The remaining 558 ft^2 of glazing is composed of exterior fiberglass with an inner glazing of polyethylene film. The south wall is made of 3.5 foot concrete block, with two inches of foam insulation on the outside, plus bermed earth. End walls are insulated woodframe construction.

Heat storage mass for the 10' x 70' structure consists of the brick classroom walls and 2,640 gallons of water located in black-painted 55-gallon barrels stored under greenhouse growing beds.

Summer cooling is provided by two 8 ft^2 manual vents. A fan (8 inches in diameter) exhausts air through one vent and pulls it through an evaporative cooler fitted to the vent on the opposite end of the greenhouse.

The greenhouse is currently used by students, the Soap Lake Garden Club, and Soap Lake Food and Nutrition Program.



Critique/analysis: The Soap Lake High School is typical of many schools built in the 1960's. Large expanses of single-glazed windows and minimal wall insulation make these schools expensive to operate, especially in eastern Washington's severe winter climate. The use of large attached greenhouses can significantly reduce fuel consumption while providing a valuable learning environment and an aesthetically pleasing addition.

Renewable Resources— A National Catalog of Model Projects

Category Low Income

State WA

Project Name Cowlitz Solar Greenhouse

Members of the Cowlitz Tribe of Washington have constructed an inexpensive solar greenhouse on their farm. The 1700-member tribe has for years operated an organic farm near Sumner, WA. The farm provides food for the tribal members, other tribes, the elderly, local Food Banks, and anyone else in need.

The greenhouse, constructed of mostly salvaged materials, measures 14.5' x 20' and has a 12 foot ceiling. It is plastic-glazed on the south and southern third of the east and west exposures. The external appearance is that of a log cabin. A composting shed is attached to the western wall with air ducts from the ceiling and floor. Heat from the compost provides a draft that delivers carbon dioxide from bacterial respiration to the greenhouse and returns oxygen from photosythesis to the shed. This technique reduces the carbon dioxide deficit common to solar greenhouses.

Critique/analysis: The greenhouse has reduced planting costs and has increased the overall food yield. The social benefits have also been considerable. The farm has contributed produce to low-income members, especially the elderly of the Cowlitz and other tribes in the area.
It has helped the Cowlitz maintain cohesiveness: many members have become involved and interested the activities relating to the farm.

Organization Small Tribes of Western Washington

Address 2815 Dale Lane East
Tacoma, WA 98424

Contact Mary Cloquet

Telephone (206) 922-9272
or
(206) 922-5950

Funded By CSA

Cost $150

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

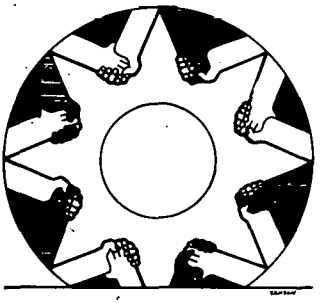
Category	Outreach
State	WA
Project Name	Ecotope Group, Inc.

Ecotope is an appropriate technology, research, demonstration, education, training, and consulting non-profit organization serving Washington, Oregon, and Idaho. It is a worker-managed collective of about 22 people, who work in teams. The various teams concentrate on design, methane conversion, operating a resource center, workshops, training, slide shows, and publications.

Since its inception in 1974, the Ecotope group has become a considerable force in the solar movement in the northwest. It was an original Sun Day sponsor. It helped direct solar policy and legislation, aided in the Seattle "Energy 1990" study, consulted with the Bonneville Power Administration, helped develop a conservation plan for the State of Montana, and conducted numerous workshops. Ecotope is now working more with wood-space heating as it is a predominant northwest heating source. They have also done computer modeling to evaluate solar greenhouse performance. Ecotope is also researching ways to overcome investment barriers to new technologies. Emphasis is placed on educating bankers, architects, loan officers, and others in a position to facilitate solar development.

Organization	Ecotope Group, Inc
Address	2332 Madison Seattle, WA 98112
Contact	Belinda Boulter
Telephone	(206) 322-3753

Funded By	State, Federal Government and Public Agencies
Cost	n/a
Congressional District	VII
Compilation Date	February 1980



Renewable Resources— A National Catalog of Model Projects

Category	Outreach
State	WA
Project Name	Energy Forum Northwest
Organization	Energy Forum Northwest
Address	University of WA Continuing Education Mail Stop DW 20 Seattle, WA 98195
Contact	Rob Wilkinson or Gordon Thomson
Telephone	(206) 543-0980
Funded By	HEW grants
Cost	$74,000
Congressional District	VII
Compilation Date	February 1980

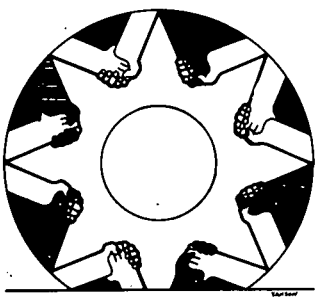
Energy Forum Northwest (EFN) was created by the University of Washington Community and Organization Development program. Its purpose is to encourage active individual and community participation in the search for new ways to meet the energy demands of the Pacific Northwest. EFN sponsors various activities to accomplish this goal.

For the last several years EFN has sponsored two conferences on renewable energy for resource people. The Conference provided an opportunity for people to share their own experiences in organizing conservation programs or using appropriate energy technology in their communities.

In another project, EFN is helping to gather and organize technical information on a wide range of low-cost, durable, and environmentally-sound appropriate technology systems. This material will be included in an Energy Resource Guide being prepared for distribution in early 1980. One section of it will feature profiles of five NW communities. Their energy problems and proposed solutions to them will be examined.

In the Resource Guide will be a Community Development Planning Scheme, for communities who want to develop energy policies and to be aware of alternative solutions to traditional energy-related problems. EFN has a list of grants that are available to communities and private individuals, and has a list of various groups involved in energy problems.

An Energy Awareness Exhibit consisting of slide shows and photo essays was developed to show how communities are currently using energy systems and conservation methods. This exhibit is suitable for presentation at fairs, shopping centers, and other public places at no cost.



Renewable Resources—A National Catalog of Model Projects

Category	Outreach
State	WA
Project Name	Washington Energy Extension Service

Organization	Washington Energy Extension Service-Seattle
Address	312 Smith Tower Seattle, WA 98104
Contact	Steve Denner, Energy Extension Agent
Telephone	(206) 344-7984

Funded By	DOE
Cost	$400,000 per year
Congressional District	I
Compilation Date	February 1980

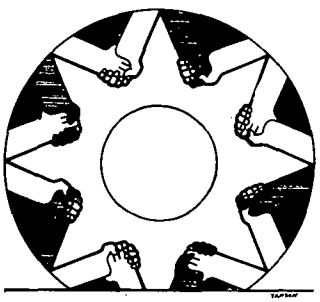
The Washington Energy Extension Service (WEES) was one of ten state pilot energy-conservation projects funded by the Department of Energy. In Washington, three cities were chosen to participate in the project: Seattle, Yakima, and Spokane. Seattle offered a wide variety of educational programs at all levels, ranging in scope from simple to very sophisticated steps people can take to conserve energy. All programs were free to the public.

Programs offered by the WEES-Seattle included a Renewable Fuels Program, which offered free classes and slide shows explaining how citizens can best utilize renewable resources such as solar energy and wood energy. Topics covered passive solar space-heating, active solar space-heating, solar water-heating, solar greenhouse design, woodstove installation and maintenance, and chimney care.

The Home Energy Conservation Program offered free classes, slide shows, and workshops to help people reduce unnecessary heat loss, save money, and conserve energy. Topics covered insulation, weatherstripping, caulking, storm-window construction, furnance maintenance, and recycling.

The Recycling Program's goal was to stimulate residents to return reusable items and save energy.

The Master Conserver Course was an intensive seminar offering 40 hours of technical training in insulation, weatherstripping, solar heating, wood burning, and home heat-loss analysis. Once trained, "Master Conservers" returned 40 hours of public service to the community, passing on what they had learned. They performed at no cost Home Energy Analyses designed to inform residents about how they can save money on their energy bills.



In addition, the WEES-Seattle also set up an energy resource library, a telephone line that provided 27 pre-recorded tapes on a variety of energy-related subjects, several tool banks, for those making home repairs, and an information service on busing, biking, vanpooling and carpooling.

Critique/analysis: Large numbers of citizens participated in the WEES-Seattle program. However, there has been no follow-up evaluation of the workshops nor any attempt to find out how many participants have used what they learned.

Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	WA
Project Name	BPA Small Wind Energy Conversion Project

The Bonneville Power Administration (BPA) has undertaken a project to study the effects of integrating several small wind generators into a small grid system.

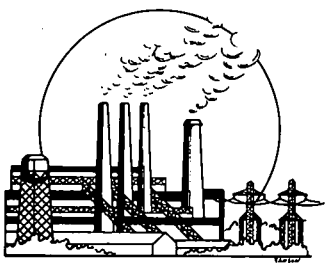
If funding is obtained, BPA will install small wind energy conversion systems (SWECS) in the two - twelve Kw range, in the Klickitat County in Washington State, adjacent to the Columbia River Gorge. The proposed units will be tied to individual residences with a provision for grid feedback. Careful site evaluation will be conducted prior to installation. BPA will pay for 90 percent of the SWECS units, the homeowner, the other 10 percent.

Audible noise, television interference, and environmental impacts will all be carefully examined and monitored aesthetics will also be taken into account.

Critique/analysis: The community is looking forward with enthusiasm to implementing this project since the utility rates for this area are being doubled so they are on a par with those of the surrounding utility districts.

Organization	Bonneville Power Administration (BPA)
Address	P.O. Box 3621 Portland, OR 97208
Contact	Roy Reinhart
Telephone	(503) 234-3361 ext. 4086

Funded By	BPA Revenues
Cost	$180,000-$200,000
Congressional District	IV
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

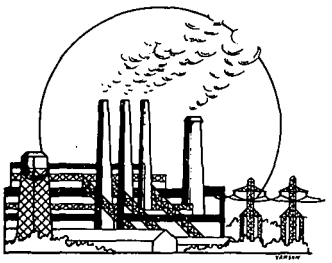
Category	Utility
State	WA
Project Name	Home Energy Analysis and Zero Interest Weatherization Program
Organization	Pacific Power and Light (PP&L)
Address	Columbia Basin Division 4100 Summitview Avenue Yakima, WA 98908
Contact	Jim Watson
Telephone	(509) 575-3180
Funded By	PP&L
Cost	$21,000,000
Congressional District	IV
Compilation Date	February 1980

Pacific Power and Light (PP&L) customers can receive zero-interest loans for weatherizing their homes. The comprehensive residential energy-conservation program launched by PP&L is aimed at customers who have electrically heated homes. Components of the plan include a home energy analysis and a zero-interest loan program.

PP&L energy specialists will perform on a customer's home an energy audit consisting of an examination of the house and a run-down of where energy is being wasted or lost. The building structure, heating system, water heating, and other features are checked. The data is analyzed to determine the cost of weatherization options compared to the estimated savings from such efforts.

After having an energy audit, the homeowner may qualify for a zero-interest loan. The loan could cover materials such as ceiling insulation to R-38, floor insulation to R-19, storm doors and windows, duct wrapping, and water-heater blankets. No interest is charged on the loan, and customers can pay it back at their disgression --within ten years or when the house is sold, whichever comes first.

The loan program involves the lender in selecting a local contractor on the basis of competitive bids and inspecting the work to insure ect installation. Provisions have been made an instructed "do-it-yourself" approach; in ...e cases, PP&L finances the cost of materials and the customer performs the installation.



Critique/analysis: Through the program's energy audits, homeowners are able to learn firsthand how and to what extent they are wasting energy. By making customers more energy-conscious, each audit is in effect an outreach effort for energy conservation. Thus, the initial skepticism over a private utility giving no-interest loans has subsided.

The waiting list for audits is long.

Renewable Resources—A National Catalog of Model Projects

Category	Utility
State	WA
Project Name	South Columbia Basin Irrigation District-Low Head Hydroelectric Project
Organization	University of WA Social Management of Technology
Address	Mail Drop FS15-C Seattle, WA 98195
Contact	Larry Swartz
Telephone	(206) 543-9039
Funded By	National Conference of State Legislatures (study)
Cost	$28,000
Congressional District	VII
Compilation Date	February 1980

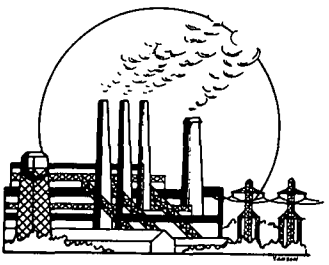
Three Irrigation Districts in Eastern Washington have submitted proposals to develop low-head hydroelectric sites. In addition to providing electricity, the low-head plants will demonstrate whether such plants will be feasible for Public Utility Districts and electrical cooperatives that cannot afford to develop large thermal plants.

The low-head plants will have a minimal environmental impact and will entail relatively low construction costs. No new dams will be built; rather, generators will be installed on existing dams.

Six sites are currently proposed. Together, they will have an annual average generating capacity of 3487 MWH. The preliminary licensing application for all six projects is now on file and is expected to be approved.

Senate Bill 3133 gives the Irrigation Districts the authority to sell bonds to finance these projects over a 40-year payback, instead of the 10-year period previously required.

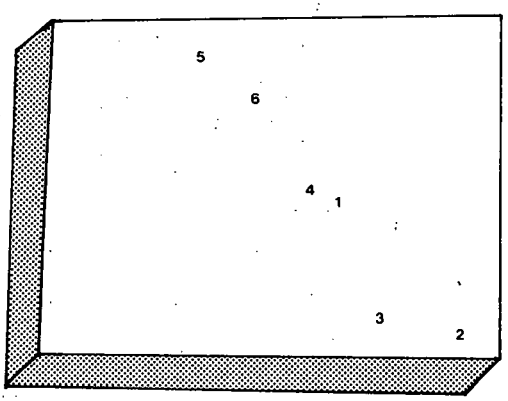
The Districts intend to sell the power generated to Tacoma and Seattle City Light Companies for 15 mil/KWH. (The Districts are currently purchasing irrigation water (cost of pumping) at 3-4 mil/KWH.) In comparison, the ɜrage cost of nuclear generated power is mil/KWH. The profits to the Irrigation Districts will be used to upgrade the irrigation systems and to offset the fees farmers now pay for their irrigation water. If these six projects are successful, twenty more will be carried out within the same three districts.



Critique/analysis: The profits and benefits could be far-reaching, particularly if other irrigation Districts or areas with small waterfalls embrace the idea.

WYOMING

1. Casper
2. Cheyenne
3. Laramie
4. Powder River
5. Powell
6. Worland



WYOMING

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Category	Agricultural
State	WY
Project Name	Proposed Alcohol Plant

Organization	AL - AGRI Corp.
Address	AL-AGRI Corp.
Contact	Bob See Powell, WY 82435
Telephone	(307) 254-4460

A $40 - $50 million distillation plant capable of producing as much as 25 million gallons of alcohol yearly is planned for construction in the Big Horn Basin in northwestern Wyoming.

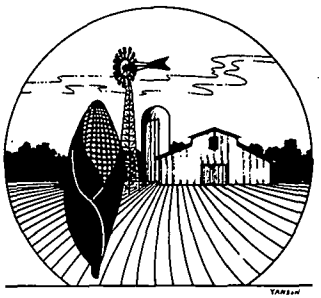
The costly enterprise will be financed entirely by private investors, who predict that alcohol and gasoline will be comparatively priced by the time the plant goes on line sometime in 1983.

The plant will also produce and market carbon dioxide, a by-product of the distillation process, and grain. Only starch and carbohydrates are removed from the grain in alcohol production, which leaves a dehydrated, high-quality livestock feed that will be sold to feed lots and dealers.

Funded By	Private funding
Cost	$40 - $50 million
Congressional District	I
Compilation Date	February 1980

Critique/analysis: Major oil companies in the area reportedly may oppose construction of the plant. The companies view alcohol as competitive and potentially destructive to the gasoline industry, according to a report.

A similar project is planned for Torrington, WY.



Renewable Resources—A National Catalog of Model Projects

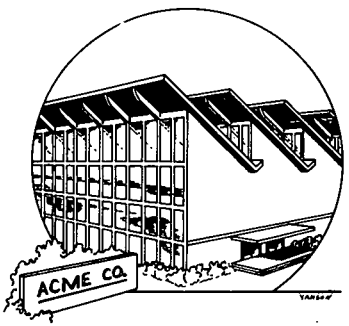
Category	Commercial
State	WY
Project Name	Wind-Powered Oil Pump
Organization	Wind-Powered Oil Pump
Address	Dave Hamilton Culbertson Ave. Worland, WY 82401
Contact	Dave Hamilton
Telephone	(307) 347-2223
Funded By	Private
Cost	$5,000
Congressional District	I
Compilation Date	February 1980

Worland resident David Hamilton raised eyebrows when he unexpectedly hit quality crude oil while drilling in a remote area of Hot Springs County. But perhaps even more surprising was the way he decided to extract his new-found treasure: wind power.

Today a 27-foot windmill pulls four barrels of the olive green crude daily from the 300-foot well at Tumbler Ridge. The pump works so well, in fact, that its owner predicts a one-year payback on the $2,500 machine.

Hamilton's oil discovery occurred accidentally while he was searching for hydrocarbon deposits. Initially the well was tapped with a propane-powered pump, which consumed a large percentage of the operation's profit. On the advice of a friend, Hamilton elected to purchase the wind-powered equipment, which has run maintenance-free ever since.

Hamilton is sold on wind power: soon he plans to install windmills on two other wells.



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	WY
Project Name	Cheyenne Community Greenhouse

Construction of a 5,000 ft^2 community greenhouse by volunteers and CETA employees in Cheyenne two years ago is now paying back rich rewards. While educating residents to the feasibility of solar technology, the center also offers food and employment to the city's low-income, handicapped and elderly citizens.

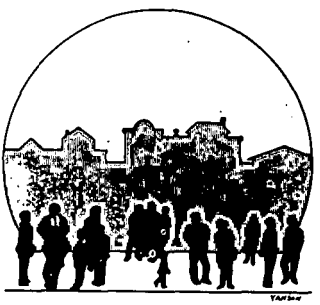
Plans for design and operation of the community facility were outlined during a one-week workshop in December 1976, attended by 35 volunteers. A small group of CETA summer employees began construction of the three-sectioned building the following spring.

The facility houses a growing center, an organic gardening store, and a research department, where studies in crop reliability, biologic pest control, and plant variability are being conducted.

Proceeds from plant sales cover tool, supply, and maintenance costs. Salaries for the two full-time staff are provided by a CSA grant.

The greenhouse is highly visible and serves as a popular stop on school field trips.

Organization	Community Action of Laramie City
Address	1603 Central Avenue Cheyenne, WY 82001
Contact	Shane Smith
Telephone	(307) 635-9291
Funded By	CSA/Local
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

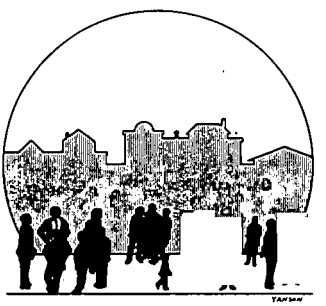
Category	Community
State	WY
Project Name	Laramie County Weatherization
Organization	Community Actior Laramie County
Address	1603 Central Ave. Cheyenne, WY 82001
Contact	Paul Hansen
Telephone	(307) 635-5735
Funded By	CSA
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Elderly residents are now enjoying reduced heating costs thanks to a weatherization program recently conducted by Community Action of Laramie County.

Three greenhouse retrofits and several solar collector installations comprised the program. Only previously weatherized homes with correct solar orientation were eligible for the improvements.

For most recipients, solar technology is something new. Red Ellis now has an 8' x 8' solar collector attached to the side of his mobile home. Red keeps daily records of the collector's performance with a meat thermometer. While he cannot give a scientific assessment, Red contends that the collector is hot enough "to cook a ham."

Critique/analysis: Lack of CSA funds has terminated this project. DOE's weatherization project, it is reported, is not flexible enough to permit construction of AT technology.



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	WY
Project Name	WY Community Energy Grants Program

The Community Energy Grants Program was developed by the state Energy Conservation Office to help local communities develop energy-conservation priorities and to determine their future alternative energy sources.

Approximately 20 communities have participated in the program since its creation in 1978. Local chapters receive $1,000 in start-up funds, and up to $10,000 for the first year's operating expenses under a DOE grant.

Program priorities include developing local energy awareness, researching energy-consumption patterns, identifying local sources of alternative energy, and lobbying local businesses and government to create an energy-management program.

(Participating communities include Big Piney, Casper, Cody, Dubois, Laramie, Keeline, Jackson, Medicine Bow, Rock Springs and Sheridan. Thermopolis, Moorcroft, Powell, Ft. Laramie, Encampment, Lander, Riverton, Wheatland, Worland, and Sundance also participate.)

Organization	WY Energy Conservation Office
Address	Capitol Hill Office Building 25th and Pioneer Cheyenne, WY 82001
Contact	WY Energy Conservation Office
Telephone	(307) 777-7131
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February, 1980

Renewable Resources—A National Catalog of Model Projects

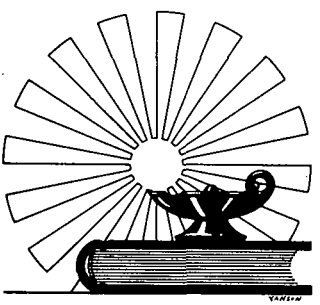
Category	Education
State	WY
Project Name	Energy and Man

In an unprecedented move, the Wyoming Board of Education voted in 1976 to incorporate energy education into the daily curriculum of state schools.

Since then over 2,000 state instructors have attended accredited energy workshops. Teachers who do are then encouraged to tailor the curriculums to the need of the local communities.

An energy committee was empowered by the Board to develop the energy-education packet, which contains information from a variety of sources including the government, oil and coal industries, and Sun Day publications. Instead of selecting and censoring information, the committee requested teachers to instruct students how to effectively identify the informational biases.

Organization	Energy and Man
Address	University of Wyoming Laramie, WY 82070
Contact	Peter Ellsworth
Telephone	(307) 766-6381
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Education
State	WY
Project Name	School Greenhouse

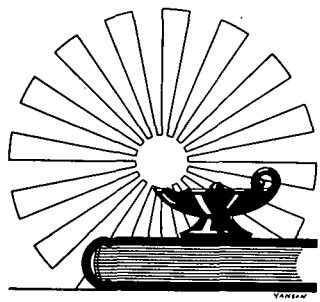
Two years ago the Powder River Elementary School students received an invaluable, first-hand education in solar technology while constructing a greenhouse and solar collector system for their tiny schoolhouse.

The first through sixth graders, aided by their teacher Lucille Reese and 44 community volunteers, built a 15' x 30' solar greenhouse on the south side of the building. For supplemental heat the group fashioned an innovative 8' x 20' solar collector from blackened aluminum which was then covered with a clear fiberglass plate. A fan transfers the heat from the collector to a storage bin containing six tons of rock.

The retrofits,which took several months to construct, are now monitored by the students.

The greenhouse and collectors are instrumental in demonstrating theoretic and practical applications of solar energy. The greenhouse also serves as a dynamic laboratory for biology classes. Community gardeners use the greenhouse to start garden plants.

Organization	Powder River Elementary School
Address	Powder River Elementary School, Box 76, Powder River, WY, 82648
Contact	Lucille Reese
Telephone	(307) 234-3939
Funded By	HEW Title IV-C Ed. $4,500; Local funds, $3,000
Cost	$7,500
Congressional District	I
Compilation Date	February, 1980



Renewable Resources—A National Catalog of Model Projects

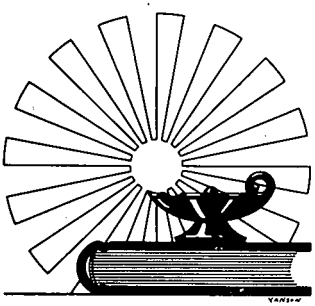
Category	Education
State	WY
Project Name	Solar Workshops

Before moving to Wyoming, Bill and Marianne North designed and built vertical air-type solar collectors in Southern California. Today the couple is teaching Wyomingites how to construct their own—and at a fraction of the normal price.

Every Saturday the Norths hold a workshop for interested residents in the east-central section of the state, well-known for its bitter, long winters. After the one-day session, participants are able to build and install their own 8' x 8' North collector. Disregarding labor, which is provided free by the builder, the North collector is estimated to cost between $2 and $3 per square foot.

Workshops are financed through a $15 workshop fee, and sale of the constructed collector at the end of each session.

Organization	Bill and Marianne North
Address	29 Marigold Casper, WY 82601
Contact	Bill and Marianne North
Telephone	(307) 234-5567
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	State
State	WY
Project Name	Energy Advocacy Program

Rising utility rates represent a critical threat to the poor and elderly, whose interests are now represented under the Wyoming Energy Advocacy Program. Founded in 1979, the program comprises a coalition of local energy advocacy chapters (WEACO) working to lower energy costs while reducing state fossil fuels consumption in favor of appropriate technology development.

Presently WEACO lobbies for rate structure reforms and a "no shut-off policy" on winter fuel supplies. The group opposed one rate increase granted by the Public Service Commission in 1979, and it has pressed for creation of a government council to represent the poor and elderly at utility rate hearings.

The program is funded and sponsored by the Region VIII Community Action Agencies Association.

Organization	Energy Advocacy Program
Address	1603 Central Ave. Cheyenne, WY 82001
Contact	Lorna Wilkes Coordinator
Telephone	(307) 635-9426
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources—A National Catalog of Model Projects

Category	State
State	WY
Project Name	Wyoming Western Sun

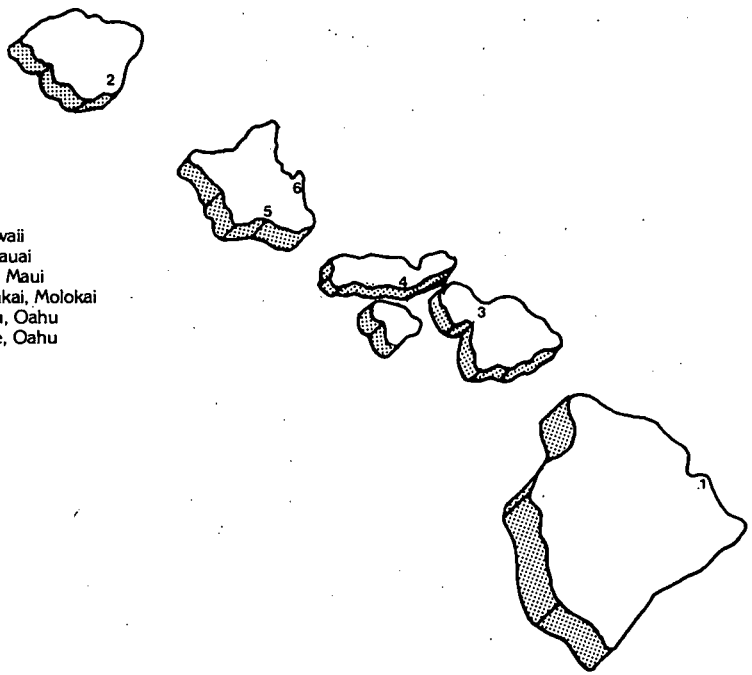
Leaders of 13 western states, including Wyoming's Governor Edward Herschler, have rallied in support of the future commercialization of solar energy through the formation of the Western Sun organization, whose headquarters are in Portland, OREGON. The Wyoming office presently lobbies for important zoning and building-code legislation. Passive solar design and solar hot water systems are also priority considerations there. The offi office organizes solar design workshops for local builders and architects, and soon plans to open an information clearing house for solar energy materials.

The office now has a toll-free number to answer any questions regarding solar. This includes sun, wind, and biomass. 1-800-442-8334

Funding delays represent the principal setback to the growing organization.

Organization	Wyoming Western Sun
Address	Wyoming Hall University Station Laramie, WY 82070
Contact	Florence Barker WY Coordinator
Telephone	(307) 766-6760
Funded By	DOE
Cost	$9,000/month
Congressional District	I
Compilation Date	February 1980

HAWAII



1. Hilo, Hawaii
2. Lihue, Kauai
3. Wailuku, Maui
4. Kaunakakai, Molokai
5. Honolulu, Oahu
6. Kaneohe, Oahu

HAWAII

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Category	Cities
State	HI
Project Name	County Self - Sufficiency Project

The Honolulu City and County Energy Self - Sufficiency Committee is concentrating on several projects involving conservation and the use of municipal wastes.

The City and County plan to have an urban waste energy-recovery system on stream by 1981. This facility will convert most of Oahu's solid waste into energy. However, it will also generate 50 tons of sludge per day, so the government has received a grant to investigate generating road asphalt form sludge.

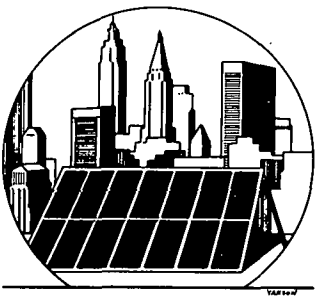
The City and County have also saved $150,000 per year in government facilities cost simply eliminating excess lighting and by having janitors work during daylight hours whenever possible.

Leaders of City and County departments have taken professional training in energy-related matters. The Director and Deputy Director of the Building Department, for instance, participated in "hands-on" courses to build solar collectors.

Finally, Honolulu City and County have a tax credit of 50 percent that can be used in conjunction with the federal credit.

Organization	City and County of Honolulu Energy Self-Sufficiency Committee
Address	Mayor's Office Honolulu Hale Honolulu, HI 96813
Contact	George Akahane or George Moriguchi
Telephone	(808) 523-4141

Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	HI
Project Name	Passive Solar Resort Hotel

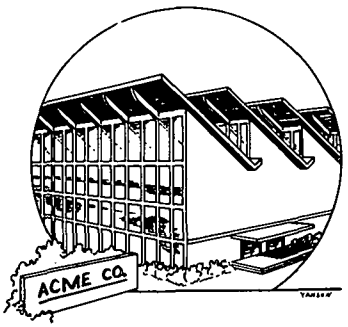
Owners of the Sheraton Molokai Hotel reduced the cotst of constructing and maintaining the hotel by utilizing passive solar and conservation techniques in its design. A beautiful hotel that blends in with its environment, the Sheraton Molokai has 300 rooms--150 condominiums and 150 resort hotel rooms--arranged in a series of frame buildings no taller than two stories.

The buildings are cooled by the prevailing trade winds which, filtered through trees and controlled by screens, louvers, and wooden jalousies, provide a natural cooling system. High ceilings with gable vents, cross ventilation, and wood-bladed tropical fans completely eliminate the need for air conditioning.

The hotel not only reduced the electrical costs of air conditioning, it even saved 10 to 15 percent of the construction costs by obviating the need for an air conditioning system.

One of the orginal reasons for choosing a passive solar design was logistical--the isolated area the hotel made air conditioning maintenance a problem.

Organization	Sheraton Molokai
Address	Molokai, HI
Contact	n/a
Telephone	(808) 552-2255
Funded By	Private
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

Category	Commercial
State	HI
Project Name	Thermal Waste Water Aquaculture

Terry Astro is utilizing waste heat from the Kauai Electric diesel fuel-generating facility to grow fish. The 90 degree F temperature and salinity are optimum for the fast-growing tilapia that grow from four ounces to 24 ounces in five months.

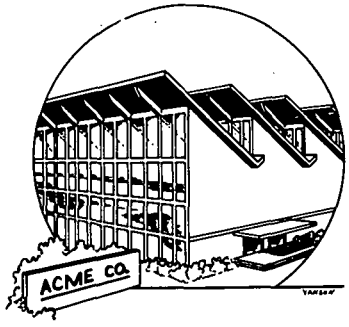
Senior citizens who live in housing less than two blocks away can walk down, pick out their fish, and buy them at half the price of fresh fish sold elsewhere.

Through Kauai Community College, four native Hawaiians are learning carpentry, plumbing, and masonry by building ponds and other facilities at the site. The University of Hawaii Marine Options Program is conducting additional training involving a fish hatchery, hybridization, and other aspects of aquaculture development at the site.

Photovoltaics are being investigated to provide electricity needed in some parts of the operation. They may be cost-effective, since the current local cost of conventionally-generated electricity is 15 cents per kilowatt hour.

Organization	Department of Planning and Economic Development
Address	Kaimalu Bldg., Honolulu, Oahu, HI 96813
Contact	Richard Fassler
Telephone	(808) 548-5496

Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

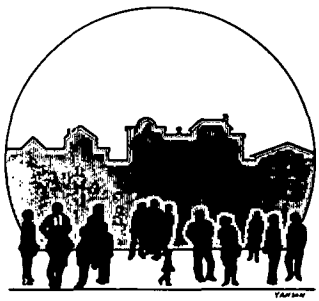
Category	Community
State	HI
Project Name	County of Maui Committee on Energy Policy and Management
Organization	County of Maui Committee on Energy Policy and Management
Address	County Bldg., High Street Wailuku, Maui, HI 96793
Contact	Ralph Masuda
Telephone	(808) 244-7711
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The Maui Energy Committee has prepared a three-volume report on self-sufficiency that compiles available energy data and presents possible contributions by renewable energy technologies.

The Committee is comprised of people from the County's three islands: Maui, with its windy isthmus, long-standing history of plantation power contribution, and likely gasohol production potential; Lanai, the island wholly owned by the Dole Pineapple Company; and Molokai, site of miles of steady wind sites, with considerable biomass potential and hydro power.

Roughly a dozen homes on Maui now obtain electrical power from individually owned windmills since electricity rates and wind speeds are high. (When the wind doesn't blow, the television doesn't work, however.)

Plantations provide power to the utilities chiefly by bagasse burning, but also by hydro-electric generation. This hydro-electric power is created by interrupting the downhill flow of water in irrigation ditches. For example, Hawaiian Commercial and Sugar Company (HC&S) on Maui made a net contribution of over 6.5 million kilowatt hours to Maui Electric in 1978, enough power to supply the total electrical needs of 6,500 families for a month. HC&S supplies Maui Electric with peak-demand (5 to 9 pm) power and with back-up and emergency power generating capacity. Because that stand-by power is available, Maui Electric and its rate payers save the millions of dollars that would otherwise be needed to provide additional generating capacity.



Renewable Resources—A National Catalog of Model Projects

Category	Community
State	HI
Project Name	Hawaii County Energy Advisory Committee

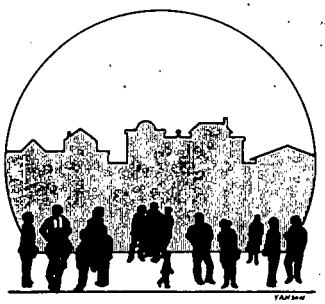
Organization	Hawaii County Energy Advisory Committee
Address	Mayor's Office, City/County Bldg., Hilo, Hawaii, HI 96720
Contact	John T. Humme Wallace A. Hirai
Telephone	(808) 961-8211

Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

On the island of Hawaii, the Hawaii County Energy Advisory Committee was the first of the state's four counties to proceed with planning for energy self-sufficiency following a report published in 1976 by the Hawaii Natural Energy Institute of the University of Hawaii.

Scenarios of the island's energy future are currently being developed and will be presented to the community. Public discussion and an implementation plan will follow.

The island of Hawaii is most likely to be the first of the islands to be in a position to export energy. It has the hottest geothermal well in the world and one of the best sites on earth for Ocean Thermal Energy Conversion (OTEC). (Already, at Ke-ahole Point, electrical power is being generated by Mini-OTEC, using ocean thermal differences.) Moreover, of all the islands, Hawaii has been the least dependent on imported oil. Up to 40 percent of the power on the island has been supplied by burning bagasse from the sugar plantations, sold to the power company and used in-house.



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Category	Community
State	HI
Project Name	Kauai County Energy Self-Sufficiency Committee
Organization	Kauai County Energy Self-Sufficiency Committee
Address	Mayor's Office, Kauai County, Lihue, Kauai, HI 96766
Contact	Kelvin L. Kai
Telephone	(808) 245-3385
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The Kauai County Energy Self-Sufficiency Committee report states that the island can be self-sufficient by 1995. Bagasse and hydropower are cited as the two resources with the most promise for near-term use. Solar thermal, photovoltaics, and wind energy potential also enter into the picture.

The Committee includes a utility engineer, a science teacher, a barrister councilwoman, an inventor, and many more. Their report will be given soon to the county council and public hearings will follow soon thereafter.

As recently as the early 1960s', all of Kauai's electrical power came from plantation boilers. Now the power comes from Kauai Electric Company and imported oil. The Lihue Plantation Company plans to build a new steam/electricity generator complex that will burn bagasse, sugarcane trash, wood chips, and municipal refuse, thereby delivering between 55 and 95 million kilowatt hours annually to the Kauai power grid.

Kauai has hydropower potential amounting to 18 million kilowatt hours per year using just a run-of-the-river system on the Wailua River. (Kauai is the location of the wettest spot in the world.)

Critique/analysis: Some Kauai citizens are resolutely opposed to hydropower. One source of opposition is the desire to have the entire island declared a national treasure and protected as such. Doing so would rule out hydropower on the Wailua River.

Renewable Resources—A National Catalog of Model Projects

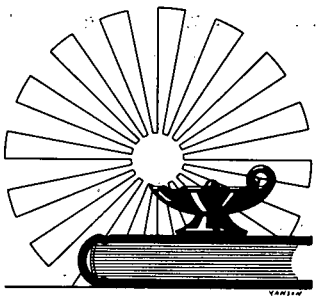
Category	Education
State	HI
Project Name	Cooperative Energy Calendar

The state of Hawaii has so much activity in the energy area that a Cooperative Energy Calendar was coordinated to eliminate duplication and maximize cooperation. Several organizations agreed to serve on each other's steering committees over an 18-month period so calendar conflicts could be avoided and so each activity could support other events.

The Energy Research and Development Administration (ERDA) kicked-off the events by sponsoring "A Public Energy Town Meeting in the Pacific" in June of 1977. At this meeting people from U.S. islands in the Pacific discussed their common energy problems and energy potentials. Activities over the next 18 months included energy fairs throughout the state, policy workshops, community seminars, lectures by "name" speakers, satellite communications, media shows, film series, courses, Sun Day events, and brown-bag gatherings.

A large "Energy, Jobs and the Environment" conference, sponsored by Life of the Land, ended the Cooperative Energy Calendar in November of 1978.

Organization	State Energy Office
Address	1164 Bishop St., Honolulu, Oahu, HI 96813
Contact	Carilyn Ogawa Shon
Telephone	(808) 548-4080
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980



Renewable Resources—A National Catalog of Model Projects

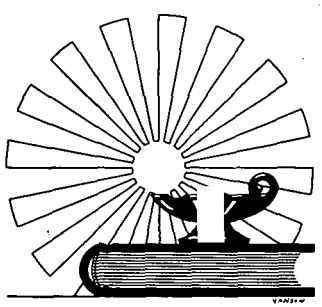
Category	Education
State	HI
Project Name	Hawaiian Energy House

The Hawaiian Energy House is a low-cost attractive energy-saving home that integrates many aspects of conservation, renewable energy, and appropriate technologies. The House incorporates solar panels for heating hot water; a lighting system using wind; passive features that include monitoring overhangs, natural ventilation, and a landscape that also facilitates air flow, cooling and heating in and around the house; efficient appliances; and plumbing (color coded) for multiple use of fresh and waste water in the house and garden. At the kitchen counter level are bins for recyclable materials, which are chuted into outside containers. The household furnishings are also part of the living design of the total project. The philosophy of the Energy House design is "doing better, not doing without."

The residents of this energy-efficient house also rely on energy-efficient transportation: electric cars and bicycles.

Critique/analysis: The Hawaiian Energy House is on the University of Hawaii Manoa Campus. Formerly a family occupied it, but now it's closed for specially arranged tours.

Organization	Hawaiian Energy House
Address	Univ. of Hawaii, Manoa Compus, Honolulu, Oahu, HI 96822
Contact	Jim Pearson
Telephone	(808) 524-6502
Funded By	n/a
Cost	$38,000 - $52,000 including monitoring equipment
Congressional District	I
Compilation Date	February 1980



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Category	Education
State	HI
Project Name	Social Impacts of Coothormal Development
Organization	Puna Hui Dhana
Address	Honolulu, HI
Contact	Everitt Kinney
Telephone	(808) 965-9140
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

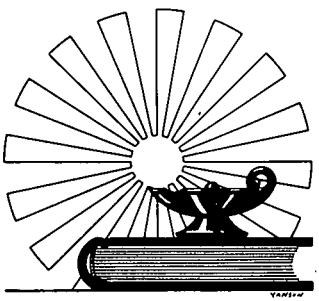
As Hawaii investigates programs that move the islands toward energy self-sufficiency, a movement is also afoot to determine the social and cultural impacts of renewable energy development. One example is a study by Puna Hue Ohana (Social and Native Hawaiians' Concerned) on the impacts of a small geothermal facility located on one of the states' largest communities of Native Hawaiians.

In Puna, on the island of Hawaii, Hawaiians still live on the land in a self-sufficient culture that has changed little over the years. Before geothermal development came to this remote area, interaction between the Native culture and Western culture was minimal.

Among the problems highlighted by the study was the question of ownership--both its political and cultural aspects. On the legal issue of ownership, both the Hawaiians and the state felt subsurface resources to be in their domain. Actually, ownership depends upon whether the particular native owns the land legally or merely lives on it.

As a question of cultural integrity, the development of geothermal energy raises questions new to Puna. Families now fight over who owns the land and who benefits. Competition for jobs is divisive and, because there is pressure on land-based resources, the remaining acreage more valuable and competition over access to m plots has arisen. The previous social ructure was very loose, so the community has a hard time organizing and taking positions on policy questions.

In brief, the study reported major cultural problems and changes. This is particularly important in light of the fact that the state plans to significantly expand the development of the geothermal reservoir.



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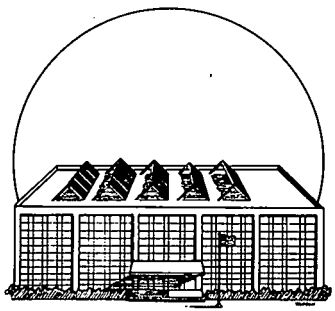
Category	Institutional
State	HI
Project Name	Energy Self-sufficient Hospital
Organization	The Wilcox Hospital
Address	Lihue, Kaui, HI 96766
Contact	Ken Ono
Telephone	(808) 245-4811
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The Wilcox Hospital on the island of Kauai has undertaken several energy projects to reduce high electricity bills and to move the facility toward energy self-sufficiency.

The projects range from conservation--including computer-powered management of air conditioning and electrical systems--to methane production. The hospital is also trying out solar photovoltaics, solar collectors, and wind power technologies.

This 155-bed acute and long-term care facility is a not-for-profit Community Hospital that pays $22,000 a month for electricity (at 12 cents/KWh) of which 30-40 percent is for air conditioning.

The solar photovoltaic project is a demonstration that will generate electricity and heat hot water with waste heat. The wind project involves a feasibility study of the site and the transmission of power to hospital. Hospital sewage is used to generate methane, which will replace the diesel fuel which presently fires the boiler.



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Category	Legislation
State	HI
Project Name	Mandated Solar Water Heating in Multiple Units

The Kauai County Council has passed an ordinance mandating solar water heating in all multi-family, hotel, and motel structures of ten or more units whenever life-cycle costing shows a ten-year payback period or less. The objective is to replace both gas and electric water heating. (This Ordinance, number 369, applies to Energy Conservation, Chapter 53.)

Organization	Kauai County
Address	Kauai, HI
Contact	Joanne Yukimure
Telephone	(808) 245-4771
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

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Category	Legislation
State	HI
Project Name	Senate Committee on Energy & Natural Resources
Organization	Senate Committee on Energy & Natural Resources
Address	State Capitol, Honolulu, Oahu, HI 96813
Contact	Senator T.C. Yim
Telephone	(808) 548-4771
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

The Senate Committee on Energy and Natural Resources created a unique mechanism for developing and passing energy legislation. Ten task forces, involving over 100 knowledgeable scientists, energy officials and interested citizens met for six months and produced a major report outlining recommendations that were then turned into legislation. The subjects of study were conservation, the need for strengthening the State energy organization and its funding, alternative sources of energy and needed legislation.

Every one of the suggested items of legislation included in the Task Force's recommendations were introduced in some 50 bills and incorporated into the Senate Majority Program. The bills were published with the report and circulated for comment. Four days of hearings were held by Senator T. C. Yim, Chairman of the Senate Energy Committee and sponsor of the process. About 30 bills and resolutions were reported out of the committee and received near unanimous approval by the Senate and full endorsement by the House.

Over $16 million in programs was suggested by the various task forces. The Legislature finally approved an energy budget of $10.2 million ($9 million more than expected).

Critique/analysis: Critical to the success of this process was inviting everyone who had testified for or against energy bills in the past to participate in the task force. Therefore, broad-based input was assured, and potential points of conflict were resolved by the task force before the bills were drafted.

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Category	Legislation
State	HI
Project Name	Utility Pricing for Renewable Energy Electricity Generation

The Hawaii Sugar Planter's Association is sponsoring legislation to have the Public Utility Commission (PUC) determine a fair rate for utilities to pay when buying electricity generated from private parties.

The sugar plantations in Hawaii have long been generating their own electricity from wastes and selling the excess to utilities. With the recent increases in prices and the unrelibility of oil fuel, a debate has emerged over the extent to which plantations should receive economic incentives to increase their electricity output.

The bill would direct the PUC to determine how much electricity generated from non-fossil fuel sources is or can be made available to public utilities. The legislation would direct the utilities to acquire excess electricity. In the event that the supplier and the utility fail to reach agreement on a rate, it would also establish a rate based on the average fuel costs the utility would otherwise incur in generating the same amount of electricity in its most efficient fossil-fuel unit operating at optimum efficiency. Among the factors to be considered are the fuel costs that the utility would otherwise incur in the supply of the same amount of electricity and the non-fuel costs that the utility would avoid or defer as a result of buying power from private suppliers.

Organization	Hawaii Sugar Planters Association
Address	Amfac Building Honolulu, Oahu, HI 96813
Contact	George St. John Ed Lui
Telephone	(808) 487-5561
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

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Category	Low Income
State	HI
Project Name	Low Cost Food & Energy Self-Sufficiency Demonstration
Organization	Kokokahi Mission Model
Address	45-741 Ko St., Kaneohe, Oahu, HI HI 96744
Contact	Dennis Alger
Telephone	(808) 247-1349
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

The Kokokahi Hunger Project experimental farm utilizes renewable resources, as well as featuring agricultural demonstrations. The farm demonstrates that a typical, tropical, rural family plot could be made to provide the basic needs of a family with available resources.

The emphasis of the project is to grow high protein foodstuffs suitable for the 38 wet tropical areas of the world where most poor families live on .5 to 2.5 acres with $75/year incomes. The two-acre plot is designed to contain the 43 nutrients needed daily by the human body to sustain life.

Visitors to the site will find solar heated hot water, windmill-powered water pumping, fish ponds to supplement the farm's vegetable protein, ducks, worms, rabbits, soil block construction, school groups, and other visitors.

Volunteers, donations, and appropriate technology are all a part of the process.

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Category	Low Income
State	HI
Project Name	Low Income Solar Development

Organization	Maui Economic Opportunity (MEO)
Address	Box 677 Kaunakakai, Molokai 96748
Contact	Fred Bicoy
Telephone	n/a

Funded By	CSA, CETA, University of Hawaii, Maui Commun. Coll., Maui County, Private Sources
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Maui Economic Opportunity (MEO) has an extensive conservation and solar energy program. Its components include training low-income workers, manfacturing and installing low-cost solar water heaters, and establishing a solar business.

At the Molokai office, MEO trained displaced pineapple field workers to produce and install solar water heaters at a cost of $400 each. Over 80 systems were put on the homes of low-income people. These systems have saved 34 to 48 percent of an the average electric bill (In Hawaii, electricty is costly because it is mostly supplied by oil-fired power plants using imported oil.) Most families in the program pay for the systems at $10 per month. If that rate proves too steep, the payback period is extended.

MEO Molokai is currently retrofitting 80 additional systems onto the homes of senior citizens.

The MEO Maui office has received a CSA grant to develop a self-sustaining energy-conservation enterprise within five years. The business will manufacture and install 2,035 solar water heaters and employ nineteen low-income residents. MEO will train the staff, buy materials, and monitor energy savings. (The Maui office had previously manufactured and installed approximately 100 systems on low-income residences before investigating the business potential of the program.)

Renewable Resources—A National Catalog of Model Projects

Category	Low Income
State	HI
Project Name	Solar for Jobs, Low Income Home Owners and Renters

The Honolulu Community Action Program (HCAP) offers a host of energy programs from solar job training for low-income youth to a fish-drying project for Native Hawaiians to an Advocacy Project on utility rate return to a unique program to provide solar and conservation technologies for renters.

In cooperation with those renters who have their landlord's permission to solar heat their hot water, HCAP is purchasing three sets of low-cost 30-to 40-gallon black-painted storage units and aluminum breadbox collectors. Renters may use this equipment and then take it with them when they move.

HCAP's native Hawaiian project involves a small site on Makauea Island near the Honolulu Reef Runway. There, HCAP is helping Hawaiians develop a fish pond, techniques and facilities for solar drying fish,and waterless composting toilets.

The HCAP Advocacy Project is also seeking Utility Rate Reform through a lifeline proposal, which would enable energy households to get 500KW at the lowest average cost for energy in 1979. A coalition of senior citizens and representatives from the four community Action Agencies along with expert testimony from Legal Aid have attracted the interest of up to 200 people.

Organization	Honolulu Community Action Program, Inc.
Address	n/a
Contact	George Lee Special Programs Coordinator
Telephone	(808) 521-4531
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

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Category	State
State	HI
Project Name	State Energy-related Advisory Committees
Organization	State Energy Office
Address	1164 Bishop St., Honolulu, Oahu, HI 96813
Contact	Carilyn Ogawa Shon
Telephone	(808) 548-4080
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

The State of Hawaii supports a wealth of activities aimed at facilitating discussion of energy policies and developing solutions to energy problems. In addition to the self-sufficiency committees operating in Hawaii's four counties, the state has several other energy-related bodies at work.

The Hawaii Energy Conservation Council, sponsored by the governor, has six working subcommittees that meet regularly to share information and ideas on saving energy. The subcommittees are those on Building and Management Efficiency, Transportation, Waste Heat Recovery, Energy Recovery (garbage and sludge), Solar Standards and Ethics, and Public Awareness. The subcommittees discuss energy-saving ideas, assess conservation prospects, and recommend policy as well as technical solutions. For example, the Building and Management Efficiency Subcommittee includes restaurant owners, office building managers, hotel administrators, libraries, and industrial plant personnel who trade stories on how they have saved energy. The subcommittees' recommendations will be published in the general report of the Council.

The Governor's Advisory Committee on Alternate Energy Development is a policy advisory body primarily concerned with commercialization priorities. It has technical subcommittees that are associated with the Hawaii Natural Energy Institute at the University of Hawaii, Manoa.

The Governor's Advisory Committee on the Energy Functional Plan is one of several such committees addressing details of the State General Plan. It also holds public hearings and reviews prior to adoption by the Legislature.

Critique/analysis: Success of these committees is significantly enhanced by the Governor's sponsorship. If the Governor issues an invitation to serve on a committee, those invited can usually attend meetings during working hours. Therefore, the meetings are well attended, and a variety of interests are assured of input.

*U.S. GOVERNMENT P RINTING OFFICE : 1980 0-311-119/144

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Category	Utilities
State	HI
Project Name	Molokai Island's Planned Self-sufficiency in Electricity
Organization	Molokai Electric
Address	P.O. Box 378 Kaunakaki, Molokai, HI 96748
Contact	Bruce Yamashita John Urauchi
Telephone	(808) 531-4688
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Using conservation and renewable energy technologies, Molokai Electric plans to make the Hawaiian Island of Molokai in Maui County totally energy self-sufficient in electricity by the year 1983. The proposed program would combine energy conservation, loan management, biomass from hay, pineapple and giant Koa Haole, hydropower, solar sources, and wind-energy conversion on a large scale.

The utility currently operates an aging diesel-powered generating system with consumer rates running close to ten cents/KWH.

A preliminary action program summary, which describes the steps to be taken to achieve Molokai's electrical energy self-sufficiency, has been prepared with the assistance of the County Energy Coordinator and the Hawaii Natural Energy Institute at the University of Hawaii. Strong support has been provided by the Mayor of Maui County, Maui's Energy Coordinator, the Maui Council and many other leaders of Molokai and Maui County.