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DOE/CS/30098-01
Volume 2 (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

MASTER

Volume 2: Mid-American Solar Energy Complex 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 2 (of 4 Volumes)
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Renewable Resources: A National Catalog of Model Projects

Volume 2: Mid-American Solar Energy Complex Region

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

July 1980

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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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Category Agricultural
State IL
Project Name Soil and Water
Conservation

The Crawford County Soil and Water Conservation District works with various cooperators in reduced tillage systems to conserve energy and save trips over the field. In recent years an exhibit at the county fair publicized conservation tillage and zero tillage.

The District assisted the conservation coordinator in the Unit #2 School District with tree planting for windbreaks to reduce fuel consumption in its office. Assistance has also been given in the planting of different species of plants in an outdoor laboratory.

A bulletin file and slide file contains entries on energy consumption.

The Illinois Institute of Natural Resources provided information on this project.

Organization Crawford County Soil
& Water Conservation
District
Address 204 W. Highland Ave.
Robinson, IL 62454
Contact Chairperson
Telephone (618) 544-3914

Funded By n/a

Cost n/a

Congressional District XXII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Operation Brotherhood is a community-based program serving the food and health needs of senior citizens in the North and South Lawndale community. It has undertaken the greenhouse program with the assistance of the Center for Neighborhood Technology (CNT), 570 W. Randolph, Chicago, IL 60606.

The construction and design began with a workshop in November 1977. Rather than construct a rooftop addition to the warehouse building, the workshop participants decided to integrate the greenhouse into the available south-facing loft space. For lighting considerations, a "penthouse" was added with the mandatory south-facing glazing.

The design and construction of the greenhouse enabled several Operation Brotherhood staffers to receive instruction and training. Other community groups became enthusiastic about solar greenhouses, seeing how neighborhood organizations can utilize technical assistance organizations to their advantage.

After the workshop, the participants donated weekends to finish the initial construction. In March 1978, disaster struck in the form of repeated vandalism. But residents in Lawndale kept at it despite the setback and rebuilt and added a security screen before the late-spring crop was started.

Operation Brotherhood now has a neighborhood steering committee for the Lawndale Neighborhood Greenhouse. Members include representatives of other Lawndale neighborhood organizations and interested residents. This group, with the assistance of CNT, not only selects and guides the staff, but also makes all the critical decisions with respect to crop production and distribution.

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tr { border-bottom: 1px solid black; }
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 Category | Community || **State** | IL |
| **Project Name** | Operation Brotherhood Greenhouse |

Organization	Operation Brotherhood
---------------------	-----------------------

Address	3751 W. Ogden Ave. Chicago, IL 60623
----------------	---

Contact	Ms. Belle Whaley, Scott Bernstein & Clay Collier
----------------	--

Telephone	(312) 522-0433
------------------	----------------

Funded By	n/a
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Cost	n/a
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Congressional District	I - XI
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Compilation Date	n/a
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ation Brotherhood decided to produce food
direct sale downstairs in their co-op store.

Critique/analysis: The committee has the potential to link the greenhouse program to many other Lawndale and westside community agencies with an interest in food, energy, jobs and health.

Renewable Resources— A National Catalog of Model Projects

The Construction Trades Department of Olney Central College has several solar programs. In 1978 a solar heated tool shed was started by Construction Trades personnel. Construction of the shed was funded by a staff development mini-grant. The system provides students and faculty with first-hand experience in operating a solar heating system. The system will keep tools in good working condition during cold weather.

A solar water heater was installed in a new home under construction by the Construction Trades Department.

The Construction Energy Program is approved by the Illinois Community College Board. Much of this program centers around the training of technicians in the advantages of alternative energy systems, particularly solar.

The Learning Resources Center has already acquired many energy-related materials in book, magazine, and pamphlet form. This collection is continually being expanded.

The Illinois Institute of Natural Resources provided information for this project.

Category	Education
State	IL
Project Name	Construction Trades Program
Organization	Olney Central College
Address	R.R. #3 Olney, IL 62450
Contact	Terry Ludwig Dean of Instruction
Telephone	(618) 395-4351 X 225
Funded By	n/a
Cost	n/a
Congressional District	XXII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The "Shawnee Sunshine Gazette" is the bi-monthly newsletter of the Shawnee Solar Project. It is distributed free to facilitate skill and information sharing in the areas of solar energy and appropriate technology. Contributions from readers in the form of articles, illustrations or announcements are encouraged.

The newsletter is partly funded by a grant from the National Center for Appropriate Technology.

Category	Education
State	IL
Project Name	Shawnee Sunshine Gazette
Organization	Shawnee Sunshine Gazette
Address	211 1/2 W. Main Carbondale, IL 62901
Contact	Tom Crompton
Telephone	(818) 457-8172
Funded By	National Center for Appropriate Technology
Cost	n/a
Congressional District	XXIV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In 1978 Southern Illinois University began a forced-air-solar heater project. High-school students attending the summer 1978 environmental workshops at Touch of Nature helped build a low-cost heater using many recycled components. In the fall of 1978 it was placed on the roof of the education building to assist the present heating system.

The Touch of Nature Environmental Center runs a variety of environmental education programs including an Energy Workshop. These programs are held year round for children of all ages.

The Illinois Institute of Natural Resources provided information about this project.

Category	Education
State	IL
Project Name	Solar Energy Training Program
Organization	Southern Illinois University
Address	Carbondale, IL 62901
Contact	Jerry Cullen Touch of Nature Ctr.
Telephone	(618) 457-0348
Funded By	n/a
Cost	n/a
Congressional District	XXIV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Design Department of Southern Illinois University ran a CETA-funded training program in home weatherization and low cost solar installation in cooperation with the State of Illinois Governor's Office of Manpower and Human Development and the Illinois Farmers Union. Twenty-four participants graduated from the program. Several took energy-related jobs.

The Illinois Institute of Natural Resources provided information on this project.

Category Education
State IL
Project Name Weatherization & Low Cost Solar

Organization Design Dept.
Southern IL Univ.
Address Carbondale, IL 62901
Contact Richard E. Archer
Design Dept.
Telephone (618) 453-5761

Funded By Illinois Farmers Union

Cost \$72,000

Congressional District XXIV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Coles County's current housing and historic preservation planning activities emphasize conservation of existing housing and neighborhood revitalization. Energy-conservation programs offer help to "do-it-yourselfers". A library provides a resource center.

The Illinois Institute of Natural Resources provided information on this project.

Category Housing
State IL
Project Name Historic Preservation
& Energy Conservation

Organization Coles County Reg:
Planning Commission
Address P.O. Box 471
701 Monroe
Charleston, IL 61920
Contact County Planner
Telephone (217) 348-0521

Funded By n/a

Cost n/a

Congressional District XXII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

George Fred Keck built the House of Tomorrow for the Century of Progress Fair in Chicago. The year was 1933. In his design for a glass and steel house, Keck mastered both simplicity and order by modularizing wall and roof sections to streamline the construction process. Once the basic walls of glass were erected, Keck noticed on a cold winter morning that the workmen had rolled-up shirtsleeves despite the freezing outdoor temperature. He mentioned that the furnace was not operating yet and that the sun light must be heating up that space. This observation was to mark the opening of a 20-year period of innovation and experimentation with light, heat, space, and comfort in multi-and single-family buildings in the Chicago metro area. Before World War II halted all residential construction, a solar sub-division was built, and quickly sold.

The persistent aims of the Keck brothers bear mentioning. One was to reduce building costs by providing the maximum interior living area with a minimal use of space. The home should serve the occupants, not the occupants the home. Second, the Kecks believed that a house should lend itself to mass production with abundant opportunity for individual expression. Third, a structure should provide a scientifically healthful, light, cheerful residence that capitalizes nature's fickle moods to man's incessant advantage. The house should bring the life-giving sunshine indoors, and exclude alike, hot, dry air in summer and damp, biting winds in winter.

Category	Housing
State	IL
Project Name	Passive Solar: 1930
Organization	Keck & Keck, Architects
Address	612 N. Michigan Ave. Chicago, IL 60605
Contact	George Fred Keck & William Keck
Telephone	(312) 787-5035
Funded By	n/a
Cost	n/a
Congressional District	I-XI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The University of Illinois Department of Agricultural Engineering is developing a greenhouse heating system that uses waste-heated water such as that produced by electric power-generating plants of other industries. This heating system applies the heated water to the outside of the greenhouse at the ridge and allows it to run over the outside surface. Research to date, including a study of an experimental waste-water-heated greenhouse at Illinois Power Company's Vermilion Power Plant demonstrates that the heating system works. It was also found that low pressure application systems and smooth greenhouse surfaces such as glass or plastic film (rather than corrugated fiberglass) works best.

The Illinois Institute of Natural Resources provided information on this project.

Category Industrial
State IL
Project Name Co-generation for Greenhouses

Organization Univ. of Illinois
Dept. of Agricultural
Engineering
Address Urbana, IL 61801
Contact Dr. P. N. Walker
Telephone (217) 333-4970

Funded By n/a

Cost n/a

Congressional District XXI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Institutional
State IL
Project Name Beer-can Collector

Organization Sparta School District

Address Sparta, IL

Contact Richard E. Archer,
Design Program

Telephone (618) 453-5761

Funded By Sparta School District

Cost \$3,000 for materials
CETA labor

Congressional District XXIV

Compilation Date February 1980

School District #146 of Sparta, IL, has cut its heating bills substantially by constructing and using a beer-can solar collector. The 750ft² collector system produces 150,000 BTUs per hour. It was built at a cost of \$4 ft². Labor costs and the \$3,000 material cost were met by CETA and 15 jobless young people were employed to construct the collector. The beer-can collector was the product of four years of research by Richard Archer.

After a wooden lean-to structure was attached to the Vocational Arts Building of the Sparta District, 24,000 beer cans were collected, cut in half, pop-riveted to second-hand litho plates and washed at the nearby car wash. The assembled modules were painted flat black and air-cured before installation. The panels were glazed with two layers of rigid kalwall and insulated behind the absorbers with fiberglass batts.

A 110-volt in-line thermostat turns the fan on when the top duct temperature reaches 90° F. The system is vented at top and bottom for summer cooling. A small fan installed within the tubes blows the warm air to floor level.

A heat-storage system was determined to be too costly, since the building is only used during the daytime. Uniquely, though, the many acres of heavy, cast iron equipment this building contains absorb heat during the heating cycle and reradiate some of that heat at night to prevent freezing.

The performance of the beer-can collector has been measured to be 120° F output, with 66° F input air and an outside ambient temperature of 18° F. Another, more significant measure is the drastic reduction in the heating bills. Despite a colder

winter in 1979, the gas allotment to the school had not been depleted by March 30. The same allotment had run out by mid-December in the previous two years.

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The Cahokia Unit School District (187) project will use both passive and active solar heating systems. The glass in classrooms on the southeast side of the school and plexiglass in the school's gym/all-purpose room will be replaced with passive solar collectors. It is anticipated that the sun can take over a significant portion of the heating for the southeast-facing classrooms and the gym.

Active solar collectors on the school's roof will provide hot water for the school's cafeteria. This portion of the project involved installing the collectors and a hot-water storage tank. A heat pump will bring the water up to 140° F when the collectors provide insufficient heat.

The Illinois Institute of Natural Resources provided information on this project.

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Category	Institutional
State	IL
Project Name	Elementary School Solar

Organization	Cahokia Unit School District 187
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Address	1700 Jerome Ln. Cahokia, IL 62206
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Contact	Jonathan J. Lewis Admin. Asst.
---------	-----------------------------------

Telephone	(618) 332-1333
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Funded By	n/a
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Cost	n/a
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Congressional District	XXIII
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

During the planning of a new community recreation center, the Naperville Park District conducted research on the utilization of alternative energy systems, such as passive and active solar design elements, and energy-conservation techniques.

As Sun Day coordinators for DuPage County, the Park District helped organize fairs, exhibits, and educational programs.

Naperville Park District spans a wide variety of energy education programs. They have introduced appropriate technology projects into the local school district's shop and science classes. Adult education programs include guides for homeowners.

The Illinois Institute of Natural Resources provided information on this project.

Category Institutional
State IL
Project Name Naperville Park District

Organization Naperville Park District
Address 421 W. Martin
Naperville, IL 60440
Contact Steven A. Lamb
Resource Develop.
Specialist
Telephone (312) 420-4230

Funded By n/a

Cost n/a

Congressional District XIV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Pilcher Park Nature Center has a display called "Sun Power." This visitor-activated exhibit employs solar cells and a model windmill to demonstrate different types of alternative energy sources.

Other energy sources highlighted in an adjacent display include wind, nuclear, solar, geothermal, and fossil fuel.

The Illinois Institute of Natural Resources provided information on this project.

Category Institutional

State IL

Project Name Renewable Energy Display

Organization Pilcher Park Nature Center

Address Joliet, IL 60432

Contact Bob Johnson,
Park Naturalist

Telephone (815) 726-2207

Funded By n/a

Cost n/a

Congressional District XVII.

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Youth Community Conservation and Improvements Projects (YCCIP) has three projects that utilize CETA-employed youths.

IN WOOD River, IL, YCCIP helped run a rehabilitation program for low-income and elderly citizens interested in fixing up and weatherizing their property. The city provided coordination between applicants of low-interest rehab loans, hard-to-employ teenagers, and city personnel.

In two other projects, YCCIP assisted in maintaining a greenhouse. This included everything from transplanting flowers and shrubs to fixing and maintaining engines and equipment. They also initiated a recycling program.

The Illinois Institute of Natural Resources provided information on this project.

Category Institutional
State IL
Project Name Youth Training

Organization Ofc. of Manpower Development
Address 200 Hillsboro Ave.
Edwardsville, IL 62025
Contact William E. Hanke,
Coord. Planning &
Evaluation
Telephone (618) 692-4592

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

Renewable Resources— A National Catalog of Model Projects

Category Low Income
State IL
Project Name Energy Conservation

In 1976, the Community and Economic Development Association (CEDA) began an energy conservation program in Cook County. This program provides cost-effective approaches to improve the thermal efficiency of dwelling units in suburban areas of the county.

The Illinois Institute of Natural Resources provided information on this project.

Organization Community & Economic Development Association of Cook County, Inc.
Address 600 S. Michigan Ave.
Chicago, IL 60605
Contact Chester LeSure
Telephone (312) 922-9158

Funded By n/a

Cost n/a

Congressional District I - XI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In April of 1978 the Energy Audit Program began. The program provides city residents with an easy and effective analysis of their energy usage, as well as tips on saving energy and money.

Auditors attend a concentrated energy audit course conducted by Illinois Power Company. The auditors learn the energy-conservation techniques and knowledge now available. They visit residents in their homes to teach these techniques and to audit the homes for insulation deficiencies.

The Project Conserve Questionnaire is used to determine the energy usage in a home. The completed questionnaire is analyzed by a computer. The results, sent directly back to the home, show the cost figures and overall savings of do-it-yourself or contractor-installed energy conservation actions. The computer printout also indicates approximately how long it will take for the improvement to pay for itself.

Members of the Department of Community Development, Decatur Housing Authority, Illinois Power Company, Decatur Township, and six low-income residents are on the policy advisory council.

A free Self-Help Winterization Clinic for city residents demonstrated how to weatherstrip and caulk doors and windows. A film strip entitled "Money to Burn" was shown. Energy door prizes, donated by local firms, were given away to people attending the clinic.

Staff salaries are funded through the CETA Program. The Community Development Block Grant money provides the tools and equipment. Project Conserve provides the audit questionnaires and their processing.

Category	Low Income
State	IL
Project Name	Home Energy Audit Program
Organization	Decatur Macon Opportunities
Address	1429 N. Jasper Decatur, IL 62526
Contact	Linda Chick, Energy Audit Supervisor
Telephone	(217) 428-2193
Funded By	n/a
Cost	n/a
Congressional District	XXI
Compilation Date	February 1980

Local newspapers, radio stations, and area television stations provided advance knowledge of the program activities to the general public. Outreach workers of all interested agencies assisted in notifying target neighborhoods the program.

The Illinois Institute of Natural Resources provided information on this project.

Renewable Resources— A National Catalog of Model Projects

The Home Weatherization Program, begun in 1975, enables low-income individuals and families, including the elderly and the near poor to participate in energy-conservation programs. These programs are designed to lessen the impact of the high cost of energy and to reduce individual and family energy consumption.

Through the Weatherization Program, income eligible homeowners qualify for attic insulation, storm windows and doors, weatherstripping, caulking, and minor furnace repairs. This program is at no cost to the applicant. Upon completion of work done, the staff conducts a final inspection and the homeowner is then required to sign a form stating that the work has been satisfactorily completed.

The Illinois Institute of Natural Resources provided information for this program.

Category	Low Income
State	IL
Project Name	Home Weatherization Program
Organization	Human Resources D Community Action Div.
Address	425 E. State St., #504 Rockford, IL 61104
Contact	Sue St. Clair
Telephone	(815) 987-5685
Funded By	n/a
Cost	n/a
Congressional District	XVI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Illinois Valley Economic Development Corporation (IVEDC) is a public, non-profit community action agency located in the rural, central Illinois counties of Calhoun, Greene, Jersey and Macoupin. The agency's mission is to combat the causes and conditions of poverty in these four counties, identifying problems and mobilizing resources. Energy issues and energy prices' increasing impact on the low-income community have been established by the agency's governing board as a priority concern.

An extensive winterization effort of homes of elderly persons was followed by solarization of several of these homes.

CETA-employed youths built solar collectors of an inexpensive "hot box" design. These were installed and vented into windows of the homes.

A booklet available from IVGDC describes the project and provides "how-to" instructions for those interested in this project.

The Illinois Institute of Natural Resources provided information on this project.

Category	Low Income
State	IL
Project Name	Illinois Valley Energy Strategy
Organization	Illinois Valley Economic Develop- ment Corporation
Address	130-1/2 N. Broad Carlinville, IL 62626
Contact	Roger Fenton, Exec. Director
Telephone	(217) 854-9677
Funded By	n/a
Cost	n/a
Congressional District	XX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Project NOW has constructed an experimental solar collector for use by low-income families. CETA youth are trained in every aspect of designing, constructing and maintaining the collector.

Small appropriate technology grants help Project NOW pursue self-education in solar alternatives. A reference library for low-income persons provides access to slides, periodicals, brochures, books.

The Illinois Institute of Natural Resources has provided information on this project.

Category	Low-Income
State	IL
Project Name	Solar Job Training
Organization	Project NOW Community Action Agency
Address	1823 2nd Ave. Rock Island, IL 61201
Contact	Francisca Olvera
Telephone	(309) 793-4160
Funded By	n/a
Cost	n/a
Congressional District	XIX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Urban Ark project is dedicated to bringing technical, financial and human resources together to combat the energy crisis for low and moderate income persons.

Energy conservation workshops, designing and installing low cost passive solar retrofits, training minority contractors, establishing a community energy co-operative and credit union and establishment of an energy related for profit enterprise are the major components of the program.

Category Low Income
State IL
Project Name The Urban Ark

Organization The Urban Ark

Address 2100 Ridge
RM 1116
Evanston, IL 60204

Contact Leanne Sowande-Brent

Telephone (312) 328-1191

Funded By Community Development
Block Grant

Cost n/a

Congressional District X

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The weatherization program is operated by the Peoria Citizen Committee for Economic Opportunity, Inc. (PCCEO, Inc.) with funds from the City of Peoria, the Department of Labor, the Community Services Administration, as well as the local CETA program administered by the City of Peoria.

The program addresses the problems of energy lost through poor or non-existing insulation at all points of entry and exit.

The services are basically free to all qualified applicants. Workshops are also provided for persons interested in learning or improving their basic home-repair and up-keep skills.

All activities of the PCCEO, Inc. Environmental Services Program are reviewed and approved by a Central Illinois Energy Advisory Committee composed of representatives of low-income consumers, utility companies, social service agencies, and city officials.

As a by-product of the Environmental Services efforts, PCCEO trains from 5 to 13 youths in general weatherization principles and application, outreach monitoring and certification of applicants and work performed, and general skills in dealing with and helping people.

The Illinois Institute of Natural Resources provided information for this project.

p>Category Low Income
State IL
Project Name Weatherization Program

p>Organization PCCEO, Inc.,
Community Svcs. Admin.
Environmental Svcs.
Address 2516 W. Montana St.
Peoria, IL 61605
Contact Chief,
Environmental Svcs. Dept.
CSA
Telephone (309) 637-4426

p>Funded By n/a
Cost n/a
Congressional District XVIII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Northwestern Illinois Community Action Agency operates a weatherization program through funds provided by the Department of Energy and the Community Services Administration. The program is designed to reduce fuel consumption for low-income homeowners in Stephenson and Jo Daviess Counties. Installation of storm-doors and windows and insulation is free to eligible clients. To be eligible, applicants must meet income guidelines established by DOE and CSA and own their home.

The Illinois Institute of Natural Resources provided information on this project.

Category	Low Income
State	IL
Project Name	Weatherization Programs (CAP)

Organization	Northwestern Illinois Community Action Agency
Address	103-109 N. Chicago, 3rd floor Freeport, IL 61032
Contact	Ms. Judy Pals
Telephone	(815) 232-3141

Funded By	n/a
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Cost	n/a
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Congressional District	XVI
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Throughout 1977, the Center for Neighborhood Technology provided technical assistance for the Christian Action Ministry greenhouse and food-production program. This was the first rooftop greenhouse in the Chicago area.

In November 1977, CNT, in conjunction with the Domestic Technology Institute, held a Neighborhood Engineer Workshop. Neighborhood leaders and housing re-hab carpenters were taught how to design and construct a solar greenhouse, as well as solar food driers and solar collectors.

The Center for Neighborhood Technology provides low- and mixed-income neighborhoods with technical assistance in projects ranging from wastewater management to weatherization, solarization, and greenhouse food production. Working with community groups in six low-income neighborhoods, CNT is constructing six food-producing solar greenhouses.

CNT operates a Neighborhood Technology Extension Service that consists of five VISTA volunteers—a horticulturalist, engineer, economics expert, and community organizer—who are available to neighborhoods for consultation.

The Center also publishes The Neighborhood Works Information Service twice monthly. This newsletter provides up-to-date information on successful neighborhood projects, government programs, and practical information on do-it-yourself or community projects. TWI includes original features, abstracts, and reprints from over 100 publications.

(The Illinois Institute of Natural Resources provided information on this project.)

Category	Outreach
State	IL
Project Name	Center for Neighborhood Technology

Organization	Center for Neighborhood Technology
Address	570 W. Randolph St. Chicago, IL 60606
Contact	Scott Bernstein Executive Director
Telephone	(312) 454-0126

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

Renewable Resources— A National Catalog of Model Projects

The DeKalb Area Alliance for Responsible Energy (DAARE) is a group of citizens who favor the development of safe energy sources and oppose the expansion of nuclear power to generate electricity. Through education, legislation, and direct action, DAARE is working to bring about a re-examination of energy priorities in northern Illinois.

DAARE members have built a solar cooker, a small hot dog cooker, a windmill, and a photovoltaic cell for demonstration purposes. DAARE built and installed plastic storm windows and insulated shutters to help conserve heat at a local health food co-op.

The Illinois Institute of Natural Resources provided information on this project.

Category	Outreach
State	IL
Project Name	DeKalb Area Alliance for Responsible Energy
Organization	DeKalb Area Alliance for Responsible Energy (DAARE)
Address	P.O. Box 261 DeKalb, IL 60115
Contact	Marilyn Shineflug Yale Simkin
Telephone	(815) 758-6181 (815) 756-1633
Funded By	n/a
Cost	n/a
Congressional District	XV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Starved Rock State Park has installed a home-made hot air type solar panel on its Visitor Center. The unit is used in conjunction with an inside display on solutions to our energy crisis. The system supplements the building heat and functions as a demonstration model. It has no storage component.

At the Annual Alternative Energy Fair, exhibitors of simple and esoteric equipment demonstrate and sell products. All areas of alternative energy generation and energy conservation are explored through public round-table discussions between recognized energy experts and visitors.

The Illinois Institute of Natural Resources provided information for this program.

Category Outreach
State IL
Project Name Demonstration Project & Fair

Organization Illinois Dept. of Conservation
Address Starved Rock State Park,
Utica, IL 61373
Contact Mike Winter
Telephone (815) 667-4906

Funded By n/a

Cost n/a

Congressional District XV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In the spring of 1976, five Evanston citizens formed a small committee concerned with the general direction of our urban culture and the problems we are bringing on ourselves. With the idea of moving to "Epoch B" and with the roof of the Evanston Ecology Center over their heads, they set out to organize and educate their community in appropriate energy technology and sound environmental practices.

The best way to educate, these Evanstonians agreed, was by demonstration and active, cooperative participation. So their goal became a community-level demonstration project. Epoch B was already housed in a fitting place: a full-scale model of contemporary architecture and its inefficient use of energy, the Evanston Ecology Center.

From its first public meeting in October 1976, Epoch B moved quickly into operation by subsequent, almost weekly organizational meetings. By the end of December, a six-month program of workshops and demonstrations was planned. Along with the donations from local businesses, workshop fees would allow parts to stand by themselves.

The first workshop, a seminar held in January 1977, taught participants how to find and calculate heat loss. One weekend in February, nearly 35 enthusiastic volunteers gathered to insulate the Center's lecture room. This involved installing 2" x 6" studs, 6" batt insulation, a vapor barrier, drywall, making storm doors, and repainting the room.

Solar space heating was the next step. The last two Saturdays in March saw workshops for constructing the solar collector panels. Work continued on these panels for the next few months of Saturdays. The rock storage unit was constructed in the fall. Now completed, the system provides

Category Outreach

State IL

Project Name Epoch P

Organization Evanston
Environmental Assoc.

Address 2024 McCormick
Evanston, IL 60201

Contact Libby Hill

Telephone (312) 864-5181

Funded By Donations from local
businesses
McDonalds
Workshop fees
City of Evanston

Cost

Congressional District I- XI

Compilation Date February 1980

heat for the 1,000 ft² lecture room. A conventional gas furnace provides back-up.

The final segment of the six-month pilot program dealt with wind-generated electricity. The wind committee, meeting through the winter of 1976-77, placed an anemometer on the roof of the Ecology Center to measure wind speed. It was decided that installation of a large (2 - 6 kw) wind generator would take more time and money than was available. However, a 200-watt unit was donated, and, in April of 1977 it was installed on the roof of the Center. It currently provides power for the foyer lights and charges two storage batteries. Since that time, the wind committee has received a grant to erect a 4 kw wind machine. This is scheduled for delivery in the spring of 1980.

With the end of the six-month pilot program came a revenue sharing grant from the City of Evanston to continue the project over the next 25 years. McDonalds Corporation gave a grant for the production and printing of a booklet about the project.

The assurance of funding permitted plans to progress for the building of a solar greenhouse to be attached to the Center.

Construction of the greenhouse began in the summer of 1979. The main construction was done by a high school class of 16 students, with the help of the Evanston Parks Department. After a break for the month of August, work picked up again with Saturday volunteers. The greenhouse, completed in April, 1980, provides food, flowers, and supplemental heat to the Center's lab room. In addition, it serves as a walk-through demonstration of a community-built passive solar energy project.

The Center's solar water heating system was installed in December 1979. It supplements the present gas hot water system.

When all of the Epoch B projects are operational, they will form a demonstration system of the major land-based alternate energy systems.

In concert, they should provide a considerable portion of the energy needs for the Center. More importantly, the Center will provide a model for community instruction and the dissemination of information.

Renewable Resources— A National Catalog of Model Projects

The Sinnissippi Alliance for the Environment (SAFE) sponsors a wide variety of educational programs on renewable resources.

SAFE sponsors a grade school solar energy curriculum called "Fun With the Sun," which SAFE members will arrange to deliver to the classroom. Plans for a solar cooker are but one project idea in this curriculum.

Various types of workshops and presentations are organized by SAFE. SAFE speakers deliver talks and hold slide shows on low-tech solar applications such as window management and window-box collectors. A portable solar water heater boils eggs. Special programs are available on the ethical issues of energy for church groups.

Information on recycling projects in the Rockford area is also available from SAFE.

The Illinois Institute of Natural Resources provided information for this project.

Category Outreach
State IL
Project Name "Fun With the Sun"

Organization Sinnissippi Alliance for the Environment
Address 734 Parkview Ave.
Rockford, IL 61107
Contact Beth L. Galbreath
Telephone (815) 397-4504

Funded By n/a

Cost n/a

Congressional District XVI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Households Involved in Pollution Solutions (HIPS) has several programs to promote "Pollution Solutions." HIPS works to reduce the amount of solid waste through group activities and individual efforts to reduce consumption. HIPS organized the first local glass drive and helped set up permanent paper salvage. It recently managed a volunteer effort that composted the leaves picked up by the city, saving the cost of landfilling the leaves and creating compost to reclaim the former Champaign landfill.

The HIPS Christmas Tree Chip has become an annual community activity providing area residents with valuable garden mulch while reducing the amount of waste going to area landfills.

To help members and others in the community conserve heating and cooling energy, HIPS sponsors weatherproofing workshops that discuss ventilating, sealing, and insulating improvements in volunteered homes.

HIPS has launched and supported bikeway efforts in both Champaign and Urbana.

To recognize outstanding contributions to the improvement of the local environment and to call attention to efforts that cause deterioration of the environment, HIPS each year presents its Rose Awards and Rotten Egg Awards.

HIPS has long worked to foster environmental legislation at all levels. HIPS members offer testimony and information to governmental bodies, participate in legislative hearings, and initiate letter-writing campaigns. HIPS supports local and state beverage container deposit legislation and maintains a Land Use Committee to monitor local land development zonings.

Category	Outreach
State	IL
Project Name	Households Involved in Pollution Solutions
Organization	Households Involved in Pollution Solutions
Address	P.O.B. 1775 Champaign, IL 61820
Contact	Heather Young
Telephone	(217) 344-4089
Funded By	n/a
Cost	n/a
Congressional District	XXI
Compilation Date	February 1980

The HIPS Bulletin is published monthly and distributed to all members. It contains information about HIPS activities and environmental issues. Its features discuss ways of living in harmony with the environment, commentary about the environmental impact of current expansion, and other contributions by members.

The Illinois Institute of Natural Resources provided information on this project.

Renewable Resources— A National Catalog of Model Projects

The League of Women Voters' ongoing community-education project centers around a slide presentation: "Solar Energy and Conservation: Options for Americans." Available through any local League in Illinois, the show has already been seen by some 4,000 persons.

In the spring of 1978 the League assembled a completely furnished "doll-house" to illustrate every possible kind of energy-saving device or design that can be used to retrofit an existing home. This includes weatherstripping, insulation, a heat pump, insulated water pipes and water heater, and passive solar design. The doll-house is available through local Leagues in Illinois. The League uses the model to educate members of their own groups, as well as the general public, about the kinds of things that can and should be done by individual homeowners to conserve energy and cut down on utility bills.

The Illinois Institute of Natural Resources provided information on this project.

Category Outreach
State IL
Project Name League of Women
Voters' Solar Display

Organization League of Women
Voters
Address 67 E. Madison
Chicago, IL 60603
Contact Joanna Hoelscher,
Natural Resources
Chairperson
Telephone (312) 833-7361

Funded By n/a

Cost n/a

Congressional District I - XI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

More than 50,000 North Shore area residents are served by a recycling program begun in 1971. The program now incorporates curbside pickup, drop off and recycling centers for paper, bottles and metal wastes. It is partly operated by paid staff.

The North Shore Ecology Center has several energy conservation demonstrations. Low-energy transportation is an electric-powered adult tri-cycle with basket for short range, in-town errands. A pedal-powered generator exercycle produces electricity to operate a small TV, radio or tape recorder. Its low energy house with solar heat is highly insulated with passive and active solar heating, hot-water pre-heating, and water conservation.

The Ecology Center has several information programs. Their Environmental Referral System helps direct people to the group, agency, or individual who can best assist them with solutions to their environmental problems.

The Environmental Information Service makes environmental, alternate energy, and energy-conservation information available to the public free of charge.

Through Environmental Awareness Programs the Ecology Center promotes solar energy and recycling.

The Illinois Institute of Natural Resources provided information on this project.

Category Outreach
State IL
Project Name North Shore Ecology Center

Organization North Shore Ecology Center
Address 683 Euclid
Highland Park, IL 60035
Contact Sol Levine
Telephone (312) 432-1440

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

Renewable Resources— A National Catalog of Model Projects

Shawnee Solar Project is a comprehensive solar energy development program. Its services include policy analysis for local governments, design engineering of passive and active solar heating systems, construction management, community development workshops and processes, public education, organizational development consulting, and research and development and demonstration projects.

SSP works with the Carbondale City Council to design and implement appropriate conservation and solar development ordinances, including policy statements and building codes. It is also working to develop zoning- and subdivision-controls and a locally oriented capital transfer program.

Demonstration programs include low-cost, low-technology greenhouses, water heating and passive gain systems. Seven buildings were retrofitted in the fall of 1978 at the Touch of Nature residential camp of the Young Adult Conservation Corps. A separate demonstration program will train 12 participants for one year in energy conservation and low- to moderate-technology solar heating and cooling.

The Shawnee Solar Project's services are free to low-income people and are billed at \$20/hr. to those with the ability to pay.

The Illinois Institute of Natural Resources provided information on this project.

Category	Outreach
State	IL
Project Name	Shawnee Solar Project
Organization	Shawnee Solar Project (SSP)
Address	211-1/2 W. Main Carbondale, IL 62901
Contact	Chris Robertson
Telephone	(618) 457-8172
Funded By	Young Adult Conservation Corps, City of Carbondale
Cost	n/a
Congressional District	XXIV
Compilation Date	February 1980

INDIANA

1. Fort Wayne
2. Frankfort
3. Indianapolis
4. Muncie
5. Richmond
6. Selma

INDIANA

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Renewable Resources— A National Catalog of Model Projects

The energy office is involved in the redevelopment of the inner city of Richmond. Some of the houses built will be passive solar homes. The design of the houses and a portion of the construction will be funded by HUD under the cycle 5 passive solar demonstrations.

The 1,300 ft² houses are expected to sell in the \$45,000 range. Two of the houses will be built by a contractor and the third will be built by the Community Action Council. The Community Action Council-constructed house will utilize CETA labor and will be sold for the cost of materials.

Category	Cities
State	IN
Project Name	Passive Solar Urban Renewal

Organization	Richmond City Energy Department (OCEMP)
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Address	50 North 5th Street Richmond, IN 47374
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Contact	Ann Cline
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Telephone	(317)966-5561
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Funded By	DOE Program Grant (OCEMP); HUD Cycle 5 Solar Demo.
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Cost	\$137,000 part of two- year program grant, \$12,000 Cycle 5
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Congressional District	X
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

The Richmond City Energy Dept. has initiated programs to provide energy audits for homeowners and commercial building owners, compiled an inventory of natural resources, started a car-pooling program and organized two energy interest groups.

All of Richmond's community buildings and most of its public buildings have been audited by the energy office. The office recommends energy conservation measures that can increase the energy efficiency of the building.

A home energy audit program is now being prepared. The home energy audit will include an information packet to show homeowners how they can conserve energy and save money. Solar domestic water heating and solar space-heating techniques will be described in the packet.

The natural resources inventoried included aquifers, wind patterns, solar sites and biomass resources.

All of the companies in Richmond that employ more than 200 people were sent data sheets to compile information on the possibility of forming car pools. Persons interested in car pooling filled out the sheets. The Energy Office compiled the data and gave the respondents lists of persons who lived and worked in close proximity. It is estimated that 50 percent of the 15,000 people who initially responded to the request participated in the car pool.

Critique/analysis: The \$137,000 that DOE spent on the Richmond Energy Department is money well spent. The four-person staff has accomplished more for the promotion of solar/conservation than any other agency in the state.

Category	Cities
State	IN
Project Name	Richmond City Energy Department
Organization	Richmond City E Department (CEE)
Address	50 North 5th Street Richmond, IN 47374
Contact	Ann Cline
Telephone	(317) 966-5561
Funded By	DOE programs grant - Comprehensive Community Energy Mgt. Program
Cost	\$137,000 for all programs, two-year budget
Congressional District	X
Compilation Date	February 1980

It is expected that the personnel now employed at the energy office will maintain their positions within the Richmond city government after the DOE funding has expired.

Few of the programs initiated have encountered any serious problems. Richmond has been very supportive of their efforts.

Renewable Resources— A National Catalog of Model Projects

The Richmond City Energy Dept. is promoting the construction of a coal gasification facility. The project will be constructed and operated by the Richmond Power and Light Company at a cost of \$52 million.

The plant will be built in four phases. The first phase will be the construction of the gasification plant, which will convert low grade, high sulphur Indiana coal into high grade "producer" gas, to fire the power company boilers and generate electricity. The system is designed to capture pollutants as saleable by-products.

The second phase will add the capability of removing low grade gas. The third phase will use the pressure of the escaping low grade gas to turn turbines to generate additional electricity.

The fourth phase will burn 90 percent solid wastes with 10 percent coal. Also in the fourth phase the low grade gas will be combined with hydrogen to produce methanol and ammonia. The methanol will fuel city-owned vehicles. The ammonia will be used for fertilizer.

Though considered experimental, the energy office formally supported the proposed facility. They disseminated information on its benefits and began an effort to locate third party financing. The project now has \$4 million committed from a private investor. FHA is being approached to guarantee the loan for the balance needed to construct phase one.

The energy office supports the project because it will reduce the cost of electricity to the consumer by approximately 50 percent, will use a local resource (coal) in an efficient, non-polluting manner, will consume a large amount of solid wastes (a significant problem for Richmond), and it will produce methanol and ammonia.

Category Cities
State IN
Project Name Richmond Gasification Plant

Organization Richmond City Energy Dept. (CCEMP)

Address 50 North 5th Street
Richmond, IN 47374

Contact Ann Cline

Telephone (317) 966-5561

Funded By DOE Program Grant - Comprehensive Community Energy Mgt. Program

Cost \$137,000 for two year program period

Congressional District X

Compilation Date February 1980

Critique/analysis: The scale of the project seems large when compared to solar retrofits or educational programs, but it is small when compared with traditional power generating plants. The large scale and high capital cost are offset by the reduced cost of electricity to the consumer and the large number of people who will benefit from the plant. The project will serve only the immediate community.

Renewable Resources— A National Catalog of Model Projects

CAAP is currently identifying and applying for federal solar grants to assist their delegate agencies, primarily neighborhood organizations, to sponsor solar demonstrations.

David Culp, program writer for CAAP, first finds information on program opportunity notices (PON) in solar energy. He then contacts a delegate agency interested in doing a solar demonstration project. An independent solar consultant reviews the PON and prepares a preliminary assessment on viability of the proposed program opportunity response.

If the program appears viable, CAAP prepares the administrative portion of the grant while the solar designer/consultant prepares the technical portion. The grant either lists CAAP as the grantee or the delegate agency as the grantee with CAAP as the grant administrator.

Using this approach, CAAP has successfully applied for three solar demonstration grants. The first grant was for the construction and design of an urban solar greenhouse. It was awarded by the Community Services Administration. The greenhouse design is nearly completed. Construction should take place in the spring of 1980.

The second grant awarded was for the passive solar retrofit of a low-income multi-family housing project. The grant funds the design of the project, not the construction. The design award came under the HUD cycle 5 demonstrations.

CAAP received a third solar demonstration grant for a passive solar retrofit of the Hispano-American Multi-Service Center. The Department of Energy sponsored this design award.

These awards provide the delegate agency with a solar system which proves to the community that solar works and is available to them.

Category Community

State IN

Project Name CAAP and Solar

Organization Community Action
Against Poverty o.
Greater Indianapolis,
Inc.
Address 611 North Park Avenue
Indianapolis, IN 46204

Contact David Culp

Telephone (317) 638-4577

Funded By CAAP

Cost n/a

Congressional District XI

Compilation Date February 1980

Critique/analysis: This program shows how to use existing manpower and talents to develop community solar projects. By combining the experience of a grant writer and a reputable solar designer/consultant, the opportunity of receiving funding improves.

The major problem has been obtaining timely information on the funding sources and programs. Solar funding comes from several sources. Finding knowledgeable people within the funding organization is often difficult.

Renewable Resources— A National Catalog of Model Projects

Breakthrough Plus Forty is a bi-monthly newsletter by and for those persons who are interested in solar energy north of the 40th parallel. As of April 1979 there were subscribers from 38 states. The newsletter spotlights people who do things themselves. It includes all alternative energy technologies. "Breakthrough Plus Forty" celebrates resourcefulness and simplicity.

Editor Alan Garinger is assisted by several volunteers who collect information and write articles for the newsletter.

Critique/analysis: The impact of the newsletter is hard to estimate. The major problem is financial support. "Breakthrough's" cost varies with each issue and directly reflects the varying cost of production.

p>Category Education
State IN
Project Name Breakthrough Plus Forty

p>Organization Breakthrough Plus Forty

p>Address Oakland Place
Box 62
Selma, IN 47383

p>Contact Alan Garinger

p>Telephone (317) 282-6028

p>Funded By Subscriptions and monthly sponsors

p>Cost Subscription \$3.74/yr
(Barely covers costs)

p>Congressional District X

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Each year 1,000 people attend an alternative energy workshop in Frankfort. The workshop is organized by Bill Caddell, director of the Frankfort Community Public Library. Bill locates and secures the speakers and enlists the assistance of many volunteers.

The community provides the building to hold the meeting, accommodations for the speakers, lunch for the workshop attendees, a gathering of the speakers and community leaders at a reception prior to the workshop, and volunteers to sell books and materials at the workshop.

The registration fee for workshops is under \$20. Speakers who have addressed the workshops include Steve Baer, Malcomb Wells, John Todd, Alex Wade, David Wright, Edward Mazria, Bill Yanda, and several other highly qualified national and local appropriate technologists.

Critique/analysis: The impact of the workshops is far-reaching. Participants came from seven states, and inquiries have come from all over the world. The speakers' presentations are video-taped and made available to interested parties. Several solar projects have been completed as spinoffs of the workshop. The only negative comment is that some speakers give very proprietary presentations

Category Education
State IN
Project Name Energy Workshop

Organization Frankfort Community Public Library
Address 208 West Clinton St.
Frankfort, IN 46041
Contact Bill Caddell
Telephone (317) 654-8746

Funded By Admissions and Library Fund
Cost \$6,800
Congressional District VII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Eureka Express expects to begin traveling with an energy/recycling show in the spring of 1980. The show will include speakers, some live theater, exhibits, an information center, and a "hands-on" workshop. The show will travel from community to community. It will cater to schools and community groups and will be geared for children of all ages.

The Eureka Express is organized and managed by Greg Jacobs. The activities all take place in converted box cars. One box car is a print shop and workshops on printing are held in the car. The second box car will be used to conduct "hands-on" workshops in the construction of breadbox solar water heaters and similar low-tech solar energy projects. The third car is an energy exhibit and information center. The fourth car is a theater car. The fifth car provides an office and housing for the travelling staff and the sixth is for storage.

Eureka Express began in 1975 as a creative resource center operating out of rented box cars. The group focused on the use of recycled materials and directed the programs to children 10 years old and up. In 1976 the Eureka Express helped put together the New Western Energy Show in Montana.

In 1977 Eureka Express purchased the railroad cars and began to insulate and rebuild their interiors. The exteriors of the cars were painted with bright graphics. The cars are now completed and the five person staff is getting ready to tour.

Critique/analysis: The program makes solar energy and energy conservation fun. It instills a "conservation ethic" in the children and adults who attend.

Category Education
State IN
Project Name Eureka Express

Organization Eureka Express
Address Box 10234
Ft. Wayne, IN 46851
Contact Greg Jacobs
Telephone (219) 424-7659

Funded By Indiana Arts Commission, National Endowment for the Arts
Cost \$29,138 (1978)
\$125,000 (1980)
Congressional District IV
Compilation Date February 1980

The biggest problem the Eureka Express has encountered is lack of funding. Eureka Express does charge the communities it visits, but these fees do not cover the costs of the Express and its staff.

Renewable Resources— A National Catalog of Model Projects

Reldo Ridenour built this "A" Frame collector out of standard building materials. The glazing for the collector is from recycled sliding glass doors. Fifteen tons of granite contained within the "A" Frame serves as system heat storage. The collector is insulated with foam.

The collector is based on John Keyes' Solar Furnace. It supplies approximately 40 percent of the heating requirements for the residence and should pay back the \$2,000 investment within five years.

Two major problems were encountered. The foam insulation broke down quickly and had to be replaced. The ducts from the collector to the house were not insulated very well. This permitted too much heat loss.

The Frankfort Energy Workshop motivated Ridenour to build this system.

Category Housing
State IN
Project Name "A" Frame Solar System

Organization Reldo Ridenour
Address 59 White Street
Frankfort, IN 46041
Contact Reldo Ridenour
Telephone (317) 654-6080

Funded By Private
Cost \$2,000
Congressional District VII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Jan and Jim O'Neil have built a solar-heated house in Muncie, IN, on the grounds of the Center for Peace and Life Studies (CPLS). Two families and a variety of individuals comprise the non-profit corporation, which works at self-education in renewable energy and energy conservation.

One of the two solar-heated homes on the 55-acre Center grounds has an attached solar greenhouse, which utilized a concrete slab floor for thermal storage, and under-floor ducting for heat distribution.

The other home is fitted with active space and water heating systems. The solar assembly includes 700 ft² of space-heating collector area, and 200 ft² of water heating collector area.

Storage is provided by 1,250-gallons of water in a tank in the basement. Back-up heating is provided by wood stoves.

During the summer, the house is naturally cooled by surrounding deciduous trees.

The CPLS plans to undertake many other renewable/conservation projects in the future.

Category Housing
State IN
Project Name CPLS Solar Homes

Organization Center for Peace and Life Studies (CPLS)

Address Route 1, Box 398C
Muncie, IN 47302

Contact Jan and Jim O'Neil

Telephone (317) 396-9167

Funded By Owners

Cost \$13,000

Congressional District X

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This solar greenhouse was designed and built by John Gabriel. It is 12' x 20' with 200 sq. ft. of glazing. The greenhouse is detached from the house. Its primary purpose is to grow food hydroponically.

Ducts carry excess heat to the house. The greenhouse provides heat, oxygen and humidity to the house. John is using 55-gallon drums for storage. He is testing the effect of using brown, black and blue as the surface color.

While no problems were encountered in the construction of the greenhouse, John now believes it should have been built attached to the house. He has also installed an active system. He says, "I would like to have the greenhouse attached and the money I spent on the active system back in my pocket."

Category Housing
State IN
Project Name Solar Greenhouse for the Gabriel Family

Organization John Gabriel

Address Route 7,
Frankfort, IN 46041

Contact John Gabriel

Telephone (317) 296-2908

Funded By Private

Cost \$3,000

Congressional District VII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This project is a simple 4' x 8' vertical wall collector. The owner/builder of the collector currently has a complete active system on his house and is experimenting with more cost effective solar heating methods. The wall collector provides heat for one room only and uses manual controls. The system does not include storage.

Category Housing
State IN
Project Name Vertical Wall Collector

Organization John Gabriel

Address Route 7,
Frankfort, IN 46041

Contact John Gabriel

Telephone (317) 296-2908

Funded By Private

Cost \$100

Congressional District VII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The wind generator is constructed completely out of scrap and junk parts. The blade was hand made from a 6" x 6" redwood post. The power is produced by an automotive alternator connected to the propeller by recycled lawn mower gears. A hinged spring allows the mill to fall back in high winds. A recycled auto shock absorber returns the assembly to an upright position when the high winds have subsided. The wind machine begins to produce power at a wind speed of 8 mph and will lay back in a 22 to 25 mph wind. The maximum output of the generator is 720 watts (60 amp).

The windmill charges a 12 volt battery which powers recreational vehicle appliances. The electricity is not converted to 110 volt. This greatly simplifies the entire system. The 12 volt system is quite effective in remote areas where the cost of obtaining electrical service can be very high.

Category Housing
State IN
Project Name Wind Generator

Organization Reldo Ridenour
Address 59 White Street
Frankfort, IN 46041
Contact Reldo Ridenour
Telephone (317) 654-6080

Funded By Private
Cost \$50
Congressional District VII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Community Action Against Poverty's HEAT Project demonstrates low cost solar retrofitting techniques on homes that have qualified for weatherization through the Marion County Weatherization Program. CAAP manages and operates the weatherization program.

Ed Cohen, energy education specialist with the HEAT Project, makes a solar retrofit analysis. With this preliminary decision on the feasibility of a retrofit, a solar designer/consultant corroborates the feasibility of the project and recommends the most reasonable retrofit design.

After feasibility has been established, the homeowner is asked if she/he wants the retrofit. If the homeowner gives the project a go-ahead, CAAP prepares formal designs.

CETA employees supervised by construction union representatives and the solar designer/consultant build and install the systems.

The first retrofit, an attached greenhouse, is now under construction and will be completed in late December of 1979. Planned retrofits include a south wall collector, a large window box collector, and the conversion of a large porch to a sun space.

This program will demonstrate low cost retrofit projects, train several CETA employees in solar retrofit procedures, and help dispell the ion that solar energy is complicated and expensive.

Critique/analysis: The major problems are those of inexperience. These include underestimating the amount of time, money, and expert advise needed. A great deal of research was done by the HEAT Project staff. Adapting existing designs to particular situations was sometimes difficult.

Category Low Income
State IN
Project Name HEAT Project

Organization Community Action
Against Poverty of
Greater Indianapolis,
Inc.
Address 611 North Park Avenue
Indianapolis, IN 46204

Contact Ed Cohen

Telephone (317) 635-4328.

Funded By CSA funds

Cost \$4,500

Congressional District XI

Compilation Date February 1980

First, climate differences affect design, costs, construction, and operation. Secondly, few houses are identical and no two homeowners are alike. The system must be designed for the house and must be appropriate for the homeowners.

Renewable Resources— A National Catalog of Model Projects

The Organization Planning for Energy Concerns (OPEC) was started by the Richmond Energy Dept. OPEC brings together representatives of business and industry who are concerned about energy. Monthly seminars discuss technological improvements that can be made to conserve energy. At least 50 persons are invited to attend each meeting.

A monthly newsletter, sponsored by OCEMP and the Chamber of Commerce, has a circulation of 1,500.

The Energy Department also helped form the Richmond Solar Interest Group. The members include homeowners and energy professionals. They meet monthly to share ideas and discuss energy alternatives.

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Category	Outreach
State	IN
Project Name	Organization Planning for Energy Concerns

table
| Organization | Organization Planning for Energy Concerns |

table
| Address | 50 North 5th Street Richmond, IN 47374 |

table
| Contact | Ann Cline |

table
| Telephone | (317) 966-5561 |

table
| Funded By | DOE programs grant - (OCEMP Pilot City) |

table
| Cost | n/a |

table
| Congressional District | X |

table
| Compilation Date | February 1980 |

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3. Cedar Rapids
4. Cherokee
5. Council Bluffs
6. Des Moines
7. Dubuque
8. Grinnell
9. Iowa City
10. Irwin
11. Maquoketa
12. Reinbeck
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IOWA

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Category Agricultural
State IA
Project Name Methane Production

"During the oil embargo of 1974, we kept wondering what we could do to short circuit the long lead time required for oil and coal formation. It was such a waste not to use the chicken manure. Besides, we work on the premise that all things can be recycled."

Josephine Heying, partner of Heying Enterprises, Inc., in West Union, Iowa, was discussing why Heying Poultry Farms built an agricultural waste-digestion system.

The digestion system was designed to handle the wastes from 160,000 laying hens. Created in an anaerobic digestion process, methane gas is used to power a 100-kilowatt engine/generator set. An important by-product of the process is a liquid fertilizer. This replaces commercial fertilizers on nearby farm fields.

Since gas production began in August of 1977, the manure production has been only half of what was originally projected. The quality (BTU per cubic foot) of gas also has been commensurately lower, although large quantities of fertilizer are being produced.

This problem was corrected in late 1979. The digester produces enough methane to operate the electrical generator at about 60 kilowatts capacity for 24 hours a day. The Heying farm requires only 6 KW of capacity with the remainder entirely salable to utilities once regulatory blens are resolved.

Once the Heyings are in a position to sell the excess power, these earnings and/or savings from the production of electricity might run as high as \$21,000 per year. The fertilizer by-products from the digester could be sold for \$6,000 per year. To build a similar system elsewhere would cost about \$160,000. Thus, a payback of six years or less might be expected depending on the availability of tax credits and on interest rates.

Organization Heying Enterprises

Address 704 West Bradford
West Union, IA
52175

Contact Josephine Heying

Telephone (319) 422-3939

Funded By DOE, Iowa Energy
Policy Council,
Private

Cost \$160,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Paul Nelson wasn't even a little bit skeptical about building a solar grain-drying system for his farm in Irwin, Iowa.

Nelson decided to utilize the south-facing wall and roof of a new machine shed as a 3,600 sq. ft. collector by using fiber-glass for his exterior surfaces. As air is heated, it moves from the building to nearby grain dryers through an underground tunnel. The solar-heated air, mixed with outside air, is then used to dry about 27,000 bushels of corn in a 60-day period.

The system costs about \$4,400 (exclusive of labor, which Nelson himself provided). This investment was offset by \$800 in income tax and investment tax credits. With fuel savings of about \$750 per year, Nelson's solar grain dryer will have a payback of less than five years.

Category Agricultural

State IA

Project Name Nelson Farm
Grain Dryer

Organization Paul Nelson Farm

Address R.R. 1, Box 80,
Irwin, IA 51446

Contact Paul Nelson

Telephone (712) 799-4979

Funded By Private

Cost \$4,400

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Agricultural
State IA
Project Name Organic Farm

When Dick and Sharon Thompson first began organic farming over 12 years ago, their Boone County neighbors laughed. Today, few doubters remain. Farming methods such as crop rotation, biological pest control methods, and composting of manure have reduced their previous energy consumption by more than 50 percent.

Yet their oat, soybean and corn production remains comparable to state and county averages and expenses have dropped \$40 to \$50 per acre since they began farming organically. The humus content of their soil has increased from less than 4 percent to the present 6 percent level.

Referring to his own 300-acre farm, Dick Thompson stresses that he is not trying to turn everyone into an organic farmer. "I'd just like to see a greater concern for energy, soil conservation and pollution in the agricultural world." But he added that "things like crop rotation, composting, and better tillage practices are available to most farmers, and they're economical, too. Common sense tells you these things are better for the soil than all the chemicals we see today."

Organization Dick and Sharon Thompson
Address Route 2, Box 132
Boone, IA 50036
Contact Dick Thompson
Telephone (515) 432-1560

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

Renewable Resources— A National Catalog of Model Projects

Cooper Evans is an Iowa legislator who takes a personal interest in the development of solar energy. He has designed a solar grain-drying system for his farm near Reinbeck.

The system incorporates a hot-air collector constructed on the drying facility's south-facing roof, which was extended to create additional collector surface. The system consists of approximately 2500 square feet of collectors—plywood panels painted black and covered with a greenhouse corrugated fiberglass called "filan".

A ten-horsepower fan draws the air through the collector and ducting, forcing it into the bottom of an 8,000-bushel grain bin. The warm air is forced up into the grain through a false floor that is permeated with many small holes. The bin also contains a circu-flow auger system that recirculates the partially dried grain to the top of the bin, allowing the warm air to come in contact with the wet corn at the floor surface.

The system is able to dry 16,000 bushels each season with the use of two 8,000-bushel bins. The cost of drying with a system powered by natural gas is approximately 4¢ per bushel while similar drying and storage services at a local elevator would cost 20 to 25¢ per bushel. Evans has calculated the operating costs of his solar drying system at 1.5¢ per bushel.

Critique/analysis: At present, the system is only utilized from October through December, plus a few weeks in the spring.

Category	Agricultural
State	IA
Project Name	Solar Grain Drying for the Evans Farm

Organization	Cooper Evans
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Address	Reinbeck, IA 50669
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Contact	Cooper Evans
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Telephone	n/a
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Funded By	Owner
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Cost	n/a
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Congressional District	III
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Compilation Date	February 1980
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In retrospect, Evans says he would have made the south-facing vertical wall a collector and installed ducts into the building floor. This would allow alfalfa to be dried for use as dehydrated pellets (excellent summer use of the collectors).

Renewable Resources— A National Catalog of Model Projects

In the 1920s John Lorenzen, a Woodward farmer, laughed when the Rural Electrification Administration told him they could hook him up for only three dollars a month. Instead, he found a couple of small wind generators to power his farm operation. Fifty years later he has yet to pay a single dime to the utility.

Lorenzen utilizes two Jacobs wind-generators mounted on 40-foot towers to provide his home and shop with 32-volt DC current. "I don't have any idea how much I use," Lorenzen chuckles, "but it's a lot." A quick tour through his machine shop supports this. Not only does he have the usual array of small power tools (many of them homemade), but he also uses bigger equipment such as an electric arc welder, lathes, an air-compressor, and electric forge.

For storage Lorenzen has three banks of alkaline nickel-iron batteries made over 75 years ago. These 170 cells can give him four to five days of electricity when the wind is down. The lack of August breezes is not a particular problem, he said. "You have to make sure your batteries are full up when you come to August. Then I just turn on my second unit. Most of the time, though, I don't need it. And I plan to do my welding when the wind is blowing. That helps!"

"I can run most anything I want. If I need 110 AC current for higher drill speeds or for a special tool, I convert it," he said, pointing to a homemade AC-DC inverter. "Honeywell came out to my place and saw my inverter system and made one of their own to sell. They sent me information on it," he noted, "but they never sent me the price. Maybe they're ashamed of it."

Category Agricultural

State IA

Project Name Wind-powered Farm

Organization Lorenzen Farm

Address Woodward, IA 50276

Contact John Lorenzen

Telephone (515) 438-2503

Funded By Personal funds

Cost n/a

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

"We need to start looking at alternatives, so we decided to use this experience to determine whether we want to loan out money for new solar homes." That's how Ken Lewis explained why First Federal Savings of Sioux City in March of 1978 chose to install solar panels in its new branch office in Cherokee, Iowa.

Branch Manager Lewis estimated the cost of installing the system, including a salt storage unit, at between \$10,000 - \$12,000. The 12 vertical forced-air panels provide 40-45 percent of the heating needs. He reluctantly points out, however, that "we should be getting a lot more, but we got burned."

Lewis explained that the solar panels "work beautifully," but the local contractors who installed them were not familiar with solar designs and they made some mistakes. Once these are corrected, the solar unit should provide 60-65 percent of the building's heating needs.

Category	Commercial
State	IA
Project Name	First Federal Savings Solar Bank
Organization	First Federal Savings of Sioux City
Address	Highway 59 Cherokee, Iowa 51012
Contact	Ken Lewis
Telephone	(712) 225-5726
Funded By	Private
Cost	\$10-12,000
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Grinnell Federal Savings and Loan Association decided to construct the first solar-energy house in Grinnell to increase the awareness of the community about solar space heating. The project has invited community involvement by employing local contractors and builders, local college students and faculty for background research and monitoring, and local media, clubs, and school as public education tools.

With the assistance of Rhys Christensen, a young Ames, Iowa solar contractor, workmen installed 400 square feet of vertical air collectors and 275 cubic feet of salt storage in the new four-bedroom home. While the home's market value is pegged at \$75,000, the solar portion ran only \$12,000. The Savings and Loan will monitor the home for about one year before selling it. It expects the solar system to provide 80-100 percent of the home's thermal load. The hot water needs will be supplemented through a pre-heater unit connected to the solar system.

As a result of this project, the Savings and Loan anticipates making future loans to solar construction.

Category	Commercial
State	IA
Project Name	Grinnell Federal S & L Solar Bank
Organization	Grinnell Federal Savings and Loan Association
Address	1025 Main Street Grinnell, Iowa 50112
Contact	Roger Zimmerman
Telephone	(515) 236-2131
Funded By	Private
Cost	\$12,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Ground was broken in August of 1979 for the new United Federal Savings and Loan Association solar-heated building in Cedar Rapids, Iowa. The solar collectors are expected to provide 50 percent of the 4800 ft² building's heating needs. It will have a large rock storage system, and heat pump provide back-up heating. Total project costs are estimated to be \$1 million. Other solar buildings in the UFS chain are in Oskaloosa, Ames, and West Des Moines.

Category Commercial
State IA
Project Name Solarized United
Federal S & L

Organization United Federal
Savings and Loan
Association (UFS)
Address 2150 Grand Avenue
Des Moines, IA 50312
Contact Evan L. Oster, Asst.
Vice-President
Telephone (515) 247-4747

Funded By Private

Cost n/a

Congressional District II, IV, & V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Solar energy is working for Bill Runde of Dubuque. Runde operates an upholstery shop located in a converted dairy building. The rooms are extremely large, with 16-foot ceilings, and large, uninsulated garage door entryways. The constant opening and closing of these doors has proven costly in terms of wasted energy.

In February 1978, Runde installed six solar liquid collectors on the shop roof. When he scrounged through junked dairy equipment he discovered two usable heat exchangers with attached fans. The exchangers were connected in series with the collectors and put into operation. During the spring, he installed another four collectors to increase his heat output.

Included in the collector system are ten panels (each with a 12.5 ft.² surface area) and a one-third horsepower pump to circulate an anti-freeze/water solution. Because the heat is required only during the day, no storage system is included. Runde uses his system for approximately six hours per day during the winter: "I could probably get another hour of heat, but there's a large hill that shades the afternoon sun." The unit is used from October through April.

Runde estimates the system costs \$2,100 (self-installed). Labor costs might increase that by another 20 percent.

"It's really easy to install," he says. "I just built a stand, bolted it to the roof, and connected the piping. I only needed an electrician for wiring the fans." Runde has experienced few problems and expects to install an additional six collectors soon. This would raise his solution temperature and allow him to add another heat exchanger.

Category	Commercial
State	IA
Project Name	Solar Upholstery Shop
Organization	Runde Upholste Shop
Address	Southern Avenue Dubuque, IA 52001
Contact	Bill Runde
Telephone	(319) 583-9448
Funded By	Business loan
Cost	\$2,100
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Larry Ashing's solar system heats his welding shop and home. The system includes a liquid collector, a 10,000 gallon water storage tank, a water-to-air heat pump and a homemade oil-burning furnace fired by used crankcase oil. Larry gets the oil free from the local gas station.

The heart of Ashing's system is a new shop with a 15' by 50' south-facing wall made of sprayed concrete. After spraying it black, Ashing installed a fiberglass glazing supported by vertical aluminum ribs. Heat is absorbed by water running through 1/2" plastic piping and pumped to his storage tank located beneath the shop floor.

Ashing estimates he should save "between \$500 and \$1,000 a year." His new building also helps cut heat bills since the thermal mass of the concrete retains heat almost twice as effectively as would other conventional construction materials in a comparably-sized building.

Category Commercial

State IA

Project Name Solar Welding Shop

Organization Larry's Welding

Address Rural Route
Grinnell, Iowa 50112

Contact Larry Ashing

Telephone (515) 236-3007

Funded By Business loans

Cost \$10,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In an effort to promote a conservation ethic in the Iowa State University and the Ames community, the ISU Research Foundation purchased about 40 acres of land for an "energy conscionable planned unit development." When fully completed, Gateway Hills, as the project is called, will contain 20 single-family dwellings, 160 townhouses, and 220 apartment units. All will feature conservation elements and solar design.

To ensure energy-efficient design, the Foundation will sell options on specific sites, but will not sell deeds until final plans are drawn up and approved. To date two passive solar homes have been completed. One won a national design award. The home is expected to obtain 80 percent or more of its heat requirements from the passive system.

Category	Community
State	IA
Project Name	Gateway Hills
Organization	Iowa State Univ. Research Foundation (ISU)
Address	315 Beardshear Hall Ames, Iowa 50011
Contact	Dan Griffin
Telephone	(515) 294-4740
Funded By	Internal
Cost	n/a
Congressional District	V
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Johnson County Council on Aging, the Hawkeye Area Community Action Program, and the Iowa Public Interest Research Group cooperated to build a solar greenhouse. Much of the labor for the project was provided by six young people employed in the summer CETA (Comprehensive Employment and Training Act) program. Materials cost only about \$2,000.

Senior citizens serve as part-time caretakers of the greenhouse, which provides seniors an early start on their summer gardens.

Category Community
State IA
Project Name Senior Citizens' Greenhouse

Organization Johnson County Council on Aging

Address 538 S. Gilbert
Iowa City, IA.
52240

Contact Joan Lewis

Telephone (319) 338-8018

Funded By CETA and donated funds

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

"Energy Today" a community college course by telephone, is designed to help students through the confusion of our energy situation. This course focuses on making a transition to a "post-petroleum" era. It offers three hours of science and one hour of social science. Topics include a review of energy sources including solar power, conservation for the consumer, energy in living systems, and the politics of production and distribution. The course meets one night a week in three-hour sessions.

Category	Education
State	IA
Project Name	"Energy Today" Curriculum
Organization	Kirkwood Community College
Address	6301 Kirkwood Blvd. S.W. Cedar Rapids, IA 52406
Contact	Larry Bean
Telephone	(319) 398-5411
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

During the past year more than 100 persons in the Sioux City area have learned how solar systems work by participating in "hands-on" workshops organized by Mack Lewis, a member of the Iowa Solar Energy Association (ISEA). Using materials provided by the Woodbury County Community Action Agency (WCCAA) workshop participants built 4' x 8' air collectors. The CAA's weatherization crews installed the collectors on the homes of low-income families in the service area.

As of 1979, Dave Jones, head of the CAA weatherization crews, has managed to find \$8,000 (primarily from DOE and CSA funds) to purchase materials for about 25 collectors and fans. One of the early 8' by 8' collectors, augmented by weatherization measures, produced enough heat to reduce one rural Iowa resident's fuel-oil consumption by 100 gallons last winter.

Other CAAs view the activity as a way to provide their weatherization crews with some solar-related experience and to give low-income families an excellent supplemental source of winter heat. Plans are under way to conduct similar programs in South Dakota, Minnesota, other Iowa CAA districts.

Category	Education
State	IA
Project Name	ISEA/WCCAA Solar Workshops
Organization	Iowa Solar Energy Assoc. - Woodbury County Community Action Agency
Address	c/o Mack Lewis, 2606 Jones Street Sioux City, IA 51104
Contact	Mack Lewis - ISEA
Telephone	(712) 258-6709
Funded By	DOE and CSA weather- ization money
Cost	\$8,000
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Kirkwood Community College has signed a \$25,000 subcontract to design and build a passive solar home as part of its regular vocational-technical building-construction program. The subcontract was awarded by the Mid-American Solar Energy Complex (MASEC).

In the first phase of the contract a team will design two single-family passive solar homes appropriate to local weather conditions and neighborhood styles. After consultation with MASEC staff, the Kirkwood team will select one of the designs for construction by building-trade students. The costs of the land, materials, and labor will be covered by the Kirkwood Facilities Foundation and receipts from the sale of the house.

The College will also conduct three workshops: the first for builders, developers and contractors; the second for bankers, loan officials, real estate professionals and appraisers; and the third for the media, prospective buyers and homeowners.

Category	Education
State	IA
Project Name	Kirkwood Community College Vocational Education
Organization	Kirkwood Community College
Address	6301 Kirkwood Blvd., S.W. Cedar Rapids, IA 52406
Contact	Larry Bean
Telephone	(319) 398-5411
Funded By	Mid-American Solar Energy Complex
Cost	\$25,000
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

By building a solar system into its new gymnasium, Scattergood School is reducing its fossil fuel requirements and giving its 60 students first-hand experience with solar power. The school is a coeducational, live-in high school operated by the Friends Society near West Branch, Iowa.

With money from the Energy Research and Development Administration (DOE), the school installed 2,500 square feet of flatplate collectors to preheat its hot water for showers and space heating. Test results indicate that the collectors, coupled with a 64-ton pebble bed storage unit, provided about 87 percent of the building's heating requirements and 75 percent of the hot water requirements.

The solar unit was later modified to siphon off hot air to dry 6,000 bushels of corn that are produced on the school's 80 acre farm.

Since each student actively participates in the school's operation, most will accumulate an impressive amount of experience with solar energy applications during their four years at Scattergood. This may provide the most unique aspect of the school's solar system.

Category Education
State IA
Project Name Solar Gymnasium

Organization Scattergood School

Address Route 1
West Branch, IA
52358

Contact Mark Patton

Telephone (319) 643-5636

Funded By DOE

Cost \$95,000

Congressional District I-

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Bob and Lynda Williams haven't used their electric furnace in three years. The Council Bluffs, Iowa, couple has installed a homemade beer-can collector and a wood stove to meet all their heating needs. The 138 sq. ft. collector comprises more than 900 aluminum beer cans collected in the early mornings behind local bars. "We pretty much scrounged for everything," he commented. "I could probably build another, better unit for \$300-\$400," he says.

With the wood stove, the Williams' solar system requires no storage unit.

By adding a solar/wood hot water system and two one-kilowatt wind generators (all home-made and/or rebuilt) the Williams' have reduced their outside energy purchases to almost nothing.

The two are now building on a 16-acre plot near Council Bluffs. "When finished, we'll have a semi-underground, two-bedroom home for \$4,000 worth of materials. That's because we'll be scrounging."

The Williams' house will have a 20' x 10' greenhouse as part of the living room. "When we move in, I'm not going to hook up to the utility at all."

Category Housing
State IA
Project Name Beer-can Collector

Organization Bob and Lynda Williams
Address 3426 11th Avenue
Council Bluffs,
IA 51501.

Contact Bob Williams

Telephone (712) 322-4936

Funded By n/a

Cost n/a

Congressional District v

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Hodges residence, a 2,200 sq. ft. building, is an earth-sheltered passive solar home in Ames, Iowa. The design permits solar heating through 500 square feet of glass on the south side. Over 100 tons of concrete provide heat storage for the home. Excavated earth is used for extensive berming on the north, east, and west sides.

All glazing is double-pane glass, except for the curved lucite in a stair tower. Three sliding glass doors, one on the upper level and two on the lower level, form part of the glass and permit ventilation. The two on the lower level are also exits. Movable insulation (large, but light styrofoam panels) will be placed over the glazing at night during the three coldest months to reduce heat loss. The panels will be covered by decorative fabrics and will take about 10 minutes to install or remove.

The Hodges will satisfy 85 percent of their heating requirements with solar energy. At current energy prices in central Iowa, the auxiliary heat needed would cost about \$40 for natural gas heating or \$150 for electric resistance heating. The solar system, estimated to have added only 6 percent to the cost of the house, has increased the structure's durability and decreased the amount of home maintenance required.

Category	Housing
State	IA
Project Name	Earth-sheltered Home

Organization	Hodges Residence
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Address	Ames Laboratory Iowa State Univ. Ames, Iowa 50011
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Contact	Laurent Hodges
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Telephone	(515) 294-1185
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Funded By	Private loans
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Cost	n/a
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Congressional District	V
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

In 1975, Iowa's Energy Policy Council founded a proposal to design Iowa's "Farmhouse of the Future." Completed in the summer 1979, the underground house features an earthen cover that varies in thickness from three to eight feet.

Heating and cooling of the structure, which is made of reinforced concrete and glass, will involve using passive solar energy. In particular, a solar pond provides heat storage, and a heat pump draws energy from the solar pond. The south wall, contoured to exclude the sun in summer and to utilize it during the rest of the year, receives much direct solar gain. The concrete walls will provide storage for this passive system.

A computer model of the solar pond suggests that water temperatures of 200 degrees in the fall and 77 degrees at the end of the heating season can be obtained. As long as the temperature of the solar pond is above 110 degrees, it will directly heat the home. Below this level, the storage energy will be used to maintain optimal performance of the heat pump.

Living History Farms, a working museum, demonstrates the operation of past, present, and future Iowa farms.

Category Housing
State IA
Project Name Farmhouse of the Future

Organization Living History Farms Foundation

Address 2600 111 Street
West Des Moines,
IA 50265

Contact Dr. William Murray
President

Telephone (515) 278-5286

Funded By DOE

Cost \$244,000

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

"It made me very nervous every time the Arabs sat down for a meeting. You didn't know what to expect so I had to calm myself," Eugene Bassler said in the course of explaining why he went solar. The Basslers operate a dairy farm north of Maquoketa, Iowa. These "do-it-yourselfers" have incorporated several types of solar devices into their home and milk parlor.

A "sun-wall" on the south face of the Bassler's home consists of 2 x 6 inch vertical supports and 2 x 2 inch crosspieces made of wood and covered with reinforced fiberglass panels. The 280 ft² wall has been painted a flat black to absorb the sun's rays.

The heated air flows by natural convection through an open window or a duct that has been inserted in the wall. Sun wall temperatures as high as 120 degrees F are achieved on sunny winter days. During the summer, the top and bottom boards are removed to allow natural convection cooling.

Three concentrating collectors are also located in the south wall. Each collector has 16 square feet of glazing area and a curved absorbing plate. This plate concentrates the solar radiation onto a duct through which the air is passed. The collectors, connected in parallel, can heat 465 cubic feet of air per/minute to 120 degrees F on a bright winter day. The heated air is ducted into the basement.

A wood furnace is utilized during the evenings or during extended cloudy periods.

Category	Housing
State	IA
Project Name	Solar Home & Milk Parlor
Organization	Eugene & Genevieve Bassler
Address	Maquoketa, IA, 52060
Contact	Eugene & Genevieve Bassler
Telephone	(319) 686-4347
Funded By	Owner
Cost	n/a
Congressional District	II
Compilation Date	February 1980

A double-chamber cast-iron heat exchanger has been installed in the furnace and is used to preheat domestic hot water. To supplement the wood fuel, a trash compacter is used to make "logs" out of burnable refuse and feed sacks. These combined systems heat approximately 2,800 square feet of floor space.

Besides these systems, two concentrating collectors are employed on the milk parlor. The connected vertical collectors provide 120 degrees F air to the 14 x 20 foot building. The eight-inch insulated concrete walls act as the storage medium. Alternate days of sunlight maintain a temperature of 58 degrees or above, and the gas heater is not needed.

Bassler has designed a unique system to utilize the heat from cows' milk for space-and water-heating. Every day, approximately 1,000 pounds (120 gal.) of milk at 98 degrees F is cooled to 36 degrees F. A heat exchanger heats 2,000 pounds of well water to approximately 80 degrees F. The water is then stored in a 275-gallon tank, which conducts heat to the parlor and preheats wash water for milking equipment and parlor floors.

The Basslers' belief that solar energy is one of the best answers to America's energy shortages has led them to initiate new projects. Eugene is currently designing a liquid solar collecting system that could be used for small-farm alcohol production. The Basslers have also utilized a solar-assisted heat pump in their retirement home.

Renewable Resources— A National Catalog of Model Projects

The Energy Research and Information Foundation was given a \$33,750 contract to conduct six "Solar Successes" workshops through the summer of 1980. The money was awarded by the Iowa Energy Policy Council as part of its efforts to fulfill its mandate to provide public education. The EPC is administering these funds for the Department of Energy.

The contract continues a workshop series given by people who have installed solar technologies and or participated in solar activities. Demonstrations and discussions have focused on alcohol stills, heating systems, solar passive and earth shelter designs, wind energy, and weatherization and conservation techniques.

The workshops have been highly successful, drawing as many as 900 people in Cedar Rapids and 300 in Sioux City. The new workshops are to be held in Cedar Rapids, Davenport, Mason City, Ottumwa, Council Bluffs, and Sioux City.

The program will continue in the fall of 1980 under funding from the Iowa Energy Extension Service and the cooperation of the Iowa Area Community College System.

table
Category	Outreach
State	IA
Project Name	Energy Research & Information Foundation

table
Organization	Energy Research & Information Foundation
Address	3500 Kingman Blvd. Des Moines, Iowa 50311
Contact	Linda Nicholson
Telephone	(515) 277-0253

table
Funded By	Iowa Energy Policy Council
Cost	\$33,750
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Recognizing a need to share and update information on working solar systems in Iowa, the Iowa Solar Office, the Iowa Energy Policy Council and the Mid-American Solar Energy Complex sponsored the First Annual "Iowa Solar Operational Results Conference" on June 21-22, 1979. The meeting brought together over 200 educators, community leaders, bankers, engineers, contractors and solar entrepreneurs from across the state.

Presentations on solar applications in use in Iowa were presented by 18 authors. Their reports covered a range of topics including solar hot water heating, passive solar design, active solar space heating and use, solar certification, earth-sheltered homes, wind and biomass.

Phil Svanoë, Iowa's Solar Coordinator, indicated that the program will become an important annual event in the overall strategy to commercialize solar energy.

Category	State
State	IA
Project Name	Solar Conference
Organization	Iowa State Solar Office
Address	Capital Complex Des Moines, IA 50319
Contact	Phil Svanoë
Telephone	(515) 281-4420
Funded By	Mid-American Solar Energy Complex; Iowa Energy Policy Council
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category State
State IA
Project Name State Energy
Management

Organization Community Action
Research Group

Address Box 1232
Ames, Iowa 50010

Contact Skip Laitner

Telephone (515) 292-4758

Funded By n/a

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Recognizing that energy management is a prime consideration in the design of publicly owned buildings, the Iowa Legislature in 1979 passed a bill that requires all public agencies to conduct a life-cycle cost analysis of proposed new building construction.

The purpose of the analysis is to maximize energy efficiency at acceptable cost. Among on-site equipment to be evaluated are solar and wind technologies. The analysis must be approved by the public agency before it sets contracts for construction. The agency may accept a specific design if it meets the operational requirements and provides the optimum life cycle cost.

The Act is effective as of January 1, of 1980, for state agencies and January 1, 1982 for a county, city, and school district.

Proponents of the bill, including the Governor, the State Solar Office, and the Community Action Research Group (the original drafters of the bill), believe it will open up a new market for manufacturers and catalyze solar commercialization.

KANSAS

1. Beloit
2. Lawrence
3. Leavenworth
4. Manhattan
5. Oskaloosa
6. Salina
7. Seneca
8. Shawnee Mission
9. Stockton
10. Topeka
11. Wichita

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Renewable Resources— A National Catalog of Model Projects

The Kansas Organic Producers (KOP) initiated a project in November, 1978, to help ease the economic burden on Kansas farmers by developing alternative technologies for organic crop cultivation. The program also provides funds to investigate possible markets for organic produce.

Presently the organization is organizing model solar projects in Delia and Formoso, and researching organic farming market potentials in Liebenthal and Hays. The project is also involved in gardening, and food processing and preservation in Lawrence..

During the second year the project will replicate the three projects in the two remaining locales.

table
Category	Agricultural
State	KS
Project Name	Organic Farming Introduced

table
Organization	Kansas Organic Producers
Address	Route 3 Beloit, KS 65402
Contact	Sue or Jim Lukens
Telephone	(913) 738-3866

table
Funded By	Action (VISTA)
Cost	\$8,000 and 6-11 employees @284/mo.
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The program is designed to help train farmers in low cost solar technology systems through hands-on installation experience.

Farmer Louis Franz, with the help of the Kansas Catholic Rural Life Conference and Kansas Vista, built a solar heater for his farm home. An engineering consultant directed the building of a 8' by 12' collector, built of wood and plastic and aluminum corrugated roofing painted black. The collector is about 15' thick and works like a car radiator in principle. A small 1/5 hp. electric motor driving a squirrel cage fan draws the heated air into the house through 7" ducts. Cost was approx. \$600. Estimated savings are about \$60 to \$70/mo. for heating bills.

In another instance, the Rural Life office paid an engineer to help George Frank of Westphalia build a simple solar collector on the south side of his house, at a cost of approximately \$1,000.

Category Agricultural
State KS
Project Name Rural Solar Construction Program

Organization Kansas Catholic Rural Life Conference Project
Address St. Mary College Leavenworth, KS 66048
Contact Dr. John Stitz
Telephone (913) 682-5151

Funded By Catholic Rural Life Conference, Vista

Cost \$600

Congressional District II & V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A swine house in Manhattan, KS, is being successfully heated by a collector storage wall. About two-thirds of the heat captured during the day is stored and released at night. The unit is reported to save the equivalent of 1.5 to 2 gallons of propane per square foot of collector during the heating season.

Category Agricultural
State KS
Project Name Solar Hog Wall

Organization Kansas Agricultural
Experimental Station

Address Dept. of Agricultural
Engineering
Manhattan, KS 66505

Contact Dr. Charles Spillman

Telephone (913) 532-5580

Funded By USDA - DOE

Cost \$50,000/yr. for all
experimentation

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Wichita's Energy Office is conducting an experiment with a fully weatherized city residence to monitor energy savings. Attic, walls and floors are fully insulated and shade window screens are attached with two types of attic power vents and one turbine exhaust vent.

Common electrical gas appliances are also being checked for both efficiency and waste-heat generation to provide the public with local data.

Alternative energy devices installed outside the test residence include a solar furnace with rock storage, a hot water closed-system heating complex, and a solar domestic hot water pre-heating device and solar domestic hot water heater. In addition, photovoltaic cells and wind generator are also being evaluated.

Thermistor sensors and automatic recording devices are installed both inside and outside the residence to monitor the systems. Meteorological data is constantly being recorded.

The entire project is open to the public on regularly scheduled tours. Preliminary monitoring results have been made available to the Wichita area in two brochures concerning heating and cooling conservation methods, which were distributed to 10,000 homes. The test facility is one of 11 similar experiments conducted by the City's Energy Office. To create further interest in the development and potentialities of solar energy, the City's Energy Office has sponsored a number of activities including a Passive Solar Conference, an annual Energy Fair and solar slide presentations. A 65-percent efficient wood heating stove was also installed and tested. A Wood Heating Seminar provided participants with information on woodheating, stoves, installation, codes and safety.

Category	Cities
State	KS
Project Name	Energy Test Facility "The Energy Place"
Organization	Department of Economic Develop.
Address	City Hall, Eleventh Floor 455 North Main St. Wichita, KS 67202
Contact	Terry Behrendt 1602 S. McLean Blvd. Wichita, KS 67213
Telephone	(316) 265-4193
Funded By	Community Develop- ment Block Grants
Cost	n/a
Congressional District	IV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Commercial

State KS

Project Name Solar Bank

Organization Kaw Valley State Bank and Trust Co.

Address 1944 N. Topeka Ave.
Topeka, KS 66608

Contact Beverly Hadley
Personnel Officer

Telephone (913) 232-6062

Funded By DOE

Cost \$78,160

Congressional District II

Compilation Date February 1980

The Kaw Valley State Bank and Trust Company has installed a solar system designed to provide 47 percent of the space heating, 75 percent of the hot water, and 95 percent of the cooling for its 5,600 ft² building. The 72 high-efficiency collectors are of a glass-tube type. Hot and cold water from the system is stored in an 1,100 gallon capacity insulated steel tank located above ground. A single gas boiler serves as a system backup.

DOE, which funded the bank's demonstration project, is supposed to be continuously monitoring the performance of the solar system through a direct wire to Huntsville, AL. Unfortunately, various problems with a shunt valve and the cooling apparatus caused the system to shut down for most of the period between February and August. When the system was working, however, it more than met expectations of the heating and cooling ability.

Critique/analysis: Bank personnel seem undaunted by the technical problems. Reports note an increased sense of pride among employees because of the system, and the bank's commitment to do something "new" and different. The bank apparently does not have a special loan program for customers wishing to buy a solar system.

Renewable Resources— A National Catalog of Model Projects

A group of between 12 and 20 volunteers has worked in the Manhattan area since August of 1978, to organize workshops and projects in the promotion of appropriate technology.

Included in the demonstrations and workshops was a four-part series in International Small Farm and Village Living Skills, funded by the North American Foreign Students Association. Energy, small farm agriculture, rural self-help methods and low-cost, energy-efficient house building and retrofitting were among the topics discussed.

About 600 people attended the workshops, held in cooperation with local farmers and especially organic growers. The sessions were taught by Kansas State University professors, farmers and agricultural technicians.

The Manhattan Appropriate Technology Group also publishes a monthly newsletter with a circulation of 300.

Other MATG projects include a small farm diversification and development project, in which a co-operative group is cooperatively cultivating eight acres of organically-grown produce. The group was also instrumental in organizing a farmers' market that grew to 31 sellers in 1979.

Critique/analysis: According to MATG spokesperson, Jim Converse: "Doing appropriate technology research on agriculture in Kansas involves...scaling down to smaller and less overmechanized units; and secondly, diversifying to meet more local and regional food needs."

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Category	Education
State	KS
Project Name	Appropriate Technology Workshops

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Organization	Manhattan Approp Technology Group
Address	210 South 10th Manhattan, KS 66502
Contact	Jim Converse
Telephone	(913) 532-5984 or 776-1413

Funded By	Newsletter Subscription & Pub. Royalties
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Cost	\$60/mo.
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Congressional District	II
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

The Energy Adventure Center sponsors a program to introduce teachers of grades 4-9 to the fundamentals of energy use, including heating/cooling, transportation and industrial applications.

Teachers are then supplied with equipment, models, resource people and laboratories from which they create their own curriculum.

Objectives of the teachers' training course include a study of the relationship between energy and society, and energy and the individual. The project seeks to develop an understanding of different forms of energy, renewable and non-renewable resources, environmental and economic impacts of various energy resources, and methods of energy conversion.

The 40-hour course can be taken through Wichita State University for two hours of graduate credit.

Category Education
State KS
Project Name Energy Adventure Center

Organization Wichita Public Schools
Address 2500 South Hiram
Wichita, KS 67217
Contact Earl F. Griffith
Telephone (316) 945-8335

Funded By Title VI-C funds;
Kansas State Dept. of
Education

Cost n/a

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Grant monies from the Solar Energy Research Institute (SERI) were recently used to develop a course and curriculum for a university-level course on theoretical and practical information on solar energy, wind power, and agricultural alternatives. The final materials are to be submitted to SERI for distribution to other universities. The course is scheduled through the spring semester of 1980.

Category Education
State KS
Project Name University of Kansas
Local Energy Sources
Center

Organization University of Kansas
Geography Department

Address Lawrence, KS 66045

Contact James DeMeo and
Robert McCall

Telephone (913) 864-3081

Funded By SERI

Cost \$3,300

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Land Institute is a non-profit education/research organization devoted to sustainable alternatives in agriculture, energy, shelter, and waste disposal. Between eight and ten students attend the Institute per semester, during which time they experiment with a wide variety of alternative energy and recycling systems including adobe and tamped-earth structures, wind energy machines, cold frames and grow holes, and composting toilets.

Students also discuss theoretic and philosophic elements of the alternative technology movement.

The Land Institute has been in operation for six semesters. Tuition is \$1,000 per semester.

The school publishes a tri-annual magazine, "The Land Report," for its contributors and subscribers.

Critique/analysis: The Land Institute, established in 1976, has received nationwide attention and support for its programs. The late E.F. Schumacher was an honorary board member, as is Amory Lovins presently. Community participation has been considered crucial to the success of the school.

Category Education
State KS
Project Name The Land Institute

Organization The Land Institute

Address Route 3
Salina, KS 67401

Contact Wes and Dana
Jackson

Telephone (913) 823-8967

Funded By Private donations,
grants, tuition

Cost \$18,000-1977
\$39,000-1979

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Farmers are vitally interested in renewable energy agricultural applications, as evidenced by the attendance of 1,800 to 2,000 people at the American Agriculture Movement's fair day in August of 1979.

Present at the event were a wide range of speakers and demonstrations, which focused primarily on alcohol production. Forrest Flippo of Abilene, KS, showed video and slide shows of the process, while Gene Schroeder of Campo, CO, described the step-by-step method of constructing a still.

Larry Nordhus of Centralia exhibited a wood-fired alcohol boiler-distiller that he built himself. Grain alcohol produced by the system was used to power an alcohol vehicle demonstrated by Scott Flippo of Abilene.

Other demonstrations included discussion of hydrogen production from well water using wind power to generate the necessary electricity. The current separates the water into hydrogen and oxygen gases.

Category Education
State KS
Project Name N.E. Kansas Energy Fair

Organization American Agricultural Movement

Address Box 130
Rural Route 3
Seneca, KS 66538

Contact Don and Shirley Schuman

Telephone n/a

Funded By American Agricultural Movement

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Organizers had to order three extra buses in order to transport an enthusiastic crowd on a passive solar home tour held by the Mid-America Coalition for Energy Alternatives and the Missouri Solar Energy Associates in April, 1979.

The program was designed to provide people with on-site examples of passive solar at work. Each of the four buses was staffed with at least one solar engineer or architect who led the 145 participants through a five-hour tour of seven homes in the Kansas City area. Three new passive solar homes and a retrofitted solar greenhouse were among the buildings visited.

The \$12.50 fee included the handout of a survey booklet that highlighted general information on each house visited. The publication also listed solar/insulation tax incentives and membership brochures from sponsoring organizations.

Critique/analysis: It was suggested that future tour booklets also address some of the existing barriers to passive construction (building code restrictions, home association problems, city ordinances, etc). It was also recommended that groups plan for post-tour follow-up. Interest generated among the first participants helped recruit helpers for other activities.

Category Education
State KS
Project Name Passive Solar Bus Tour

Organization Mid-America Coalition for Energy Alternatives; Missouri Solar Energy Associates
Address 5130 Mission Road
Shawnee Mission, KS 66205

Contact Marsha Marshall

Telephone (913) 362-5932

Funded By Fees

Cost \$1,649

Congressional District III

Compilation Date February 1980

Category	Education
State	KS
Project Name	Washburn University Energy Course

Organization Washburn Unviers
Topeka

Address 2724 NW 35th
Topeka, KS 66618

Contact Bob Lawson

Telephone (913) 286-0657

Funded By Washburn

Cost	n/a
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Congressional District **II**

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The City of Wichita Home Insulation Program, part of the City Department of Economic Development, provides zero-interest loans to eligible home owners for installation of attic insulation.

A testing program on ten typical Wichita residences during the winter of 1974-75 showed that the most effective way of reducing heating costs was to upgrade attic insulation. Accordingly, in January of 1976, the loan program was established with an initial community Development Block Grant of \$135,000. Between 1976 and 1978 more than 3,500 city residents took advantage of the loan. An additional 1980 have insulated their homes outside the program, as a result of a public energy awareness campaign.

To be eligible for a loan, an individual must own and occupy a home within the city limits. The home owner is required to make a 10 percent down payment, which goes into the general loan fund. Depending on income and family size, the owner has anywhere from six to sixty months to repay. The default rate appears to be about 2 percent.

About two-thirds of the insulation contractors in Wichita participate in the loan program. Participating contractors have all the necessary paperwork for the loan program. The city has standardized the cost-per-volume of each insulation material.

Category Financing
State KS
Project Name Insulation Loan Program

Organization City of Wichita Home Insulation Loan Program

Address Dept. of Mechanical Engineering
Wichita State Univ.
Wichita, KS 67208

Contact A. Richard Graham

Telephone n/a

Funded By Community Service & Continuing Ed. Title IV of the Ed. Act of 1965, as amended

Cost n/a

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Resident Richard Froetschner of Offerle has built a 1600 ft² home of solar collectors for his space and domestic hot water needs. Included in the system is an 18,000 lb. rock energy storage bin. The \$8,500 project is expected to produce 70 percent of Froetschner's heat and hot water, with a payback of 8.3 years.

Froetschner reports propane bills for heating, cooking and hot water last winter amounted to approximately \$30 monthly.

Category Housing
State KS
Project Name Residential Solar

Organization Solar Farm Industries

Address P.O. Box 242
Stockton, KS
67669

Contact George Lane or
Joe Leonard

Telephone (913) 425-6726

Funded By Private

Cost \$8,500

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

K.S.A.66-1,184 requires every public utility in the state to enter into a contract for parallel generation service upon request of a customer to do so. No apparatus connected to the utility's system shall cause damage to that system. The contract shall provide for fair and equitable compensation on the customer's monthly bill for energy supplied to the utility. Effective date, 7-1-79.

As of October, 1979, six utilities in the state filed tariffs with the Kansas Corporation Commission (KCC) for parallel generation rate. There are approximately 12 wind generating systems interconnected with the utility grid, as of this time.

The rate paid to the customer for excess energy returned to the utility is based on the cost of the fuel required to generate a similar amount of electricity (i.e. cost of displaced fuel for the independently owned utilities, this equals the fuel cost base, adjusted for current differences; for co-ops, it is equal to the (adjusted) average wholesale power cost.

Under (b) of Section 1, the utility has the right to require at certain times that the customer limit production of electrical energy from the generating facility "to an amount no greater than the load at the customer's facility." Steve Blake, of a regional wind energy firm, asserted that such a requirement would increase the cost of interconnection by synchronous inversion by over 50 percent! Unfortunately, his warning went unheeded in the final version of the legislation.

Critique/analysis: Parallel generation is a very new issue. In testimony before the House Committee on Energy and Natural Resources, Blake made the point that there may also be a plant capacity savings associated with parallel generation equipment, in addition to the fuel savings.

p>Category Legislation
State KS
Project Name Kansas' Parallel
 Generation Law

p>Organization Kansas Energy Office

p>Address 503 Kansas Ave.
 Topeka, KS. 66603

p>Contact Joe King

p>Telephone (913) 296-2496

p>Funded By n/a

p>Cost n/a

p>Congressional District II

p>Compilation Date February 1980

MICHIGAN

1. Addison
2. Ann Arbor
3. Cedar Springs
4. Detroit
5. East Lansing
6. Genesee
7. Grand Rapids
8. Holland
9. Hopkins
10. Jackson
11. Kalamazoo
12. Lansing
13. Madison Heights
14. Manitou Beach
15. Muskegon
16. Northville
17. Okemos
18. Ottawa
19. Oxford
20. Perry
21. Powers
22. Saginaw
23. Tecumseh
24. Vulcan
25. Waterloo
26. Warren
27. Ypsilanti

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Renewable Resources— A National Catalog of Model Projects

Hog farmers Alexander and Bloomer devised an underground trench system to dehumidify and heat or chill the air in his farrowing house. Tom had dug trenches to lay new water lines on his farm. Then he saw the opportunity to cut the cost of heating his hog farrowing house. Animal respiration makes farrowing houses very humid. So Tom lined the existing 150 feet of tunnels with plastic drain pipe to bring outside air into his farrowing house. Air is drawn out of the building by a fan to remove the humidity. Incoming air via the tunnel is either heated in winter or cooled in summer to the temperature of the surrounding earth: 55 degrees. The temperature of the earth at a depth of 5 feet remains fairly constant throughout the year. The animals body heat provides most of the rest of the heat, which is retained because the building is very well insulated.

Alexander believes that the tunnel would be more effective at regulating the air temperatures if it were lengthened, perhaps to 1,200 feet. This might increase the problem of condensation within the pipe. A sump pump would solve the condensation problem but raise the costs.

Category Agricultural
State MI
Project Name Earth-heated
Farrowing House

Organization Private Farm
Address 5257 Jennings Road
Ann Arbor, MI 48106
Contact Tom Alexander
Tom Bloomer
Telephone (313) 994-6292
(313) 995-0859

Funded By Private, owner

Cost \$60

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Mason County Farm generates electricity from manure produced by 350 head of cattle. The manure is processed into methane, which powers an internal combustion engine that runs an electric generator.

Fresh manure enters one end of the digester, where it remains to decompose over a period of seven to 20 days. To catalyze the decomposition, the digester is heated to 95 degrees F utilizing the exhaust from the generator's engine. Two inches of insulation reduce heat loss from the digester.

An inflatable plastic bag stores the 14,000 to 20,000 ft³ of gas (60 percent of it is methane) produced daily by the system. System residues are automatically removed from the digester on a continuous basis.

The methane powers the electrical generator at a cost of 4.5 to 5 cents per Kwh. The system promises a payback period of five to seven years.

Critique/analysis: Marketing is the only problem in the project. The technology is readily transferable. Some hand labor is required, especially in the handling of the manure. The developers are working to design a fully automatic system.

Category	Agricultural
State	MI
Project Name	Mason County Farm

Organization	Agricultural Energy Corp.
Address	4919 N. Beaune Ludington, MI 49431
Contact	Jerry Molstrom
Telephone	(616) 843-4287

Funded By	Private
Cost	\$40,000
Congressional District	IX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Michigan State University is conducting three projects in agricultural applications of alternative energy technologies. One involves a solar-heated poultry house in which the building's supplemental heat is supplied by a 1,200 ft² flat plate solar collector. The heated air is delivered to the poultry house by a duct system. Common farm construction materials were used throughout. Data collected for two summers and winters indicated that the solar heating was economically feasible for the building, which houses 5,000 birds.

In an attempt to get more use of the collector, the University also tried using the heated air to dry poultry droppings. The manure was spread on a drying belt, and the solar heated air was distributed over it. The amount of additional water removed was increased by 16.7 percent in one trial application.

The other two projects involve solar air grain drying and using solar water heating for dairy operations.

Category Agricultural
State MI
Project Name Michigan State University (MSU)
Solar Research

Organization Michigan State Univ.

Address Agricultural Engineering Department
East Lansing, MI 48823

Contact Bill Stout

Telephone (517) 355-4720

Funded By USDA, Agricultural Research Service

Cost \$3,000

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

For several years the Forestry Department at Michigan State University (MSU) has conducted a hybridization project involving 20 species of fast-growing trees. A recent grant from DOE underwrites research of the trees' fiber content.

The trees are used in the production of methane gas, animal food, and paper products. They are also an important source of woodchips.

Category	Agricultural
State	MI
Project Name	Michigan State University (MSU) Tree Hybridization Project
Organization	Michigan State Uni
Address	Michigan State Univ. Forestry Department East Lansing, MI 48423
Contact	Jim Hanover
Telephone	(517) 355-0090
Funded By	Grant from D.O.E.
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Reed Maes, an environmental engineer, has built a 6,000 ft² commercial-scale solar greenhouse. At a cost of \$4.00/ft², the A-frame greenhouse produces a wide variety of organically grown crops year round.

The support framework is strong and economical; the A-frame arch is constructed of 24 ft. long 2"x4" boards. The garden has two pivoted "reflector insulators" made from foam board covered with aluminum foil. When open during the day, they form a reflective north wall that intercepts and transmits low-angle sunlight onto the growing surfaces. When lowered at night, they form an insulated ceiling.

The greenhouse also has an insulated north wall; 55-gallon drums filled with water to obtain and retain solar energy. The interior temperature never drops below 45 degrees in winter, even without conventional back-up heat. Plants survive, but grow very slowly at lower temperatures reached in January.

Critique/analysis: Maes recommends using some supplemental heat (he uses natural gas) in January and during extended periods of cold weather in general.

Category Agricultural
State MI
Project Name Solar Greenhouse

Organization Reid Maes
Address 6200 Carpenter Road
Ypsilanti, MI 48197
Contact Reed Maes
Telephone (313) 483-2658

Funded By DOE Grant
Cost \$24,000
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Betsy Shipley and Gunter Pfoff, owners of the Shipley and Pfoff Farm recently decided to use renewable energy to heat their old farmhouse. As a first step, they purchased a greenhouse kit from the Vegetable Factory (a manufacturer in New York State), and attached the greenhouse to their house. In addition, to heat an old section of the house, they added two vertical solar collectors to the structure. They also have plans to retrofit hot-air type collectors on their roof for space-heating.

The Sun and People Project is intended as an educational tool as well as a practical experiment in solar heating. Shipley and Pfoff plan to go on the road with an audiovisual show to share their solar experience with the uninitiated.

Category Agricultural

State MI

Project Name Sun & People Project

Organization Shipley & Pfoff Farm

Address 14780 Beardslee Rd.
Perry, MI 48872

Contact Betsy Shipley
Gunter Pfoff

Telephone (517) 675-5213

Funded By Owners

Cost \$4,000 +

Congressional District X

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A company consisting of ten southeastern Michigan farmers is planning a "Total Food Energy Plant." The plant is expected to produce corn oil, protein feed, yeast, fusel oil, CO₂, ethyl alcohol, methane gas, and food suitable for human consumption. Methane gas produced on the site is expected to provide 50 percent of the energy needed to produce the ethyl alcohol.

The farmers initially spent \$30,000 to complete project marketing and feasibility studies.

Critique/analysis: Foreign firms, or foreign subsidiaries of U.S. firms, will build the plant since the Agri Power Company believes U.S. technology is not sufficiently advanced. The Project has financial backing, but presently lacks the federal loan guarantee needed to proceed at full speed. Agri Power estimates construction could begin in six months to a year. The proposed plant would be located on a 106-acre site north of Addison.

Category Agricultural

State MI

Project Name "Total Food Energy Plant"

Organization Agri Power Alcohol, Incorporated

Address P.O. Box 377
MI 49220

Contact Jim Mickel

Telephone (517) 547-5524

Funded By Private

Cost \$56,000,000

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

For Architectural Design Course 442, six of Keith Brown's students designed an energy-saving farm of 100 acres. The farm is designed to accommodate 20 residents and agricultural activities.

Drawings and designs are available from Keith Brown or John Mowat.

Category Agricultural
State MI
Project Name University of Michigan Architectural Design

Organization University of Michigan Department of Arch.
Address Room 3119
Arts and Arch. Bldg.
University of Michigan
Ann Arbor, MI 48106
Contact n/a
Telephone (313) 764-1837

Funded By University

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Gary Kempf has installed a 14 ft. diameter 2.5 Kw wind generator that produces electricity for his rural home in Lenawee County. The machine cost \$3,500 in 1977.

As an experimental unit, the wind generator has not yet proved its potential effectiveness or practicality for typical consumers. Rather, it provided supplemental electricity to that from the utility company.

Kempf stated that, although average wind speed in Michigan is only 10.6 m.p.h., at specific sites and higher elevation, average wind speeds may be higher. He claimed average wind speeds were 13-14 m.p.h. in Lenawee County.

Category Agricultural
State MI
Project Name Wind Generator

Organization Kempf Engineering and Research

Address 12034 Ridge Highway
Tecumseh, MI 49286

Office: 164 South Platt
Ann Arbor

Contact Gary Kempf

Telephone (313) 439-8338
(313) 434-6320

Funded By Private

Cost \$3,500

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Saginaw Federal Building, a solar-heated structure, uses a vacuum-jacketed, water-type collector mounted on a tall, free-standing platform above the center of the building. Heat is stored in two 15,000-gallon tanks of water. An oil-fired boiler is used as a back-up.

The building is cooled in the summer using an absorption-type chiller powered by water from the solar heating system or by water from the boiler.

The building, in operation since July of 1977, is predicted to supply 40 percent of its energy needs with solar heat.

Category	Cities
State	MI
Project Name	Solar for the Saginaw Federal Building
Organization	General Service Administration ERDA
Address	100 South Warren Saginaw, MI 48605
Contact	n/a
Telephone	n/a
Funded By	General Services Administration ERDA
Cost	\$4,600,000
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The solar heated and cooled Macomb County Satellite Services building is one of the largest operational solar installations in the state.

Functioning since January of 1977, the building features a triangular shape that permits the in-corporation of flat plate collectors on the south exterior wall. The roof was designed to accommodate further expansion of the building.

8,000 ft² of liquid collectors are positioned on the wall at an angle of 45 degrees. The fluid is circulated through the collector tubing and to the storage system at a rate of 0.5 gallon per minute. During the night, when the system is not in operation, the fluid is drained down to storage tanks. Two gas-fired boilers supplement the solar heat.

In insulated reflective glass wall on the north maximizes heat gain from the morning sun. It positioning parallel to prevailing winds minimizes winter heat loss.

Plans for the building, drawn up in 1975, called for pay-back period of 12.5 years. By designing the collectors as an integral part of the structure, the initial costs were reduced.

The county has not been monitoring the success of the building, but projects a 50 per-savings in fuel bills over those incurred imilar-sized buildings.

Category	Cities
State	MI
Project Name	Solar Macomb County Satellite Building
Organization	Macomb County Thomas Strat & Assoc.
Address	29600 Civic Center Blvd. Warren, MI 43093
Contact	Thomas Strat
Telephone	(313) 585-6600
Funded By	Revenue Sharing- Federal monies not earmarked
Cost	\$2,600,000
Congressional District	XVIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

This hot water heating system was installed in 1978 by a class at the Lansing Community College. It consists of two 20 ft² air-type panels mounted on a flat roof at a 45 degree angle. Hot air is blown across a heat exchanger (a radiator-like device) through which water passes. They chose an air system to avoid water-leakage and freezing problems that sometimes occur with a liquid system. This system uses a gas-fired heater as back-up.

Category Commercial
State MI
Project Name Lansing Community College (LCC)
Solar Systems

Organization^{ns} Lansing Labor

Address 342 Clare Street
Lansing, MI 48924

Contact Dick Holmes

Telephone (517) 484-7408

Funded By United Auto Workers

Cost \$2,200

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This system consists of a solar-heated toilet and shower facility for a private campground. The one-story, 2,500 ft² facility is heated by an air-type collector (950 ft²) mounted on the two south roofs. Heat is stored with a 100-ton bin of stones. The 2,100 ft³ of two-inch diameter stones are housed in a rectangular block-bin in the south-central part of the building. Eighty-five percent of the building's heat is produced by the solar heater. An electric hot-air furnace provides back-up heat.

Category Commercial
State MI
Project Name Solar Camp Lavatory

Organization Sandy Pines

Address Hopkins, MI 49328

Contact Jerry Brower

Telephone (616) 392-6937

Funded By Developers at Lake
Monteray Corporation

Cost n/a

Congressional District IX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Peerbolt's Inc., an expanding company in the energy field, installed a flat plate solar collector system in their new 1,800 ft² office building. It is an air system, consisting of 312 ft² of collector area and eight tons of rock used for thermal storage. The system was designed to supply 50 percent of the heat and 100 percent of the company's hot water needs.

The system utilizes an electric heat pump for back-up. The pump switches on automatically when controls are activated by temperature sensors.

Peerbolt's will use this system to gather information on the effectiveness of solar energy in this area of Michigan.

Category	Commercial
State	MI
Project Name	Solar-heated Office Building
Organization	Peerbolt's Inc.
Address	1274 Industrial Avenue Holland, MI 49423
Contact	Jeff Peerbolt
Telephone	(616) 392-6937
Funded By	Owner, bank
Cost	\$12,000
Congressional District	IX
Compilation Date	February, 1980

Renewable Resources— A National Catalog of Model Projects

This two story office building is heated and cooled by 104 air collector panels located on the south face of the multi-purpose room at approximately a 53 degree angle.

The system can operate in four modes: heating directly from the solar panels, heating from storage (a rock storage bed), storing heat, or ventilating the panels.

Direct heating occurs when the outdoor temperature is below 65 degrees. If the temperature at the solar panels exceeds that of the rock storage by 20 degrees F, the solar fan starts up and supplies air to the building air handler.

Heating from storage occurs if the rock bed is hotter than the solar panels. Building return air then goes through the rocks and back to the building air handler. (If neither the panels nor the rocks contain heat, the boiler will fire to heat the building.)

Heat goes into storage if the building requires less than full heat and heat is available at the solar panels. The solar fan will then start and force heat into the rock bed.

Ventilation occurs when the solar panel temperature exceeds 160 degrees F. The ventilation fan then starts, sucking in outdoor air through the panels to cool them.

Category Commercial
State MI
Project Name Solar Office Building

Organization Retail Store Employees Union, Local #876, Madison Heights
Address 876 Horace Brown Drive, Madison Heights, MI 48071
Contact Paul Sliver
Telephone (313) 585-9671

Funded By n/a

Cost \$125,000 for solar components

Congressional District XVIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Commercial
State MI
Project Name Wind Electric/Power Plant.

Windependence has a wind-electric power plant consisting of a restored Jacobs wind generator, a restored Windcharger Tower and an ironclad battery set. It provides 100 percent of the electric power needs to the office and workshop areas (Windependence restores electric wind generators produced during the 1930s and 40s). The company uses a gasoline generator connected to propane as a stand-by system.

The wind generator system requires annual maintenance and is expected to pay back the initial investment in twelve years.

Organization Windependence Elec Power Co.
Address 9080 Beeman Road
Waterloo, MI 48118
Contact Craig Toepfer
Telephone (313) 475-9669

Funded By owner
Cost \$10,500
Congressional District VI
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Muskegon Senior Citizen Community Center added a solar greenhouse to their 5,500 ft² building. The greenhouse is double glazed with movable insulation on the 352 ft² of south-facing glazing. The main building uses natural gas for heat. Opening two doors and two windows between the greenhouse and the main building permits heat exchange in both directions.

The greenhouse supplements the heating and food supply of people whose small incomes are fixed. Planting beds in the greenhouse have aided the senior citizens in their gardening.

The construction of the greenhouse was done by young people involved in a solar training project with the local summer employment program for youth.

Category	Community
State	MI
Project Name	Muskegon Senior Citizen Community Center Greenhouse
Organization	Neighborhood Senior Citizen Community Center
Address	313 Jackson Muskegon, MI 49440
Contact	Fred M. Gerow
Telephone	(616) 724-6211
Funded By	Local and Federal Govts., Community Groups
Cost	\$3,200
Congressional District	IX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The 1,050 ft² Post Office will be heated with an active (hot water) solar energy system that consists of flat plate collectors manufactured with a copper serpentine coil brazed to a copper plate.

The panels have been especially designed for the north country. The flat plate collectors are installed in the space provided by the trusses. The liquid in the flat plate collector is a glycol based boiler anti-freeze solution. Heat is transferred through a heat exchanger to water in a storage tank. Water from the storage tank is used to preheat cold water before it enters into the domestic hot water heater.

For space heating, the water from the storage tank is circulated through a hot water coil installed in a forced-air system.

Air conditioning is supplied by a split system with a coil in the hot air distribution system for summer cooling.

The system is controlled by solid state controls that regulate pump speed to provide maximum efficiency. If the storage tank reaches 192 degrees F, the pump goes into high speed to dissipate the heat. It takes very thick clouds to close down these solar panels. Even during a snowstorm, designers were able to get a reading of 135 degrees from a test panel. On a sunny day, the same panel develops about 196 degrees.

The back-up heating consists of an in-line, circulating, electric booster heater. If temperature is low, water from the solar storage tank booster heater will come on until building heat is satisfied. No attempt is made to heat storage facilities.

This is the first solar heated post office in the 13 state central region. Construction of the building is being done by a local firm mostly from

Category Community
State MI
Project Name Solar Powered Post Office

Organization U.S. Post Office Powers, MI
Address Highway U. S. 2 Powers, MI 49874
Contact Rapheel N. Paolegiti or Melvin Pettie
Telephone (715) 479-7710

Funded By Designer, Helio Structures

Cost \$87,000

Congressional District XI

Compilation Date February 1980

local materials. The designers have had to fund the building themselves because they were not able to obtain a loan from a financial institution.

Renewable Resources— A National Catalog of Model Projects

The Michigan Energy Educators Forum designed workshops to enable members of industry and education to work together to develop an energy awareness among Michigan educators in the sciences and the humanities. Through this program, educators will be better prepared to guide their students and clientele to make informed assessments of energy impacts and choices within the framework of our societal values.

Stressing rational understanding for viable, equitable remedies or changes, the Forum searches for real progress in conservation and the simultaneous development of existing new or alternate energy sources.

Category	Education
State	MI
Project Name	Education/Training Programs
Organization	Michigan Educators Energy Forum
Address	P.O. Box 11056 Lansing, MI 48901
Contact	George P. Sakalosky
Telephone	(517) 788-2397
Funded By	Consumers Power, Detroit, Edison Bechtel
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Governor's Energy Awareness Advisory Committee is a group of individuals appointed by the Governor to develop programs and oversee projects designed to increase public awareness of national and state energy situations. The Committee (a non-profit corporation) is composed of forty individuals who represent business, industry, energy production and supply, labor, education, government, religious, and public interests. Committee appointments are made by the Governor and staff support is provided by the Department of Commerce.

Specific goals include increasing awareness of Michigan citizens about the role, importance, uses, and cost of energy; drawing attention to the various methods for conserving and utilizing energy; demonstrating the cost and savings impact of conservation; showing the importance and impact of new energy sources and technologies.

The Committee began in 1976 as an outgrowth of the first Michigan Energy Month, which was designated by the Governor to increase public awareness of energy issues. Formally established in 1977, the Committee provides continuity as well as legal and administrative structure for the Energy Month program which the Governor has proclaimed will take place each November.

The Committee has sponsored a variety of energy conferences (for students and the general public) on conservation, wood energy and social issues related to energy. It has distributed printed material on energy and energy conservation. Most recently, the Committee sponsored a state energy exposition in Detroit and three regional energy expositions.

Critique/analysis: The Detroit energy exposition, although advertised as similar to a trade show, failed to transcend the trade-show format. Very little attention was given to renewable resources.

Category : Education
State : MI
Project Name : Governor's Energy Awareness Advisory Committee

Organization : Governor's Energy Awareness Advisory Committee
Address : 6545 Mercantile Way
Lansing, MI 48910
Contact : Sandra J. Yonker
Telephone : (517) 374-9648

Funded By : Contributions and Income from Program Activities

Cost : n/a

Congressional District : VI

Compilation Date : February 1980

Few small business and alternative energy people could afford the \$900 for a 10' x 10' booth. (A 90' x 10' booth went for \$3,900!) Consequently large companies dominated the Conference. Educational groups received free booth space but were hard pressed to complete the fancy floor shows, bright lights, and glossy brochures.

Renewable Resources— A National Catalog of Model Projects

Grand Rapids Junior College (GRJC) was funded in 1978-79 to produce two 30-minute color video cassette television programs for community education in energy. One program uses mime to show simple, practical and cost-effective energy-conserving techniques in new and retrofitted homes. The tape also deals with public and private transportation.

The second tape presents the solar projects and opinions of Tom Newhouse and others at both Central Michigan University and Jordan College.

GRJC received additional funding this year to distribute the programs to colleges, public schools, and other organizations.

GRJC is also one of ten coordinating colleges in a nationwide program entitled "Energy and the Way We Live." The program, targeted for January through March of 1980, involves public forums on energy issues. Similar programs on a given topic are offered around the country during the same week. GRJC coordinates approximately 50 participating colleges in Michigan, Indiana, Ohio and Kentucky. The programs are also offered as "courses by newspaper" out of California.

p>Category Education
State MI
Project Name Grand Rapids Junior College Energy Programs

p>Organization Grand Rapids Junior College

p>Address Continuing Ed.
143 Bostwick, N.E.
Grand Rapids, MI
49503

p>Contact Lynne Goede

p>Telephone (616) 456-4890

p>Funded By Title I, Higher Ed.
Act of 1965, College
matching monies

p>Cost approx. \$40,000

p>Congressional District v

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Jordan College has constructed seven alternative energy demonstration projects. The projects have featured active solar space heating and solar water heating systems, a wind electrical generator, a photovoltaic demonstration project, and a solar greenhouse.

A 14' x 26' attached passive solar greenhouse has been built at Madison Hall using triple-glazed, 3/16" tempered glass. An automated solar blanket with reflective coating retains winter heat and reflects summer sun. Eutectic salts store heat in winter for nights and overcast days. Sheathing insulates the foundation, which has 48" footings. Back-up heat is provided by conventional electricity.

Students and faculty participated in the construction of the solar greenhouse and other low-technology projects. A team of professional consultants and engineers helped construct the projects.

Jordan College offers an Applied Sciences Degree in Alternative Energy, and a Bachelor of Science Degree in Alternative Energy. They also offer a cooperative Energy Engineering Program in conjunction with a few Michigan Universities. Workshops, symposiums and concentrated one-semester programs covering the basic renewable resources: solar, wind, biomass, geo-physical energies, and design of alternate energy systems, are also available.

Category	Education
State	MI
Project Name	Jordan College Solar Demonstrations
Organization	Jordan College
Address	360 West Pine Street Cedar Springs, MI 49319
Contact	Ms. Lexie Coxon Co-President
Telephone	(616) 696-1180
Funded By	U.S. DOE Demo Project
Cost	From \$1,200 to \$138,000
Congressional District	v
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Kalamazoo Nature Center is sponsoring the "Living Systems Program." The purpose of the program is to translate environmentally sound concepts of energy use, food production and waste handling into concrete models that can be easily examined and economically applied to existing homes.

A residence on Nature Center property is being retrofitted to demonstrate the use of energy-efficient technologies that are simple, low-cost and durable. Included will be weatherization, active and passive solar heating systems, a solar greenhouse, worm compost bin, solar and wood water heaters, woodstoves, composting toilet, wind-powered pumps and generators, and organic gardens.

Educational programs focussed on the house's systems will include workshops, lectures, "hands on" experience, library materials, and a mobile unit.

table
Category	Education
State	MI
Project Name	Kalamazoo Nature Center Living Systems Programs

table
Organization	Kalamazoo Nature Center
Address	7000 North Westnedge Ave. Kalamazoo, MI 49007
Contact	Doug Wood
Telephone	(616) 381-1574

table
| Funded By | NCAT; mostly private donations, goods and services |

table
| Cost | \$5-10,000 |

table
| Congressional District | III |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Neighborhood Service Organization received a contract from the Detroit CETA program to train youths in winterization and solar energy applications. Thirty SWEPT participants received approximately 28 weeks of training which began in January of 1979. Training covered six skills areas: Basic wood-working, sheet metal working and electrical skills; Basic energy conservation and solar utilization with special emphasis on urban settings; On-the-job experience winterizing and solarizing homes of low-income families in Detroit; Community involvement with SWEPT participants; and job counseling and placement.

To date the program has installed a passive solar porch, one four-panel domestic hot water system in a commercial building, one residential two-panel domestic hot water system and three vertical, passive-flow air collector systems.

Category Education

State MI

Project Name Solar Skills Training

Organization Neighborhood Serv---
Organization Solar
Winterization Educa-
tion Program for Teens
(SWEPT)

Address 5089 Bishop
Detroit, MI 48224

Contact Roger Hoskins

Telephone (313) 881-0089

Funded By City of Detroit
Manpower Office

Cost n/a

Congressional District XIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

People from the Upland Hills Ecological Awareness Center, an Oxford-based organization, have annually conducted summer seminars on renewable energy. It recently became apparent, though, that a year-round educational and training facility was needed. The Upland Hills Ecological Awareness Center, which was completed in April 1980, is this facility. It embodies the belief of a group of people who are committed to living in harmony with nature.

The Center's integrated system uses both active and passive solar heating and cooling. A wood-burning furnace and a wood-burning stove are used for back-up heat. A two-Kw windmill is also employed. Fork lift batteries are used for storage, providing a three-day storage capacity.

The building is also well insulated, and on-site materials have been incorporated as much as possible. For example, the roof is insulated with sod.

The three-year project has received various grants and donations, and the labor has been provided by Center friends and members.

People able to construct their own renewable energy systems can, project participants believe, replicate the building for one-third the cost.

Category	Education
State	MI
Project Name	Upland Hills Ecological Center
Organization	Upland Hills Ecological Awareness Center
Address	2575 Indian Lake Rd., Oxford, MI 48051
Contact	Ann Franklin
Telephone	(313) 693-1021
Funded By	Various grants & donations
Cost	\$120,000 (approx.)
Congressional District	XIX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Saver Plus Program offers homeowners reduced interest rates and higher mortgage ceiling rates to promote energy efficiency.

There are two incentive plans. Option one provides an interest rate reduction of 1/4 percent and a \$1,000 increase in the maximum mortgage amount (to \$39,000) for basic conservation measures: insulation, automatic thermostats, and energy-efficient furnaces.

The second option reduces the interest rate 1/2 percent with a \$2,000 increase in the maximum mortgage amount (to \$40,000) for conservation improvements plus the utilization of solar equipment (such as space or water-heating).

table
Category	Financing
State	MI
Project Name	Home Improvement Loans
Organization	MI State Housing Dev. Authority and MI Dep. of Social Services
Address	Plaza One Bldg., 5th Fl., 401 South Washington Ave. P.O. Box 30044 Lansing, MI 48909
Contact	n/a
Telephone	(517) 373-6840
Funded By	n/a
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Public Service Commission has approved a program permitting Michigan utilities to make interest-free energy conservation loans to their customers. Similar to the terms of a program proposed by President Carter, higher rates will pay for the loans.

The rules governing the program were approved early in 1979. Under the rules utilities can make interest-free loans for insulation or furnace and flue modifications. The improvements must repay the investment within seven years.

The program will begin operating by late 1980. Since utilities must apply for the program on an individual basis and cannot be forced to participate, delays have arisen. So far only Michigan Consolidated Gas and Consumers Power have applied. They are now at the public hearings stage of the process.

The public will be notified through newspapers, radio and other means when the program has been implemented.

Category	Financing
State	MI
Project Name	Interest-free Loans
Organization	Public Service Commission
Address	PSC, MI Dept. of Comm. 6545 Mercantile Way Box 30221 Lansing, MI 48909
Contact	Robert Nelson
Telephone	(517) 573-0858
Funded By	n/a
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The retrofit of the Belaski home utilizes "solarcrete." Solarcrete is expanded polystyrene foam sandwiched between sprayed-on or trowelled-on concrete. One inch diameter PVC pipes are installed six inches apart between the insulation and the outer concrete layer. This creates an active liquid collector integrated into the massive back wall of the solar greenhouse. The concrete acts as a storage mechanism.

Category Housing
State MI
Project Name Belaski Solar Residence

Organization John Belaski
Address 1441 Greenview
East Lansing, MI
48823
Contact John Belaski
Telephone (517) 351-3373

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

Renewable Resources— A National Catalog of Model Projects

This direct gain-passive solar system, provides the residence with 70 percent of its heating needs.

Domestic hot water is provided by two collectors. The solar hot water heater preheats water that is further heated in the electric water heater.

A wood stove serves as a back-up energy source. It uses the same vent system as the solar system does to distribute heat to space.

The owner chose this combination of solar energy systems because natural gas was not available for the planned site.

Category Housing
State MI
Project Name Kalamazoo Solar Residence

Organization Tim Greening

Address 7478 South 25th St.
Kalamazoo, MI 49001

Contact Tim Greening

Telephone n/a

Funded By Owner, Contractor

Cost \$9,000

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This passive home traps heat and stores it in the conventional dry wall. The system is providing an estimated 30 percent of the home's annual heating needs. The house uses wood heat and a gas boiler for back-up.

The owner hopes to install a wind-electric system in the future. The house has an insulated all-weather wood foundation. High humidity requires fan-assisted air exchange.

Category Housing
State MI
Project Name Manitou Beach
Solar Residence

Organization Jerry Fluegge
Address 3387 Glen Hill Hwy.
Manitou Beach, MI
49253
Contact Jerry H. Fluegge
Telephone (517) 547-3568 (home)
(313) 322-2209 (work)

Funded By owner

Cost \$5,000

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Don Price built this environmentally sensible house primarily from local materials. It corresponds to the immediate landscape and uses passive solar heating. The home is timber-framed with Michigan oak. It features a massive centrally placed chimney that does not lose heat to the outside. Rather, the winter sunlight warms the brick and stone of the floor and chimney. One wall of the chimney has been used, as the back of a greenhouse.

The owner uses a Defiant wood stove to back-up his passive system. Last year, without drapes or other insulating material, only 2.5 cords of wood were needed to provide back-up heat.

Category Housing
State MI
Project Name Price Passive
Solar Residence

Organization Don Price

Address 6536 Scio Church Road
Ann Arbor, MI 48103

Contact Don Price

Telephone n/a

Funded By owner

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This passive solar, earth-sheltered home has a two-story concrete/earth shelter wall. A Trombe wall provides for thermal mass heat storage. All of the windows have moveable insulation, and the house features an adjustable summer overhang, a freestanding airtight wood stove and (as a back-up) zone-thermostated electric heat.

The passive solar system provides approximately 60 percent of the annual heating needs of the Newhouse family.

Category Housing
State MI
Project Name Newhouse Solar Home

Organization Jill and Thomas Newhouse
Address Tallmadge Township
Ottawa County, MI
Contact Jill and Thomas Newhouse
Telephone n/a

Funded By Owner, bank, HUD
passive solar grants
awards

Cost \$56,500

Congressional District IX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Housing
State MI
Project Name Sanderson Passive
Solar Home

The 1,000 ft² Sanderson residence was designed to optimize passive solar gains. The site is located in the Upper Peninsula, in a valley with a dense coniferous forest to the north, east, and west. This forest blocks winter winds, and almost 100 percent of the southern exposure is open to the sun. The system supplies 65-70 percent of the heating load.

The house has eleven air collectors totaling 201 ft². Air is circulated by a 12 inch blower powered by a 1/2 horsepower motor.

The solar storage medium for the hot air is 220 ft³ of crushed stone enclosed in a horizontal concrete tank.

The house design allows air to circulate freely for efficient heat distribution. East and west wings of the house are angled to help block westerly and easterly winds from flowing across the main collector array.

In addition, 145 ft² of double-glazed, south-oriented windows fuel the passive system.

The owners also use electric baseboard heaters and a Ben Franklin stove to supplement the solar heating system.

R. D. Sanderson is the Vice-President and Technical Director for Solartran Corp. of Manabau, MI.

Organization Ric Sanderson
Address Route 1
Vulcan, MI 49892
Contact Ric Sanderson
Telephone (906) 563-5103

Funded By Owner
Cost \$4,300
Congressional District XI
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This auxiliary solar hot water heater system consists of five flat plate collector panels that have a total surface area of 120 ft².

Water warmed in the system moves at a rate of .3 to .5 gallons per minute per collector. It is stored in the house in a "day tank," a recycled 200-gallon insulated oil tank.

A heat exchange system diverts heat from the fireplace in the house to the water heater system.

The system was built with recycled and readily available materials to save on construction costs.

Category Housing
State MI
Project Name Tecumseh Solar Residence

Organization Anthony Amrhein
Address 6181 Billmyer Hwy.
Tecumseh, MI 49286
Contact Anthony Amrhein
Telephone n/a

Funded By owner
Cost \$1,000
Congressional District IV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A solid waste energy-recovery plant that will convert 500 tons of waste into salable steam each week is being developed by Genessee Township Building Authority. The steam will then be used to heat and cool businesses in the Dort/Carpenter Industrial Complex.

The steam-generating plant will be the only one of its kind in Michigan. Viewed as an alternative to land fill, the plant will burn garbage to produce steam. Buildings located in the industrial park area will be heated in winter and cooled in summer by the steam generated. Industry will be attracted to the park because the steam is cheaper than conventional heating and cooling systems. By attracting industry to the area, Genessee will receive an additional tax base and be able to provide more jobs for area residents.

The plant will cost \$2.01 million. It is estimated that it will save the township 1.2 million gallons of oil per year and reduce the cost of waste disposal. Genessee Township pays more than \$200,000 a year to collect and dump its refuse (garbage). Savings from the steam process will result from reduced transportation costs (the plant is centrally located) and reduce expenses related to compliance with federal regulations on landfills.

Pollution poses no real problem because any particles that do not burn can be recycled for re combustion. In adapting the system to a northern area, the engineer has put the steam pipes under sidewalks, a move that will keep snow and ice from forming on them.

p>Category Industrial
State MI
Project Name Solid Waste Steam Plant

p>Organization Genessee Township Building Authority
Address Dort/Carpenter Industrial Complex Energy Drive Genessee Twp., MI 48437
Contact Hanumanthaiya Marur P.E. Engineer & Manager

p>Telephone (313) 640-2620

p>Funded By Building Authority Revenue Bonds

p>Cost \$2,000,000

p>Congressional District VII

p>Compilation Date February, 1980

Renewable Resources— A National Catalog of Model Projects

The Ingham County Medical Care Facility, in the cloudiest county in the nation, has been meeting 20 percent of its hot water needs with solar energy since May of 1979. The system consists of 10,000 ft² of dual-glazed flat plate solar collectors set up on land adjacent to the building. The array has 14 parallel rows of 36 collectors each, 504 modules in all.

The system is expected to collect four billion BTU per year, equivalent to saving 15,000 gallons of heating oil. If fuel oil prices increase at 10 percent a year, the system is expected to pay back in 19 years. Compared to the cost of electricity, (at \$14/million BTU) the payback under the same assumptions is 9.5 years.

The 204-bed geriatric facility has high year-round domestic hot water requirements. The high usage demands make it possible to use solar energy to preheat domestic water without installing expensive storage facilities. Usage is particularly heavy during the day, when kitchen, bath, and laundry needs are met.

The system was built to help cut utility expenses at the facility. There have been no plans to expand the capacity of the system to increase the percentage of energy needs being met by solar energy. Congressman Bob Carr recommended to the Department of Energy that they provide funding for the project. The Ingham County Board of Commissioners has stated its willingness to take a risk with the cloudy climate to put up over \$90,000 in matching funds to complete the Medical Care facility.

The solar system has an extensive, built-in monitoring system. Thirty data sensors connect the facility by telephone to the National Aeronautics and Space Administration (NASA) computer in Huntsville, Alabama. The data collected will provide detailed performance descriptions on a year-round basis.

Category	Institutional
State	MI
Project Name	Ingham County Medical Care Facility
Organization	Ingham County Medical Care Facility
Address	3860 Dobie Road Okemos, MI 48864
Contact	H. E. Harrington or Jeanne Fisher
Telephone	(517) 349-1050
Funded By	DOE, Ingham County
Cost	\$510,466
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The UAW's Reuther Family Education Center at Black Lake serves as a demonstration site for solar and other wind- and water-power innovations.

The largest project at the UAW education Center is the solar heated, olympic-size, indoor swimming pool. The modified copper roof serves as a solar collector. An ordinary plumbing system allows a thin sheet of water to flow down the copper roof under a transparent fiberglass cover. The heated water collects at the bottom of the collector and from there it is piped into the basement. The hot water is then pumped through a heat exchanger coil integrated into the swimming pool's circulation system. This heats the pool water. Water leaving the heat exchanger returns to the roof for reheating.

An outdoor shower for children at summer camp uses the sun in a similar fashion to heat the water. Under a fiberglass cover, water is pumped through blackened copper tubing. The water is pumped by thermal siphoning: natural circulation caused by the change in the density of water as it is heated. The shower is designed with all parts exposed so that users can see how it operates.

UAW has also installed the first commercially available Darrieus Rotor in the U.S. The wind unit is rated at 4KW and produces 60 cycles of alternating current (AC).

The Recreation Inn at Black Lake is cooled by 7 degree water from a natural artesian well below the Inn.

A 1975 estimate showed that using the sun instead of a gas-fired pool heater saved \$2.16 each hour that the solar collector was used.

Category	Institutional
State	MI
Project Name	UAW's Reuther Family Education Center
Organization	Int'l. Union UAW Conservation & Resources Development
Address	8000 East Jefferson Avenue, Detroit, MI 48214
Contact	Rus Gossman
Telephone	(313) 926-5271
Funded By	U.A.W.
Cost	n/a
Congressional District	XIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Act No. 615, 1978 sections 400.1051 to 400.1071 of Michigan Compiled Laws.

This act may also be cited as the "Low Income Household Home Weatherization Act." It establishes a home-weatherization program and creates a weatherization program review board. The Act limits the liability of the state, establishes penalties, and makes appropriations.

The Department of Social Services helps the administration determine the income eligibility of an applicant. DSS shall notify persons receiving Aid for Families with Dependent Children (AFDC) and supplemental security income of the availability of the weatherization program. Information concerning the program's eligibility criteria and availability shall be distributed through such agencies as county offices of social services, area agencies on aging, community action agencies, etc. The act will expire on December 31, 1981.

Category	Legislation
State	MI
Project Name	Home Weatherization Program
Organization	Michigan State Legislature
Address	State Capitol Lansing, MI 48913
Contact	n/a
Telephone	(517) 373-1837
Funded By	n/a
Cost	n/a
Congressional District	Statewide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Act No. 504, 1978.

This act orders the State Park Commission to utilize solar energy systems to heat hot water at State park rest rooms and shower facilities when constructed or modernized, except when topography or trees make it impractical.

Category Legislation
State MI
Project Name Solar Park Facilities

Organization Michigan State Legislature
Address State Capitol
Lansing, MI 48913
Contact State Representatives
Monsma, McCullough
Bullard, Bennane
Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Act No. 502, 1978, section 247.661 of Michigan Compiled Laws.

This act orders the Department of Transportation to use solar energy systems, integrated with conventional systems, to heat hot water at newly constructed or extensively remodeled highway rest areas or travel-information centers, except when trees or topography make doing so impractical.

The act also orders the Department of Transportation to post an explanation of solar technology, and estimates of the amount of energy saved by solar, at facilities now utilizing solar power.

Category Legislation
State MI
Project Name Solar Rest Stops

Organization Michigan State Legislature
Address State Capitol
Lansing, MI 48913
Contact State Representatives
Monsma, McCullough
Bullard, Bennane
Telephone (517) 373-1837

Funded By not applicable
Cost not applicable
Congressional District State-wide
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Act No. 605, 1978 as amended by Act No. 41,
1979 section 206.262 of Michigan Compiled Laws.

This act establishes income tax credits for devices for converting solar, wind, or water energy. Whereas Federal regulations have been ambiguous regarding income tax credits for passive solar energy systems, Michigan regulations permit them.

For 1979 and 1980, income tax credits are 25 percent of the first \$2,000 of cost and 15 percent of the next \$8,000 of cost for a single-family home. Other buildings can obtain income tax credits of 25 percent of the first \$2,000 of cost and 15 percent of the next \$13,000 of cost.

The law defines an eligible solar, wind, or water energy conversion device as a "mechanism or series of mechanisms designed primarily to collect, convert, transfer or store for future use solar, wind, or water energy for the purpose of heating, cooling or electric supply." Eligible systems include active and passive solar, wind, ground-water heat pumps, low-head hydro and photovoltaics.

The regulations exclude fireplaces, wood-assisted furnaces, and installation labor. Wood stoves currently are not eligible, but pending is further legislation that would extend credits for wood stoves that are integrated into energy-ration systems.

The Energy Administration must certify that a system conforms to eligibility criteria before the owner may apply for the tax credit program. This certificate must be attached to his or her income tax forms.

Category Legislation

State MI

Project Name Tax Credit
(Income)

Organization Michigan State
Legislature

Address State Capitol
Lansing, MI 48913

Contact n/a

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Act No. 133, 1976, section 205.94e of
Michigan Compiled Laws.

This act exempts from the State use tax
property containing energy-conversion devices
used in the supply of solar, wind, or water
energy for heating, cooling, or electrifying
existing or new residential or commercial
buildings.

Category Legislation
State MI
Project Name Tax Incentives
 (Property)

Organization Michigan State
 Legislature
Address State Capitol
 Lansing, MI 48913
Contact n/a
Telephone (517) 373-1837

Funded By not applicable
Cost not applicable
Congressional District State-wide
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Act No. 132, 1976, section 205.54h of
Michigan Compiled Laws.

This act exempts from State sales tax
energy-conversion devices used in the supply
of solar, wind, or water energy for heating,
cooling, or electrifying existing or new
residential or commercial buildings.

Category Legislation

State MI

Project Name Tax Incentives
(Sales)

Organization Michigan State
Legislature

Address State Capitol
Lansing, MI 48913

Contact n/a

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4759.

This bill requires the installation of automatic flue dampers in the furnaces of all new buildings and structures constructed after July 1, 1980. The object of the bill is to conserve energy by preventing heat loss through flues left open due to improper manual operation. The bill is a stronger version of House Bill No. 4772, which only covers residential construction.

Category Proposed Legislation

State MI

Project Name Automatic Flue Dampers

Organization Michigan State
of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representatives
Bennane, Anderson,
Vonek, Vaughn, Scott
Bullard

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4082.

This bill establishes income tax credits for energy conservation measures by homeowners. The credits cover 25 percent of the actual cost, but not more than \$25 for each of the following energy-conservation measures: ceiling insulation, wall insulation, and installation of storm windows. They also cover 25 percent of the actual cost, but not more than \$50 for installation of exterior siding.

Further, the bill provides that if no income tax is due, or if the State income tax due is less than the credit allowed, the State will pay the amount established above to the homeowner. This is a significant step beyond normal tax credits since the State would actually pay a homeowner money for energy-conservation measures when the homeowner has paid no income to the state.

Category Proposed Legislation

State MI

Project Name Conservation Tax Credits

Organization Michigan State House of Representatives

Address State Capitol
Lansing, MI 48913

Contact n/a

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill 4021.

This bill provides for the installation and use of electric energy converters. These are devices that convert variable voltage DC electric current into constant voltage AC electric current and connects DC electric power sources to AC electric utility facilities.

Such a device will make an electric meter run backwards when power is added to the utility grid from a private source or household by means generating facilities such as a wind generator. The overall effect would be to reduce utility bills.

The electric utility shall not use or install a meter that prevents an electric energy converter from running the meter backwards. The electric company also shall not charge a fee, terminate service, or otherwise take action to discourage a consumer of its electricity from installing or using an electric energy converter.

Category Proposed Legislation

State MI

Project Name Electric Energy Converters

Organization Michigan State House of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representatives
Bullard, Bennane,
Clodfeller

Telephone (517) 373-2577

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4181.

This bill authorizes school districts to borrow money and issue bonds for the purpose of paying for energy-conservation projects and provides State loans for such projects.

Category Proposed Legislation

State MI

Project Name Energy Conservation Loans

Organization Michigan State House of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representative
Keith

Telephone (517) 373-0849

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Senate Bill No. 473.

This bill establishes State controls over oil and gas extraction. Controls cover exploration, development, production, and conservation of oil and natural gas.

A supervisor of wells, an advisory board, an appeal board, rules, penalties, and fee-assessment system are established by the bill.

Category Proposed Legislation

State MI

Project Name Energy Resource Controls

Organization Michigan State Se

Address State Capitol
Lansing, MI 48913

Contact State Senators Engler,
Arthurhultz, Hertel
and Young

Telephone (517) 373-3760

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Senate Bill No. 9.

This bill creates a fuel-conservation research and development project. The project involves the exclusive use of alcohol fuel for a selection of State vehicles. The performance of the vehicles would be monitored and the results reported to the State Legislature and Governor.

Category Proposed Legislation
State MI
Project Name Fuel Conservation and Development

Organization Michigan State Senate

Address State Capitol
Lansing, MI 48913

Contact State Senator
Bishop

Telephone (517) 373-1758

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Senate Bill No. 414.

This bill requires the sale of gasoline-alcohol blends of fuel sold for use as motor fuel. The gasoline-alcohol blend required to be sold is ordered to contain at least: 3 percent alcohol by January 1, 1981; 5 percent alcohol by January 1, 1982; 7 percent alcohol by January 1, 1983; 10 percent alcohol by January 1, 1984.

The bill would in effect establish universal use of the gasoline-alcohol blend of fuel commonly known as gasohol.

Category : Proposed Legislation

State : MI

Project Name Gasohol Legislation

Organization Michigan State :

Address : State Capitol
Lansing, MI 48913

Contact : State Senators Hertel,
Monsma, Arthurhultz,
and Sederburg

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4001.

This bill creates a division in the Department of Commerce to study, provide information, and promote the use of alcohol in internal combustion engines. The bill also orders the Department of Commerce to recommend changes in the State law or rules that would encourage the use of alcohol as vehicle fuel.

Category Proposed Legislation

State MI

Project Name Gasohol Promotion

Organization Michigan State House
of Representatives

Address State Capitol
Lansing, MI 43913

Contact State Representative
McCollough

Telephone (517) 373-0847

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4174.

This bill provides State loans to schools for energy-conservation projects.

Category Proposed Legislation

State MI

Project Name School Energy Conservation

Organization Michigan State of Representatives

Address State Capitol Lansing, MI 48913

Contact State Representative Keith

Telephone (517) 373-0849

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A bill known as the "Solar Contractor Licensing Act" would provide for the licensing and rights of any person to engage in business as a solar energy contractor or salesperson and to fix the standards of qualifications and eligibility for said licensing. The bill would also establish a state solar energy contractors' board to direct, supervise, and enforce this act. Such a board would have the power of licensing and regulation of solar contractors in Michigan. The board would also authorize the collection and expenditure of fees, and provide penalties for the violation of this act.

Solar energy contractors would be required to pass a written examination; or, for a restricted license, an oral examination.

Category Proposed Legislation

State MI

Project Narr. Solar Contractor
Licensing Act

Organization Michigan State House
of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representative
Perry Bullard

Telephone (517) 373-2577

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4083.

This bill provides for the creation, conveyance, and recording of easements to assure access to direct sunlight by solar energy devices.

Easements must include information on the vertical and horizontal angles expressed in degrees at which the solar easement extends over property subject to a solar easement, the terms and conditions under which the solar easement is granted or will be terminated, and the provisions for compensation of the owner of the solar energy device should the access to sunlight be blocked.

Category Proposed Legislation

State MI

Project Name Solar Easement

Organization Michigan State House of Representatives

Address State Capitol
Lansing, MI. 48913

Contact State Representative
Bullard

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4127.

This bill establishes specific requirements for the creation and execution of solar collectors to direct sunlight.

The bill states that a solar easement must be in writing and executed in the manner of a deed as prescribed under section 8, chapter 65 of the Revised Statutes of 1846 as amended (section 565.8 of Michigan Compiled Laws).

Category Proposed Legislation

State MI

Project Name Solar Easement

Organization Michigan State House
of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representative
Bennane

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4045.

This bill establishes quality, information, and product-safety standards for the manufacturing, labeling, and installation of insulation. It also provides for testing, establishes the State police as administrators, and provides civil remedies and penalties.

Category Proposed Legislation

State MI

Project Name State Insulation Standards

Organization Michigan State House of Representatives

Address State Capitol
Lansing, MI 48913

Contact n/a

Telephone (517) 373-1837

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4677.

This bill exempts alcohol fuel from the fuel tax. Ethanol and Methanol fuel of greater than 99 percent purity and obtained from sources other than petroleum or natural gas are exempted. The bill would help promote the use of alcohol fuel in Michigan.

Category Proposed Legislation

State MI

Project Name Tax-exempt Fuel

Organization Michigan State House
of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representative
McCollough

Telephone (517) 373-0847

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Senate Bill No. 480.

This bill reduces the state tax on alcohol-gasoline fuel blends for motor vehicles, commonly known as gasohol, to 6¢ per gallon. The tax is a 5¢ cut from the 11¢ per gallon presently imposed on gasoline.

The bill will have the effect of reducing the cost and promoting the use of gasohol.

Category Proposed Legislation

State MI

Project Name Tax Incentive
(Gasohol)

Organization Michigan State Ser

Address State Capitol
Lansing, MI 48913

Contact State Senators Corbin
Allen, Ross and Dinello

Telephone (517) 373-1636

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

House Bill No. 4076.

This bill exempts from State use tax consumption for use rather than resale of electricity, natural gas, artificial gas, or steam. The bill encourages user generation of energy by exempting such energy from State tax.

Category Proposed Legislation

State MI

Project Name Tax Incentive (Use)

Organization Michigan State House
of Representatives

Address State Capitol
Lansing, MI 48913

Contact State Representative
Montgomery

Telephone (517) 373-0587

Funded By not applicable

Cost not applicable

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Extension Service (EES) focuses on public education, consumer affairs, federal-state relations, and encouraging community efforts to help Michigan residents and small businesses conserve and use energy efficiently.

The Michigan EES sponsored a pilot program that ended in September of 1979. The program was comprised of four areas of activity.

One was the Youth Energy Education Project; designed to raise the energy consciousness of high school students and their families through teacher workshops and experiences for the students. 50,000 students were involved throughout the state.

Second was the clearinghouse. It provides literature, curriculum guides and a toll-free, state-wide "Energy Hotline" telephone service.

Third was the special project grant monies which help develop evaluation tools for instructors and administrators using energy-education curricula in their schools.

Fourth was an EES contract to train small businesses in management. The seminars took place in Detroit and eight surrounding counties. Technical assistance visits followed-up the seminars.

Critique/analysis: Participants were satisfied by the services they had received. Michigan EES is hoping for a new grant to run similar programs in 1980-1982.

*The Michigan Energy Extension Service (EES) was one of ten nation-wide pilot EES programs funded by the Department of Energy to promote energy conservation.

Category State
State MI
Project Name Energy Extension Service

Organization Michigan Energy Extension Service

Address Box 30228
Lansing, MI 48909

Contact Dennes J. Sykes

Telephone (517) 373-0480

Funded By D.O.E.

Cost \$1.1 - 1.5 million

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Consumers Power, largely concerned with generating electricity and distributing natural gas, now has eight service representatives located throughout the state to advise customers with questions concerning solar energy.

The solar service representatives strongly encourage solar design of new housing to help conserve the diminishing supply of traditional fuels. The representatives are also monitoring existing solar systems throughout the state to provide hard data on the effectiveness of solar in Michigan.

The utility also presents lectures and slides on solar energy to any group interested.

Category Utility
State MI
Project Name Consumers Power

Organization Consumers Power Company

Address Jackson, MI 49201

Contact Eugene Yehl

Telephone (517) 788-0550

Funded By Consumers Power Company

Cost n/a

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Detroit Edison's demonstration project, a residential two-story building, utilizes 11 solar collector panels for space and water heating. Water is heated in the collector and transferred through tubes to a storage tank in the basement. Heated water is pumped from the storage tank to a heat exchanger, from which heat is transferred to air and then distributed by a fan in the ductwork throughout the house.

A heat pump is used as a back-up. Twenty to thirty percent of the water-heating requirements are met with this system.

Category: Utility
State: MI
Project Name: Detroit Edison Solar Demonstration

Organization: Detroit Edison

Address: 17075 White Haven Dr
Northville Township,
MI 48617

Contact: n/a

Telephone: n/a

Funded By: Detroit Edison

Cost: n/a

Congressional District: II

Compilation Date: February 1980

Renewable Resources— A National Catalog of Model Projects

Category Utility
State MI
Project Name Wolverine Electric
Co-op

Organization Michigan Dept. of
Natural Resources
Address Forest Mgt. Division
Box 30028
Lansing, MI 48909
Contact John Keen
Telephone (616) 373-1275

Funded By Consumers Power of
Jackson, Wolverine
Electric, Morbank
Industry, Inc.

Cost \$40 million

Congressional District X

Compilation Date February 1980

Plans for a wood-fired electrical power plant are underway in Osceola County near the town of Hersey. The plant would produce 25 megawatts of power. Wolverine Electric Co-op, presently using electric service generated from oil and natural gas, would use the power from the wood fired plant.

Environmental impact and socio-economic studies indicate that the new plant would double the tax base of the township, increase employment in construction and operating positions, and lower wood-hauling costs. The cutting of trees would also benefit wildlife habitats.

Wood contains minimal amounts of sulphurous oxides and won't pollute like coal and oil. The main pollutant from wood is carbon particles and some exhaust heat.

Dead and decaying wood and slash (branches, tops, chips) on public lands will be used to fuel the plant. Under a ten-year contract with the Michigan Department of Natural Resources Wolverine can assure its customers an adequate fuel supply.

The plant should come on-line in 1984.

Renewable Resources— A National Catalog of Model Projects

Dr. Min Yew, in charge of Electric Car Research at General Motors Research Division, has been working on large alkaline storage batteries. Currently, Dr. Yew has developed a battery that powers a car for a 30-mile range. Dr. Yew states that a large amount of further research must be done before the car and its batteries are marketable. But, he believes, breakthroughs in terms of extending the driving range and minimizing the time needed to recharge the batteries are both near.

Category Education
State MI
Project Name General Motors Battery Research

Organization General Motors

Address GM Technical Center
Warren, MI 48090

Contact Dr. Min Yew

Telephone (313) 575-1123

Funded By n/a

Cost n/a

Congressional District XVIII

Compilation Date February 1980

MINNESOTA

1. Applevalley
2. Becker
3. Blue Earth
4. Brook Park
5. Buffalo Lake
6. Detroit Lakes
7. Duluth
8. Fridley
9. Hibbing
10. Lakeland
11. Maple Plain
12. Marshall
13. Minneapolis
14. Moorhead
15. Red Wing
16. Rosemount
17. Roseville
18. St. Cloud
19. St. Croix
20. St. Louis Park
21. St. Paul
22. Staples
23. Valley
24. Waverly
25. Webster

MINNESOTA

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Renewable Resources— A National Catalog of Model Projects

In July of 1979, three faculty members of Minnesota's Southwest State University, established a toll-free alcohol fuels information center.

Prior to the opening, the three scientists attended a crash-course on alcohol fuel production, sponsored by the Colby Community College and Alternative Energies, Ltd., of Colby, Kansas. Instructors included a distilling expert from the brewery industry, an expert in engine design, and representatives of the Federal Bureau of Alcohol, Tobacco and Firearms, and the National Gasohol Commission.

Besides answering questions and providing information, the three teachers are interested in collecting information about work going on in the alcohol fuels field and in referring callers, when appropriate, to one another.

Although the program is only funded through April of 1980, an extension is being sought in order to establish a longer-term information service.

Category	Agricultural
State	MN
Project Name	Alcohol Fuels Information Hot Line
Organization	Alcohol Fuels Information Center
Address	Southwest State Univ. Marshall, MN 56258
Contact	Alvin Rusk
Telephone	Minnesota 800-622-5234 (toll- free) 800-533-5333
Funded By	Department of Energy (DOE)
Cost	\$10,000
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

A chemical-engineer-turned-farmer is utilizing about 5 percent of his crop residue to dry his entire 16,000-bushel corn crop. Greg Wieweck designed, built and patented a heating unit that burns cornstalks (95 percent are left in the field), bean stalks and wheat straw.

Wieweck reports a \$1,000 savings on fuel costs last year. This biomass fuel has replaced 100 percent of the gas formerly used to dry his corn crop.

Category Agricultural
State MN
Project Name Biomass System

Organization Greg Wieweck
Address R.R. 2
Buffalo Lake, MN
55314
Contact Greg Wieweck
Telephone (612) 833-2233

Funded By Owner
Cost \$2,000 plus labor
Congressional District VI
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Al Rutan has completed the construction of a combined energy system consisting of a greenhouse and methane digester for a farmhouse near St. Cloud.

The two-story addition, attached to the barn and incorporated as part of the barn structure, houses a solar greenhouse and a methane digester on the first level. The second story features another level of greenhouse space, a toilet, shower, tub, basin, and (in the floor between stories) the storage tank for the solar-heated water for use in the bathroom. The toilet (a 2-quart flush marine-type fixture) is positioned over the "fill" end of the methane digester below. The human wastes, animal manure and necessary vegetable matter will manufacture 300-400 ft³ of methane gas per day for use in the house for cooking, water heating, and space heating. The warm water needed for the methane process will be the "grey water" from the bathroom above--that is, the water used for bathing.

The floor of the lower level of this addition is two feet below grade. It is well insulated and carefully lined and sealed with fiberglass to produce a rodent-free enclosure. The floor will receive heat through the glazing on the south wall during the day and store it for night-time warming of the greenhouse area. This will also maintain the necessary warmth surrounding the methane digester. A system of concentrating collectors inside the glass on the lower level will provide heat for the bath water and cause it to rise to the storage tank suspended in the ceiling.

A system of moveable insulating shutters will cover all glass areas at night.

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Category	Agricultural
State	MN
Project Name	Combined Energy System

Organization	Rutan Research
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Address	P.O. Box 3585 Minneapolis, MN 55403
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Contact	Al Rutan
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Telephone	(612) 874-7812
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Funded By	Minnesota Energy Agency & Personal funds
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Cost	\$20,000
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Congressional District	VI
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Lance Crombie, a farmer, scientist, and inventor, put his academic training to practical use and built a solar still that produces 20 gallons of 190-proof alcohol each sunny day. The alcohol is used as fuel on his farm and, after further refining, can be used in making gasohol.

Crombie's first still was confiscated by local authorities, but Crombie has obtained the necessary license from the Federal Bureau of Alcohol, Tobacco and Firearms, and he has built a second still of improved design, which is now operating.

Work on the solar still has led Crombie to design and build a completely automatic, continuous-flow alcohol plant that will produce approximately 200 gallons per day, 330 days per year, using grains and field wastes.

Crombie has published a booklet, Making Alcohol Fuel - Recipe and Procedure, (available from Rutan Publishing, P.O. Box 3585, Minneapolis, MN 55403), which covers the necessary steps for making alcohol fuel. Included are description of how to build a still, how to make it work, and how to obtain an experimental permit from the Bureau of Alcohol, Tobacco and Firearms. The booklet also contains information on where to obtain and how to use enzymes for converting both cellulose and starch grains to alcohol.

Category Agricultural

State MN

Project Name Crombie Solar Still

Organization Crombie Farms

Address Route 1.
Webster, MN 55088

Contact Lance Crombie

Telephone (507) 652-2804

Funded By Lance Crombie

Cost \$1,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A 1978 Plymouth Horizon being driven around Minnesota is pulling a trailer carrying an alcohol still. The car burns only alcohol made from beets, corn and other grains, produced by the still.

For less than \$200, the car was adjusted to run entirely on the home-made fuel (although a small amount of gasoline is used just to start the engine).

The demonstration still can operate on solar power (from concentrating collectors) or on wood, corncobs, or methane gas, depending on where it is parked and what kind of fuel is available. Under continual operation, the still can produce five gallons of alcohol per day. A small boiler, designed to heat mineral oil, carried in an 80-gallon tank on the trailer, provides the process heat for the distilling. Al Rutan, the designer, displays the still, and the modifications made on his car, at fairs and energy shows.

Category	Agricultural
State	MN
Project Name	Rutan Research

Organization Rutan Research

Address : P.O. Box 3855
Minneapolis, MN
55403

Contact Al Rutan

Telephone (612) 874-1306

Funded By Al Rutan

Cost	\$2,000
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Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Tom Griffin of the Natural Resources Corporation is demonstrating that a farm windmill can provide electricity for a household and produce excess electricity to feed into the Rural Electrification Association (REA) grid.

Griffin is installing a Jacobs-type wind generator on a 35-foot tower near the house and a synchronous inverter in the home of Cannon Falls farmer Merle Tate. The inventor, placed on the wall next to the fuse box, turns direct current into alternating current and sends it into the house for use, or into the commercial power line for sale to the utility.

The windmill will start up in an eight mph breeze and operate best in a 20 mph wind. Griffin expects it to produce an average of 450 kilowatt hours per month, meeting the Tate family's needs, and feeding power into the REA grid.

Cooperative Power Association, (REA) utility in Cannon Falls, has agreed to provide, install, and monitor necessary metering equipment and to pay Merle Tate 2.1¢ per kilowatt hour for his excess power.

Category Agricultural
State MN
Project Name Wind Power for Farm Use

Organization Natural Resource Corporation
Address 7232 Boone Ave., N
#14
Brooklyn Park
MN 55428
Contact Tom Griffin
Telephone (612) 535-4132

Funded By Community Services Admin. (CSA) & DOE

Cost \$17,750

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The City of Red Wing, home of Red Wing Shoes, and S.B. Foote Tannery, supplier of leather for the shoes, will soon be the joint beneficiaries of a trash-burning plant.

Energy for the Tannery traditionally has been provided by increasingly scarce gas or oil-generated steam; and the city and surrounding townships are in need of a new landfill for municipal solid waste. A mutually beneficial solution to both problems has resulted in the authorization to call for bids for a trash-burning plant to be built and operated by the city. The plant will provide between 50 and 60 percent of the steam needed by the Tannery. It will be adjacent to the Tannery and will sell be the steam at a reasonable price. Thus, the Tannery will be able to slash its use of fossil fuels, and Red Wing and the surrounding townships will not have to find a new landfill site and haul trash long distances for disposal.

Critique/analysis: Public acceptance of the plan has been enthusiastic. Early planning stages of the project were funded by the City of Redwing and by a Technical Assistance loan from the Minnesota Department of Economic Development.

Category Cities
State MN
Project Name Trash-burning Plant

Organization City of Red Wing
Address Red Wing, MN 55066
Contact Dean Massett
Telephone (612) 388-6796

Funded By City and State
Cost \$1,500,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1978, Control Data Corporation consolidated its parts and distribution warehouse and support functions into one energy-conserving facility.

The 260,000 sq. ft. building obtains approximately 74 percent of its summer cooling, 55 percent of its winter heat, and most of its domestic hot water needs from 25,200 ft² of concentrating collectors. Four 20,000-gallon steel storage tanks are used for storing the solar heat and reclaimed heat from the building.

The building has other energy-conserving features, including earth-bermed walls and a minimum of exterior glass. Thermal mass is provided by the precast concrete floors, columns, walls and roof.

The annual energy consumption during the first year of operation was 55,000 BTU/ft.² per year, which is one-third of the maximum now allowed by new government regulations.

Category Commercial
State MN
Project Name Earth-bermed Office Building

Organization Control Data Corporation
Address World Distribution Ctr.
304 North Dale St.
St. Paul, MN 55103
Contact Rod Sall
Telephone (612) 292-2348

Funded By Control Data Corporation

Cost \$8,000,000

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Commercial

State MN

Project Name Honeywell Office Building

Organization Honeywell, Inc.

Address Honeywell Plaza,
Minneapolis, MN
55404

Contact Steve Scarborough

Telephone (612) 378-4758

Funded By Honeywell, Inc.

Cost \$2,100,000

Congressional District V

Compilation Date February 1980

In December of 1978, a solar energy system using 20,250 square feet of concentrating collectors was located on the roof of a Honeywell parking ramp. The installation, one of the largest of its kind in the world, is expected to provide all of the energy needed for the building while the sun is shining. The system heats and cools the air, and heats the hot water for the adjacent 8-story office building.

Parabolic trough collectors track the sun, and concentrate its energy to heat a special heat transfer oil to a temperature of 350 degrees. Heat is stored or transferred directly from the collectors to the building's heating, cooling, or hot water systems.

Automatic controls start and stop pumps, operate control valves through pneumatic-electric switches, and sense temperature fluctuations of fluids within the system to optimize operation.

Critique/analysis: Extensive data collection is being carried on by Honeywell, and performance has conformed to expectation (65 percent of total energy requirements).

Renewable Resources— A National Catalog of Model Projects

The 250-room Radisson Hotel, under construction in the center of downtown St. Paul as part of an ambitious center-city redevelopment project, will be equipped with solar collectors.

The south side of the 16-story tower will feature solar collectors from the third-floor level to the top. The collectors will comprise two separate systems. The lower section contains 4,065 ft² of liquid-type, flat-plate collectors, placed at an angle. This system will heat water for the lower three levels of the hotel, which include restaurants and service areas.

The second system consists of 2,880 ft² of vertical collectors. It will be used to heat the hotel rooms and the hot water for the guest bathrooms in the tower.

Category Commercial

State MN

Project Name Radisson
Solar Hotel

Organization Radisson Plaza-
St. Paul

Address 7th and Cedar St.,
St. Paul, MN
55101

Contact Dennis Behrendt

Telephone (612) 540-5500

Funded By DOE & NASA

Cost \$360,000 (solar
only)

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Adjacent to the manufacturing plant of Telex Communications, Inc., is an array of solar collectors the size of a football field. This hot water system provides 70 percent of the heat for Telex's 94,000-sq. ft. building.

Hot water flows from the collectors to a 20,000-gallon storage tank and to heating coils installed at existing air-handler units. Thermostats automatically open a valve to the hot-water coils when space heating is required and close the valve when the demand has been satisfied.

Existing electric space heaters supplement the solar unit when necessary.

Telex is cooperating with the Department of Energy to collect information on the system's performance.

Category Commercial

State MN

Project Name Telex Solar Building

Organization Telex Communications, Inc.

Address West 1st St.,
Blue Earth, MN
56013

Contact Phil Phelon

Telephone (507) 526-3205

Funded By Telex Communications, Inc., &
DOE

Cost \$522,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A 400 square foot solar collector system now provides much of the heat needed to keep the main lodge at Camp Shawondasee warm throughout the winter.

A joint effort of the Camp Fire Council and the Region IV Environmental Education Council of the Minnesota Environmental Education Board made available the funds needed to winterize the lodge. Winterization measures included a woodstove in the basement for heat, a fireplace designed for heating efficiency in the main meeting room, full insulation, and storm windows. Following these winterization efforts, the collector system was installed. Thermal storage is located in a rock bin under the kitchen floor.

The lodge is used jointly by the Camp Fire Girls and the Environmental Education Council for recreational and educational programs.

Category Community
State MN
Project Name Camp Shawondasee

Organization Lake Agassiz Camp Fire Council

Address 824 Center Ave.,
Moorhead, MN
56560

Contact Dianne Wray

Telephone (218) 236-1090

Funded By DOE (At Small Grants Program)

Cost \$3,300

Congressional District VII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Minnesota has 28 Community Action Program organizations working to provide weatherization and energy-conservation improvements in the homes of low-income residents, including the elderly.

Some CAP energy directors have secured special grants and contracted with local solar installers for the application of renewable energy systems in rural and small-town settings.

CAP contracts have resulted in the installation on previously CAP-weatherized homes of several vertical wall collectors, a solar greenhouse converted from a porch, and many solar hot water heaters.

The Ottertail-Wadena Community Action Council has built 15 solar greenhouses in conjunction with a two-year vocational-technical school training and marketing program.

Many CAP contractors also serve as resource people for energy workshops held around the state by educational and community groups.

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Category	Community
State	MN
Project Name	Community Action Programs (CAP)

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Organization	Community Action Programs (CAP)
Address	Mahube Community Council 518 Summit Ave. Detroit Lakes MN 56561
Contact	Jim Kooyer
Telephone	(218) 847-9252

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Funded By	Community Services Administration (CSA) & Special Grants
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Ottertail-Wadena Community Action Council and the Detroit Lakes Area Vocational Training School are cooperating in the administration of a grant to build 12 solar greenhouses for food and plant production in rural areas.

The free-standing, 200 ft² greenhouses are paid for and built by the participants, with the assistance of Jim Wylie, project manager. The greenhouses cost approximately \$5 per sq. ft. Auxiliary heat is provided by a hot water system that is powered either by propane, wood, or natural gas.

The focus of the program is food production for marketing of the produce increased farm income. This aspect of the program is being monitored very closely. Progress reports are updated weekly.

Upon completion of the program, participants will own the greenhouse, and will have learned about solar heating, greenhouse agriculture, and marketing.

Category Community
State MN
Project Name Greenhouse Project

Organization Ottertail-Wadena
Community Action
Council/Detroit
Lakes Area Voc. School
Address Detroit Lakes
MN, 56501

Contact Jim Wylie

Telephone (218) 847-3129

Funded By State; Governor's
Rural Development
Council

Cost \$10,728 + building
materials

Congressional District VII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Hennepin County taxpayers will be relieved of some fossil-fuel costs in their Park Reserve District operations in the future. The recently completed maintenance shop is the first of several planned buildings in the Hennepin County Park Reserve District program designed to reduce energy consumption and thus cut operating costs.

Energy-conserving measures incorporated in this project include the use of six inches of fiberglass wall insulation and twelve inches of fiberglass roof insulation, earth sheltering of the building on three sides, and a conservative, but effective use of window areas. Mechanical heat recovery from exhaust air, a dual-fuel furnace, and flat-plate solar collectors will provide a portion of the building's space-heating and domestic hot water requirements.

The District nursery is presently being developed in the Crow-Hassan Park Reserve; and the equipment storage and refrigerated storage buildings are nearing completion. The four-building complex will be enclosed on three sides by a coniferous windbreak to reduce wind-chill on the buildings (which will be oriented around a south-facing courtyard.)

Plastic roof panels integrated into the metal roof deck of the unheated equipment storage building will provide most of the lighting in this building, with fluorescent fixtures being used only on heavily overcast days or for task lighting. Economizer refrigeration cycles have been included in the refrigerated storage building, which will accommodate nursery root stock in a dormant state.

In the future, greenhouses recessed, to take advantage of earth-insulating values, will be located on the site. All light and solar heat will enter the space solely through the fiberglass glazing panels on the south roof faces. Solar energy will be stored in the

Category	Community
State	MN
Project Name	Hennepin County Park Reserve

Organization	Hennepin County Park Reserve District
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Address	P.O. Box 296 Maple Plain, MN 55359
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Contact	John Oehlke
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Telephone	(612) 473-4693
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Funded By	Hennepin County
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Cost	\$340,000
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Congressional District	VI
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Compilation Date	February 1980
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masonry mass of the building walls, as well as directed into the earth-planting bed and under-floor rock-storage areas. Movable insulated shutter will close the glazing panels at night to minimize heat loss.

Renewable Resources— A National Catalog of Model Projects

In September of 1979, area planners and local governments in the seven-county Twin Cities metropolitan area received, free of charge, a publication entitled "Planning for Solar Access Protection." This advisory report (for city, township, and county governments) provides information and models for use in planning for development and protection of access to direct sunlight for solar energy systems. The report includes model solar access elements for local comprehensive plans, model zoning and subdivision-ordinance provisions. A separate appendix features a model community residential energy analysis, a discussion of legal techniques to protect solar access, and an extensive bibliography.

Planners and local governments outside the metropolitan area may purchase the report and separate appendix for a nominal cost.

Category	Community
State	MN
Project Name	Solar Planning Report
Organization	Metropolitan Council
Address	300 Metro Square Bldg. St. Paul, MN 55101
Contact	James Uttley
Telephone	(612) 291-6361
Funded By	HUD, Metropolitan Council
Cost	n/a
Congressional District	I-VI; VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Community
State MN
Project Name Solar Greenhouse

The Minnesota Energy Agency recently awarded the Twin Cities Tree Trust \$10,000 to construct a solar greenhouse. The Trust is a private non-profit corporation dedicated to preserving and providing education, training, and employment to Twin Cities youth and other unemployed individuals.

The greenhouse will be used to start seedlings for later transplanting to nurseries, and eventually to metropolitan-area neighborhoods where Dutch elm disease and other losses have made reforestation necessary. The solar-heated greenhouse was built adjacent to an identical structure heated by conventional means. Monitoring will provide comparative data on the two systems.

The solar system is an active water system utilizing a large plastic collector and storage of solar-heated water in the floor of the experimental greenhouse. The 675 ft² collector is made from five layers of ultraviolet resistant polyethylene. The front of the collector is an envelope formed by two layers of clear polyethylene inflated by a small electric fan. The back of the collector is also an inflated double polyethylene envelope. Sandwiched between these two clear envelopes is a single layer of black polyethylene. Water is pumped over the black plastic and collected in a gutter at the collector's base. This heated water drains into the greenhouse floor, which is lined with heavy plastic and filled with 12 inches of gravel. This large volume of stored warmed water (approximately 2,500-gallons for a greenhouse 22' X 30' in size) heats the greenhouse throughout the night.

Organization Twin Cities Tree Trust
Address 4100 Vernon Ave.,
S, St. Louis Park
MN 55416
Contact James Halquist
Telephone (612) 920-9326

Funded By Minnesota Energy Agency

Cost \$12,000

Congressional District V

Compilation Date February 1980

In the morning when the water has cooled, it is circulated from the storage pool through the collector, where it is heated and stored for that night's heat requirements.

Recently a 100,000-gallon storage tank was donated to the trust. Plans are being made to incorporate the tank into the existing system and, thus, to make increased use of the solar collectors (which normally stand idle in the summer and can now be used to collect additional heat for wintertime use.)

Renewable Resources— A National Catalog of Model Projects

The Wildwood Living/Learning Center, operated by the Beech family, is dedicated to helping families, groups, and individuals reassess their lifestyles. They host low-cost conferences and offer coordination and/or assistance with workshops on home-built solar systems, solar and electric food-drying, and simple living and energy conservation.

Other projects undertaken by the Beech family include the construction of a solar greenhouse, using mostly recycled materials. Built by Beech and his two sons, the 12' x 22' greenhouse provides food for their own use as well as for sale in the local food co-op.

The design includes water storage for direct solar heat, homemade solar panels for the space heating system, and a gas furnace for back-up energy.

During the winter of 1980 a series of workshops will cover the construction and operation of the greenhouse.

Food crops started in the greenhouse and transplanted outdoors in the spring have a much needed headstart in Minnesota's short growing season.

The Beech family and several community residents have also begun a solar alcohol fuel-production project. They secured the necessary permits for alcohol production and are designing an alcohol fuel distillation and distribution system. If the still is successful, each member family involved will receive some of the fuel produced, as well as share any profits from the sale of the fuel.

Category	Community
State	MN
Project Name	Wildwood Living/ Learning Center

Organization	Wildwood Living Learning Center
Address	Route 1, Becker, MN 55308
Contact	Bob Beech
Telephone	(612) 263-3203

Funded By	Beech family
Cost	under \$300 (greenhouse only)
Congressional District	VI
Compilation Date	February 1980

Prospective members are now growing corn and potatoes for conversion to alcohol and will experiment with other grains and root crops to determine which are the most efficient the process and which grow better in the soil of the Becker area. Since potatoes --- a major crop in the area, plans are being laid for utilizing the rejects from the potato harvest.

This fuel production/distribution plan, now being sponsored by Wildwood Center, will become independent when the cooperative is finally organized. The service area will be a 25 square-mile rural area around Wildwood.

Renewable Resources— A National Catalog of Model Projects

Several years ago, a 50-year old house in the inner city of St. Paul was weatherized and solarized. The project began as a cooperative effort between the Science Museum of Minnesota and the University of Minnesota at St. Paul. Private donations of materials, money, and expertise combined to develop a demonstration project of building insulation, water conservation, door and window weatherstripping, fireplace rehabilitation, landscaping, and solar energy.

Two separate collector systems meet the hot water and space-heating requirements of the building.

An attached greenhouse supplements the space heating and provides food. A Clivis Multrum waste system uses the vegetable waste from the greenhouse and from the kitchen and outdoor garden, along with human wastes. In turn, it provides fertilizer for the lawns, trees and flowers.

Critique/analysis: The project has proven to be a valuable educational tool for the community; many tours have been conducted through the house, both during the renovation and following completion. It demonstrated some of the problems and solutions involved in changing from traditional heating and energy use to energy conservation and alternatives for the average homeowner. Recently, Ouroboros East was sold to a private individual who will occupy the house and continue the work begun by the University and the Museum.

Category Education
State MN
Project Name Demonstration Home

Organization Ouroboros East
Address 1020 Laurel Avenue
St. Paul, MN 55104
Contact Susan Loitz
Telephone (612) 227-1883

Funded By State Sci. Museum
of MN & Univ. of MN

Cost n/a

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1976, under a grant from the U.S. Department of Health, Education and Welfare, citizens and teachers in the Staples school district began a three-year effort to devise an energy-conservation curriculum for use in the public schools. Additional funds were granted by the Minnesota Energy Agency. The working task force was then expanded to represent a six-county area in central Minnesota.

After writing, revising, trial-teaching, more revising and editing, the task force published the program for grades kindergarden through twelve. It is now in use in the Staples school district and is offered for sale (at cost) to any interested person. Prices and information are available from the Energy Office, Independent School District 793, Staples, MN 56479.

In addition, the Regional Energy Information Center (REIC) has been established in the school district to serve that portion of the state. The center is one of three REIC's in the state, all of which are funded by Federal funds channelled through the Minnesota Energy Agency. Its aim is to provide consumer information.

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Category	Education
State	MN
Project Name	Energy Conservation Curriculum

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Organization	Staples Energy Conservation Program
Address	Chicago Ave. & 5th St., N.E. Staples, MN 56479
Contact	Ray Gildow
Telephone	(218) 894-2430 ext. 146

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Funded By	Minnesota Energy Agency (MEA), & HEW
Cost	\$28,600+, 1979-80 budget
Congressional District	VII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In early 1976, the University of Minnesota launched its first environmental design competition. Huldah Curl, prime mover behind the idea, sought to integrate into one competition the building professionals, the environmentalists, and the maverick improvisers. The competition, so successful, was repeated in 1979. Project entries comprised the entire range of energy uses -- from residential design and re-design, to farming, industry, transportation, planning and education.

Although entries were judged in two sections (one for registered architects, planners and engineers, and one for everyone else), prizes were awarded with no regard for professional status. In the competitions, an impressive group of consultants and judges representing the fields of education, business, architecture, research, government, and grassroots organizations examined a range of entries "from grandiose to miniscule, visionary to nuts and bolts, professionally elegant to grubby but determined."

Six \$1,000 cash prizes were awarded in the 1977 competition, along with a number of merit awards. A total of \$3,500 in cash awards was made in 1979, and several entries received honorable mention. Prize money was provided by the Minnesota Energy Agency and by several Minnesota corporations and foundations.

A descriptive catalog of each year's competition is available from the Office of Continuing Education in the Arts.

Category Education
State MN
Project Name Environmental Design Competition

Organization University of MN;
MN Society, Amer.
Inst. of Architects
Address Cont. Ed. in the Arts
320 Westbrook Hall
University of MN
Minneapolis, MN 55455
Contact Huldah Curl
Telephone (612) 373-4947

Funded By Univ. of MN, MN Soc.,
Amer. Inst. of Arch.,
private foun. & corp.
MN Energy Agency

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A 22,000-gallon buried water tank air conditions the home of engineering professor, Tom Atchinson. The ice air conditioning system, funded three years ago by the Minnesota Energy Agency, saves the winter cold by means of a water glycol solution circulating between the underground tank and outside heat exchange coils, slowly freezing water in the tank.

In the heat of summer, this block of ice serves as a cooling source to air condition the house. Cold anti-freeze is circulated through the chiller coil, which cools and dehumidifies the air in the ventilation air duct, and the ice slowly melts to water, to be frozen again the following winter. The only energy required is that for the 1/10-horsepower circulating pump—less than one-percent of the energy required to power a conventional air conditioner.

The work is being carried out by students in the Mechanical Engineering Department and the Underground Space Center of the University of Minnesota, Minneapolis campus.

Category Education
State MN
Project Name Ice Air Conditioning System

Organization University of MN
Underground Space
Center
Address 11 Mines & Metallurgy
Bldg. 221 Church St., S.E.
Minneapolis, MN 55485
Contact Charles Lane
Telephone (612) 376-5342

Funded By Minnesota Energy
Agency

Cost \$26,000

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Minnesota Environmental Education Board (MEEB) cooperates with groups and individuals throughout the state to provide energy education. It sponsors workshops, seminars, curriculum development, and other activities. It serves groups both within and outside the educational system.

Thirteen regional councils work with local groups to respond to localized needs and interests. The regional councils, the metropolitan area task forces, and the state board determine the year's priority issues and plan programs around these themes.

The "Solar Olympics" is one innovative program planned by the MEEB. Its purpose is to expose students and teachers to practical solar energy experience. Interested students, under teachers' guidance, will compete on a regional basis by designing and building solar collectors. A limit on expenditures will be imposed, and entries judged according to how fast they heat a given amount of water in a given period of time. Care will be taken to insure equal sun conditions throughout. Awards will be granted for unique designs.

Category	Education
State	MN
Project Name	Minnesota Environmental Education Board
Organization	Minnesota Environmental Education Board
Address	Box 5 Centennial Ofc. Bldg. St. Paul, MN 55155
Contact	Karen Loechler
Telephone	(616) 296-0212
Funded By	State of Minnesota
Cost	\$254,000 annual budget
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Ouroboros South Project is an ongoing experiment in alternative living and low-impact technology. Conceived by Professor Dennis Holloway and his Environmental Design class at the University of Minnesota, the house is one of the earliest full-scale working experimental dwellings that combines energy-conserving experiments with sensitive architectural design. Work was done by University students and donations in cash and materials have been made by 50 Minnesota corporations, foundations, and institutions.

The house was built to emphasize energy conservation, climate, orientation, the use of indigenous materials, the use of renewable energy sources, and low-impact technology. Historical architecture provided the design for several aspects of the house (orientation, post and beam construction, saltbox design, sod roof, natural ventilation, and vestibules).

An elevated knoll berms two-thirds of the house and is an important factor in energy conservation. The roof slants to the ground on the north; it is covered with six inches of sod and is important in providing coolness in summer and preventing heat-loss in winter. The south wall is 50 percent glass, and it maximizes the sun for winter heat.

A greenhouse, adjacent to the south side, provides a protective barrier from winter winds. It captures additional solar energy, which is stored in black-painted water drums that slowly release the warmth into the greenhouse at night. A 8-collector system heats water, which is stored in three 350-gallon tanks in the center of the house. Because the house has an open-floor plan, this "central heating system" passively radiates heat without the use of perimeter heating.

The Electrical Engineering Department of the University will soon install a wind system on the site. The generator will have a peak

Category	Education
State	MN
Project Name	Ouroboros South Project
Organization	University of Minnesota, Ouroboros South Project
Address	Rosemount, MN 55068
Contact	R. Scott Getty 77 Pleasant St., S.E. Minneapolis, MN 55455
Telephone	(612) 373-5170
Funded By	University of Minnesota, Minnesota Energy Agency, and others
Cost	\$85,000
Congressional District	I
Compilation Date	February 1980

output of 3 kilowatts in a 25-mph wind. It will provide both hot water and space heating.

A Clivus Multrum waste system in the house keeps water usage down, disposes of food and human wastes, and provides fertilizer to be returned to the yard and garden.

Tours of the Ouroboros South Project may be arranged by calling or writing Scott at the address given.

Renewable Resources— A National Catalog of Model Projects

The Red Wing Area Vocational-Technical Institute has developed an Energy Education Center. Although the Center is multidimensional in its programming, major activities are associated with career programming. The following career programs are or will be offered in 1980: air conditioning, heating, refrigeration and related solar technology; energy management and conservation technology; and solar energy technology. Course material also covers wind energy systems, alternative energy information, and biomass-conversion technology.

Seminars and workshops, adult education, consultant services, teacher training, courses for high school students, courses for credit at area universities and colleges, and agricultural application of alternative sources of energy are also being developed.

The Red Wing Energy Education Center will be located on a 300-acre estate near Red Wing. Red Wing voters approved a \$1 million local expenditure to develop the Center. In addition, the state will contribute \$1,000,000 towards this project.

Category	Education
State	MN
Project Name	Red Wing Energy Education Center
Organization	Energy Education Center/Red Wing Area Vocational-Tech. Inst.
Address	Red Wing, MN 55066
Contact	Edward Dunn Pat Enz, Mgr.
Telephone	(612) 388-8271 (Inst.) (612) 388-3594 (Center)
Funded By	City of Red Wing & Minnesota Dept. of Education
Cost	\$2,000,000 +
Congressional District	I
Compilation Date	February 1980

The St. Paul Local of the Sheet Metal Workers Union offers, on a regular basis, a solar training program for journeyman sheet-metal workers. Held at the St. Paul Area Vocational-Technical Institute, the program offers instruction in both the theory and installation of solar systems. Classes are regularly filled to capacity.

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1975 the Minnesota Legislature gave the Minnesota Housing Finance Agency authority to provide grants and low-interest loans to qualified homeowners for home improvements. While many weatherization projects have been financed by MHFA and by similar institutions in other states, this Minnesota Agency stands out: it is particularly supportive of solar energy development, providing financing for solar domestic hot water and space heating.

Low-interest loans (from 1 to 8 percent), FHA-insured, available to qualified applicants earning less than \$16,000 per year, can be used for energy-saving improvements such as insulation, storm windows, wood furnaces, and the purchase and installation of (FHA approved) solar equipment for space or water heating.

For qualified applicants earning less than \$5,000 per year, grants of up to \$5,000 are available to correct defects in a home's energy usage, safety, and habitability.

Category Financing
State MN
Project Name Minnesota Housing
Finance Agency
(MHFA)

Organization Minnesota Housing
Finance Agency
(MHFA)

Address 333 Sibley St.,
St. Paul, MN
55101

Contact Mary Tingerthal

Telephone (612) 296-7615

Funded By State
appropriations &
sale of tax exempt
revenue bonds

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Carpentry students at the Willmar Area Vocational-Technical Institute (WAVTI) have completed the construction of an earth-sheltered home.

The project, made possible by an award from the Minnesota Housing Finance Agency's design competition, was completed, opened to the public and sold to a Willmar physician. Monitoring of the energy system is being done by the University of Minnesota's Underground Space Center.

Eighty percent of the walls and roof area are underground, and 47 percent of the yearly heating requirements will be met from passive solar gain stored in the concrete structure. A standard forced-air heating system is provided for back-up.

Two classes of carpentry students were involved in this project. Some of these students will also build an energy-efficient above-ground house in the coming year.

Category	Housing
State	MN
Project Name	Earth-sheltered Home
Organization	Willmar Area Voc.-Tec. Inst./MN Housing Fin. Agency
Address	WAVTI- P.O. Box 1097 Willmar, MN 56201 MHFA-333 Sibley St. St. Paul, MN 55101
Contact	Mike Cullen-WAVTI Mary Fingerthal-MHFA
Telephone	(612) 235-5114-WAVTI (612) 296-8844-MHFA
Funded By	State
Cost	\$90,000
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Members of the Seward Community in South Minneapolis are benefitting from the use of solar energy. The project, being completed by Redesign, Inc., a neighborhood-based non-profit housing development and management corporation, involves the construction of 12 connected earth-sheltered townhouses. The project began as an entry in the Minnesota Housing Finance Agency's (MHFA's) earth-sheltered housing demonstration competition.

The townhouses will utilize passive solar heat collection on both upper and lower levels. A solar collector system supplements space - and domestic water-heating needs. The solar collectors, which stretch the entire length of the 12-unit structure, rest on an overhang that shades the first-floor windows during the summer. Excessive heat gain and night-time heat loss will be minimized by mechanically operated insulating shutters.

Insulation from summer heat, winter cold, and constant freeway traffic noise is provided by the earth sheltering.

Seward West Redesign obtained the site, a narrow strip of land adjacent to Interstate Highway 94, which was considered undevelopable by most standards. Redesign has taken the role of a "developer of the last resort" by submitting proposals for the development of housing on specific properties when no other developer does so. All of its proposals are reviewed by the resident-controlled Project Area Committee.

table
Category	Housing
State	MN
Project Name	Earth-sheltered Townhouse

table
Organization	Seward West Redesign, Inc.
Address	2202 27th Ave., S. Minneapolis, MN 55406
Contact	Ronald W. Duty
Telephone	(612) 338-6330

table
Funded By	Minnesota Housing Finance Agency
Cost	\$900,000
Congressional District	V
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

One of the projects resulting from the Minnesota Housing Finance Agency's (MHFA's) Demonstration Program is the three-bedroom park manager's residence at Camden State Park.

The structure, nearing completion, will be fully instrumented and monitored to assess the effects of earth sheltering, passive solar contribution, and conventional energy consumption. The passive solar gain and earth-sheltering, mechanical night-time window insulation on the major glass areas, and other conservation aspects will minimize heating demand. Solar collectors mounted on the roof will provide domestic water heating.

The bedrooms and living room are oriented toward the south to provide egress and receive low-angle winter sunshine. The kitchen, eating, bath, and utility areas are located on the north side of the home. A south-oriented light monitor with two large skylights provides sunlight and a sense of three-dimensional space in the kitchen and eating areas. A turbine ventilator located in the top of the light monitor draws warm air out of the top of the space in the summer to provide cross ventilation. The roof is covered with 18 inches of earth.

In compliance with a requirement of the program, the home will be opened to public view before being occupied by the park manager.

Category Housing
State MN
Project Name Park Manager's Home

Organization Dept. of Natural Resources (DNR) & MN Housing Finance Agency (MHFA)
Address Camden State Park
Marshall, MN 56258
Contact Roger Liska
Bur. of Engin. DNR
444 Lafayette Rd.
St. Paul, MN 55101
Telephone (612) 296-2119

Funded By Minnesota Housing Finance Agency (MHFA)

Cost \$64,000

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A casual observer visiting the William O'Brien State Park in eastern-central Minnesota will see the park manager's residence as a traditional split-level rambler with flatplate solar collectors on the roof. However, the retrofitted residence is equipped with an exhaustive system of sensors and monitors that feed system information continually to Huntsville, Alabama, for interpretation by NASA officials.

The project, a combined effort of several agencies and corporations, features 600 square feet of fluid-type collectors and a water thermal storage system for space and water-heating. Together they provide roughly 50 percent of the building's needed energy.

The State Department of Natural Resources (DNR) provided the park manager's residence so the project would have public visibility.

Category	Housing
State	MN
Project Name	William O'Brien State Park
Organization	MN Dept. of Natural Resources (DNR)
Address	William O'Brien State Park Marine St. Croix, MN 55047
Contact	Roger Liska Bur. of Engr'g., DNR 444 Lafayette Rd. St. Paul, MN 55101
Telephone	(612) 296-2119
Funded By	DNR, Honeywell, NASA
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Joint Strategy and Action Committee is an interfaith coalition made up of twelve denominations. Within the Committee, the Church Development Task Force involves four denominations: United Methodist, American Baptist, the Presbyterian Church in the United States, and the American Lutheran Church. Energy considerations play a large part in church construction and operation, and this committee and task force have embarked on extensive conservation projects, one of which is a survey of 200 churches in eight areas of the United States. The impact of energy costs and conservation steps taken are the topic of a report on the survey, which appeared in the December 1977 "Grapevine," the publication of the Joint Strategy and Action Committee. In this article, church members are urged to set an example of good stewardship of the earth's resources by embarking on wise energy conservation and renewable energy programs.

The work of the Church Development Task Force also includes awarding grants for the installation of solar heating systems on new churches. The American Lutheran Church grant went to the new Shepherd of the Valley Lutheran Church in Lakeland, Minnesota. Other denominations' grants have gone to congregations in less severe climates. The American Baptist Church funded a solar system for a congregation in San Ramon, California. The United Methodist Church has funded several solar projects.

The Shepherd of the Valley congregation in Lakeland attends services in a wood-frame church reminiscent of the Cape Cod saltbox house, with the north-facing roof sloping low to the ground. The south roof face supports 42 collectors, which provide warm air to the sanctuary and to the rock-bin storage area. Other areas of the church (office and classroom wings) are heated and cooled by conventional means--independently, and only as needed. The performance of this recently completed building is now being monitored.

Category Institutional
State MN
Project Name American Lutheran Church

Organization American Lutheran Church (ALC)
Address Shepherd of the Valley Lutheran Church Lakeland, MN 55043
Contact Rev. Jon Olson
Telephone (612) 436-2848

Funded By American Lutheran Church (ALC)
Cost \$31,000 (solar only)
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

All residents of Minnesota who hold a public library card may borrow circulating material from the Environmental Conservation Library (ECL) through their local libraries.

ECL's library services include reference assistance and circulation of library materials. Books, periodicals, indexes, current information services, government documents, directories, bibliographies, environmental impact statements, and curricula are available through the system.

Energy-related subjects include energy resources, environmental effects of energy production and use, alternative energy sources, and conservation.

table
Category	Institutional
State	MN
Project Name	Environmental Conservation Library

table
Organization	Environmental Conservation Library (ECL)
Address	Minneapolis Public Library, 300 Nicollet Mall Minneapolis, MN 55401
Contact	Julia W. Copeland
Telephone	(612) 372-6637

table
| Funded By | State of Minnesota & Minneapolis Public Library |

table
| Cost | \$135,000 + annual budget |

table
| Congressional District | V |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The new headquarters (office building and program center) for the Girl Scout Council of the St. Croix Valley is built partially underground. It includes passive design, flat-plate collectors, a vertical axis wind generator and a Clivus Multrum waste system.

The earth-sheltered/solar design was a dream of past Executive Director Thea Childs, who took her idea to the Board of Directors, won approval, and raised the necessary funds.

Nearly 1,300 ft² of collectors, using an ethylene glycol solution and a heat pump system, are expected to provide 65 percent of the winter heat and to help cool the building in the summer when the system is reversed. Two heat exchangers and hot water storage tanks provide domestic hot water from the same collector system.

Pipes throughout the building are color coded, as are the pipes in the mechanical room, which has an observation window.

The building site was selected with maximum solar heat gain in mind. The south-facing wall is sloped at 65 degrees, to make collecting solar energy from the low winter sun possible. Triple-glazed windows located below the solar collectors allow maximum sunlight to penetrate the structure during the winter, and the roof overhang minimizes solar gain in the summer.

Category Institutional
State MN
Project Name Girl Scout Program Center/Office

Organization Girl Scout Council of the St. Croix Valley
Address 400 South Robert St.
St. Paul, MN 55107

Contact Jane Crosby

Telephone (612) 227-8835

Funded By Grants, United Way, Girl Scout Council of St. Croix Valley & State
Cost \$1,000,000

Congressional District IV

Compilation Date February 1980

The prairie grass roof, earth berming around the building, and concrete structure create a heat sink and thermal lag for the building, which tend to stabilize the interior environment.

Visitors enter the building through an atrium spread along ramps leading to upper and lower floors (providing accessibility for the handicapped). A large fishpond provides humidity and serves as a possible food source.

Indoor plant clippings and outdoor yard cuttings provide the vegetable matter necessary for the composting action of the Clivis Multum. The compost will, in turn, be used as fertilizer for the plants.

Renewable Resources— A National Catalog of Model Projects

The Fort Snelling Branch of the Minnesota Historical Society is an unobtrusive solar/earth-sheltered building located in a cliff on a Mississippi River bluff. The building will house an interpretive center for the Historical Society Archeological Laboratory, and the central office of the Society's Historic Sites Division.

From the roof terrace, one can see the restored Fort Snelling upstream, and the sweep of the Mississippi River gorge. The building design, with its roof surface only a half-story level above grade, minimizes its impact on the historic setting and the natural environment. (A view of the outdoors will be reflected by mirrors to the offices on the lower level to reduce the "underground" feeling experienced by workers there). The two-level structure encloses offices, labs, an auditorium, exhibit rooms, pedestrian concourse and mechanical and storage areas.

A concentrator collector system will supply space- and water-heating and electricity generation. Excess electricity generated during the warm months will be diverted to the utility power grid. This will occur at the time of the utility's highest electrical demand--for summer air conditioning.

table
Category	Institutional
State	MN
Project Name	Minnesota Historical Society Solar/Earth Building

table
Organization	Minnesota Historical Society
Address	Fort Snelling Branch Building 25 St. Paul, MN 55110
Contact	John Ferguson

table
| Telephone | (612) 726-1171 |

table
| Funded By | State |

table
| Cost | \$2,500,000 |

table
| Congressional District | v |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Paulucci Planetarium, opened in the spring of 1979, illustrates energy conservation and alternative energy technology use. Insulation, earth berms, heat loss resistant entrances, and windowless construction all contribute to the Paulucci Planetarium's uniqueness. (A solar collector system will be added.) In addition, the building also represents one of the northernmost DOE-funded projects.

The Planetarium is one of a small number of projects striving to obtain 100 percent of its heat through the solar system, thus addressing the problem of long-term thermal storage.

When operational, the solar heating system will utilize line-focus concentrating solar energy collectors. In conjunction with a heat-pump system, this energy will be introduced into a 225,000-gallon reservoir of water in the lower level of the building. Heat pumps will draw energy from the reservoir and conventional heating and ventilating equipment will distribute it throughout the building as needed.

The building's geographic location, 47 degrees north latitude, places this project where alternative energy systems are especially needed. Winter temperatures in Hibbing often dip near-35 degrees F for extended periods. Also, during winter months, the solar insulation in this area is relatively poor.

The Planetarium will be used for classroom and laboratory functions, and the science department at Hibbing Community College and other area colleges will study the solar system. The department is presently collecting solar insolation and cloudcover data, as there is very little available for this region.

This public building is close to a national park, on a college campus and adjacent to a county fairground. The project will be a working example of solar energy to students

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Category	Institutional
State	MN
Project Name	Paulucci Planetarium

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Organization	Hibbing Community College, Paulucci Planetarium
Address	1515 East 25th Street Hibbing, MN 55746
Contact	Larry Mascotti
Telephone	(218) 262-3877

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Funded By	Federal (DOE, EDA, Dept. of Commerce)
Cost	\$1,500,000
Congressional District	VIII
Compilation Date	February 1980

of elementary through college level and to members of the public, who will be participating in solar-related instructional programs within the building.

Renewable Resources— A National Catalog of Model Projects

Ramsey County correctional officials faced a perplexing problem when they had to find a site for a new Adult Detention Center that would be close to the Court House and to the old jail in St. Paul's congested downtown.

Their investigation led the group across the street to a limestone bluff, which dropped seven stories to the banks of the Mississippi River. A team of architects then designed an energy-efficient structure to "hang" on the side of the cliff.

Occupied since September of 1979, the building receives its heat from a heat pump, which extracts energy from 54 degrees F well water. Supplemental heat is generated from lighting, body heat, and passive solar gain during the day. The angular configuration of the south-facing walls allows maximum perimeter area, and permits natural light to enter all the living areas.

Two tunnels connect the new center with the old City Hall and Court House on the bluff.

Category Institutional

State MN

Project Name Ramsey County
Department of
Corrections

Organization Ramsey County
Department of
Corrections

Address St. Paul, MN 55101

Contact Chuck Sullivan

Telephone (612) 425-5777

Funded By Ramsey County

Cost \$8 million

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Members of the Unitarian Universalist Fellowship in St. Cloud are constructing a new solar-heated building, on L-shaped sanctuary with a detached "solar tower". Fellowship members have designed the building and the heating system and secured the Appropriate Technology grant for the solar system. They are also helping with the construction work.

A collector area of 320 ft² will, with the use of two standard compressors, heat the 4,200 ft² building. The air system uses local granite in the rock storage bin inside the solar tower. (The collector area is relatively small because the heat will be removed from the rock bin for use at a lower than usual temperature.)

The south face of the solar tower, about 30 feet from the main building, is covered with collectors containing a fiber-glass mat absorber surface. The mats, painted black on the top and white on the back, are about two inches thick. The inside area of the 8' x 21' tower (22' tall) contains the rock bin and heat pumps. Heat is carried to the main building by piped freon.

Supplemental heat is available from an electric resistance-heating system, usable only during off-peak hours. The sanctuary can be warmed in this manner early in the morning, if necessary.

Complete monitoring of performance and savings is planned.

Category	Institutional
State	MN
Project Name	St. Cloud Unitarian-Universalist Building
Organization	St. Cloud Unitarian-Universalist Fellowship
Address	Main Prairie Rd., St. Cloud, MN 56301
Contact	Bill Carlson
Telephone	(612) 251-9495
Funded By	DOE, Unitarian-Universalist Church
Cost	\$18,000 (solar only)
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Institutional

State MN

Project Name Springbrook Nature Center

In the fall of 1980, the residents of Fridley, a suburb of Minneapolis, will have an earth-sheltered Nature Center. Fridley needed a new nature center in its 120-acre park, so the Springbrook Nature Center Foundation and the City applied for some state money being administered by the Metropolitan Council through its Regional Parks Special Use Fund.

Grant guidelines required energy-saving features; accordingly, the Center will be 75 percent underground and will incorporate some passive design features on the south and west sides of the building. An active solar heating system will added in the future.

The 5,000 sq. ft. building will include an amphitheater, a live animal workshop (where injured animals from the park will be treated and housed), a lab for experiments and taxidermy work, an exhibit area, a carpentry shop, offices, and restrooms. In addition, a library area will open onto an outside observatory deck for bird-feeding, astronomy sessions, and other activities. The programs will be conducted by a full-time naturalist.

Organization Springbrook Nature Center

Address University Ave., NE
and County Road 32
Fridley, MN 55421

Contact Jerry Boardman
City Planner
6431 Univ. Ave., NE
Fridley, MN 55421

Telephone (612) 571-3450

Funded By State

Cost \$365,000

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

By going "underground," designers have been able to build an 18,000 square foot library facility on a 20,000 square foot site. And, literally "on top of that," they have provided ample parking spaces and a communal open space in this Hennepin Lake neighborhood.

The arrangement of roof parking demonstrates a cost-effective use of urban land, since the additional cost of designing the building to support rooftop parking is substantially less than the cost of purchasing equivalent additional land.

Placing the building below the ground reduces heat-loss and heat-gain problems, eliminates outdoor traffic noise, and provides protection from vandalism.

Category Institutional
State MN
Project Name Underground Public Library

Organization Minneapolis Publ Libraries
Address 2901 Hennepin Ave.
South
Minneapolis, MN 55408
Contact Ruth Johnson
Telephone (612) 372-6608

Funded By City of Minneapolis

Cost \$1,900,000

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The University of Minnesota Underground Space Center was created as a research and information center on underground construction. The center incorporates the disciplines of civil, mineral, and mechanical engineering in its research projects and studies, investigating not only earth-sheltered houses but also deep-storage facilities and space for laboratories, libraries, and zoos.

The center has received five grants -- from the Legislative Commission on Minnesota Resources, the Minnesota Energy Agency, the Department of Housing and Urban Development, the Minnesota Housing Finance Agency, and the University of Minnesota.

Center projects range from mini-courses on building your own earth-sheltered house, to the monitoring of underground facilities, to studies of designs and structures, heat-transfer modeling, housing codes, financing for experimental structures, and ice air-conditioning.

Completed projects of the center and the Department of Civil and Mineral Engineering include construction of an underground test room at the University and the publication of a manual on earth-sheltered designs. On an ongoing basis, the center sponsors general conferences on numerous aspects of utilizing underground space. Publications on many of them are available through the center.

The Legislative Commission on Minnesota Resources designated the Center as the official contact point in Minnesota for overseas groups interested in underground construction.

Category	Institutional
State	MN
Project Name	Underground Space Center

Organization	Underground Space Center
Address	University of MN Minneapolis, MN 55455
Contact	Dr. Raymond Sterling
Telephone	(612) 376-1200

Funded By	State of MN, HUD, et-al.
Cost	n/a
Congressional District	V
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

By the Spring of 1980, some activities on the St. Paul campus of the University of Minnesota will have gone "underground."

The old Student Center has received a new front, which provides, in addition to more space, new insulated building elements and an entry to a protected pedestrian concourse (an underground street). The underground space also provides offices, recreational spaces, a 350-seat theater, a new bookstore, and new art and music lounges.

The new construction is 71 percent underground and demands only 20 percent as much energy per square foot as do the spaces presently being used above ground.

Category	Institutional
State	MN.
Project Name	Underground Student Center
Organization	University of M
Address	Student Center St. Paul Campus St. Paul, MN 55108
Contact	Harvey Jaeger
Telephone	(612) 373-5765
Funded By	Student fees
Cost	\$3,100,000
Congressional District	IV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Backed by a \$15.8 million appropriation from an enthusiastic Minnesota Legislature, construction is soon to begin on a 150,000 ft² solar/earth-sheltered building to house the University of Minnesota's Civil and Mineral Engineering Department.

A national demonstration project, the 95-percent-underground building will tap the sun for heat and light and store Minnesota's frigid winter cold for summer cooling.

On the west end of the completed site, an atrium will protrude with skylights and the solar heat and light collection systems. A descending courtyard on the east end will lead to the entrance. Solar heat will be gathered both passively and actively.

Design features include double-paned, south-facing windows covered at night by rolling shutters to reduce heat loss. In addition, vines will be grown over the windows, reducing interior heat during the summer yet allowing the full strength of the sun to enter during the winter when the vines have shed their leaves.

The active solar collection system involves mirrors that will focus sunlight on receiving pipes to heat an antifreeze solution. Pumps will direct the hot solution to storage tanks for circulation through the building during cold weather.

Sunlight will directly penetrate about half of the rooms on the building's four floors from banks of windows along the courtyards.

Category	Institutional
State	MN
Project Name	University of Minnesota Engineering Department
Organization	University of Minnesota
Address	Dept. of Civil & Mineral Engr., Minneapolis, MN 55455
Contact	Dr. Charles Fairhurst
Telephone	(612) 373-2968
Funded By	State of Minnesota
Cost	\$15,800,000
Congressional District	V
Compilation Date	February 1980

Other rooms will open into the center atrium. Sunlight may be piped into some of the remote interior areas through an experimental optics system of mirrors and prisms. On cloudy days and at night, photoelectric sensors will activate a single powerful back-up source of light that will be channeled through the same distribution system.

Critique/analysis: This building is designed to be a showcase of technological alternatives in energy conservation. It will save money: although initial costs are expected to be on a par with those of conventional buildings, operating costs will be greatly reduced. But more important, it will make a dramatic statement to today's students and tomorrow's decision-makers about imaginative approaches to energy and environmental problems.

Renewable Resources— A National Catalog of Model Projects

In 1979, the Minnesota Legislature passed a renewable energy tax credit as part of its Omnibus Tax Bill (a bill that requires building plans for new state buildings to include designs using renewable energy systems) and a second bill adding a "purpose clause" to the Minnesota Housing Finance Agency's Charter. This clause specifies that financing alternative energy systems and energy-conserving equipment is a public aim. The Legislature also appropriated \$50,000 to the Minnesota Energy Agency to develop literature on solar energy and gasohol, and it directed the Energy Agency to prepare model zoning ordinances for solar energy systems.

The renewable energy credit provide a 20 percent tax credit on the first \$10,000 of expenditures on renewable energy systems for residences (six dwelling units or less). Included are passive and active solar, wind, biomass-conversion equipment for producing alcohol and methane, and earth-sheltered dwellings. The credit is retroactive to systems installed after January 1, 1979, and it is in force until December 31, 1984. (The State credit is available in addition to the Federal solar tax credit.)

In addition, there are references to solar and renewable energy included in existing Minnesota statutes: "Solar energy system" is defined; performance standards are specified; and property tax exemption is granted for renewable energy systems. Since 1976, various energy laws and amendments have been enacted. They include requirements for extensive energy audits and surveys state-wide. The State of Minnesota must include maximum conservation measures and consider the possibility of utilizing some alternative energy system in every new state-owned building and in major remodeling projects. Such buildings must also meet the State Energy Code, which is part of the State Building Code.

Category Legislation
State MN
Project Name Active Legislation

Organization State of Minnesota
Statutes
Address St. Paul, MN 55155
Contact Suzan Stewart, MN
Energy Agency, 980
American Cen. Build.
St. Paul, MN 55101
Telephone (612) 296-6720

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

Minnesota's planning and zoning laws facilitate consideration of solar energy at the metropolitan, county, and municipal levels. First, official controls of land and water use may be applied to protect and encourage access to direct sunlight for solar energy systems. Second, a board of adjustment may consider the inability to use solar energy systems a "hardship" in granting of variances. Third, a municipality may (for the purposes of protecting and assuring access to direct sunlight for solar energy systems) prohibit, restrict, or control development through subdivision regulations (restrictive covenants, height restrictions, side yard and setback requirements, etc.).

The State also has a statutory mechanism for facilitating solar easements to ensure adequate exposure of a solar energy system to direct sunlight. The law sets forth requirements for negotiated solar easements between property owners: (a) a description of the properties involved; (b) a description of the vertical and horizontal angles of the solar easement or any other description that defines the three-dimensional space, or the place and times of day in which an obstruction to direct sunlight is prohibited or limited; (c) terms or conditions of granting or terminating easement; (d) compensation provisions; (e) other necessary or desirable provisions. Enforcement provision is injunction or civil action.

Renewable Resources— A National Catalog of Model Projects

Since 1975, the Center for Local Self-Reliance (CLSR), a Minneapolis non-profit neighborhood organization, has been conducting programs designed to help urban residents provide more of their own energy, food, shelter, and water. Various methods have been used to achieve these goals.

Through a contract with the Minneapolis Housing and Redevelopment Authority, the Center provided weatherization grants to low- and moderate-income homeowners in the Power-horn Planning District and Bryant-Regina neighborhood.

The Center has sponsored demonstration projects on the use of solar space heating, solar water heating, insulated curtains, and solar greenhouses.

The Minneapolis Community Action Agency provided funds to initiate an Energy Policy Advocacy Project, which has intervened in cases against higher energy costs and has organized Minneapolis residents into the Neighborhood Energy Alliance to affect local energy policy decisions.

The Center holds workshops on energy audits, energy conservation, insulation techniques, alternative sources of energy, and greenhouse construction.

Library materials are available on 1 from CLSR. These include books,azines, and newsletters on energy con-
servation, appropriate technology, and food production.

Category Outreach
State MN
Project Name Center for Local Self-reliance

Organization Center for Local Self-Reliance
Address 3302 Chicago Ave., S.
Minneapolis,
MN 55407
Contact Douglas Crockett
Telephone (612) 824-6663

Funded By Minneapolis Housing & Redevelopment Authority & Special Grants
Cost \$200,000 1979 budget
Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Since 1977 the Wright Alternative Energy Association has been sponsoring bimonthly meetings for advocates of renewable energy. An average meeting draws between 25 and 30 people who discuss, learn about, report on, and plan their programs.

Usually a presentation is given, after which those present trade experiences and insights on their own activities and work. Discussions have covered a broad range of topics: solar, wood, wind, greenhouses, taxes, building codes, aquaculture, and legislation.

Participants in the Wright Alternative Energy Association pay no dues; they have no officers and no organizational structure. Mailings, publicity, and coordination are handled by the Wright County Community Action Agency.

Category	Outreach
State	MN
Project Name	Wright Alternative Energy Association
Organization	Wright Alternative Energy Association
Address	Box 39 Waverly, MN 55390
Contact	Luke Markve
Telephone	(612) 658-4415
Funded By	Community Service Administration
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Minnesota Department of Transportation (MnDOT) has recently built six new highway rest-stop buildings, using three different approaches to energy efficiency: solar, earth-sheltering, and underground construction. Data collected from these buildings will help decide the shape of future public accommodations along the nation's highways.

The Straight River Rest Area (six miles south of Owatonna on Interstate 35) includes two identical buildings, one heated with conventional fuel, the other (on the south-bound side) heated by solar collectors. The 1,600 square feet of lobby, restrooms, and mechanical rooms are heated by a hot-air system. The pipes are exposed and color-coded to a corresponding explanatory chart of the system for visitors to study. An educational exhibit will explain solar energy in general and specifically how it is being used in this building. Heating data from the two identical buildings (built for \$586,000) will be compiled and used in future planning.

Three other rest stop buildings are earth-sheltered. One, the Anchor Lake Rest Area, is also a Travel Information Center. This \$233,000 building received special funding from the State of Minnesota and will be staffed year-round by a highway department information specialist. The other two earth-sheltered rest stops which are on Interstate 90 near Blue Earth, were built with 90 percent federal/10 percent state funding at a cost of \$160,500 each. Although conventional oil-heating systems have been incorporated into the design, south- and west-facing glass areas will permit direct heat gain from the sun.

The rest stop at Enfield, about 75 miles northwest of the Twin Cities on Interstate 94, is completely underground. On this heavily wooded site, the building is set about two feet below grade and completely covered with

Category State
State MN
Project Name MN Highway Rest Areas

Organization Minnesota Department of Transportation (MnDOT)
Address Transportation Build. St. Paul, MN 55155

Contact James Reiersen

Telephone (612) 296-5773

Funded By State of MN and Federal Highway Admin.

Cost \$1,303,000 (for all six buildings)

Congressional District II, VI, VIII

Compilation Date February 1980

earth. Two descending courtyard entries serve the building and skylights allow natural lighting in the lobby and restroom areas. The building is conventionally heated by gas.

Renewable Resources— A National Catalog of Model Projects

Several sections of the Minnesota Zoological Garden have their heating and hot water needs met by solar energy. When the zoo opened to the public in May of 1978, there were provisions for a two-mile monorail train to carry visitors around the 480 acres. The monorail is now operating, and visitors board the trains from a transit station heated by solar energy.

The 8,280 square feet of collectors are used year-round to supply space heating and tempered ventilation air to the Zoo Ride transit station. They also heat domestic hot water for the main building complex. This complex includes the Tropics Exhibit, Minnesota Exhibit, administration offices, educational facilities, food service, a gift shop, and other visitor support services.

The zoo is open to the public year-round. Approximately one million people will visit the site each year, with approximately 60 percent riding the Zoo Ride.

A graphic exhibit portrays the basic principles of solar energy and explains the specifics of the installation at the zoo. The storage tanks, pumps and controls are, to the extent possible, within the public's view.

Category	State
State	MN
Project Name	Minnesota Zoological Garden
Organization	Minnesota Zoological Garden
Address	12101 Johnny Cake Ridge Road, Apple Valley, MN 55124
Contact	Vicki Uchida
Telephone	n/a
Funded By	State and DOE
Cost	\$450,000 (solar only)
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Minnesota's new maximum security correctional facility is tucked into a ravine in the St. Croix River valley. This earth-sheltered building incorporates substantial energy-saving features. Extra insulation, direct solar gain, and a reclamation system (which stores excess heat from lighting and activities in underground water tanks, and provides 40 percent of the needed building heat) all contribute to this building energy efficiency. Additional water is heated electrically during off-peak hours.

These design features eliminate the need to utilize the conventional heating system until the outside temperature drops below 16 degrees F.

The pay-back period of the special features is expected to be between six and seven years.

Some portions of the building are over 30 feet underground, where a constant 55 degrees F temperature minimizes heating and cooling requirements. Walls protected by 20 feet or more of earth were found to need no insulation. Five inches of polystyrene insulation in the roof areas is utilized.

This is the first correctional facility built in Minnesota in over 60 years. The structure will provide an improved environment for the inmates.

Category	State
State	MN
Project Name	St. Croix Dept. of Corrections
Organization	State of Minnesota, Department of Corrections
Address	430 Metro Sq. Building St. Paul, MN 55101
Contact	James Zellmer
Telephone	(612) 296-8621
Funded By	State of Minnesota
Cost	\$30,000,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In 1977 the Minnesota Legislature appropriated \$500,000 for a Solar/Earth Housing Demonstration Program to be administered by the Minnesota Housing Finance Agency (MHFA).

As a result of the competition, three state park manager residences, four private homes, and an earth-sheltered urban townhouse project were constructed. Each project held or is holding publicized "open houses" for a period of ten weeks. This provides public access to the renewable resource and conservation technologies employed.

Three of the projects include active solar, and all of the projects include passive solar design techniques.

All of the projects will be monitored for a period of two to five years in order to determine energy usage and performance.

Category	State
State	MN
Project Name	Solar/Earth-shelter Design Competition
Organization	Minnesota Housing Finance Agency
Address	333 Sibley St., St. Paul, MN 55101
Contact	Mary Tingerthal
Telephone	(612) 296-7615
Funded By	MHFA
Cost	\$500,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In April of 1977 the doors were opened to Williamson Hall on the Minneapolis campus of the University of Minnesota. The 83,000 square foot, solar/earth-sheltered facility is located 95 percent below grade. Year-round energy savings are expected to be immediately dramatic for Williamson Hall and to become more impressive as fuel costs continue to rise.

Underground construction is particularly well suited to this location. Compared to a similar above-grade structure with walls containing 6 inches of glass wool insulation, Williamson Hall required 55 percent less energy on an average January day. The above-grade section of Williamson, needed for support and lighting, is only 5 percent of its total volume, but it accounts for 34 percent of its total conduction heat loss.

Six thousand square feet of concentrating collectors will heat and cool the building. Between 33 and 100 percent of the building's heating and cooling needs are expected to be handled by this system. Storage is provided by an 8,000-gallon buried tank. Back-up heating and cooling is provided from the conventional steam-conversion system that the University uses for heating and cooling other buildings.

During the summer, the gathered heat is used to operate a hot water absorption chiller for air conditioning. The constant underground temperature will keep air conditioning need minimal.

The National Science Foundation has awarded a research grant to the Mechanical, Civil and Mineral Engineering Departments at the University to monitor Williamson Hall's energy-conserving characteristics. Based on this information, a computer program is being developed that will estimate the heating and cooling requirements for underground buildings. These data will be used to advise smaller and less technically expert builders about underground structural requirements.

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Category	State
State	MN
Project Name	Williamson Hall

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Organization	University of Minnesota
Address	Williamson Hall University of MN Minneapolis, MN 55455
Contact	Dean Arnold
Telephone	(612) 373-0169

Funded By	State of MN, Dept. of Energy
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Cost	\$3,600,000
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Congressional District	v
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Minnesota Power and Light Company (MP&L) has installed a preheat solar domestic hot water system on the new addition of its corporate office building.

The system includes five solar collectors feeding two 120-gallon storage tanks. The cold water supply temperature of 45 degrees F is raised to about 115 degrees F by the solar system. This hot water is then fed to an 18 kW, 120-gallon electric water circulation system connected to it set at 120 degrees. This system is meeting 60 percent of the water heating needs for the building. Equipment cost was about \$3,000 and installation cost about \$3,000.

MP&L hopes that the experience of owning and operating the solar system will greatly assist its customer Service Representatives in properly advising their customers on the pros and cons of solar water heating.

Critique/analysis: Because this system was installed in July, MPLC is distributing publications on solar pros and cons based on systems other than its own. If its system continues to be as successful as it is presently, providing annual hot water needs of 60 percent, the company will provide information on its specific system.

Category	Utility
State	MN
Project Name	Minnesota Power and Light Company (MP&L)
Organization	Minnesota Power and Light Company (MP&L)
Address	30 West Superior St., Duluth, MN 55802
Contact	T. G. Lyden
Telephone	(218) 741-8844 Ext. 28
Funded By	MP&L
Cost	\$6,000
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Northern States Power Company built the Roseville Energy-Saver House, an octagonal, three-bedroom demonstration home filled with energy-saving features. The basic heating/cooling system is an Annual Cycle Energy Storage System (ACES) that utilizes a 16,000-gallon water reservoir (buried under the garage floor) and a heat pump system that cools the house in summer and warms it in the winter. The water in the reservoir is cooled over the winter as heat is extracted to warm the house, and, in reverse, the reservoir is warmed again during summer as coolness is extracted by the heat pump. Solar collectors add heat to the reservoir during the spring, summer, and fall, and preheat the domestic hot water supply before it goes into the electric water heater, which runs only in off-peak hours.

The following components, integrated into the design and construction of the house, provide energy-saving functions that contribute to the efficiency of the total system: (1) proper landscaping to break winter winds from the northwest and shade the house in the summer; (2) an energy-efficient fireplace and a woodburning stove; (3) insulated shutters on the inside of basement and second-story windows and on the outside of first-floor windows; (4) windows designed for structural shading in the summer and heat gain in the winter; (5) arctic entrance (a foyer that acts as an air-lock when inner and outer front doors are opened and closed separately); (6) triple-glazed windows; (7) extra insulation in walls and ceilings, and insulated thermal break doors and threshold; (8) exhaust-air heat recovery system; (9) centralized water-use areas; and (10) water-flow restrictors.

Detailed monitoring is being conducted on all systems by NSP and by the family now living in this experimental setting. Tours are offered for interested groups.

Category	Utility
State	MN
Project Name	Roseville Energy-Saver House
Organization	Northern States Power Company (NSP)
Address	North Fairview Ave. Roseville, MN 55102
Contact	Lee Tuskey NSP 414 Nicollet Mall Minneapolis, MN 55401
Telephone	(612) 330-6847
Funded By	NSP
Cost	n/a
Congressional District	IV
Compilation Date	February 1980

MISSOURI

1. Columbia
2. Drury
3. Jefferson City
4. Kansas City
5. St. Louis

MISSOURI

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Renewable Resources— A National Catalog of Model Projects

New Life Farm, Inc. (NLF), a 40-acre community-based, non-profit, research and educational center, is located in the Ozark hills near Drury, Missouri. It is dedicated to resource conservation and economic self-reliance for individuals, families, farms, and communities within the context of maintaining and improving the health of the environment.

New Life Farm (NLF) is currently researching two renewable energy projects: Solar Heating Made Easy and the Rural Gasification Project, which is focused on a methane digester. Results of the research are carried to the public through outreach programs such as workshops, demonstration projects, and lectures. NLF always remembers that their farm research moves the farm toward self-sustainment and that this research has a direct impact on national energy problems. NLF shows that solar energy is not just for space heating. Diverse agricultural uses of renewable energy that can re-invigorate the farm economy and environment are developed and demonstrated at New Life Farm.

Category Agricultural
State MO
Project Name New Life Farm (NLF)

Organization New Life Farm

Address Drury, MO
65638

Contact Ted Landers

Telephone (417) 261-2553

Funded By State Financing,
CSA

Cost n/a

Congressional District VII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

New Life Farm (NLF) has secured a grant from the Community Services Administration to conduct a nationwide experimental methane program, the Rural Gasification Project (RGP). RGP will generate data and determine the feasibility of using low-cost, owner-built bio-gas plants to relieve rural families' burden of high energy costs. Twenty digestors of various designs will be located throughout the country. The gas these digestors produce can be used by farms in place of propane, butane or natural gas.

This project has several components. It will establish a digester technician-training center that the use of a digester will make energy self-sufficient. Its participants will build four digestors in each of five areas of the country and train ten digester technicians to assist the selected families in building their digestors.

To be eligible for a digester, families' income must be no more than 25 percent above the poverty guidelines set by CSA. Each family will be required to pay for at least 10 percent of the materials.

The first digester built was a 300 cubic foot unit with a masonry tank that involved relatively low materials costs. The gas from this unit is being used for domestic hot water and cooking and for supplemental heating in the farrowing house. It is estimated that the farmer's electric bill will be reduced by \$300 to \$400 per year.

The second unit, a 30 cubic foot system, was on a trailer to demonstrate methane production at county fairs and energy expositions. This mobile digester encompasses many of the features of the first unit, such as the automatic heating system and valving. Its unique features include an inexpensive solar water heater, passive scum breakers, a plexiglass tank end that makes it easy to view the diges-

Category Agricultural
State MO
Project Name NLF Methane
Digester Project

Organization New Life Farm
Address Drury, MO 65638
Contact Ted Landers
Telephone (417) 261-2553

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

tion process, a lavatory so that participants feed the digester, and a stove so that participants can eat food cooked with bio-gas.

Renewable Resources— A National Catalog of Model Projects

Solar Heating Made Easy (SHME), a New Life Farm project, conducts workshops around the Midwest. The SHME team teaches people how to build and install solar air heaters, solar water heaters, and solar greenhouses. These workshops demonstrate that low-cost, low-technology, owner-built solar systems are within an individual's easy reach.

The workshop sponsored by the Housing Authority of Mountain Grove, Missouri was typical. The participants included Housing Authority work crews and interested citizens. The workshop site was a low-income dwelling being rehabilitated by the Housing Authority. The workshop demonstrated the ease, value, and economic feasibility of using low-technology solar air heaters for retrofitting the homes of low-income people. The work crew that participated in the workshop is now prepared to continue building and installing similar units.

Any organization, group or individual can sponsor a workshop by completing an Application Form and a Design Data Worksheet. The Worksheet contains all of the information necessary for NLF to design a solar unit appropriate to the site. After the design is completed, a bill of materials is sent to the sponsor so that all the materials can be on hand when the workshop begins. Material costs have been running under \$225 for an 8' x 8' collector. This cost includes a fan, thermostat/fan switch, and ductwork.

Category	Agricultural
State	MO
Project Name	NLF Solar Heating Made Easy

Organization New Life Farm

Address Drury, MO
65638

Contact Ted Landers

Telephone (417) 261-2553

Funded By Southwest Missouri
State University

Cost	n/a
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Congressional District VII

Compilation Date February 1980

An air heater workshop, which generally runs for two days, begins with a classroom presentation and slide-show to familiarize everyone with the construction procedure. Participants from previous workshops help explain the instruction steps. From the classroom, the group moves to the job site, where all the materials are ready. Teams of participants divide the tasks. While one group installs the ductwork under the house, another paints the collector plate black, and another cuts the materials to size. The New Life Farmers move from group to group, directing the work and answering questions.

When the collector is half-assembled, it is attached to the house. The thermostat/fan switch is installed and the ducts are connected to the collector. Next, a black absorber plate is added. Then the glazing material is put on. When the final trim, caulking, and touch-up paint are added, the unit is ready to operate and to be tested for efficiency. The finished solar unit is an attractive addition to the house, cutting fuel bills while adding to its value.

Funding for nine workshops was provided by a Community Development grant through Southwest Missouri State University. Workshop sponsors furnished the materials.

Renewable Resources— A National Catalog of Model Projects

The Bakewell Corporation has developed three 6,048 square foot energy-efficient office buildings that are priced competitively with conventional buildings. The structures simply use standard components whose use is tailored to the local climate.

The efficiency of the complex begins with the site. Buildings are oriented to the south. The front building is on a lower grade so that the two rear buildings are not shaded in the winter when the sun is low in the sky. Earth is banked on all sides of the buildings to conceal parking lots and to deflect the cold winter winds.

The sloping southern roof of each building is made of conventional wood trusses. Between each truss is a sheet metal trough with glass over it. The roof thus acts as a solar collector. Small fans circulate the heat throughout the building.

Thick concrete walls provide heat storage. Heat pumps provide back-up heating. Conventional electrical resistance heating provides heat in temperatures below 12 degrees F when heat pumps begin to lose their efficiency.

South-facing skylights admit light and additional heat in the winter months. These are automatically opened and closed by Freon-gas controlled louvers. They are closed permanently in summer months when north-facing skylights are opened to admit light without permitting heat gain.

On sunny days the solar heat and heat generated by people and office machines should be enough to provide a comfortable working environment even on the coldest days. Sunshine will eliminate the need for artificial light except that needed for extremely detailed work.

In the summer, heat generated by the solar-heating system is vented outside. This super-

table
Category	Commercial
State	MO
Project Name	Solar Office Development

Organization	Bakewell, Corpora
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Address	8820 Ladue Road St. Louis, MO 63124
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Contact	Ted Bakewell, III
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Telephone	(314) 862-5555
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Funded By	Boatman's National Bank
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Cost	n/a
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Congressional District	I-III
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Compilation Date	February 1980
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heated air also draws natural ventilation. It should be possible to maintain a temperature of 78 degrees F in 90 degree F weather without air conditioning.

Other energy efficient measures in the buildings include low-flush toilets, in-line demand water heaters that use energy only when hot water is actually being used, and recirculating air fresheners instead of exhaust fans.

Ted Bakewell estimates energy savings in the buildings to be a minimum of 30 percent. This assumes that an occupant will not utilize the solar advantages of the building by making seasonal adjustments of skylights and vents. Greater care will result in greater savings of up to 70 percent.

The project is being financed by Boatman's National Bank in St. Louis. The developer is the Bakewell Corporation.

These buildings, even with their built-in solar and other energy saving advantages, are cost competitive with any first-class but energy-inefficient office space available in St. Louis today. Furthermore, no government grant or other institutional subsidy camouflages the true costs of what the developer believes to be one of the first truly practical examples of how low-energy concepts can be applied to commercial buildings.

Renewable Resources— A National Catalog of Model Projects

This mobile home is economically competitive and incorporates life-support systems appropriate to a variety of climates. It is independent of utility grids and reliance on fossil fuels. Agricultural silo components were utilized as both building skin and absorber surfaces for active air collectors and domestic hot water. Paracrystalline phase-change materials (like eutectic slats) provide thermal storage. An air-lock/greenhouse and skylights provide passive gain. Photovoltaics and wind-generated compressed air meet essential electrical needs. Potable water is supplied by rain and grey-water recycling. Human and organic wastes are composted.

The "Autonomous Dwelling Vehicle", as Bakewell and Jantzen call it, is transportable on existing highways, local roads, railroads, river barges, and ocean freighters: it meets all U.S. limitations on height, width, and weight. It floats, can be airlifted by a helicopter, and can withstand high winds in a full tie-down position.

Of special advantage is the full-comfort living space for two people. The home is appropriate in many climates and has adequate storage space and maximum psychological spaciousness. But most important, it is mass-producible with currently available components and technologies at a first-cost that is competitive with existing luxury travel trailers of comparable size.

Category Housing
State MO
Project Name Autonomous Dwelling Vehicle

Organization Bakewell Corporation

Address 8820 Ladue Road
St. Louis, MO 63124

Contact Ted Bakewell
Michael Jantzen

Telephone (314) 862-5555
(618) 765-2445

Funded By Private

Cost \$30,000

Congressional District I-III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In a small subdivision southwest of Columbia, energy-efficient "earth contact" homes are being built. John Coats, a mason and an owner-builder of the "earth contact" homes has worked independently on the construction of about twenty-five of these energy-efficient homes.

Coat's "earth contact" home is underground on three sides. The fourth side enjoys an above-ground southern exposure. The outside of the concrete walls are insulated. (Quality foundation and weatherproofing are essential.) The house has a conventional roof and windows on the south side that provide effective ventilation and light. The earth around the house is tiled and slopes away from the house on all three sides.

The south side of Coat's home has a 12' x 24' glass-enclosed front porch. While it does not stay warm enough for most plants in the winter, it does stay above freezing most of the time. This porch also acts as an air lock for the house. When the sun does shine, the porch can reach temperatures of 80 degrees when it is 0 degrees outside.

The cost of an "earth contact" home runs much lower than that for a conventional home. The average cost of a new conventional home today runs \$35 to \$45 per square foot. The average cost of an "earth contact" home is \$226 per square foot.

Coats has made great savings on his summer and winter utility bills. The house's temperature never rises above 80 degrees in the summer, and in the winter a wood-burning stove provides back-up heat.

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Category	Housing
State	MO
Project Name	Earth Contact Subdivision

Organization	John Coats
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Address	Rural Route 3 Columbia, MO 65201
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Contact	Bob Garret
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Telephone	(314) 479-7511
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Funded By	Owner
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Cost	\$22-26/ft ²
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Congressional District	VIII
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Compilation Date	February 1980
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A National Catalog of Model Projects

The typical masonry house consumes great quantities of energy. High energy-related operating costs depress their value, contribute to poor maintenance, and often result in early demolition.

The south wall of the Michels' home was not insulated. It is glazed and functions as a Trombe wall. The frame-stucco bay that protruded on the second floor was removed and replaced with glass. On both sides of the bay, a collector of glass ductwork was installed. This connects a solar greenhouse to the second floor by side vents from the duct to the bay.

Retrofitting the outside of masonry walls has a number of advantages over insulating the inside. Retrofitting need involve only carpenters and insulators -- not a host of tradespeople -- and it requires only rough finishing. It also covers all paths for heat loss, moves the mass inside the house, results in no reduction in the amount of living space, and leaves interior finishes.

Organization	Tim Michels
Address	7365 Tulane Ave. Univeristy City, MO 63130
Contact	Tim Michels
Telephone	(314) 725-0811

Cost	Insulation \$3/ft ²
	Collector \$15/ft ²

Compilation Date February 1980

electrical service, woodwork, and windows intact. It is also the least costly approach for occupied dwellings that are in relatively good shape.

The experimental retrofit was jointly sponsored by the Department of Energy and Londer-Parker-Michels, Inc.

Renewable Resources— A National Catalog of Model Projects

The Kansas City Fire Department has built a solar energy fire station that opened in March of 1979. Station 24 is the first solar application built in conjunction with Kansas City's Continuing Energy Conservation Program.

At a cost of about \$500,000, the station was financed by general revenue sharing funds and by a \$150,000 U.S. Department of Energy grant for the solar elements. The estimates of savings on space-and water-costs are about \$6800 yearly, which puts the pay-back period at around 22 years.

The 8000 ft² station receives about 60 percent of its annual heating requirements from the solar energy system. The solar system includes 2808 square feet of solar collector panels on the roof. It also features automatic controls for regulating the system's various operating modes. A stand-by electric heating system provides back-up.

On sunny days the station will be heated directly from the collector panels. Additional heat from the collector will be stored in 72 tons of enclosed rock located on the south side of the station. The rock storage has a 36-hour capacity.

Category	Institutional
State	MO
Project Name	Solar Heated Fire Station
Organization	Kansas City Fire Department
Address	2039 Hurdesty Kansas City, MO 64127
Contact	John Waas Fire Chief
Telephone	(816) 274-1330
Funded By	DOE
Cost	\$150,000
Congressional District	v
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Black Economic Union of Greater Kansas City is operating the Solar Utilization, Economic Development and Employment (SUEDE) program in Kansas City. Funded by the Community Services Administration, the Department of Energy, and the Department of Labor, the project is managed through the City of Kansas City, Missouri Urban Affairs Department.

The SUEDE program's objectives are to install solar heating systems at no cost on 50 eligible families' homes in the Kansas City area, and to train eight previously unemployed persons in the installation of solar heating systems. This training should provide a solid base of marketable skills.

The SUEDE program to install solar heating systems in 50 Kansas City homes will involve the installation of active solar equipment. The systems suck cool air from the home into the collector. There the air is heated and blown back into the home. When the sun is not shining, the existing furnace heats the house.

The heart of the system is a vertical wall collector mounted on the south side of the home. The collector has a cedar wood frame, a black metal absorber plate, and clear fiberglass glazing. Ducts are installed in the basement walls and attic of the home. The cool air is sucked in from the basement. The air warms as it rises through the collector and is blown into the house. A blower that can easily be plugged into any outlet moves the air.

The collector requires a minimum amount of maintenance. Once every fall the blower needs oiling. Twice each winter a filter on the duct system needs to be changed. The only visible parts on the inside of the home are a register and a grill through which air passes. The blower

p>Category Low Income
State MO
Project Name Black Economic Union SUEDE Program

p>Organization Black Economic Union

p>Address 1720 Paseo Suite E Kansas City, MO 64108

p>Contact Steve Walz

p>Telephone (816) 842-8787

p>Funded By DOE/DOL/CSA

p>Cost n/a

p>Congressional District V

p>Compilation Date February 1980

is controlled automatically by a fan control in the collector panel.

To be eligible to receive this low-cost solar heating system, a family must own its own home and have an income within 25 percent of the poverty line. The home must also meet some minimum standards of weatherization.

The eight trainees receive both classroom and workshop training. The trainees gain field experience by weatherizing homes. After the weatherizing is complete, the trainees start building and installing the solar systems. By taking part in every aspect of residential solar heating, the trainees gain the skills and experience necessary to find a job within a highly competitive job market.

Renewable Resources— A National Catalog of Model Projects

The Union-Sarah Energy Conservation Program in St. Louis is in the first year of a three-year District Energy System Project. Currently, the Union-Sarah area suffers from high unemployment, high utility bills and a scarcity of locally owned businesses. The plan addresses all three problems with an integrated strategy. It's goals are to utilize the community's primary capital (available labor) and to move quickly into the development, manufacture, and installation of renewable energy systems.

The program has three objectives. It plans to reduce the energy costs in the Union-Sarah community by weatherizing buildings and installing renewable energy systems in them. To this end, Union-Sarah is training many of the unemployed in the area to take energy-industry jobs. This process will facilitate the establishment of community businesses and a District Energy System. Union-Sarah, through grants from CETA, is making progress on its first two objectives. Assembling the District Energy System includes centralized and decentralized devices. Centralized systems such as co-generators, wind mills and solar batteries will produce electricity. Alcohol and bio-gas from city wastes can be used as fuels.

Community businesses will directly serve individual homes with solar water heaters and passive solar heating systems (such as Trombe walls, solar greenhouses and solar windowboxes). Residents will select the types of retrofit they want.

The projected cost of the District Energy System is \$5,000,000. Federal grants from CETA, the Community Services Administration, and the Community Development Administration are expected to pick up most of this tab.

Category	Low Income
State	MO
Project Name	District Energy Systems

Organization Union-Sarah Energy
Conservation Program

Address 4969 Enright
St. Louis, MO 63108

Contact Bob Zeffert

Telephone (314) 361-4470

Funded By **CETA**

Cost	\$5,000,000
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Congressional District I-III

Compilation Date February 1980

NEBRASKA

1. Bennet
2. Columbus
3. Ft. Calhoun
4. Goehner
5. Hartington
6. Lincoln
7. Macy
8. Mead
9. Omaha
10. Plattsmouth
11. Scottsbluff
12. St. Helena
13. Wahoo

NEBRASKA

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Renewable Resources— A National Catalog of Model Projects

Category Agricultural

State NE

Project Name Small Farm
Energy Project

The Small Farm Energy Project is a three-year experiment to test the applicability of solar technologies on small, low-income farms. The project is sponsored by the Center for Rural Affairs and is funded through CSA.

This project utilizes standard experimental methods and involves two groups of farms. The experimental groups consist of small farms that utilize a proven solar technology and are then monitored for energy use, cost of production, and net income. The central group remains unchanged: its only function is to maintain detailed energy and income records.

Forty-eight small farms participated in the project (24 central, 24 experimental). Each active participant selected a form of solar technology that could be applied to the farm. All of the technologies were simple, low-cost technologies that could be built from locally available materials. Examples of the applications are solar grain dryers, vertical wall solar collectors, solar-heated farrowing barns, and wind electric generators. The technologies covered three categories in all: energy conservation, heat flow, and on-site production.

An example of a project being monitored by the Center is the Kaiser Wind Electric System. It is one of the few energy innovations of the Energy Project that is not homebuilt. This project was undertaken to demonstrate and study some important aspects central to the debate over de-centralized vs centralized power in rural areas.

The project is being carefully monitored to determine the return on investment and the payback of the system. Although the system is costly, (approximately \$4,000), rising electric rates are making this design even more feasible.

Organization Small Farm Energy
Project

Address Center for Rural
Affairs,
Box 736
Hartington, NE 68739

Contact Dennis Demml
or
Ron Prupicka

Telephone (402) 254-6893

Funded By CSA

Cost \$287,000

Congressional District I

Compilation Date February 1980

As the project is nearing the end of its 41-month funding period, tentative plans are being made to continue the program. Similar programs are being developed elsewhere in the state to gather other regionally specific data.

Renewable Resources— A National Catalog of Model Projects

This 3,840 ft² swine building uses active and passive solar systems for 98 percent of its energy production. In winter, when its translucent panels are closed, this building will turn into a passive direct gain solar system.

In addition, an array of flat-plate air collectors (covering 416 square feet) is mounted on the roof to provide more heat. Heated air travels through the hollow concrete blocks beneath the floor, which is used as a storage unit. The system is designed so that a central collection duct can be opened to allow cooling of the storage unit at night.

During the summer months, this self-built unit's translucent panels can be opened to increase natural ventilation. Also at this time, the solar collector is rotated to face north to avert solar radiation.

Category Agricultural
State NB
Project Name Solar Pig Sty

Organization Solar Pig Sty
Vennie Kavans
Address RFD 1
Wahoo, Nebraska
68066
Contact G. R. Bodman
Vennie Kavans
Telephone (402) 472-3948

Funded By USDA/DOE

Cost \$2,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This office building utilizes both a solar space heating and a solar water-heating system. The building is located in Lincoln, Nebraska, and covers 2,856 sq. ft.

The solar space-heating system consists of a roof-mounted array of flat-plate collectors. A water storage tank is located in the equipment room. A heat exchanger is used to transfer heat between the antifreeze collector loop and the water storage. Heated water from storage is then pumped to the building's heating equipment.

The building's solar domestic water-heating system employs two roof-mounted flat-plate collectors. A water storage tank located in the lower level equipment room and a piping system with pumps transfer heat from the collectors to a heat exchanger on the storage tank.

Category Commercial
State NB
Project Name Lincoln Solar Office Building

Organization Lincoln Solar Office Building
Address Lincoln Housing Auth.
56th and R Streets
Lincoln, NB 68505
Contact n/a
Telephone (402) 846-5728

Funded By DOE (\$13,486)

Cost \$92, 837

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Renewable Energy Trade Association is an alliance of organizations representing labor, industry, business and agriculture interests that have an economic stake in promoting the transition from non-renewable energy resources.

RETA, under contract with Energy Inform, Inc., sponsored an energy trade show in Omaha in October of 1978. The event drew over 5,000 attendants, provided over a dozen educational programs and attracted significant community attention.

In October of 1979, RETA sponsored a working convention to discuss state and local options to promote solar energy. Legislative priorities and strategies developed then are now being pursued by the Association.

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Category	Commercial
State	NB
Project Name	Renewable Energy Trade Association

table
| Organization | Renewable Energy Trade Association |

table
| Address | Renewable Energy Trade Association, 715 South 14th St., Lincoln, NB 68508 |

table
| Contact | n/a |

table
| Telephone | n/a |

table
| Funded By | Private |

table
| Cost | n/a |

table
| Congressional District | I |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Nebraska Energy Extension Service is concerned with promoting increased public awareness of the efficient use of energy, including energy conservation. To date, the activities of the Service have been primarily limited to the publication of the "Nebraska Energy New." This publication is a joint newsletter of the Nebraska State Energy Office and the University of Nebraska-Lincoln.

The Service has also been involved in several programs on the Educational Television Network and in some outreach education programs.

Category Education
State NB
Project Name Energy Extension Service

Organization Nebraska Energy Ext. Service
Address W181 Nebraska Hall
U of NB - Lincoln
Lincoln, NB
68588
Contact Dr. John E. Langerstrom
Telephone (402) 472-7211

Funded By DOE

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State NB
Project Name Nebraska Underground
Space Association

Organization Nebraska Underground
Space Association

Address Box 52
Omaha, NB 68101

Contact n/a

Telephone n/a

Funded By n/a

Cost n/a

Congressional District II

Compilation Date February 1980

The Nebraska Underground-Space Association (NUA) was formed to promote the goals of the American Underground Space Association (AUSA). The NUA is the center of earth-sheltering activity in Nebraska, functioning as a clearinghouse for earth sheltering information.

NUA is a non-profit organization dedicated to promoting recognition of the great potential of underground space and furthering research in technical, environmental, legal, economic, social, and political problems associated with the use of the underground.

The Nebraska Underground Space Association is one of several chapters created to function as area liaisons for the AUSA.

Renewable Resources— A National Catalog of Model Projects

In the first project of its kind, the largest solar cell-powered crop irrigation system has been constructed near Mead, Nebraska. The unit provides energy for irrigation, as well as for grain drying.

Approximately 100,000 photovoltaic solar cells are mounted upon 29 flat panels covering 5,600 square feet. This makes the unit's peak power about 25,000 watts. The solar panels are arranged in two 350-foot rows that face due south. One row is set about five feet lower than the other to prevent shading.

The cells are interconnected by electrical wiring that leads to two trailers. One trailer houses large storage batteries for off-peak power use, and the other houses inverters to convert the direct current (DC) into alternating current (AC).

The system has been operational since July of 1976. It was designed and built by the University of Nebraska-Lincoln, and MIT's Lincoln Laboratory.

Category	Agricultural
State	NB
Project Name	Solar Irrigation and Grain Drying System
Organization	University of Nebraska, Agricultural Engineering
Address	Univ. Field Lab. Mead, NB 68041
Contact	Above Address
Telephone	(402) 628-6145
Funded By	Energy Research and Development Administration
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Research and Development Center (ERDC) was established in 1976 by the Nebraska University Board of Regents. However, the ERDC's focus extends far beyond the boundaries of the University. Its broadrange program of research, development, training, and public service programs extends statewide and into the national arena.

ERDC's educational activities complement the responsibilities of the Nebraska State Energy Office, which include energy-policy development, regulation, enforcement, and promotion. The shared aim is to assure Nebraskians adequate energy at a reasonable price for the future.

All aspects of energy-related research -- energy-consumption planning, energy generation and distribution, environmental effects, economic and legal aspects, policy analysis, social impact and long-range planning for national and regional independence -- come under the purview of the ERDC.

Category	Education
State	NB
Project Name	University of Nebraska Energy Research & Development Center
Organization	Univ. of Nebraska Energy Research & Development Center
Address	Energy Research & Development Center, Univ. of Nebraska, Lincoln, NB 68588
Contact	Donald Edwards
Telephone	(402) 477-7211
Funded By	Federal, Regional, State & Local Sources
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Local Energy Conservation Grants Program, funded by the U.S. Department of Energy and administered by the Nebraska Energy Office, is designed to encourage and financially help communities initiate or augment energy-conservation projects.

The Program divides communities into five population categories, and awards grants to two communities in each category. The ten grants awarded range from \$4,000 to \$12,000. A minimum 10 percent match of the total grant amount is required of each community funded. This local match may be in the form of cash or services, or a combination of both.

Among the communities selected for the 1979 grants were Brainard (population 310), Northfolk (population 16,610), and Ord (population 2,439). Brainard will install a solar hot water unit in the new village-owned fund hall. Village residents will install the unit, as well as maintain records on the energy and dollar savings. A workshop and demonstration program on solar energy will be offered in the summer of 1980.

Northfolk will conduct a wide range of activities under its grant program. Key activities include energy audits of residential buildings, a lighting survey of public and commercial buildings, vehicle-efficiency testing, a community-attitude survey on energy, an energy fair in cooperation with a local radio station, and creation of an energy information center and a hot-line telephone at the Northfolk Library.

Ord will be conducting a research and information project on alcohol-fuels production. On-farm alcohol production units will be manufactured and tested, with the help of a local company and an area farmer who has obtained an experimental alcohol-production permit. A solar still is included in

Category Financing
State NB
Project Name Local Energy Conservation Grants Program

Organization Nebraska Energy Off

Address P.O. Box 95085
Lincoln, NB 68509

Contact Ms. Teri Carey

Telephone (402) 471-2867

Funded By DOE

Cost n/a

Congressional District State-wide

Compilation Date February 1980

other units to be tested. All information gathered will be made available to the public.

Quarterly reports, pictorial presentations and project results will be available.

It is expected that a second round of local energy grants will be offered early in 1980 for September 1, 1980, implementation.

Renewable Resources— A National Catalog of Model Projects

This 2,700 ft² home located in Bennet incorporates many energy conserving techniques into its design. It features earth-berming, air lock entries, extra insulation, night-time insulation, and limited glass exposure on the north, east, and west.

Forty tons of rock storage are located in the basement of the home. It is presently being used as an energy/heat buffer. Hot air is drawn off the upper lever of the house and forced through the rock storage before it is distributed throughout the home. Cooling is accomplished with natural ventilation.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NE
Project Name Energy-Conserving Residence

Organization Nebraska State Solar Office
Address W191 Nebraska Hall
Lincoln, NE 68588
Contact Sally Beck
Telephone (402) 472-3414

Funded By Owner
Cost \$1,500 - \$2,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The solar furnace in this 1,245 ft² home is a frame-type collector built by the owner. It is estimated that the system meets 35 percent of the home's heating needs.

The south-facing collector of the furnace has fiberglass glazing covering halved beer cans. The halved cans are painted with flat black enamel and used as absorber plates.

The space inside of the A-frame is filled with 14 tons of river bed rocks that serve to store heat. A blower is used to move the hot air into the home when needed. The system is completely controlled through a solid state control center.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Home Solar Furnace

Organization Nebraska State Solar Office

Address W191 Nebraska Hall
Lincoln, NB 68588

Contact Sally Beck

Telephone (402) 472-3414

Funded By Owner

Cost \$2,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In Washington County, Nebraska (20 miles north of Omaha) architect Charles Morton has built "the House at Maka Ina." Maka Ina, which means "Mother Earth" in the Sioux language, was designed to be both energy-efficient and architecturally pleasing.

The earth-sheltered house is constructed with reinforced masonry walls and a poured-in-place concrete roof structure. The wall insulation was surfaced with metal lath and stucco. The roof was covered with four-inch insulation, two inches of coarse gravel, a fiberglass soil separator blanket, 14 inches of earth, and a topping of native grass and wild flowers. The calculated time lag for heat to pass through the roof is approximately 36 hours. A very stable indoor temperature is maintained.

The house is oriented at 15 degrees east of due south to maximize the penetration of morning sun and to minimize that of the afternoon. Glass areas are concentrated on the south (about 85 percent), while windows are used sparingly on the other elevations. The north side of the house is mostly buried into the hill.

A two-story sunspace, the Solarium, is located at the heart of the house. This glassed-in, outdoor room, unheated except for the sun (although a small electric heater is used for emergencies), relies on natural ventilation for summer cooling. The Solarium opens via sliding glass doors to the terrace, which joins all south-facing spaces. These large glass doors have sliding insulating panels that can be closed over them in cold weather and at night. These add significantly to the home's ability to retain heat.

The house at Maka Ina incorporates both active and passive solar-heating systems. The active systems consist of solar collector panels in which air is heated. The hot air is passed through a bed

Category	Housing
State	NB
Project Name	The House at Maka Ina
Organization	Charles H. Morton Architect
Address	Route 1, Box 228A Ft. Calhoun, NB 68023
Contact	Charles H. Morton
Telephone	(402) 468-5369
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

of pebbles where it gives off some of its heat before returning to the collector. When the house requires heat, return air from the rooms circulates through the heated pebbles on its way to the air-handler, where supplementary heat may be added, (if required) by a heat pump.

In summer, the heat pump is used as an air conditioner. Another summertime cooling aid is a system to cool both the house and the pebble bed storage can be cooled with the heat pump at night (when it runs most efficiently). During the day, the cold stored in the pebble bed can be circulated through the house.

The design of the house itself is a solar collector, gaining heat directly through the windows and indirectly by use of the sunspace in the Solarium. The Solarium stores heat for nighttime release in its brick floor and sand bed. The brick floor and pool are insulated from the earth with foamed polystyrene insulation.

The house's ability to retain the sun's warmth comes from heavy insulation and massive structural elements.

Active and passive solar equipment and designs meet about 70 percent of the building's space-heating needs.

Renewable Resources— A National Catalog of Model Projects

This 1,920 ft² three-bedroom home is equipped with solar space- and water-heating. Triple-glazed windows, and heavy use of wall and roof insulation contribute to the effectiveness of the structure.

Liquid flat-plate collectors mounted on the roof cover 410 square feet. A heat exchanger is used to transfer heat between the anti-freeze collector loop and the water storage. Heated water from storage is pumped to coils in the air ducts for space heating, and to the heat exchange jacket around the preheat tank for water heating.

The house was monitored during the winter of 1977-78. The solar contribution to heating was pegged at 78 percent.

Category Housing
State NB
Project Name Lincoln Solar Home

Organization Peterson Construc
Company

Address 1325 Galloway Ave.
Lincoln, NB 68512

Contact Dale Geistlinger

Telephone (402) 472-3414

Funded By Cycle 3 HUD grant

Cost \$13,721

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Three duplex buildings (6 townhouses) in Plattsmouth, Nebraska, have converted to solar energy to meet 70 percent of their space- and water-heating needs. Each townhouse has two bedrooms and a fireplace.

The roof-mounted collectors cover a 512.5 ft² area on each town house. A heat exchanger is used to transfer heat between the antifreeze collector loop and the water storage. Hot water from storage is pumped to coils in the ducts for space heating and to the heat exchange jacket around the preheat tank for domestic hot water.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Lincoln Solar Townhouse

Organization Nebraska State Solar Office

Address W191 Nebraska Hall
Lincoln, NB 68588

Contact Sally Beck

Telephone (402) 472-3414

Funded By Cycle 3 HUD Grant

Cost \$14,966 per/townhouse

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This home solar space-and water-heating system was completed in November of 1977. This design is unique in that the solar collector can be converted to a greenhouse by simply removing the absorber panels.

The volume type air collector has two glass covers and encompasses 128 square feet. It is located on the south side of this four-bedroom home at ground level. There are eight absorber panels, each containing 250 aluminum beer cans, the tops of which have been removed and the cans painted black.

Heated air in the collector is forced through ducts into a storage unit composed of 8,000 beer cans. Each can is filled three-quarters full with dry sand. Water is preheated through 60 feet of copper tubing woven over collected cups.

The cost of this system was \$2,500. It meets 50 percent of the annual space-heating and water-heating needs.

(The owner has requested that personal information be kept confidential, so please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NE
Project Name Louisville Home

Organization Nebraska State Office

Address W191 Nebraska Hall
Lincoln, NE 68588

Contact Sally Beck

Telephone (402) 472-3414

Funded By Owner

Cost \$2,500

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Housing
State NB
Project Name Scottsbluff
Solar Home

Organization Nebraska State
Solar Office
Address W191 Nebraska Hall
Lincoln, NB 68588
Contact Sally Beck
Telephone (402) 472-3414

Funded By Owner

Cost n/a

Congressional District III

Compilation Date February 1980

This 1,500 ft² home, located in Scottsbluff, is equipped with a solar system that provides space heating, cooling, water-heating. Earth-banking, a west-facing garage, and a sloping roof that directs the prevailing winter winds over the house are featured in this total passive structure.

The house built on a slab is organized around a large stone wall that forms the north wall of the major living area. Sunlight enters through windows on the south and heats the stone wall.

Hot air at the top of the sunspace is taken by return air grills and forced through ductwork in the stone-filled wall. It is then forced through additional ductwork in a stone bed beneath the floor slab. Finally, the warm air is emitted through floor registers.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance).

Renewable Resources— A National Catalog of Model Projects

A 4,100 ft² home located in Rokeby, Nebraska, has been equipped with a solar energy system to provide space heating and water heating (for use in the home and the swimming pool). This is an active system that is expected to provide 50 per-cent of the home's energy.

Blackened plywood absorber panels are placed between the roof rafters to absorb solar radiation. Air passing between the absorber and glazing is heated and then circulated across a coil to heat water pumped from storage.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Office for possible assistance.)

Category	Housing
State	NB
Project Name	Solar-heated Home and Pool
Organization	Nebraska State Solar Office
Address	W191 Nebraska Hall Lincoln, NB 68588
Contact	Sally Beck
Telephone	(402) 472-3414
Funded By	Owner
Cost	\$8,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

This 2,200 ft² home was designed with passive solar characteristics and energy-conservation in mind. Earth-banking on the north, a garage on the west, and a hip roof profile that directs winter winds over the house all combine with the south-facing glass wall to reduce winter heat needs. Night-time insulated panels of styrofoam are used to cover glass areas in the winter.

The open character of the house (which was built in 1976) and a combination of low perimeter and high, centrally located screened vents allow the house to be cooled and ventilated naturally during the summer months.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Solar Home

Organization Nebraska State Solar Office
Address W191 Nebraska Hall
Lincoln, NB 68588
Contact Sally Beck
Telephone (402) 472-3414

Funded By Owner

Cost n/a

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Located in Lincoln, this well-insulated house uses both active and passive solar systems to provide heat and hot water. The annual contribution of this unit represents 60 percent of the heat production and 90 percent of the hot water requirements.

Overhangs on the south are designed to prevent direct summer sun from striking windows, but to allow winter sun to provide solar heat gain and storage in sculptured metal water-filled tubes.

Thermal storage of the active solar system is used for heating in winter and cooling in summer. A domestic hot water preheat exchanger is located at the top of the solar storage bin for winter use.

(Because the owner has requested that personal information be kept confidential; please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Solar Home

Organization Nebraska State Solar Office
Address W191 Nebraska Hall
Lincoln, NB 68588
Contact Sally Beck
Telephone (402) 472-3414

Funded By Owner

Cost \$9,430

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This solar home located in Lincoln has been operational since January of 1976. It was retrofitted with a solar system that includes flat-plate collectors that cover 672 square feet of the roof. The solar unit meets approximately 55 percent to the annual consumption rate.

The solar storage bin is filled with ten tons of loosely stacked bricks. It utilizes the existing gas-fired furnace, a furnace fan, two thermostats, and five motorized dampers. A collector fan draws air from the top of the bin to circulate inside the house.

A passive solar greenhouse was added to the home at a later date.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Solar Home and Greenhouse

Organization Nebraska State Solar Office

Address W191 Nebraska Hall
Lincoln, NB 68588

Contact Sally Beck

Telephone (402) 472-3414

Funded By Owner

Cost \$2,500

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This residence in Goehner, Nebraska has been modified by the owner to include a solar heating system. It is estimated that this design will meet 70 percent of the structure's heating needs.

The attic of this two-story home is fitted with a volume-type air collector with fiberglass roofing. The solar heated air is forced through ducts to the lower two floors, or to the rack storage in the basement.

The central unit has sensors in the attic, the heat storage room, and in a thermostat. Thus heat goes where it is needed. In the summer, the system will be sealed and hot air from the attic will be ducted to the outdoors.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Solar House

Organization Nebraska State
Solar Office

Address W191 Nebraska Hall
Lincoln, NB 68588

Contact Sally Beck

Telephone (402)472-3414

Funded By Owner

Cost \$5,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This 4,000 ft² ranch home located in Columbus, Nebraska, uses solar energy for part of its space heating. It is estimated that the system provides 50 percent of the annual heating needs.

Air type flat-plate collectors are mounted vertically on the south wall. Two volume dampers control the air flow between the solar collectors and the house. When needed, conventional furnace heat is used. There is no solar storage in the house.

(Because the owner has requested that personal information be kept confidential, please contact the Nebraska State Solar Office for possible assistance.)

Category Housing
State NB
Project Name Solar Ranch House

Organization Nebraska State Solar Office

Address W191 Nebraska Hall
Lincoln, NB 68588

Contact Sally Beck

Telephone (402) 472-3414

Funded By Owner

Cost \$5,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The cultural-health center owned by the Omaha Tribal Council is equipped with a solar system that provides approximately 70 percent of the domestic hot water for the building. The flat plate-collectors covers 225.5 square feet of the roof. Collected energy is transferred by antifreeze and stored in three 120-gallon water tanks.

The system has been operational since April of 1978. It was funded by the Economic Development Administration (EDA) at a cost of \$51,000.

Category	Institutional
State	NB
Project Name	Cultural Health Center
Organization	Omaha Tribal C 1
Address	Macy, Nebraska 68039
Contact	Garry Harley
Telephone	(402) 339-2420
Funded By	Economic Development Administration
Cost	\$15,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In April of 1977, the Douglas County Correctional Facility was converted to solar energy to meet its space-heating and water-heating needs. Funding from the Economic Development Administration enabled the Department of Corrections to install the solar system at a cost of \$317,000.

The correctional facility (84,995 ft²) has a capacity for 200 people. The solar system is designed to meet approximately 20 percent of the annual space- and water-heating needs. The flat-plate collectors, south-facing and roof-mounted, cover 500 square feet.

The 20,000-gallon water storage tank is located below grade. It utilizes a heat exchange linked to an antifreeze collector loop: The hot water from storage is pumped to the coils in the ducts for heating and to the heat exchangers to preheat water for domestic use.

Category Institutional

State NB

Project Name Douglas County Correctional Facility

Organization Douglas County of Department of Correction

Address Omaha Douglas Civic Center
Omaha, NB 68102

Contact Dana - Larson - Roubal

Telephone (402) 393-4100

Funded By Economic Development Administration

Cost \$317,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This pilot project provides preheated water to the existing domestic hot water system in Mabel Lee Hall, a large physical-education facility on the University of Nebraska's Lincoln campus. The system has been operational since March of 1978, annually meeting 60 percent of the building's hot-water needs.

The system includes two ground-mounted 208 ft. long collectors, a large underground storage container, piping pumps, and controls. The double-glazed south surface is a flat-plate system, with freeze-proof silicon oil pumped through aluminum absorber sheets beneath the glazing. The north collector is a hybrid air/water system.

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Category	Institutional
State	NB
Project Name	UNL Pilot Solar Project

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Organization	University of Nebraska-Lincoln
Address	Mabel Lee Hall Lincoln, Nebraska 68583
Contact	Nebraska State Solar Office
Telephone	(402) 472-3414

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Funded By	State of Nebraska
Cost	\$110,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Nebraska has been a leader in the development of biomass fuels, primarily crop derived ethanol alcohols, that are mixed with diesel or gasoline to produce gasohol.

Legislation has been enacted to support gasohol research, which is conducted at the University of Nebraska at Lincoln. The financing of testing facilities has been mandated, and the use of gasohol in the State's Department of Roads vehicles, where feasible, is now required.

This past legislative session, a special tax was levied on other gasoline products to finance a fund for the construction of ethanol plants. This legislation has been challenged as unconstitutional based on the state's credit provision. Currently, the matter is before the courts.

(To date, no ethanol production facilities exist within the state. However, such a plant is currently under construction near Lincoln.)

Other proposed pro-solar legislation includes a constitutional amendment exempting solar installations from the state's property tax laws. This amendment passed the legislative and executive processes, but failed in a vote of the people.

Currently, legislation is pending to provide savings in state government energy expenditures through the use of cost-effective energy given to incorporating thermal- and lighting-efficiency dards in a state-wide building code.

table
Category	Legislation
State	NB
Project Name	1980 Energy Legislative Package (Proposed)

table
Organization	1980 Energy Legislative Package (Proposed)
Address	Senator Don Wesely State Capitol Bldg. Lincoln, NB 68509
Contact	Don Macke
Telephone	(402) 471-2347

table
| Funded By | n/a |

table
| Cost | n/a |

table
| Congressional District | I |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Midwest Energy Alternatives pledges to "improve the quality of life for ourselves and our children by promoting a more rapid transition toward the use of non-polluting and inexhaustible energy sources and the conservation of limited earth resources." MWA was launched in December of 1975 by a group of concerned citizens who saw the need for local cooperative effort in solving the energy problem. MWA involves both consumers and producers in this effort.

MWA provides a number of services. It publishes a monthly journal, conducts tours of solar and earth-sheltered homes, holds public information meetings, staffs a MWA energy reference library and mobile energy-information center, and coordinates solar workshops.

Any person can become a member of MWA by making a minimum contribution to the organization. MWA is a people's approach to solving the energy problem. Volunteers devote many hours to the various MWA activities.

Category	Outreach
State	NB
Project Name	Midwest Energy Alternatives (MWA)
Organization	Midwest Energy Alternatives
Address	2444 B Street Lincoln, NB 68502
Contact	Lincoln B. Justice
Telephone	(402) 477-1977
Funded By	Individual Donations
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Nebraska Solar Resource Advisory Panel (NSRAP) serves as the citizen advisory group for several state and federal agencies that deal with renewable energy resources. These groups include Mid-American Solar Energy Complex, Nebraska State Solar Office, and the Nebraska State Energy Office.

NSRAP, a non-profit organization, is responsible for advising these agencies on current and proposed agency policies, programs and priorities, current and proposed agency allocations of financial and staff resources, and the identification of new needs and resource opportunities.

NSRAP exists solely to provide interested Nebraskans with the opportunity to voice their views of how best to develop Nebraska's renewable energy resources.

Category	Outreach
State	NB
Project Name	Nebraska Solar Resource Advisory Panel

Organization	Nebraska Solar Resource Advisory Panel
Address	Nebraska State Solar Off. W 191 Nebraska Hall Lincoln, NB 68588
Contact	Dr. Bing Chen, Chairperson
Telephone	(402) 472-3414

Funded By	MASEC (Mid-American Solar Energy Complex)
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Cost	n/a
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Congressional District	State-wide
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

The Nebraska State Solar Office is jointly assisted by the Nebraska State Energy Office and the University of Nebraska's Energy Research and Development Center. NSSO is active in five programming areas: research, development, demonstration, commercialization, and policy formation.

One of the most effective activities of the agency has been its information services and its workshops. These workshops have dealt with passive architecture, solar water heating, general introductory material (for financial community persons), and various other topics.

The NSSO is part of the twelve-state Mid-American Solar Energy Complex (MASEC), which is one of four Regional Solar Energy Centers funded by DOE. The activities of the Regional Centers will compliment the research efforts carried out by the Solar Energy Research Institute (SERI) in Golden, Colorado.

Category State
State NB
Project Name Nebraska
Solar Office

Organization Nebraska State
Solar Office
Address University of NB-
Lincoln
Lincoln, NB 63583

Contact Robert Youngberg

Telephone (402) 472-3414

Funded By Federal Funding

Cost n/a

Congressional District 1

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Solar Electric Heat Pump Demonstration Home was completed in November of 1975. Constructed for under \$30,000, the 1,089 ft² home was built on a utility-owned site. The solar electric heat pump constructed at a cost of \$2,000 was the result of a joint effort by the University of Nebraska-Lincoln and the Lincoln Electric System (UNL-LES).

The volume-air collector houses a heat pump within a solar heated space. In winter, a freon-to-water heat exchanger is used to transfer heat from the solar-assisted heat pump to the water storage. The water is circulated through a fan coil vent on demand to heat the home. In summer, the unit operates during off-peak night hours to chill water for space cooling.

The annual heating contribution of the system was rated at 60 percent, but the actual contribution is 43 percent.

Category	Utility
State	NB
Project Name	Solar Electric Heat Pump Demonstration Home
Organization	Lincoln Electric System (LES)
Address	P. O. Box 80869 Lincoln, NB 68501
Contact	LES Customer Service Division
Telephone	(402) 475-4211
Funded By	Lincoln Electric System
Cost	Under \$30,000 (heat pump - \$2,000)
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

A non-profit educational network known as the National Alcohol Fuel Producers Association (NAFPA) is seeking to speed the acceptance and use of alcohol fuels.

NAFPA wants to "expand the world-wide alcohol fuel industry in such a way that the technology will be appropriate to local needs and conditions and will be under local control by farmers."

Category Agricultural
State NE
Project Name Alcohol Fuel Producers Assoc.

Organization National Alcohol Fuel Producers Association (NAFPA)

Address 1700 South 24th St.
Lincoln, NE 68502

Contact n/a

Telephone (402) 477-3101

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

NORTH DAKOTA

1. Bismarck
2. Cavalier
3. Dickinson
4. East Grand Forks
5. Fargo
6. Flasher
7. Grand Forks
8. Mandan
9. Minot
10. Vella

NORTH DAKOTA

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Renewable Resources— A National Catalog of Model Projects

On-farm alcohol production is a reality for potato-grower Warren Hartje. After a year and a half of planning and six months of building, Hartje cooked up his first two batches of potato mash in mid-August of 1979.

The alcohol plant sits inside a remodeled 50' x 72' machine shed. A headhouse was added to protect the distillation column. Hartje ferments cull potatoes although his plant can also use grain.

"We don't have all the bills yet," says Hartje. "I started out estimating it at \$50,000. But I think now, with the building and all, it'll be somewhere between \$75,000 and \$100,000."

The alcohol storage tanks are locked with government-owned locks. A government agent must inspect the seals and supervise alcohol denaturing with ketone, which is poisonous.

The plant was designed to fit Hartje's operation. Each year after grading his seed potatoes, Hartje has 30,000 hundred-weight of cull potatoes left. In the past, these have just been discarded.

Warren plans to operate the plant during North Dakota's long winter. Including raw materials, investment, depreciation, labor, and energy, it costs 50 cents to 60 cents per ton to produce 190-proof alcohol. This is based on a production of 30,000 gallons per year. Hartje hopes to locate a livestock producer who can use the potato residue as feed.

Hartje frankly admits that his plant is only a pilot project. "There are many questions to be answered. It's strictly trial and error." However, he firmly believes that the needed research and development must be done on individual farms.

p>Category Agricultural
State ND
Project Name On-Farm Alcohol

p>Organization Warren Hartje
Address Cavalier, ND 58220
Contact Warren Hartje
Telephone (701) 265-8959

p>Funded By n/a
Cost \$50,000-\$100,000
Congressional District I
Compilation Date February 1980

Hartje will experiment with blending the 190-proof alcohol with gasoline. He intends to burn straight alcohol, starting with the easier-to-modify gasoline engines before using it in diesels.

Renewable Resources— A National Catalog of Model Projects

Gate City Savings and Loan installed a solar system at their Wahpeton branch office. It features forty-five 3' x 6' collectors mounted on the roof. This provides 810 ft² of collector area. This space-heating system uses water as the transfer medium.

Critique/analysis: The Association expressed a number of reasons for its interest in solar heating. First, solar is the only non-polluting, limitless energy source available. Second, solar provides an alternative to ever-costlier fossil fuels. Third, there is a shortage of natural gas hook-ups. And finally, Gate City Savings and Loan wanted to acquire some expertise in the solar heating field. It believes the day is fast approaching when customers will desire residential solar systems.

Category Commercial

State ND

Project Name Solar Bank

Organization Gate City Savings and Loan Association

Address Box 2847
Fargo, ND 58108

Contact n/a

Telephone (701) 293-2400

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Completed and occupied in late 1975, this four-story building is built into the side of a hill, faces southeast and is well insulated to minimize heat loss or heat gain, depending on the season. It is one of 13 commercial buildings funded by ERDA as solar demonstration projects around the country.

The solar system includes 5,000 ft² of flat-plate solar collectors, 270 collectors in five rows. The sun's rays pass through the double-paned glass and strike the copper absorber plate. Heat is then passed to a solution of water and antifreeze. A heat exchanger transfers the heat to a 20,000 gallon storage tank, which provides a three-day back-up heating supply.

The system meets approximately one-third of the heating requirements of the building. It is not designed for integration with the building's air-conditioning system. First-year results show that the panels collected 167 million BTUs of energy in an 81-day period (December 12, 1978 to March 2, 1979). This displaced \$1,713 worth of electricity. Assuming a full, six-month heating system, the electrical energy saved may be estimated at \$3,807.

Category Commercial
State ND
Project Name Solar Heating System

Organization Basin Electric Power Cooperative
Address 1717 East Interstate
Bismarck, ND 58501
Contact n/a
Telephone (701) 223-0441

Funded By DOE, (ERDA)
Basin Electric

Cost \$397,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This recently completed headquarters building for Blue Cross and Blue Shield of North Dakota is located near the intersection of Interstates 94 and 29 at the west edge of Fargo. The heating system features 200 solar panels with 4,000 ft² of collectors. In addition, four rows of offices are located underneath the panels and reap benefit from direct solar gain.

The North Dakota Chapter of the American Institute of Architects presented a special award of excellence in energy conservation to the firm that designed the building.

Category Commercial
State ND
Project Name Solar Offices

Organization Blue Cross/Blue Shield

Address West Acres Shopping Center
Fargo, ND 58102

Contact n/a

Telephone (701) 282-1100

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Basin Electric and the participants in the Coyote Power Project are using the sun's energy for heating water in a wash house in Mercer County near the Prairie Hills Housing subdivision in Beulah. The wash house uses 800 ft² of collector panels to heat approximately 1,800 gallons of water for showers and to provide heat for the building.

The showers are coupled to three-minute timers, which provide users with a 90 degree water mix. (The timers can be re-set to extend the shower time, if necessary.)

The solar system was first operated in the summer of 1979. Monitoring equipment installed on the wash house facility showed that in May, June and July, 5,844 kilowatt hours were saved. Based on the 1979 retail rate of 3¢/kwh, this amounted to a savings of about \$175 in actual energy purchased.

p>Category Commercial
State ND
Project Name Solar Wash House

p>Organization Basin Electric Power Cooperative
Address 1717 East Interstate Ave.
Bismarck, ND 58501
Contact n/a
Telephone (701) 223-0441

p>Funded By n/a
Cost \$70,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Larry Neubauer's energy needs are met by a combination of renewable energy systems. Attached to the south side, a 300 ft² greenhouse provides 50 percent of the space heating requirements for this home.

Heat is transferred from the greenhouse into the living area in three ways. First, the sun shines directly through the patio door and window. Heat trapped in the greenhouse also passes through these openings. Finally, the cold air return of the forced air furnace draws hot air into the furnace for distribution throughout the house. Six hundred gallons of water located in the greenhouse provide heat storage.

An integrated wind/solar system supplies all the domestic hot water needs. Fifty-four ft² of collectors located on the roof and a 3-KW wind generator in his back yard heat 125 gallons of water from a storage tank placed in the basement.

In addition to supplying domestic hot water, the storage tank is connected to the cold air return duct of the furnace. When needed, hot water can be pumped through 50 feet of water-to-air radiators to supplement other space-heating sources.

A wood-burning stove assists with space heating. Neubauer has voluntarily cut back significantly on his electric energy usage, and he receives all of his electricity through his 3-KW wind generator.

The greenhouse also provides year-round fresh fruits and vegetables and a built-in sauna.

p>Category Housing
State ND
Project Name Neubauer Residence

p>Organization Larry Neubauer
Address 304 2nd Avenue, N.E.
Mandan, ND 58554
Contact Larry Neubauer
Telephone (701) 663-3557

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

Renewable Resources— A National Catalog of Model Projects

This 100-percent solar house is located in Minot, North Dakota. About 80 percent of the construction was done by Roland and his wife, Jan. The house was built in 1978 for \$20,000 (less approximately \$2,000 in federal and state tax credits).

It has 350 ft² of collector area on the south wall and 70 ft² of open south-facing glazing for lighting and direct solar gain. In one recent test, the operation of all major house lights increased night-time indoor temperature from 58 degrees to 72 degrees in three hours, with a 0 degree outside temperature.

The house contains 634 ft³ of concrete for short-term (2-to 3-day) storage and 4,224 ft³ of earth for long-term annual heat storage. The annual heat storage capacity allows the house to store some late-summer heat for use in winter. Approximately 4,000 feet of 1" plastic pipe pass through both the bottom of the heat storage and the concrete floor. In case of power failure, vents can be opened in the collectors to allow heated air to thermosiphon into the house. The entire system can be reversed to cool the house during the summer. Daytime heat is stored in the concrete and released through the collectors at night.

An instant-flow water heater heats the water as it is needed. Water temperature is varied by changing the flow rate of water from the tap; the slower the flow, the hotter the temperature. There is no water storage tank. This type of water heater saves at least 50 percent on water heating costs.

A four-foot earth berm on the west and north walls cuts infiltration and adds insulation.

p>Category Housing
State ND
Project Name Riemers' Home

p>Organization Roland Riemers

p>Address 513 11th Street, N.W.
East Grand Forks,
ND 56721

p>Contact Roland Riemers

p>Telephone (218) 773-0926

p>Funded By Owner

p>Cost \$24,000

p>Congressional District I

p>Compilation Date February 1980

Tough energy-conservation measures make this house energy efficient. The ceiling is insulated to an R-36 rating and the walls to R-28. The sloping roof allows the cold northwest wind to pass over the house. All conventional windows are triple-glazed. Dimmer switches help cut electrical usage.

Renewable Resources— A National Catalog of Model Projects

Located atop the Mouse River Valley, Gordon Rosby's home commands spectacular views to the southwest, northwest, and northeast. However, its hilltop location exposes the building to the frigid northwest winter winds. This requires special attention to orientation considerations.

The 675 ft² of solar collectors provide the home with approximately two-thirds of its hot water and space heating needs. Auxiliary heat systems include a wood stove for cooking and space heating, and an electric in-duct coil for back-up.

Walls and ceilings all have extra-thick insulation, R-19 and R-33, respectively. The northwest wind blows snow off the garage and driveway. The double-door air chamber entrance, sheltered from the wind, minimizes air infiltration. Basement and second floor spaces can be isolated from the main living area and maintained at a lower temperature during the coldest months.

Triple-glazed windows capture the views. Window space was minimized on the north and west sides to cut exposure to the wind. Weatherstripped insulated shutters add warmth to these windows.

The deck shades the house from the hot summer sun on the south and west yet allows it to receive the cool southeast summer breeze.

At present, construction of this house is 70 percent complete. Plans are being made to add a 10-KW wind generator for 110 volt AC electrical production. This would provide most of the electricity the Rosby's need.

Category Housing
State ND
Project Name Rosby Residence

Organization Gordon Rosby
Address Route 6
Minot, ND 58701
Contact Gordon Rosby
Telephone (701) 852-2685

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

Renewable Resources— A National Catalog of Model Projects

The house has 600 ft² of solar panels: 200 ft² in back and 400 ft² in front. Mrs. Doran Smith describes the family's project as "survival" against rising energy costs.

"The only real expense we've had has been the glazing, which sells for roughly 65 cents a square foot," said Mrs. Smith. "All of the rest of the materials are salvage. We started four years ago when the house needed a new roof. We started putting on solar panels instead and also started a small greenhouse. The house was built in 1910 and this will be the first year that the basement will be heated due to the extra heat created by the panels".

"Even with energy prices increasing, we've managed to stay even," said Mrs. Smith.

Category Housing
State ND
Project Name Smith Residence

Organization Doran Smith
Address 411 North 12th Street
Fargo, ND 58102
Contact Doran Smith
Telephone (701) 237-0393

Funded By Owner

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

These two solar greenhouses are attached to Fargo North High School. The upper one was built by the Southeastern North Dakota Community Action Agency (SENDCAA) in the fall of 1977. The lower one was built by students from a high school carpentry class with technical assistance from SENDCAA. Donations from local businesses helped support these projects.

Category Institutional

State ND

Project Name High School Greenhouses

Organization Fargo North High 01

Address Fargo, ND 58102

Contact n/a

Telephone (701) 241-4701

Funded By Donations

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This 400 ft² collector was built by the Fargo Community Action Agency. The system utilizes 4,200 beer and pop cans. The cans are painted black to absorb the rays of the sun. Those cans that appear white in this picture have rotated since the system was built. It's a good policy to paint the entire can when building a system of this type in case the cans somehow manage to rotate. Fuel savings in this house are estimated at 35-40 percent.

Category Low Income
State ND
Project Name Aluminum Can Collector

Organization Fargo CAA
Address 1448 1st Avenue South
Fargo, ND 58102
Contact Eddit Brusnvold
Telephone (701) 232-2452

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

Renewable Resources— A National Catalog of Model Projects

This solar system, built by the Fargo Community Action Agency in the spring of 1977, has 112 ft² of collectors. The fuel savings for this small house have been estimated at 50 percent by Eddit Brunsvold energy coordinator for the Fargo CAA.

Category Low Income
State ND
Project Name Low Cost Solar

Organization Fargo Community Action Agency
Address 1101 29th Street North
Fargo, ND 58102
Contact Eddit Brunsvold
Telephone (701) 232-2452

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In Grand Forks, the North Dakota Migrant Council owns a member-built experimental greenhouse. Built four feet below ground level, the greenhouse is completely insulated on roof, floor, and sides with an earth berm to the north. The greenhouse is 16' x 36', with an entrance vestibule. The concrete floor and water drums provide heat storage.

This greenhouse, part of a Community Gardening Project, is used to raise vegetables and vegetable starters. Research to determine the feasibility of year-round vegetable production is under way.

Plans call for the installation of a windmill to power the lighting and a fan.

Category Low Income.
State ND
Project Name NDMC Greenhouse

Organization North Dakota Migrant Council (NDMC)
Address Post Office Drawer X
Grand Forks, ND 58201
Contact Jerry Nagel
Telephone (701) 746-6494

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Energy costs hit poor and low-income people harder than anyone. Crisis assistance programs serve only as an expensive band-aid. They fail to solve the problem, but cost taxpayers large sums.

To relieve the burden that energy costs impose on the poor and the associated tax costs to the middle class, Community Action Programs (CAP) throughout North Dakota have led the way in innovative solar solutions. Funding has been provided by the federal Community Services Administration (CSA) and Department of Energy (DOE).

Meeting the needs of low-income and elderly people on fixed incomes has required imagination. Products have had to be inexpensive, reliable, made of local materials, reasonably attractive, able to withstand Dakota weather, and simple to make (so that unskilled labor could be employed).

CAP has constructed and installed both passive and active solar air and water heaters in the Minot, Grand Forks, Fargo, Jamestown, Bismarck, and Dickinson areas. Solar greenhouses, mostly home-attached, have been constructed in the Minot, Grand Forks, Fargo and Bismarck areas. Grand Forks' CAP also has a wood-burning project. All CAP conduct large weatherization programs, and make available information on energy conservation of all kinds.

Category Low Income
State ND
Project Name North Dakota Community Action Association

Organization North Dakota Community Action Association
Address 601 East Bismarck Ave.
Bismarck, ND 58501
Contact Bill Roath
Telephone (701) 222-0506

Funded By CSA, DOE

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Association of North Dakota, a non-profit corporation, will allow North Dakotans to interact formally with the Mid-American Solar Energy Complex (MASEC). The Association will represent the opinions and needs of the state's citizens, generating support for and information on renewable energy sources.

Governor Arthur A. Link recently appointed thirteen members to the NDEA's Board of Directors on the basis of geographical and occupational considerations. The directors have not yet met to determine the direction and activities of NDEA.

Category Outreach
State ND
Project Name Energy Association of North Dakota (NDEA)

Organization Energy Association of North Dakota (NDEA)
Address Engineering Experiment Station
Box 8103
Grand Forks, ND 58202
Contact Mason Somerville

Telephone (701) 777-3132

Funded By MASEC

Cost \$24,000/year.

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Consumer and Utility Law Project represents low-income residents of North Dakota in many areas of consumer, energy, and utility law. The bulk of the staff's time is devoted to utility rates and related utility-company policies.

CULP was founded in June of 1978. It was the product of a joint-venture between Legal Assistance of North Dakota and Quad County Community Action Agency. Before long Community Action Programs throughout the state wanted to participate in this project. In June of 1979, a new joint-venture agreement took effect between LAND and the North Dakota Community Action Association. CULP's offices are presently located with the state office for LAND in Bismarck. The project is staffed by one full-time attorney.

CULP's primary purpose is to intervene in each gas and electric utility rate increase application filed with the Public Service Commission. It hires expert witnesses for rate hearings and, where necessary, appeals the decisions of the Commission to the courts.

CULP has also been active in the legislature. It lobbies on bills that would directly affect utility rates.

CULP is also investigating rural electric cooperatives, which are major service-delivery mechanisms in North Dakota. Many low-income households depend on the RECs for electric power. No direct advocacy efforts are under way in this area since the co-ops are not regulated by the Public Service Commission. CULP is preparing a study of rate-setting and customer service policies observed by the co-ops.

In addition, CULP staff members devote

Category	Outreach
State	ND
Project Name	Energy-Related Law Practice
Organization	Consumer and Ut Law Project (CU)
Address	222 West Bomen Avenue Bismarck, ND 58505
Contact	Susan Rester
Telephone	n/a
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

considerable time to community-education activities. They address groups throughout the state on utility and energy issues. The most significant community-education project consisted of seven workshops held at various locations around the state on utility rate-setting and rate structures.

Renewable Resources— A National Catalog of Model Projects

The Dakota Resource Council is an organization of North Dakota ranchers, farmers, and other citizens concerned about the consequences of rapid energy production in western North Dakota. The Council recognizes that large-scale industrialization may disrupt traditional lifestyles and values and may jeopardize the state's number-one industry--agriculture--by competing for the state's productive land, clean air, and water.

The goal of DRC is to encourage and assist the participation of North Dakotans, both urban and rural, in the important decisions that affect their lives. The Council is firmly committed to the protection of prime agricultural lands. DRC feels that agricultural, municipal, and domestic uses of surface and ground waters should receive top priority. As an alternative to large-scale industrialization, the organization advocates the development of renewable resources.

Council members concentrate on research on energy development, communication/education through newsletters/presentations, and advocacy.

Category	Outreach
State	ND
Project Name	Dakota Resource Council (DRC)
Organization	Dakota Resource Council (DRC)
Address	Box 254 Dickinson, ND 58601
Contact	John Norton
Telephone	(701) 227-1851
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

This private non-profit corporation was incorporated in May of 1979 to encourage the use and development of renewable energy resources. The major activities of this organization are educational programs and supporting legislation favorable to renewable energy at the state level. In addition, an office will be established to act as a clearinghouse for the latest information on renewable resources.

The group is developing a state-wide, membership-supported corporation with regional and county coordinators throughout North Dakota.

Category Outreach
State ND
Project Name Dakota Sun

Organization Dakota Sun
Address Box 5033
Grand Forks, ND 58201
Contact Jerry Nagel
or
Dave Haley
Telephone (701) 746-6494
or
(701) 252-8803

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Jerry Nagel is the Special Projects Coordinator for the North Dakota Migrant Council. He is the project director of a six-state (North Dakota, South Dakota, Montana, Wyoming, Colorado and Utah) conservation/renewable energy project, which involves all farmworker programs in that region. The theme of this project is self-sufficiency. Activities include the weatherization of homes, building of solar collectors to be placed on homes, and consumer and utility advocacy.

Category Outreach
State ND
Project Name North Dakota
Migrant Council

Organization North Dakota
Migrant Council

Address Post Office Drawer X
Grand Forks, ND
58201

Contact Jerry Nagel

Telephone (701) 746-6494

Funded By n/a

Cost n/a

Congressional District 1

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Federal Aid Coordinator's Office of Energy Management and Conservation facilitates and coordinates energy-related activities between the public and private sectors. It responds to, plans for, develops, and implements appropriate energy-conservation programs and encourages the adoption of alternative energy technologies.

The Energy Office has programs in energy conservation and renewable energy. The energy conservation programs focus on educating the public to better understand the energy problem. They encourage the cooperation and voluntary participation of the citizenry in reducing wasteful energy consumption.

The alternative energy program concentrates on public awareness, information collection, information packaging and dissemination, consumer protection, intergovernmental communication, (legislative) initiatives, and financial incentives to facilitate the increased use of solar and other alternative energy resources.

Category	State
State	ND
Project Name	Federal Aid Coordinator's office

Organization	ND Energy Commission
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Address	1555 North 12th St. Bismarck, ND 58501
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Contact	Cliff Ness
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Telephone	(701) 224-2250
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Funded By	DOE
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Cost	n/a
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Congressional District	I
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

In December of 1978, Mor-Gran-Son Electric Cooperative established an energy-conservation program for the "efficient use and conservation of electric energy both for the Cooperative and its member customers." Working with groups knowledgeable in housing, commercial building, irrigation, and renewable energy, the Coop is developing programs on load control, energy efficiency, and renewable resources. The central focus of the program has been the on-site energy audit.

When conducting audits, Mor-Gran-Son staff analyze the building orientation in relation to the natural surroundings, the building materials used in construction, the heating, cooling, and hot water systems, and the appliance and machinery efficiencies. Additionally, the auditor checks the homeowners' energy use and conservation habits. The Cooperative views the energy audit not only as a building analysis, but also as an educational tool to increase members' knowledge of conservation and renewable resources.

While these energy audits are the most visible part of Mor-Gran-Son's efforts, their energy-conservation activities also include a load-control and energy-conservation program for its own use. This program includes analysis of all forms of energy consumed: electricity, gasoline, and diesel fuel. A utility rate structure that reflects a flat rate per kilowatt hour plus a capacity charge is being developed.

Category	Utility
State	ND
Project Name	Energy Audits

Organization	Mor-Gran-Son Elec Cooperative
Address	Flasher, ND 58535
Contact	Bob Hoffman
Telephone	(701) 597-3301

Funded By	Mor-Gran-Son
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Cost	n/a
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Congressional District	I
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Category	Utility
State	ND
Project Name	Verendrye Electric Cooperative

Verendrye Electric Cooperative is involved with conservation/renewable energy in a variety of ways. For approximately two years, it has conducted energy audits for its members. (At present, Verendrye has 4,000 residential members.) The Cooperative has set an ambitious goal of 400 energy audits, 10 percent of its residential system, to be completed by 1980.

Any new customers requesting electric heat, receive heat-loss calculations on their prospective home. Verendrye compares the costs and benefits of the various fuel types. This is then presented to the prospective members before they are hooked into the system.

Verendrye also administers a weatherization loan program out of its general fund. It is similar to Farmers Home Administration programs. Only a part of the Co-op's members qualified under the non-rural requirement of the FmHA program. In an effort to expand this program to all its members, Verendrye established its own program for those not eligible under FmHA.

Educating people about conservation and renewable energy is another Verendrye emphasis. A solar water heater is displayed in the Velva office. Personnel explain to interested members how the heater works. The Co-op also is negotiating with the North Dakota Energy Office and the Department of Energy to obtain grant money for a 10-KW wind generator. If they are successful, generator will be located near Minot.

Organization	Verendrye Electric Cooperative
Address	Velva, ND 58790
Contact	Wally Bier
Telephone	(701) 338-2855

Funded By	Co-op
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Cost	n/a
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Congressional District	I
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Compilation Date	February 1980
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OHIO

1. Columbus
2. Euclid
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4. Kent
5. Mansfield
6. Miamisburg
7. Middletown
8. Milan
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10. Oberlin
11. Piketon
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16. Greenwich
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Renewable Resources— A National Catalog of Model Projects

Ten farmers will install solar systems on new or existing livestock structures as part of a three-year energy-demonstration project. The demonstrations will show swine and dairy farmers across the state ways to conserve fossil fuels.

Participants were selected from the many farmers eager to work solar systems into their normal farm operations. Government financing covers up to 50 percent of the solar installation costs, which vary in cost from \$1,000 to \$25,000. Coop Extension expects energy savings to range from 10 to 20 percent for the lower-cost units and up to 75 percent for the more expensive systems.

Cost-effectiveness played a large role in system design and equipment selection. For example, two dairy farmers will use solar to heat their milking parlor, but not for water heating. Instead, through cogeneration, waste heat from the milk and from the refrigeration unit will provide enough heat for hot water at about 1/10 the cost of a solar system.

The typical swine-farrowing house requires a steady supply of heat from an outside source. Only a few days elapse between litters. For other livestock and for grain-drying, the heating systems are only used for a few weeks to six months of the year. The payback is therefore quickest on swine structures.

Farm "field days" and county or area shops will reach local farmers. Response will be sent to interested farmers after a "field day" or workshop to determine the effect of the programs.

A slide/cassette program about the demonstrations will be available. Information about the projects will be sent to over 200 farmers who have expressed an interest in solar energy. Special programs will reach vocational-agriculture teachers, extension employees, and Ohio

Category	Agricultural
State	OH
Project Name	Farming Conservation Methods

Organization Cooperative Extension Service

Address 2073 Neil Avenue
Columbus, OH 43210

Contact Randall Reeder, PE

Telephone (614) 422-8972

Funded By DOE, USDA, Landmark,
Inc.

Cost	\$51,000+
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Congressional District State-wide

Compilation Date February 1980

State teachers and students. Data from these systems will allow Coop extension to recommend system changes on a case-by-case basis.

The ten systems built in conjunction with this program vary. Gary Ames' new 6-crate farrowing house and nursery will use a commercial active solar heating system. At a cost of \$25,000 (including that for water storage), the system will handle 70 percent of the total heating load. Alonzo Orr will retrofit his existing 24-crate farrowing house. The heating system will feature a 16-inch thick south wall of solid concrete blocks for heat storage and a vertical collector of fiberglass reinforced plastic (FRP) panels. The roof of Richard Steiner's new nursery will be covered with clear FRP panels. This solar-heated attic will provide warm air when the sun shines, and the \$1,000 investment will cut fuel use by 15 percent. Harlan Baldwin's new nursery will incorporate a solar water system with automatic drain-back to an insulated storage tank. Hot water lines in the floor will distribute the heat collected by \$10,000 worth of collectors on the ground. For \$2,000 John Greten added a south roof of clear fiberglass to his 24-crate farrowing house. Warm air from the attic is pulled into an insulated air duct and center hallway to warm the rooms. Wayne Upton's new nursery with south roof FRP panels will cost about \$1,000. Botkins Grain is adding a solar collector to a 12-foot wide modular building that will be used as a pig nursery. Air collectors mounted on the south wall will pre-heat ventilation air when the sun shines. Dave and Tom Brown's new farrowing house will have a commercial solar system similar to Gary Ames'. Roger Peterson's new 60-cow dairy incorporates a \$12,000 commercial solar heating system. The collectors mounted on the roof of a free-stall barn are linked to a eutectic-salt storage medium, which changes phase at 90 degrees F. Richard Forbes' solar attic with FRP panels is attached to a milking parlor he added to an existing barn.

Renewable Resources— A National Catalog of Model Projects

J. R. Wallrabenstein has as much experience in solar grain drying as anyone. For five years he has used a solar system to dry about 20,000 bushels of corn per year at a cost of 2.5 cents per bushel. The collector is a multi-layer heavy plastic bag with dimensions of 15' x 85'. The system's small meter delivers 3000 cubic feet of air per minute with a temperature rise of 30 degrees.

"It is the black plastic under the clear vinyl cover that absorbs heat and warms the outside air that is forced into this 'tunnel' by a $\frac{1}{4}$ horsepower fan. This little fan keeps the bag inflated, while the big 10-horsepower fan connected to the bin pulls the air from the collector and mixes it with outside air before pushing it into the bin to dry grain." (The Ohio Farmer, May 1, 1976, "Letting the Sunshine Dry Grain in the Bin.")

The solar unit is usually in operation from the first week in October until December. With enough cool dry days, the shelled corn reaches 40 degrees F and 15.5 percent moisture. Then, the system can be shut down since the corn is stable in storage unless the warm weather returns.

Supplemental heat comes from 250-watt heat bulbs. But this source is not used unless the weather is particularly wet and foggy or the corn has a high moisture content. Energy costs kept at a minimum since the regular operation requires only three small fans. Solar drying requires patience, planning and decent weather. Its main disadvantage is that it is slow, J. R. Wallrabenstein points out. Still, speed depends in part on how the sizes of the solar unit and fan compare to those of the storage structure. Moisture, volume of air, static pressure, and other storage factors must also be taken into account.

Category Agricultural
State OH
Project Name Solar Grain Drying

Organization J.R. Wallrabenstein

Address R.R. 1
Milan, OH 44846

Contact J.R. Wallrabenstein

Telephone (419) 499-2314

Funded By Private

Cost \$1,500

Congressional District XIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This 24' x 64' building has 384 square feet of collectors. The six foot high unit extend 64 feet on the south wall of the confinement building. It uses a black gravel bed as a low-cost storage system. The unit will also be used to dry grain in adjacent pens.

The builder states that confinement buildings have large wall and roof areas that can be used as solar collectors at reasonable cost. Fitting a solar unit onto the building is economically justified since the present price for a high-grade steel structure is around \$51.00 per square foot, while good solar panels cost about \$62.00 a square foot.

Category Agricultural
State OH
Project Name Swine Farrowing House

Organization L.K. Builders and Supply
Address R.D. #2
Greenwich, OH 48837
Contact L.K. Builders and Supply, R.D. Rt. #1
Shiloh, OH 44878
Telephone (419) 895-1154

Funded By n/a

Cost \$39,000

Congressional District XVII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In the face of a deepening energy crisis, Middletown officials began some effective "do-able" activities. Building citizen support, the city has put into effect a comprehensive energy-management program. Further, it has done so largely with its own resources.

Says Robert Moschell, Director of Public Utilities and City Energy Coordinator, "Certainly there are national issues that will need to be addressed, ... but the problem, if solvable, will be by a series of community and regional energy actions... We have been so indoctrinated in the concept that 'bigger is better' and letting other agencies take the lead in solving problems that we lose sight of the essential objective."

In 1978 Middletown considered applying for a federal "Community Energy Management Planning" grant, but it decided that the benefits would be outweighed by added demand on staff and the need for special technical and professional assistance. Instead, it turned its efforts to local projects "on the drawing board " and/or already begun.

In early 1978, the city conducted an airborne infra-red survey of home heat loss and made photos showing heat loss available to city residents. A University intern, CETA employees, and housing inspectors all helped in the interpretation of the photos--assisting owners of residential as well as of commercial, industrial, and institutional buildings. 3800 requests for information were made, equivalent to 22 percent Middletown's residential buildings.

Middletown is following up the survey with detailed heat-loss surveys of city-owned buildings. The administration building is being retrofitted to increase the efficiency of its heating, lighting, ventilating, and air-conditioning systems.

Future plans include solar heating for a city office building, bus facility and fire

Category Cities
State OH
Project Name City Energy Planning and Doing

Organization Dept. of Public Utilities
Address 1 Center City Plaza
Middletown, OH 45042
Contact Robert Moschell
Telephone (513) 425-7766

Funded By City of Middletown, OH
Dept. of Economics &
Community Development
Cost \$12,500 (survey)
\$18,000 (retrofit)
Congressional District VIII
Compilation Date February 1980

station; a solar-heated and -cooled shopping mall; using groundwater heat from the public water supply; the downtown development of energy-efficient multi-family units; and hydroelectric power development.

Renewable Resources— A National Catalog of Model Projects

The city of Miamisburg constructed the largest working salt-gradient pond in the country. The pond will reduce the city's dependence on fossil fuels in its community park development project. The thermal energy stored in the facility will supply heat to a swimming pool in summer and to a recreation building in winter. Construction of the pond has been financed by the municipality at an approximate cost of \$70,000, or just \$3.20/square foot. The cost over a ten-year period is expected to be competitive with the cost of heating by fuel oil. The concept followed initial work by Professor Carl F. Neilsen of Ohio State University. The Department of Energy founded the Miamisburg facility, which will provide DOE with performance data and an evaluation of the pond.

Category Cities

State OH

Project Name Miamisburg
Solar Pond

Organization Miamisburg Recreation
and Parks

Address 120 N. Second St.
Miamisburg, OH 45342

Contact Rick Bryant

Telephone (513) 866-3303

Funded By Miamisburg, DOE

Cost \$70,000

Congressional District III, VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Columbus office of Columbia Gas of Ohio is partially solar-powered. In June of 1978, it installed concentrating collectors on an office and printing facility leased from a local publishing company.

The system's forty-four solar panels, each 16' x 4', follow the sun and focus its rays on a fluid-filled absorber tube. Heat from the fluid (an anti-freeze/water solution) is used for heat or air-conditioning. Heat that cannot be used immediately is transferred to storage. Performance data is collected and made available to the public.

As a result of special requirements for paper storage in the building's printing facilities, a higher-than-projected demand was placed on the system.

Columbia Gas feels that for high temperature applications, the economics of concentrating collectors will be comparable to those of flat plates. They expect to use information gained from this project in future projects, where natural gas may provide a desirable back-up.

Critique/analysis: The collectors showed an unexpected tendency to twist. The problem has been solved by placing counterweights on the collectors. The problem of excess demand will be alleviated by dividing the building into different "climate" zones.

Category Commercial
State OH
Project Name Concentrating Collectors

Organization Columbia Gas of
Address 1600 Dublin Road
Columbus, OH 43215
Contact Bill Potter
Telephone (614) 486-3681

Funded By Columbia Gas, DOE
Cost \$550,000
Congressional District XV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Commercial
State OH
Project Name Photovoltaics Research

Researchers at Battelle's Columbus Laboratories have begun improving upon a method of making silicon solar cells, which they hope could bring down the costs of solar energy.

In a one-year, \$300,000 study for the U.S. Department of Energy, Battelle researchers will further develop a method for fabricating amorphous (non-crystalline) silicon and will adapt the process to solar cell fabrication.

A major problem with solar-cell technology has always been high costs. Current solar-cell modules now sell for about \$9 per peak watt of output. Typical methods for manufacturing involve growing large crystals of silicon, slicing them, then fabricating the solar cell and enclosing it in a protective capsule.

As part of the current study, Battelle researchers hope to develop a method that could produce silicon solar cells at costs as low as 30 cents per peak watt by 1986. They also hope to attain at least a 10 percent efficiency rate from solar cells using the electrodeposited amorphous silicon. This is comparable to current efficiency rates ranging from 7 to 14 percent.

To produce the silicon, researchers will use electrodeposition—a technique traditionally used for plating one metal over another to protect coatings. The silicon will be produced on a low-cost metal substrate in one continuous step by passing electric currents through solutions in organic solvents. The resulting silicon will be thin and non-crystalline. (Molecules will be arranged in no apparent order, so the solar cells will be able to absorb the maximum amount of sunlight.) Until now, most cells have been made of crystalline materials.

This process of making silicon could be

Organization Battelle
Columbus Laboratories

Address 505 King Avenue
Columbus, OH 43201

Contact John Mesaros

Telephone (614) 424-7984

Funded By DOE

Cost \$300,000

Congressional District XII-XV

Compilation Date February 1980

scaled up for large production runs and operated continuously. Because the process can be operated at room temperature, little energy will be required for production.

Renewable Resources— A National Catalog of Model Projects

Radio station WBNO-AM switched on to photovoltaic solar energy on August 30, 1979. In a cooperative program with the Massachusetts Institute of Technology and the U.S. Department of Energy, the 15,000-watt station installed a 110' x 160' array of solar cells capable of generating 15,000 watts. With the addition of storage batteries to provide 40 KWH of back-up energy, the system provides 70 to 80 percent of the electricity used by the transmitter.

Station manager Luke Thaman became interested in the project after receiving a questionnaire sent by the Department of Energy to more than 750 radio stations. The cost of the photovoltaic system is being underwritten by DOE while WBNO prepared the land and is housing the batteries and monitoring equipment.

The project will gather data on the operation and maintenance of photovoltaic systems. In the meantime WBNO has begun an education campaign of its own devising: it is airing songs with sun-related themes.

Category Commercial
State OH
Project Name WBNO Photovoltaic System

Organization Radio station
WBNO-AM
Address P.O. Box 603
Bryan, OH 43506
Contact Luke Thaman
Telephone (419) 636-3175

Funded By WBNO, DOE

Cost n/a

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Toledo Metropolitan Area Council of Governments (TMACOG) has received a Department of Energy (DOE) grant to develop a comprehensive community energy-management plan (CCEMP). The CCEMP program allows local governments to examine their capabilities to decentralize traditional technologies; determine if widespread acceptance and implementation of supplemental energy systems can be achieved; and create an opportunity for consumers to select alternative energy systems.

An Energy Guidance Group (EGG) that includes elected officials, bureaucrats, and citizens has been formed. It provides project guidance and insures consideration of various social, political, and economic factors. A technical team from the University of Toledo College of Engineering will assist the TMACOG staff. A community energy audit that will include physical characterization of land-use parcels and accounting of fuel types and available energy sources is being developed. A selection of alternative energy options and strategies for implementation by local governments will be developed.

The energy audit is the characterization of community energy use under standard conditions. It includes analysis of both the sources and end uses of energy consumed. Energy use is subdivided into five categories: residential, commercial, municipal, industrial, and transportation. This data will give the total energy use by parcel, activity and fuel type for a base year. The technical team can then evaluate alternative energy-use patterns as requested by the EGG.

The EGG will examine and identify potential alternative energy options and management strategies. An action plan will be linked to crisis contingency planning on the state and local levels and to state and local energy conservation plans.

Category	Community
State	OH
Project Name	Comprehensive Community Energy Management Program
Organization	Toledo Metropolitan Area Council of Governments
Address	123 Michigan St. Toledo, OH 43624
Contact	June Brown, Project Director
Telephone	(419) 241-9155
Funded By	Argonne National Lab. DOE
Cost	\$403,016
Congressional District	IX
Compilation Date	February 1980

Critique/analysis: The final step is the formal adoption and implementation of the CCEMP by local governments and the general public in the target area. A final evaluative report will be published at the conclusion of the project.

Renewable Resources— A National Catalog of Model Projects

The city of Kent, Ohio, is facilitating active citizen participation in its solar energy technology assessment program (TAP). The program consists of three phases: developing a solar future scenario for the City of Kent; communicating the solar scenario to the community; and assessing the social, economic, political, institutional, and lifestyle impacts of the solar future scenario.

In the first phase, a questionnaire will be distributed through the local newspaper. Citizens will be asked to list actual or potential applications of solar technology within the community. The open-ended questions should allow citizens to contribute at the very outset, increasing the degree of citizen commitment to the project. The Project Staff believes that no local technology can be successful without community support.

A second questionnaire will be mailed to those who completed the first. Citizens will be asked to rate the suggestions of solar experts and the comments compiled on the first round of the questionnaire. The final product will list potential applications of solar energy within the community. This listing will include the citizens' evaluation of the importance or desirability of each application.

The second phase, starting in late October 1979 will develop the suggested applications into alternative energy scenarios. This process includes three tasks. First, experts will evaluate the feasibility (economic and technical) of each suggested application. Second, the applications will be consolidated into program elements. Third, the feasibility evaluations and program elements will be combined into transition scenarios that will indicate the program paths leading to longer term scenarios. Three working groups (the Citizens' Task Force, the Project Staff, and the Citizens' Advisory Board) will rise from a community energy audit with baseline energy information about the city.

Category	Community
State	OH
Project Name	Solar Assessment Program
Organization	City of Kent, Oh
Address	Kent Solar Technology Assessment Program Kent, Ohio 44240
Contact	J.W. Ostrowski
Telephone	(216) 678-8100 ext: 225
Funded By	Argonne Natl. Labs
Cost	\$50,000+
Congressional District	XIV
Compilation Date	February 1980

Together, they will develop one scenario each for 1985, 1990, and 2000.

In the third phase of the TAP, citizens will be invited to a series of meetings to predict the impacts of the proposed scenarios. Participants will meet in small groups according to interests and be asked to list the potential impacts of the solar scenario in social, economic, political, institutional, life-style, and ecological terms. This citizen assessment will be a major component in the Task Team's final evaluation and analysis.

After the final report, the city of Kent will decide whether to implement the chosen scenario. Funding is a major variable.

Renewable Resources— A National Catalog of Model Projects

Local 98 of the Sheet Metal Workers International Association is opening a center in Columbus to train sheet metal and air-conditioning contractors to install solar systems. Under a \$1.5 million grant from the U.S. Department of Energy for design, engineering, and materials, a solar air-heating and hot water system will be built on the Union Local's training center. Local 98 and area contractors will provide the labor and operate the program for the Solar Training Institute.

This is one of six such programs in the U.S. that, taken together, will provide training to contractors who will in turn train an estimated 11,000 solar installers a year.

Category Education
State OH
Project Name Sheet Metal Workers' Training Program

Organization Sheet Metal Work Local 98 JAC
Address 3031 Lamb Road
Columbus, OH 43219
Contact Richard D. Newlon
Telephone (614) 471-3107

Funded By DOE
Cost \$1.5 million
(nationally)
Congressional District XII, XV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Courses on wind and solar energy are being offered at the Mansfield Campus of Ohio State University (OSU). The solar energy course is available on the Columbus Campus as well. A different solar program planned for 1980 will be presented by a local architect.

The Solar Energy Workshop emphasizes home heating. It is intended for both the layman and the housing industry professional. Co-sponsored by OSU's College of Engineering and School of Architecture, it covers such topics as the background of solar energy use in the US, system types, energy-conserving construction, and architectural examples and system design for north-central Ohio.

The Wind Energy Workshop explains the dynamics of wind energy, outlines the history of wind applications, reviews current developments, and looks beyond the "state of the art" to possible future uses of windpower.

table
Category	Education
State	OH
Project Name	Solar and Wind Workshops

table
Organization	The Ohio State University, Mansfield Campus
Address	1680 University Dr. Mansfield, OH 44906
Contact	Donovan L. Clark
Telephone	(419) 755-4289

table
| Funded By | Participant Fees |

table
| Cost | Solar Energy Workshop-\$20; Wind Energy-\$15 |

table
| Congressional District | XVII |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Huth Westwood Builders build energy-saving houses that respond to the environment. Besides the insulating materials typically used in the building industry, the firm offers an "Energy Saving Package" (ESP). This package is designed to take into account the optimum use of sun energy, the use of landscaping as an insulator, orientation to prevailing winds, shading devices, solar heat storage devices, opportunities to capture waste heat, tempered natural ventilation, low maintenance finishes, and wood as an insulator.

The firm received the "Design for Better Living Award" from the American Wood Council for its ESP Berm House with an all-weather wood foundation and passive solar system. The earth berming keeps out the cold in winter and the heat in summer. It also deflects cold winter winds.

The builders note that wood is an efficient insulator. It insulates six times better than brick, 15 times better than concrete and 1770 times better than aluminum.

Category	Housing
State	OH
Project Name	Energy Saving Package
Organization	Huth Westwood Builders
Address	1700 E. Main Street Kent, OH 44240
Contact	W. Lee Bull
Telephone	(216) 678-4382
Funded By	Private capital
Cost	\$120,000
Congressional District	XI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Housing
State OH
Project Name Kittinger Solar Greenhouse

Even Ohio's coldest days are usually its clearest, solar greenhouses can endure even the severest winters. Don and Carolann Kittinger have proven the point by keeping detailed temperature readings.

The records show that the change of inside temperature from day to night is smooth and gentle. Even successive, cloudy days have not resulted in excessively low greenhouse temperatures. The lowest temperature reading has been 45 degrees F. During the winter of 1978-79, the daily highs varied considerably but the lows remained between 50 degrees and 60 degrees F. Even outside temperatures below 0 degrees F did not significantly affect the temperature inside the greenhouse.

The Kittingers have incorporated important principles of solar greenhouse construction into their buildings. The 28' x 10' greenhouse is built against the south wall of their home. It incorporates proper shading, use of thermal mass, and careful attention to air infiltration.

The Kittingers did much of the construction work themselves with invaluable assistance from local teenagers. After one year of use, the Kittingers are completely satisfied with their greenhouse.

A slide show is available and interested organizations should contact Don for fee information.

Organization Don and Carolann Kittinger
Address 408 Rustic Court
Fairborn, OH 45324
Contact Don or Carolann Kittinger
Telephone (513) 878-9633

Funded By Private

Cost \$4100

Congressional District VII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This residence maximizes passive systems. The 45 degree slope of the roof is designed for a future active solar system. There is minimal window space on the north, east, and west facades. The south face has 140 square feet of glazing. There is R-38 insulation in the roof and R-24 in the walls. The oil bill for the winter of 1977-78 totalled approximately \$35.00 per month.

Category Housing
State OH
Project Name Passive House

Organization James A. Monsul & Associates, Architects

Address 642 Brooksedge Blvd.
Westerville, OH 43081

Contact James A. Monsul

Telephone (614) 890-3600

Funded By Private Financing

Cost \$70,000 +

Congressional District XII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

College Co-op members financed and installed a solar hot water heater on a dormitory they rent from the College. The system, purchased from an Ohio solar firm, took about two and one-half weeks to install. Student workers were supervised by professionals.

The dormitory doubles as a dining hall, so that hot water requirements include those for cooking and cleaning as well as for showers, and tap water. Although demand is lightest in the summer when solar input is highest. The structure's south-facing backyard and the dorm's remote location from the College central heating system made it a fit site for the solar experiment.

Category Housing
State OH
Project Name Solar Dormitory

Organization Oberlin Student Co-op Association

Address Box 28, Wilder Hall
Oberlin College
Oberlin, OH 44074

Contact Matt Herschberg
Heather Pois

Telephone n/a

Funded By Co-op Members

Cost n/a

Congressional District XIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Bob Novak's window air heater has undergone more than one transformation. The original 4' x 8' device was constructed from particle board, fiberglass, and clear plastic sheeting. After the first winter, Novak made the collector 2' x 6' and encased it in a lumber frame. Two thermostatically controlled fans automatically regulate air movement from the collector.

After the second winter, Novak decided to convert the device to a water preheater. This allowed Novak to take advantage of the sunshine available from March through October and to decrease the payback period from fifteen to five years.

As a water heater, the collector will be enclosed in plywood siding. Rock storage will be added within the enclosed area. The heat exchanger will be a finned copper tube. An automatic drain-down system will go into operation when the outside temperature drops below 40 degrees F.

Category Housing
State OH
Project Name Solar Space/
Water Heating

Organization Individual Application
Address 21751 Crystal Ave.
Euclid, OH 44123
Contact Bob Novak
Telephone (216) 731-6350

Funded By Private

Cost \$200

Congressional District XXII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The 3180 square foot living space in this house is divided between basement, main floor, and loft. A thermal envelope tempers the harsh winter climate of northwest Ohio.

A 400 square foot passive solar greenhouse covers the south side of the building. Twenty-eight tons of rock in the crawl space, 15 tons of topsoil in the greenhouse and tons of concrete-and-block wall contribute to the thermal mass.

Two large wood-burning stoves and electric space heaters in each of the three bathrooms, provide back-up heat.

Paul zum Feld says, "We only moved into the house on Easter Sunday 1979, so we have not had the opportunity to test the house through the winter as yet. The house did pass the first major test in July by not overheating, even though attic ventilating fans have still not been hooked up." The owner wants to share his experiences about solar design with interested and informed persons. To regulate what has become a flood of visitors, however, he will charge a small fee for a tour of the house. He expects in April 1980 to have detailed results of how the house works.

Category Housing
State OH
Project Name zum Feld's Passive Solar House

Organization Paul R. zum Feld
Address 4-4300-13
Wauseon, OH 43567
Contact Paul R. zum Feld
Telephone (419) 335-8148

Funded By Local Lending Institution & Private Savings

Cost \$65,000

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Institutional

State OH

Project Name "Buckfry"

The creative combination in this project was Professor H. W. Engelman's concern with oil supply, his knowledge of motors and fuels, and the eating habits of Ohio State students. Engelman decided to use cooking oil for fuel.

After five years of extensive testing in the laboratory, Engelman determined that the optimum mixture is 80 percent regular diesel fuel and 20 percent used cooking oil. This mixture can be used in diesel engines without any complicated processing or engine changes. The cooking oil requires only a simple filtration process to strain out bread crumbs and shrimp tails (Engelman sewed the first cheese cloth strainer himself.)

This concoction, dubbed "Buckfry," is now being road tested in the Ohio State University (OSU) shuttle bus. Professor Engelman emphasizes that the oil will not mix with gas or work in gas-powered autos.

Just how well the fuel will work under normal-winter driving conditions and how it will affect engine wear will not be known until the road-test results are available. While caution is in order, "Buckfry" could be a practical energy saver for universities or food-service companies.

At present a graduate student is overseeing the operation. She will eventually tear down the engine to see if the fuel has caused any problems. The Ohio Department of Energy and General Motors helped fit the bus with a new motor so that the test could be done under optimal conditions.

Organization Ohio State Department of Mechanical Engineering

Address Ohio State Univ.
206 W. 18th Avenue
Columbus, OH 43210

Contact Professor H.W.
Engelman

Telephone (614) 422-4254

Funded By Ohio State University

Cost \$75,000

Congressional District XV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

With 23,400 square feet of floor space, the Troy-Miami County Public Library is one of Ohio's largest solar-heated facilities. The rooftop solar system, installed in 1977, relies on advanced tubular collectors. The 102 4' x 8' collectors cover a total of 3264 square feet.

The collectors consist of two tubes, one nestled inside of the other, with a vacuum in between them. Heat from the sun is trapped inside the inner tube in the same way the sun's heat is captured inside a greenhouse. The use of vacuum insulation means that the performance of the collectors is virtually unaffected by low ambient temperatures or high winds.

Computer simulations show that even on cold, heavily overcast days when the collector will not be collecting useful energy, the collector temperature will not fall below freezing. Thus, the system can use untreated water as the heat transfer medium eliminating the problems and costs of special antifreeze fluids. If, under extreme conditions, the water begins to freeze, water from the storage tank will be circulated through the collectors.

In a normal year, the system supplies 40 to 50 percent of the building's heating needs. Even in the poor "solar winter" of 1978-79 the system saved 31,600 kilowatts. The net energy cost saving with the system is about \$2900 per year. Annual savings are expected to be greater when a solar cooling system is installed.

A large animated display in the library lobby promotes public understanding of the system's operation. Included are electronic readouts showing energy-cost savings and the amount of solar energy used.

p>Category Institutional
State OH
Project Name Solar - heated Library

p>Organization Troy-Miami County Public Library

p>Address 419 W. Main Street
Troy, OH 45373

p>Contact Bill Paplinski

p>Telephone (513) 339-0502

p>Funded By Energy Research and Development Admin.
(ERDA)

p>Cost \$307,000

p>Congressional District IV

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Blackhand Gorge State Nature Preserve is the site of the Division's first solar maintenance facility. Ms. Tina Takach, Preserve Manager, supervised the construction of the facility.

The 2,048 square foot building will house an office, workshop, vehicle-service bay, and storage area. The building will serve as the hub of Division Maintenance operations in eastern Ohio.

The passive solar system consists of drums of antifreeze solution placed on large racks behind panels of south-facing fiberglass. The drums collect and store heat from the sun. Back-up heat is provided by a conventional fuel oil furnace, but the solar system provides most of the heat during the winter months.

Local contractors installed electrical, heating, plumbing, and sewage service, but the bulk of the structural and carpentry work was done by members of the Young Adult Conservation Corps. Participants gained training in carpentry skills while cutting total construction costs by providing cheap labor.

Critique/analysis: The Division would like to undertake several similar projects, but it is limited by lack of funding.

Category Institutional

State OH

Project Name Solar Maintenance Facility

Organization Division of Natural Areas & Preserves, Dept. of Nat. Resour.

Address Blackhand Gorge St. Nature Preserve, 5212 Rock Haven Rd., RFD #4 Newark, OH 43055

Contact Tina Takach

Telephone (614) 763-4411

Funded By Division of Natural Areas and Preserves

Cost \$500

Congressional District XVII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The first state legislation to promote solar energy in Ohio took effect on August 14, 1979. HB 154 deals with three potential barriers to solar development: access to sunlight, financial disincentives, and possible discrimination against solar home owners.

The first provision of HB 154 established a procedure for creating voluntary solar easements. Any previous easements are preserved under HB 154. Easements may be protected by injunction and are transferred to new property owners.

HB 154 creates financial incentives for solar development. Since renewable energy systems have a higher capital cost than other systems, higher sales and property taxes result. The benefits of future reduced fuel costs may be lost. Also, conventional fuels enjoy large government subsidies (research and development money, tax breaks) that most renewable energy sources do not. The Ohio legislature recognized these problems in approving a sales tax exemption, property tax exemption, and 10 percent individual and corporate franchise tax credits for the purchase and installation of solar, wind, and hydrothermal systems.

The bill also prohibits discrimination against renewable energy users in service curtailment orders of the Public Utilities. It further prohibits natural gas companies from refusing new service to otherwise eligible homes.

Passive design and owner built systems are specifically included in the bill. A sunset clause terminates the tax credits in 1985. At that point, the legislation may be improved and/or extended.

Category Legislation
State OH
Project Name Ohio's HB 154

Organization Ohio Legislature
Address Statehouse
 Columbus, OH 43216
Contact Rep. Ken Rocco
Telephone (614) 466-8023

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

Renewable Resources— A National Catalog of Model Projects

Old refrigerators and discarded water heaters are turning into solar hot water heaters to be installed at Crosby Gardens Metro Park. During fall and winter 1979-80, the Solar Opportunities League built three systems from materials that would otherwise be scrapped. This approach saved metal, money, and energy.

The idea came from an article in Mother Earth News. Retired refrigerators provide pre-fabricated, pre-insulated containers for a black-painted hot water tank. A few additional parts are purchased or scrounged to complete the collector. All three systems will operate at Crosby Gardens where their performance will be monitored. Visitors to the Gardens can see the systems working.

"Hands-on" experience will be gained by the workshop participants who construct the systems.

Critique/analysis: Obtaining the refrigerators has proven more difficult than expected. Certain models are more suitable than others and these preferred types can be difficult to find.

Category Low Income
State OH
Project Name Solar from Junk

Organization Solar Opportunities League & Crosby Gardens

Address Crosby Gardens
Toledo, OH 43615

Contact Mary Tucker

Telephone (419) 537-0353
(419) 536-8365

Funded By DOE

Cost \$4,984

Congressional District IX & V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Licking County Community Action Agency creates solar work for low-income people. Not only does it demonstrate low-cost solar retrofits, it also offers training to CETA workers in the construction of the systems. To date, it has completed two passive solar greenhouses and an active solar system. The active system is designed to cut energy bills for its elderly owner. The greenhouses demonstrate the heat- and food-producing potential of solar design.

Two more solar applications are slated for the winter of 1980.

Category	Low Income
State	OH
Project Name	Training and Retrofits for Licking County
Organization	Licking County Community Action Agency
Address	9 North Fifth St. Newark, OH 43055
Contact	Richard Downs
Telephone	n/a
Funded By	CETA, CSA
Cost	n/a
Congressional District	-XVII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In southern Ohio, the Appalachian Rural Alternatives Network (ARAN) and the Pike County Community Action Committee (PCAC) are helping dispersed rural people to use renewable energy technologies. Formation of ARAN, a loosely knit and informal organization, was inspired by a solar workshop led by Malcolm Lillywhite. Since then, ARAN has involved about 100 people in the construction of low-cost solar systems.

The CAC is a nonprofit agency that serves and acts as advocates for low-income people. For the last several years, "hands on" workshops sponsored by the two groups have demonstrated low-cost solutions to the energy crisis for low-income people and enabled people to design and build their own systems.

ARAN volunteers built a passive solar greenhouse in Piketon, Ohio. The freestanding structure uses water in 30-gallon barrels for thermal storage. Originally intended to house a Head Start and Appalachian Regional Commission-supported child-development program, the structure has been severely vandalized several times. The PCAC is currently seeking funds to move it to another site.

With funds donated by the Presbyterian Church, ARAN constructed several different low-cost solar systems. An 8' x 8' collector that can be easily mounted onto an outside wall and that uses a small fan to circulate air into the living space was built and installed on a home in Pike County. A passive air collector and food-drying bin was built for the Portsmouth Food Coop. A drain-down hot water heater was assembled and installed on "Our Lady of Lords" Catholic Church in Ottaway, Ohio.

Serious health problems and lack of good local medical facilities in its service region are among the challenges facing PCAC. This led to a PCAC decision to build a clinic for Pike County. Despite the difficulty of raising enough money all at once to complete the project, they

Category Outreach
State OH
Project Name Appalachian Rural Alternatives Network

Organization Pike County Community Action Committee

Address 109 Third St.
Piketon, OH 45661

Contact Steve Dixon

Telephone (614) 289-2371

Funded By HEW, ARC, Dept. of Comm., Dept of Labor, ARAN, Community Ser. Admin., donations

Cost \$76,200

Congressional District VI

Compilation Date February 1980

went ahead, deciding to "do it right." Construction of the new 1800 square foot clinic included energy-conservation measures. 540 square feet of solar collectors supply heat to a 40-ton rock-bed storage unit. The building now not only houses critical health-care services, but also serves as an ongoing demonstration of solar energy's feasibility this region.

Renewable Resources— A National Catalog of Model Projects

When the Ohio Department of Natural Resources (ODNR) built new maintenance buildings in three southern Ohio state parks, it decided to cut its nonrenewable energy consumption by building in active solar systems. The buildings, in Paint Creek, Buck Creek, and Barkcamp state parks, now serve as repair areas for ODNR equipment.

Maintenance buildings present a special design challenge because of warm air loss through the large garage doors. Typical winter day heat loads range around 800,000 BTUs for the 4500 square foot buildings.

On clear winter days the 1900 square feet of solar collectors plus rock bed storage meet three-quarters of the heat requirement. 200,000 BTUs are provided by a back-up source on cold mornings. The solar contribution varies from zero to 75 percent, according to the degree of cloudiness. This percentage should rise when storage modifications are made.

Deer Creek Lodge, under construction in Pickaway County, will include a DOE-financed system that relies on 800 square feet of liquid-type flat-plate collectors. Scheduled for completion in early 1981, the building will use solar for both space- and water-heating.

The use of solar in state facilities offers at least three benefits: reduced consumption of fossil fuels, a financial boost and subsequent cost reductions for solar manufacturers, and education of visitors to the facilities.

Category State
State OH
Project Name ODNR Solar Buildings

Organization Ohio Dept. of Natural Resources, Div. of Parks

Address Fountain Square, Building C
Columbus, OH 43224

Contact Jim Swartzmiller

Telephone (614) 466-4633

Funded By Ohio Dept. of Natural Resources, DOE

Cost \$250,000

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Public Utilities Commission of Ohio (PUCO) is studying the effectiveness of residential solar space- and water-heating. The research staff supports the development of alternative sources of energy. It recognizes, however, that the number of solar energy/renewable resource applications in Ohio is too limited to significantly affect utility company practice.

The staff believes special rates should apply to solar customers. These rates should cover the cost of providing service, in addition to the actual cost of the energy consumed. PUCO currently favors time-of-day rates with a demand provision as a means of charging solar customers.

Category	Utility
State	OH
Project Name	Utility Rates for Solar Users
Organization	Public Utilities Commission of Ohio
Address	180 E. Broad St. Columbus, OH 43215
Contact	Bill Groves
Telephone	(614) 466-6353
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

SOUTH DAKOTA

1. Custer
2. Huron
3. New Effington
4. Pierre
5. Rapid City
6. Sioux Falls
7. Spearfish
8. Vermillion

SOUTH DAKOTA

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Renewable Resources— A National Catalog of Model Projects

Mr. Frank Navratil recently received \$140,000 from the FmHA State Office for the construction of an alcohol still. The 700-gallon still will use potatoes or grain depending upon which is in abundant supply. The still is the first to be funded through FmHA throughout the nation.

Ninety percent of the by-product remains as protein. This is mixed with small amounts of grain to produce feed pellets. Local livestock feed suppliers sell the pellets to local farmers.

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SD-1

Renewable Resources— A National Catalog of Model Projects

The Lead-Deadwood High is promoting the use of solar in an architectural drawing class. The students are asked to design a home that uses some form of alternative energy source. To free the students to use their imagination, the instructor allows them to work on concepts for technologies that do not now exist. The librarian helps by stocking some renewable energy books.

The wide variety of solar technologies (including window-box collectors and solar green-houses) that students incorporate into their designs show that common sense and ingenuity combine readily in the creation of solar technologies at the high-school level.

Category Education
State SD
Project Name High School Solar Experiments

Organization Lead-Deadwood High School

Address Lead, SD 57754

Contact Mr. Erickson

Telephone (605) 584-3013

Funded By Lead-Deadwood High School

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A teacher at the South Dakota School of Mines and Technology and advisor to the Mount Rushmore Visitor Center Project, C.W. Chiang, encourages students to design and build solar applications. Though the School of Mines offers no solar courses per se, students are given credit for undertaking solar projects of their own devising. Dr. Chiang is the advisor to all of the students involved in such projects.

In one instance, students designed a solar greenhouse. After locating a site next to the civic center, the students organized a workshop to build the greenhouse. It works well, and it has been turned over to senior citizens, who farm the indoor tracts.

table
Category	Education
State	SD
Project Name	Solar Energy Independent Study

table
Organization	South Dakota School of Mines and Technology
Address	Rapid City, SD 57701
Contact	Dr. C.W. Chiang
Telephone	(605) 394-2401

table
Funded By	School of Mines
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Mr. Asmussen, a loan officer with First Federal, makes loans for weatherization projects. Most are arranged through FHA's Title I insured loan program. Asmussen considers these sound investments in energy and economics.

Category Financing
State SD
Project Name Conservation Loan Program

Organization First Federal Savings and Loan

Address Pierre, SD 57501

Contact Tom Asmussen

Telephone (605) 343-1524

Funded By FHA (Partial)

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Department of Transportation will construct two rest stops, west of Pierre, as experimental projects in solar and geothermal. One rest stop will be constructed with a solar heating and hot water system. The cost and one year's record of performance will be evaluated.

The rest stop on the opposite side of the interstate will be constructed using the geothermal available. The costs of solar and geothermal will then be compared. Depending on the results, future rest stops may incorporate solar or geothermal heating systems.

Category Institutional
State SD
Project Name Solar and Geothermal Rest Stops

Organization State Department of Transportation

Address Pierre, SD 57501

Contact n/a

Telephone (605) 773-3265

Funded By n/a

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Dan MacMickels, Superintendent of Schools, initiated a proposal to the Solar Applications Branch of the Department of Energy to install solar collectors on Spearfish's newly proposed high school.

This high school and its solar system were ready in December of 1979. The collectors are expected to provide 50 percent of the heat and 90 percent of the hot water needs. The high school's back-up heating system is natural gas.

Mr. MacMickels is also responsible for an energy redesign project for the elementary schools. An energy audit will form the basis of the energy redesign. The Department of Energy will provide technical assistance and matching funds to retrofit the schools with renewable energy units.

Public institutions heated by renewable resources include school systems in Philip, Midland, and Edgemont. These projects are funded through DOE, FmHA and local sources.

Category	Institutional
State	SD
Project Name	Solar Spearfish High
Organization	Spearfish School Board
Address	Spearfish, SD 57783
Contact	Dan MacMickels Superintendent of School
Telephone	(605) 642-5711
Funded By	Solar Applications, Department of Energy
Cost	\$300,000
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

This solar system provides 53 percent of the heating and 41 percent of the cooling of the existing Visitors' Center at Mount Rushmore. Solar collectors are mounted on the roof, facing southwest. These liquid flat-plate collectors use an antifreeze solution to prevent freezing during cold weather.

The hot water solution from the heat exchangers is pumped through coils in the existing forced air system. When cooling is needed, the hot fluid powers the refrigeration system, which also feeds into the forced air systems. Excess heat produced by the solar collectors is stored in an insulated 3,000-gallon water tank.

Category Institutional
State SD
Project Name Mount Rushmore
Visitors Center

Organization National Park Service-
Mount Rushmore National
Memorial
Address Mount Rushmore National
Park Visitors Center;
National Park Service
Custer, S.D. 57730
Contact n/a
Telephone (605) 574-2523

Funded By National Park Service,
Department of Agri-
culture

Cost \$200,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

South Dakota has initiated a gasohol rebate tax. The large increase in demand for gasohol is based on: consumer preference for a vehicle fuel derived from renewable sources, a selling price competitive with those of premium unleaded gasolines, and consumer perception of gasohol as a high quality motor fuel.

Gasohol is an attractive fuel to many motorists who feel they need high octane unleaded fuel.

Every major city in South Dakota sells gasohol. South Dakota's rebate tax equals \$.40 per gallon or \$16.80 per barrel on the alcohol used to make gasohol. As an incentive for gasoline stations to stock gasohol, the retailer receives the rebate.

Category	Legislation
State	SD
Project Name	Gasohol Tax Credit

Organization	SD State Legisla
Address	Pierre, SD 57501
Contact	n/a
Telephone	(605) 773-3011

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

Renewable Resources— A National Catalog of Model Projects

Community Action Programs across the state have begun emphasizing the importance of using alternative forms of energy to assist with utility bills.

Southeastern Human Development, (SHD) serving seven counties in the Sioux Falls area, has sponsored solar window-box collector workshops. Working with the Public Utilities Commission, SHD set up workshops in several counties. These successful workshops are aimed at the low-income community.

The Community Action Program in Rapid City recently completed a solar greenhouse, which was placed behind the Citizens Center in Box Elder. The greenhouse is used to grow vegetables and other plants for the Center.

Category Low Income
State SD
Project Name Sioux Falls Community Action Program

Organization Southeastern Human Development

Address Sioux Falls, SD
57101

Contact Kathy Huntly

Telephone (605) 472-1406

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Rich Muller of KUSD, the educational channel based at the University of South Dakota, has taken a keen interest in solar energy.

Mr. Muller attended a solar window-box collector workshop held in Vermillion. He brought his filming crew to record the construction of a collector. He aired this along with other energy saving information in an hour-long special on energy alternatives. He hopes to film an hour segment exclusively devoted to solar energy.

Category Outreach

State SD

Project Name Media

Organization KUSD-TV

Address 310 E. Clark
Vermillion, SD
57069

Contact Mr. Richard Muller

Telephone (605) 677-5270

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Public Utilities Commission (PUC) and local South Dakota organizations co-sponsored a series of solar workshops aimed at low-income people in 1979. Window box collectors are the main focus of the PUC program.

The PUC has organized eight workshops in rural communities and expect to hold eight to ten more during the winter season. In response to the large demand, the PUC is training persons in local communities to assist in future workshops. Public Utilities Commissioner Ken Stofferahn and Assistant Director Gwen Steingraber instituted the program following a "Minorities and Solar Energy Seminar" sponsored by the North Dakota Migrant Council.

In Gettysburg, a solar collector workshop was co-sponsored by the Senior Citizens Center. The Center then began to manufacture the collectors and sell them for use on local schools, buildings and residences.

Twelve collectors appeared on local residences in Vermillion following a workshop co-sponsored by the Community Action Program. The audience, primarily female, exclaimed afterwards that building solar collectors is easy.

The average workshop attendance is 70 to 100
-----e. All who attend help build the collector.

Category	State
State	SD
Project Name	PUC's Solar Workshops
Organization	Public Utilities Commission
Address	State Capitol Bldg. Pierre, SD 57501
Contact	Gwen Steingraber Asst. Director of Fixed Utilities
Telephone	(605) 773-3011
Funded By	State Government
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

South Dakota Rural Electric Cooperatives are conducting energy audits on members' homes. All rural cooperative members are eligible for the audits free of charge.

Auditors received training at a Pierre workshop.

Farmers Home Administration (FmHA) provides loans of up to \$1500 through the rural electric coops for weatherization. Repayable in five years, these loans are for moderate-income coop members. The coops process the applications, help the consumer find reliable contractors, and pay the contractors when the job is satisfactorily completed. These low-interest loans are paid back as part of the coop electric bill.

Category	Utility
State	SD
Project Name	Rural Electric Cooperatives
Organization	South Dakota Rural Electric Association
Address	Pierre, SD 57501
Contact	n/a
Telephone	(605) 224-8823
Funded By	FmHA
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Arthur Donnell runs a Northwestern Public Service program that monitors solar collectors and their energy savings in the Northwestern service area. Since the beginning of 1979 a total of 14 units in five cities have been charted. Northwestern Public Service will analyze the data to determine the practicality of solar in the northwestern part of South Dakota.

Because the winter of 1979-80 was unseasonably warm, the statistics are not comparable with last year's. In addition, a couple of the systems that were poorly built and installed have been eliminated from the survey.

All of the systems were customer-initiated and owe nothing to the utility. So far, the systems for heating domestic hot water seem the most cost-effective.

Category	Utility
State	SD
Project Name	Solar Monitoring Program
Organization	Northwestern Public Service
Address	Huron, SD 57430
Contact	Mr. Arthur R. Donnell
Telephone	(605) 352-8411
Funded By	Northwestern Public Service
Cost	n/a
Congressional District	II
Compilation Date	February 1980

WISCONSIN

1. Ashland
2. Berlin
3. Cedarburg
4. Cottage Grove
5. Eagle River
6. Eau Claire
7. Ettrick
8. Fond du Lac
9. Gays Mills
10. Glenwood City
11. Green Bay
12. Janesville
13. Keshena
14. Kickapoo Valley
15. La Crosse
16. Lancaster
17. Madison
18. Menomonie
19. Milwaukee
20. North Freedom
21. Oshkosh
22. Pewaukee
23. Richland Center
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25. Soldiers Grove
26. Spooner
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28. Viola
29. Washington Island
30. Wausau

WISCONSIN

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Through fleet management the Agri Transport Conservation Project seeks to reduce the cost of transporting agricultural commodities. This includes any aspect of agriculture that is transport intensive: milk gathering, fuel distribution, and feed pick-ups and deliveries.

The program employs two full-time people trained in agricultural marketing. The marketing teams would work with businesses on a reduce-costs basis (truck use costs about ninety cents a mile) to check routing patterns, vehicle-maintenance schedules, load patterns and driver education.

This is reportedly the only agri-transport conservation program in the country funded by the national Energy Extension Service.

p>Category Agricultural
State WI
Project Name Agri Transport Conservation Project

p>Organization College of Agricultural & Life Sciences

p>Address 285 Animal Science Bldg.
University of Wisconsin
Madison, WI 53706

p>Contact Leonard Anderson

p>Telephone (608) 263-4310

p>Funded By Energy Extension Service

p>Cost \$100,000

p>Congressional District State-wide

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Agricolural
State WI
Project Name Alcohol Cooperative

The Power-alcohol Coop wants to build an alcohol-production facility. The favored site now is the Rock River power station owned by Wisconsin Power and Light Co. The waste heat from the power plant would be converted into process steam for alcohol production. Grain and whey from nearby areas will provide the starting product. The resulting alcohol would be enough to replace 1 percent of the gasoline used in the state.

The plant, owned by the Power-alcohol Cooperative, has offered shares to members of 600 cooperatives in Wisconsin. The total capital outlay for the plant will be about \$20 million. The internal structure is yet to be determined.

Critique/analysis: The Coop is still only in the "feasibility study" stage.

Organization The Power-alcohol Cooperative
Address Cenex Cooperative
Main Street
Cottage Grove, WI 53527
Contact Galen Hartung
Telephone (608) 839-4541

Funded By n/a
Cost \$20 million
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A Wisconsin Public Service Corporation project is using heat recovered from the ventilated air of a dairy barn to provide space heat for the farm house.

Category Agricultural
State WI
Project Name Cogeneration

Organization Wisconsin Public Service Corporation

Address Adams Street
Green Bay, WI
54301

Contact K. M. Hawks

Telephone (414) 433-1598

Funded By Wisconsin Public Service Corp., R.W. Sawbridge Co.

Cost \$7,500 estimate

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The University of Wisconsin Agricultural Engineering Department is studying a working methane digester in order to measure the productivity of a unit in the field. Previous productivity data has been based on small, laboratory digestors.

A 96.65m³ digester, constructed on a poultry farm will process the manure from 15,900 birds. The digester is water-heated in a closed cycle fashion by methane produced by the process. Excess gas is stored or utilized for external heating.

The net energy recovery, in the form of electricity, is 50-60 percent over an approximate three-year period.

Critique/analysis: The digester could produce more methane using solar energy technologies.

Category Agricultural
State WI
Project Name Methane Digester

Organization University of WI
Address Agricultural Engineering Dept.
Madison, WI
53706
Contact Prof. J.C. Converse
Telephone (608) 262-3310

Funded By From budgeted funds of Animal Waste Management Program

Cost n/a
Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Reducing the number of field cultivating practices can reduce fuel use for farmers. In addition, "minimum till" operations can reduce soil loss.

With these facts in mind, University Extension and the Soil Conservation Service will hold educational meetings to discuss the advantages and disadvantages of minimum- and no-till operations. Field demonstrations will show farmers the different types of equipment available from implement companies for minimum-till operations.

Category Agricultural
State WI
Project Name Minimum Till Conservation Project

Organization University Extension & Soil Conservation Service
Address 112 Classroom Building
UW Center
Fond du Lac, WI
54935
Contact H. A. Reineche
Telephone (414) 921-5600
Ext. 54

Funded By n/a

Cost n/a

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

John Fayen has a unique barn. Fayen's barn, which is nestled in the southern Wisconsin valley of Gays Mills, features a cathedral ceiling and 1,200 ft² of solar collectors.

First Fayen retrofitted 600 ft² of collectors onto his 1,500 ft² barn. This decreased his fuel use from 200 gallons of LP gas per year to 40 gallons. Then he used the concrete base of the manure pit as storage by passing pipes through it. With the addition of 600 ft² of collectors to the roof, the solar system provided all of the heat for the barn.

The collectors can also be used for low-temperature grain drying. First tried in the fall of 1979, the dryers processed 20,000 bushels of corn.

So successful was his experiment with the hog-farrowing barn that John Fayen solarized his machine shop too. The roof is a 300 ft² collector. Instead of roofing, glazing was put on the 2 x 4 roof beams. A quarter inch of plywood was hung under the 2' x 4's to act as collector and to strengthen the roof.

The payback for both systems is less than one year.

Category Agricultural

State WI

Project Name Solar Barn

Organization John Fayen

Address Route 2
Gays Mills, WI
54631

Contact John Fayen

Telephone (608) 624-5787

Funded By John Fayen, DOE

Cost \$2,500 DOE

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Begun in 1973, this project developed a computer program that traces the unnecessary energy losses in large buildings. This energy audit, especially designed for public buildings such as schools, is currently in use by many consulting engineering firms.

Category Commercial
State WI
Project Name Computer Energy Audits

Organization The Trane Company

Address LaCrosse, WI
54601

Contact Neil Patterson

Telephone (715) 787-2000

Funded By n/a

Cost n/a

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Oshkosh Area School District provided funds to 23 schools for investment in miscellaneous energy-conservation measures. These included installing roof insulation, lowering ceilings, reducing window areas, creating buffer zones around exits, and installing efficient lighting lamps.

Combined with mandated thermostat settings and tighter operational and maintenance procedures, each school lowered its consumption of electricity and natural gas 25 to 45 percent. The project has been in operation for approximately six years.

The data indicates that this energy conservation effort in 1978 (compared with 1972 usage) saved the District \$175,000 at 1978 prices.

Category Commercial
State WI
Project Name Energy Conservation
in Public Schools

Organization Oshkosh Area Sch
District
Address 215 South Eagle Street
Oshkosh, WI 54901
Contact Paul J. Smith
Telephone (414) 424-0029

Funded By 60% local taxes, 40%
State of WI

Cost \$210,000

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

If all goes as planned, Soldiers Grove, WI, will soon be a showcase for alternative energy planning and technologies. Soldiers Grove sits on a flood plain. When the worst flood on record hit in July of 1978, the desperate village board decided to relocate the downtown portion of the town. They backed the decision with the purchase of 190 acres on higher ground at a cost of \$82,000.

Although nature precipitated the relocation, it was the energy crisis that moved the community to adopt renewable, energy-efficient technologies. In August of 1979, Soldiers Grove hired a Chicago-based planning/architectural firm that specializes solely in solar design, the Hawkweed Group.

Hawkweed first examined the site and climatic conditions. It studied geographic conditions such as the large hill to the south of the site, seasonal wind patterns, sun and shadow lines, and local vegetation. The Hawkweed group then based the building designs on the natural patterns.

All of the structures will maximize orientation toward the south and minimize north exposure with extensive insulation and earth berming. Thus, the use of passive solar heating, integrated into the structures, will provide 75 percent of the space- and water-heating needs for the buildings. A variety of storage media will be used, and heat from large appliances will be recovered.

Back-up heat will initially come from gas. Village planner Tom Hirsch hopes that a central-heat, wood pyrolysis plant will be built by Soldiers Grove. (Wood pyrolysis, the combustion of wood to create gas, has been used since the 1930s). The bio-gas produced will supply the back-up heating needs for both businesses and residences.

Wood is readily available from the dozen

Category	Community
State	WI
Project Name	Soldiers Grove Community Energy Planning
Organization	Village of Soldiers Grove, WI
Address	Soldiers Grove, WI 54655
Contact	Ronald R. Swiggum Community Dev. Dir. Tom Hirsch Community Dev. Coord.
Telephone	(605) 624-5209
Funded By	FmHA, HUD, Village Government (40% local, 60% State & Federal)
Cost	\$ 5.75 million
Congressional District	III
Compilation Date	February 1980

mills within a 30-mile radius of the village. The plant's anticipated waste-wood consumption amounts to less than 4 percent of the area's production. Acres of trees on the farmland purchased by the village could provide another source of fuel for the central plant.

The planning group is trying to maximize the use of local and energy-efficient building materials that are also low cost.

Since 1975 a voluntary planning committee has been hammering out the details of the relocation. Every member of the community can have a say in these decisions. The relocation office, is part of the village Government and has acted as the "developer" on behalf of the community.

With input from the community, the seven-member village board gave some direction. It mandated solar orientation, encouraged the new builders to use alternative energy, and taxed the village people for the improvements made by the municipality.

Construction on the first three relocated buildings was begun in early October, with the bulk of the remaining buildings starting in the Spring of 1980.

Renewable Resources— A National Catalog of Model Projects

When the LaCrosse City Council refused to vote funds for an energy commission, the Mayor organized a volunteer committee. Mailing costs and some labor are provided through the Mayor's office. The members, two engineers, one manager, one chemist, one housewife, one business person, and one journalist, contribute the rest of the work.

This Energy Commission has investigated energy supplies, specifically questioning the reliability of electric supplies. A local company performed a computer energy audit on City Hall. (This type of audit can be used for any large building.)

Critique/analysis: The Committee has dealt with almost entirely with energy conservation. While sponsoring hearings on wood-stove safety, the committee has not shown much interest in renewable energy sources. Its members fear that a model project would entail unbearable costs and be a failure.

Category	Community
State	WI
Project Name	Energy Commission
Organization	University of Wisconsin-LaCrosse
Address	LaCrosse, WI 54602
Contact	Prof. Dell Fystrom
Telephone	(608) 788-7176; 785-8431
Funded By	n/a
Cost	n/a
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Funding from the City-Community Energy Management Program (CCEMP) pays for staff time in the city planning department to develop energy-management techniques. Janesville has started with city energy audits on existing residential and governmental buildings.

The audit of government facilities is proceeding faster because there are better records of past energy use. The planning department is working with Wisconsin Power and Light Co. to gather records on residential usage. Records on fuel-oil use are much harder to organize.

The project is still in its data-collection phase. This phase has not involved citizens to any great degree, but the CCEMP contract calls for citizen input and provides for a citizen observer. This person has been appointed and will be overseeing citizen input more as the next phase, data analysis, begins.

Category Community
State WI
Project Name Janesville Energy Planning

Organization City of Janesville

Address City Plan Dept.
18 N. Jackson
Janesville, WI
53545

Contact Bill Gavinsky

Telephone (608) 754-2811

Funded By Two year grant
from Argonne (DOE),
\$10,000 (CCEMP)

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Northern Thunder's recycling drop-off center has been operating since 1971. In February of 1978 it began a nine-month pilot project of home pick-up in one neighborhood. Based on the success of this pilot project, Northern Thunder received a one-year CETA grant to expand home pick-up to cover the entire city of Eau Claire.

This home pick-up service experienced a 10 percent participation rate overall. The monthly pick-ups utilized 18 neighborhood routes. This project recycles newspaper and ferrous and non-ferrous metal.

Critique/analysis: The major problems have been with markets. Income cannot be guaranteed because the market fluctuates greatly. Tax assistance to recycling organizations and government purchase of recycled materials would help improve marketing problems. In August of 1979 the project was turned over to Western Dairyland Economic Opportunity Council, the local CAP agency. It is used as a training site for their supported work program, so does not need to be totally self-sufficient on recycling income.

Category	Community
State	WI
Project Name	Recycling Center and Home Pickup
Organization	Northern Thunder
Address	22-1/2 South Barstow Eau Claire, WI 54701
Contact	Joyce Olson or Paul Wiegner
Telephone	(715) 835-2672
Funded By	One year CETA grant
Cost	\$36,000
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Sludge disposal on farmland is just getting organized in Fond du Lac. At present the sludge is being put in the county landfill site. This material has some plant food value, plus some organic matter that conditions the soil.

Fond du Lac has hired a person to test samples of sludge regularly to see if any toxic chemicals are building up and to inform farmers of the pros and cons of sludge utilization.

Fond du Lac produces enough sludge to fertilize 1,200 acres.

Category Community
State WI
Project Name Sludge Disposal

Organization University Extension
& Soil Conservation
Service
Address 112 Classroom Building
UW Center
Fond du Lac, WI 54935

Contact H. A. Reineche

Telephone (414) 921-5600
Ext 54

Funded By n/a

Cost n/a

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Washington Island, located in Lake Michigan at the northern tip of the Door County peninsula, is separated from the mainland by approximately seven miles of water. Roughly 600 year-round residents occupy the 36 mi. island. The population increases to about 2,800 in the summer. Ferry boats maintain the primary transportation link to the mainland.

Because there is no direct energy link to the mainland, the islanders' costs include those of transporting diesel fuel for the electric coop's generators. The cost of electricity is more than double that on the mainland.

For this reason, the people on the island, in cooperation with the Washington Island Energy Office, the Rural Electric Coop, the town government, the local CAP agency, the State Energy Office and two Coastal Management Program staff, are looking at reducing energy use and using alternative energy to increase the island's self-reliance.

Continued on p. 16

Islanders are investigating wind generation, solar space and domestic hot water heating, and wood heating. A 20-percent savings is expected from conservation alone. Two special projects, study of increased bicycles use and an aquaculture program, are also planned.

The studies will provide the basis for the En Office and community representatives to draft a comprehensive energy plan. The plan will be implemented through additional grants.

Category Community
State WI
Project Name Washington Island Energy Planning

Organization Washington Island Energy Office

Address Washington Island, WI, 54246

Contact n/a

Telephone (414) 847-2031

Funded By Coastal Management (\$10,000), State Energy Conservation Plan (\$32,500), Community (\$10,000)

Cost \$82,500

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Northwest Wisconsin's 5,000,000 acres of commercial forests have an exceptionally strong potential for supplying wood for fuel. Thus, there is a need to assess the demand for wood in the residential and the commercial sectors and to analyze the obstacles to the use of wood as fuel.

The Northwest Regional Planning Commission, cooperating with the Department of Natural Resources (where advantageous) will undertake five tasks.

First it will assess the supplies of fuel wood (including roundwood, timber stand improvement cuttings and wood residues). Second, it will investigate the different methods of harvesting wood, paying particular attention to the economics involved. Third, it will assess the current "state of the art" for processing wood, making cost and employment projections under contract to Forest Products Laboratory. Fourth, it will identify major marketing areas and assess transportation costs. Fifth, it will assess the demand for fuel in both the residential and commercial sectors.

Category Community
State WI
Project Name Wood for Fuel Development

Organization Northwest Region Planning Commission
Address 302 1/2 Walnut Street
Spooner, WI 54801
Contact n/a
Telephone (715) 635-2197

Funded By Office of State Planning and Energy

Cost \$29,350

Congressional District X

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Under the sustained-yield forestry program of the Menominee Indian Tribe, hundreds of acres of various species of trees are re-planted each year. Mature trees are harvested annually and sold to processors for paper making and lumber.

Sawdust and other wastes power the mill machinery. Tops, scrap logs, windfalls and other unusable logs are harvested and processed for firewood under a Tribal program. Firewood is sold on the open market.

table
Category	Community
State	WI
Project Name	Wood Marketing

table
Organization	Menominee Indian Tribe
Address	P.O. Box 397 Keshena, WI 54135
Contact	George Curry, Director of Planning
Telephone	(715) 799-3485

table
Funded By	Bureau of Indian Affairs and Tribal Mill
Cost	\$250,000 annually
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Access House Energy Demonstration Project focuses upon existing housing, rather than new construction, as the linchpin in our nation's energy and housing future. The Access House tests the benefits and costs of new and existing conservation and renewable energy technologies.

The program began as a series of small projects conducted by students within the School of Architecture and Urban Planning at the University of Wisconsin-Milwaukee. The project aimed to design and test various retrofit technologies within the context of a working residence; to provide a life model of an older, typical home that has been modified to function with maximum efficiency; and to communicate the applied efforts of this work to the public.

Originally a vacated HUD property, the Access House was brought up to minimum housing codes in 1975. This work cost about \$15,000. An energy audit determined the most cost-effective energy conservation measure. This comprehensive audit served as the basis for energy conservation work in the residence.

The total cost of energy conservation work was \$2,200, for a total reduction of energy consumption of 51 percent. In 1975, calculations indicated a saving of \$293 per year. Without considering inflation, the overall recovery period for these modifications was 7.5 years.

Begun under a HUD Cycle I Solar Demonstration Program grant of \$13,800 in January of 1976, installation of the solar space and hot water system was completed in September of 1977, for a total cost of \$25,028.

The Access Solar water heating system was donated by Solar Dynamics of Wauwatosa, WI. The system is designed to provide about 90 percent of the domestic hot water requirements in the home with a savings of \$121 per year (1978 prices)

Category	Education
State	WI
Project Name	Access House Energy Demo. Project
Organization	School of Architecture and Urban Planning, Univ. of Wisconsin-Milwaukee
Address	P.O. Box 413 Milwaukee, WI 53201
Contact	John Schade, Principal Investigator; Cynthia Behrendt, Access Program Coord.
Telephone	(414) 963-6399
Funded By	HUD, NCAT, Univ. of Wisconsin-Foundation, et al
Cost	\$25,028
Congressional District	V
Compilation Date	February 1980

The cost of the installed system is approximately \$2,200. Recovery period assuming a 10 percent annual inflation rate is 10.9 years. The home is located at 2915 North First Street in Milwaukee.

Renewable Resources— A National Catalog of Model Projects

Within 150 miles of LaCrosse citizens are weighing the issues and making some choices about their energy future. The Energy Environment Simulator, an energy game, introduces issues about energy such as alternative energy sources, conservation, economics and motivation for change. The computer allows the participants to get immediate feedback on the energy decisions they make.

Over 115 programs have been seen by more than 2,800 people. The game is designed for institutions and works best with groups that are already established.

Category Education
State WI
Project Name Citizens' Energy Workshop

Organization University of Wisc LaCrosse

Address LaCrosse, WI 54601

Contact Dell Fystrom

Telephone (608) 785-8431

Funded By n/a

Cost n/a

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The "Eco-house," designed and constructed by high school students, utilizes alternate sources of energy. Two barns were dismantled and 30 tons of field stone gathered to provide materials for this 16-person dormitory.

About half the basement of the two-story structure contains a stone-filled bin for heat storage. Built into the south side of a hill, about 2/3 of Eco-house's first floor is underground. The north walls are constructed of field stone up to the second floor. A fireplace with a 48" opening is built into the north wall.

A one-meter overhang protects the first and second floors from the summer sun. A penthouse serves as a school observatory. All windows are home-built and thermopanned. There are no windows on the north side of the building, and only those in the penthouse open.

A forced-air heating system is powered by the solar panels and/or a wood furnace.

Electricity is provided by a 3.5 KW Jacobs wind generator. Fifty-six two-volt batteries provide storage. Lights, small appliances, and two ½ hp motors for air circulation are operated by the stored electricity.

Eco-house is not complete. As a result of inflation and a misunderstanding of the management as specified in the NSF grant, monies ran before completion. About \$10,000 is needed to complete the project. For the past six years Eco-house has generated much interest in north-east Wisconsin.

Critique/analysis: Begun in 1973, Eco-house was completely the students' project. Project funding and outside help is difficult to secure

Category Education

State WI

Project Name Eco-house

Organization J.F.K. Prep

Address Box 109
St. Nazianz, WI
54232

Contact Rev. Melvin Tracy

Telephone (414) 773-2111

Funded By Office of Education,
National Science
Foundation

Cost \$26,000

Congressional District VIII

Compilation Date February 1980

for a high school project. Since 1975, NCAT, ERDA, DOE, and many foundations and industries have been approached. Nothing but praise was received in return. Nevertheless, many students remain committed and interested.

Renewable Resources— A National Catalog of Model Projects

In April of 1978, the Energy and Buildings Research Institute was formed within the School of Architecture and Urban Planning, University of Wisconsin-Milwaukee. It incorporates the Access Program, the Energy Demonstration Centers Project, and other energy-oriented projects within the School of Architecture and Urban Planning. The Institute offers professional research that stresses direct application of design efforts to specific energy-related problems. These services are offered to the public and to practicing professionals, including architects, engineers, builders, manufacturers and government agencies.

Since 1971, the School of Architecture and Urban Planning has been involved in energy conservation and alternative sources of energy. The projects, conducted by students within the School, include the design and construction of a self-heating geodesic dome, wind mills, methane digestors and solar-assisted greenhouses. All of these are full-scale installations.

In 1974, the Access Program was instituted to coordinate these ongoing projects and to disseminate information on energy conservation. One project involved retrofitting an inner-city residence for energy conservation, and solar space and hot-water heating systems. The residence, Access House, is open to the public and tours are regularly conducted for interested organizations and individuals. Installations and displays provide specific information related to the cost-effectiveness and practicality of active and passive solar energy, solar domestic hot water systems, solar greenhouses and various other residential retrofit techniques.

In 1977, the School began an expanded Energy Demonstration Centers Project. The project helps local governments take leadership roles in energy conservation. It illustrates the significance and cost-effectiveness of simple architectural and HVAC retrofit measures on school, local government and small commercial buildings. This

Category	Education
State	WI
Project Name	Energy and Buildings Research Institute
Organization	School of Architecture and Urban Planning
Address	Univ. of WI-Milwaukee Box 413 Milwaukee, WI 53201
Contact	John R. Schade
Telephone	(414) 963-4014
Funded By	n/a
Cost	n/a
Congressional District	II, V
Compilation Date	February 1980

project is supported by the U.S. Department of Energy through the Wisconsin Energy Extension Service.

In addition, the School has been an active participant in national design competitions. The Institute's students have received four awards in two past national competitions.

Renewable Resources— A National Catalog of Model Projects

Since the design, construction, and enforcement of new energy-related code requirements will be sophisticated, all the people involved in this process need to be educated in the principles of energy conservation and the methods of meeting code requirements.

DILHR will have primary responsibility for developing two two-day workshops. Architects and engineers will study energy conservation in building design and compliance with new code requirements. Contractors and building inspectors will study construction techniques and the new code. A manual will be developed for each workshop.

Category	Education
State	WI
Project Name	Energy Conservation Training
Organization	Department of Industry, Labor and Human Relations (DILHR)
Address	201 East Washington Ave. Madison, WI 53702
Contact	Richard Meyer
Telephone	(608) 266-3080
Funded By	Office of State Planning and Energy
Cost	\$50,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

High quality curriculum materials are needed to replace, supplement and upgrade materials available to post-secondary classroom instructors. The Energy Curriculum Development Program will fill that void.

Energy-related course materials will be developed for existing courses and an energy-conservation section will be added to existing occupational training and technical assistance programs and activities.

Three specialists will focus specifically on industrial energy conservation, commercial and transportation energy conservation, and residential energy conservation. These curricula will include printed and audio-visual materials.

Category Education
State WI
Project Name Energy Curriculum Development

Organization Wisconsin Board of Vocational, Technical and Adult Education (UTAE)
Address 4802 Sheboygan Avenue
Madison, WI 53702

Contact Sherman Ansell

Telephone (608) 266-7848

Funded By Office of State Planning and Energy

Cost \$127,900

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Waukesha County Technical Institute, with the guidance and cooperation of the Wisconsin Energy Coalition, will develop and offer a series of energy-related educational modules. These modules will be grouped and integrated as necessary into course offerings designed to assist industry and commerce save energy. A sampling of the educational modules includes energy use and costs, energy conservation, building construction and design, burner efficiency, heat loss and recovery systems, and internal environmental-control systems.

These courses are offered throughout the area served by the Waukesha County Technical Institute. The development and monitoring of the program is closely coordinated with the State Board of Vocational, Technical and Adult Education to insure that no curriculum duplication occurs.

Category	Education
State	WI
Project Name	Energy Education Modules
Organization	Waukesha County Technical
Address	800 Main Street Pewaukee, WI 53072
Contact	n/a
Telephone	(414) 548-5566
Funded By	Office of State Planning and Energy
Cost	\$80,000
Congressional District	IX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In order to implement the school and hospitals program approved as part of the National Energy Act, Wisconsin needs trained, Office of State Planning and Energy (OSPE)-certified auditors.

The University of Wisconsin Extension is attempting to assist the state in meeting this need by offering courses in both hospital and school auditing.

UWE's hospital audit training course is aimed primarily at consulting engineers, who are OSPE-certified upon successfully completing the course.

Using knowledge gained from the current Energy Conservation in Educational Facilities program, the Extension is developing a school-audit program.

In addition to the training programs, UWE is developing a mini-audit procedure for use in setting priorities for federal funds, and is establishing criteria and procedures OSPE can use to set priorities and manage applications for schools and hospitals.

Category	Education
State	WI
Project Name	Hospital and School Audit Training Program
Organization	University of Wisconsin Extension (UWE)
Address	432 N. Lake Street Madison, WI 53706
Contact	Tom Smith
Telephone	(608) 262-2061
Funded By	Office of State Planning and Energy (OSPE)
Cost	\$10,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

A 1978 Dodge Omni has been altered to burn hydrogen in a single-cylinder, 16-hp engine. As long as we have water and air, the supply of hydrogen is unlimited. The hydrogen is stored in a hydride tank designed by the SCORE group.

For city and street use and normal short-distance running, the vehicle uses a hydrostatic drive. The engine powers a hydraulic pump that compresses fluid in an accumulator tank. The pressurized fluid drives a hydraulic motor to move the vehicle.

The motor charges the accumulator tank whenever a maximum power load is not required. At speeds of 45-55 mph, the engine electronically shifts into direct drive to power the wheels.

The SCORE vehicle incorporates many additional innovations. The disc brakes reduce rolling resistance in the front wheels. The water-cooled cylinder head increases the volumetric efficiency. The hydride tank makes hydrogen fuel as safe to use as any other fuel on the market. Computerized controls help the driver maximize performance and economy. Aerodynamic modifications to the vehicle body reduce the rolling resistance by nearly 17 percent.

This car adheres to all vehicle requirement codes for a four-passenger vehicle.

p>Category Education
State WI
Project Name Hydrogen-powered Car

p>Organization SCORE Project
Address Energy & Transportation
Department
University of WI-Stout
Menomonie, WI 54751
Contact Ed Morical
or
Jim Collier
Telephone (715) 232-1278
or
(715) 232-2385

p>Funded By Donations
Cost \$27,000-30,000 for
prototype
Congressional District X
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In anticipation of the passage of the National Energy Act, which included (under the school and hospitals aid program) funds to audit local government buildings, the University of Wisconsin Extension (UWE) has been preparing a Local Government Audit Training Program.

The training program will be aimed at professional engineers, who will automatically be certified by the Office of State Planning and Energy upon successfully completing the course.

Also being developed by UWE are a mid-audit procedure, which will be integrated into the training program, and the means to assess the energy-conservation needs of local governments to determine funding priorities vis a vis federal grants.

Category	Education
State	WI
Project Name	Local Government Audit Training Program
Organization	University of WI Extension
Address	432 N. Lake Street Madison, WI 53706
Contact	Tom Smith
Telephone	(608) 262-2061
Funded By	Office of State Planning and Energy (OSPE)
Cost	\$10,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

JFK Prep developed two slide show/lecture programs. One slide show combines slides from a variety of existing sources: DOE, EPA, NASA and Tennessee University. It provides a short history of energy: where it comes from and how it is used. In the past two years this show has been used in talks to local community groups, and colleges.

The other slide show documents the construction of Eco-house, an energy self-sufficient dormitory designed and constructed by high school students. For three years now, the Eco-house presentation has been given at energy fairs, the meetings of civic groups, education conventions and school assemblies.

Category Education
State WI
Project Name Slide Shows

Organization JFK Prep
Address Box 109
St. Nazianz WI 54232
Contact Rev. Melvin Tracy
Telephone (414) 773-2111

Funded By Spin-off of DOE and
NSF grants (funds
provided by school)

Cost \$30

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Small Business Energy Project conducted conservation workshops for retailers, small manufacturers and income property owners. The direct participation workshops attracted some 700 people while those broadcast through three educational telephone networks reached another 350 to 400 individuals.

The conservation workshops taught "energy control as a management technique." They also offered energy audits. The recipient paid \$12.50 for a half-day audit, while the cost to the agency was \$200. The audits were sub-contracted to four engineering consulting firms. Ninety audits were done in 15 months.

Category Education
State WI
Project Name Small Business Energy Project

Organization University of WI
Small Business
Development Center
Address University of Wisconsin
One South Park St.
Madison, WI 53706

Contact Wes Mott

Telephone (608) 263-7830

Funded By State Energy Office

Cost \$150,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Trees for Tomorrow has conducted a variety of educational programs involving speakers, demonstrations, and field trips. The main focus of the seminars is conservation of land and forest resources. This often includes updates on solar energy and energy in general. These seminars feature field trips to solar installations and lectures by energy specialists.

Category Education
State WI
Project Name Solar Education and General Energy

Organization Trees for Tomorrow Environmental Center
Address Eagle River, WI 54521
Contact Mark R. Peterson, Program Director
Telephone (715) 479-6456

Funded By Trees for Tomorrow Board and sponsoring groups

Cost n/a

Congressional District IX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Students at Western Wisconsin Technical Institute are gaining first hand knowledge of air-to-air solar heating systems through a special classroom demonstration unit.

The LaCrosse Technical College recently installed twelve air-to-air solar heating collectors to heat a laboratory area. The 223,2 ft² collectors are supplemented by an electric furnace. Through monitoring the system, students can learn the percentage of heat available for space heating and hot water requirements. Other important parts of the solar heating system, the controls, rock storage area and distribution system, can also be studied.

Category	Education
State	WI
Project Name	Solar Heating Training at WWTI
Organization	Western Wisconsin Technical Institute
Address	LaCrosse, WI 54601
Contact	n/a
Telephone	(608) 785-9138
Funded By	n/a
Cost	n/a
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Solar Lab provides training for UW Chemical Engineering and Mechanical Engineering graduate students, practicing engineers in Extension programs, and the general public. Through research publications and lectures geared to these different audiences, the Solar Lab disseminates the latest information on solar energy. Constant evaluation ensures that courses meet students' needs.

Category Education

State WI

Project Name Solar Lab

Organization University of Wisconsin-Madison

Address Solar Energy Lab
1303 Engineering
Research Building
University of Wisconsin
Madison, WI 53706

Contact Jack A. Duffie

Telephone (608) 263-1587

Funded By n/a

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Farm (Solar Energy Works) is a community committed to developing a standard of living within the reach of everyone in the world. One aspect of this has been the development of alternate energy sources, particularly solar air collectors, for domestic use.

The project demonstrates simple, low-cost solar energy systems. It's based on the belief that solar energy is a realistic approach to stabilizing the rising cost of energy.

This project began in 1976 with fruit drying. Trial and error led to a highly efficient, low-cost design that Solar Energy Works began to manufacture in 1978.

Since the first demonstration on Sun Day, May 3, 1978, Solar Energy Works has visited ten cities in Wisconsin, and Nashville, Tennessee. People respond to working solar energy—feeling the hot air and hot water and hearing music run by photovoltaic cells.

Currently Solar Energy Works is installing as many systems as possible in a variety of applications at the grass-roots level.

Category Education
State WI
Project Name Solar on The Farm

Organization Solar Energy Works
(The Farm)
Address Route 2, Box 33
Ettrick, WI
54627
Contact Roger Kanies
and
Douglas Cobb
Telephone (608) 525-5626

Funded By Private

Cost Ongoing

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The SUEDE (Solar Utilization, Economic Development and Employment) program has had a highly visible effect on the seven countries of West Central Wisconsin.

Some 60 solar installations (e.g. greenhouses, panels for space and water heating) were completed by the 24 low-income people who were trained under the program.

Critique/analysis: The West Central Wisconsin SUEDE project was highly successful. It has provided highly visible examples of solar utilization and has placed approximately half of the trainees in the solar industry.

Category Education
State WI
Project Name SUEDE - Solar Training

Organization West Central Wisconsin Community Action Program
Address 525 Second Street
Glarwood City, WI 54013
Contact Gary Titus
Telephone (715) 265-4271

Funded By CSA, DDE, DOL, CETA, (labor)

Cost \$400,000 per year approximately

Congressional District X

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The state-wide vo-tech solar program partly sponsored by the Wisconsin Board of Vocational, Technical and Adult Education, receives one-half of its operational budget from local districts in matching funds. Project staff develop and disseminate energy-related educational programming. They offer courses in oil and LP gas burner repair, home weatherizing, selection of home heating units, principles of solar heating, and interpretation and application of the Wisconsin energy code for single- and multiple-family dwellings.

Category Education
State WI
Project Name Vo-tech Solar Program

Organization North Central
Technical Institute

Address 1000 Schofield Ave.
Wausau, WI 54401

Contact Ronald Beckman

Telephone (715) 675-3331

Funded By Federal/state funds

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Home Savings and Loan wants to encourage the use of solar energy. Three years ago it lowered its interest rate $\frac{1}{4}$ of 1 percent for borrowers building new homes with solar systems.

To advertise its commitment, the bank also installed a solar system on a new building. This 1,800 ft² structure has 264 sq. ft. of air-type collectors. The heating bills for the last two years were \$185 and \$220. In comparison, with other similar buildings, Home Savings and Loan's building uses 60 percent less fuel.

Visitors to the bank are encouraged to look around. A guided tour and leaflets explaining the system are also available.

Category Financing
State WI
Project Name Solar Loans

Organization Home Savings & Loan

Address 400 W. Main St.
Stoughton, WI
53589

Contact Dan McGee

Telephone (608) 873-5633

Funded By n/a

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Bill and Sandy Euclide designed and constructed their own solar air system. This active system provides heat for the living area and domestic hot water. The flat-plate collectors stand on the ground at the rear of the home. A stone bin provides heat storage.

The system has reduced natural gas consumption by about 30 percent for each of the two years it's been in operation. With that, the 190 ft² collector has fulfilled its energy savings potential.

During construction, Bill Euclide (a lecturer at Lakeshore Technical College and UW-Whitewater) took slides to provide audio-visual materials. He has used the slides to teach a solar class and lecture on self-designed and -constructed solar heat systems.

Category Housing
State WI
Project Name Do-It-Yourself Solar System

Organization Bill and Sandy Euclide

Address 7295 Glencoe Drive
Cedarburg, WI 53012

Contact Bill and Sandy Euclide

Telephone (414) 377-5942

Funded By Private

Cost \$3,993.63 before tax
credits, \$1,677.41
after tax credits
Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In February of 1977, Family Homes United, Inc., of Omro applied for a \$38,000 grant from HUD to buy solar equipment for five homes in its self-help homes project. Family Homes had already provided technical assistance for the building of over 30 self-help homes in its three-county area and was building more than 20 homes at the time.

The completion of the five solar homes consumed over half of the administrative time of the project staff for two and a half years. Four of the homes are now occupied. The fifth unit, the demonstration model on which construction began, was never finished and is being foreclosed.

Of the four homes completed, one is a beautiful and efficient showpiece, a second is highly successful, and two are moderately successful. The construction produced considerable diffusion of solar technology in the local building industry. But the learning process was difficult.

Critique/analysis: FmHA, which financed the self-help homes, was at first suspicious and hostile. It reportedly accused the project of "experimenting with the lives of low-income people." They approved the project only after giving explicit contractual agreements that HUD would correct any failures. Approval came a little over one year after HUD awarded the grant.

Category Housing
State WI
Project Name Family Homes United

Organization Family Homes United

Address c/o Office of Planning & Energy
1 W. Wilson St.,
Box 511, Rm. 201
Madison, WI 53701
Contact Jim Mickler

Telephone (608) 266-9861

Funded By HUD
Farmers Home Admin.

Cost n/a

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Three conventional homes with forced-air furnaces were built in a small development near Cottage Grove, Wisconsin. The heating similarities end with the furnaces, though.

One of the homes has a rooftop solar collector while the second features a remote array in the back yard and the third (the control home) has a conventional heating system.

In order to conduct the test, the homes, which have been studied for four winters, are fully instrumented with sophisticated electronic monitoring equipment.

Testing results show that both solar homes are measuring up to prediction of performance by the University of Wisconsin "f" chart method. For more detailed information on performance, write to Research Products Corporation, Solar Division, P.O. Box 1467, Madison, WI 53701.

Category Housing
State WI
Project Name Field Verification

Organization Research Products Corporation
Address 1015 E. Washington Ave., Madison, WI 53701
Contact Vern J. Hellenbrand
Telephone (608) 257-8801

Funded By Research Products Corporation

Cost \$350,000-\$450,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Two 6-room passive solar houses with attached two-car garages were built as demonstration homes during the winter of '78-79. Both houses were monitored for heat level and fuel use by Wisconsin Power and Light. One house has a separate gas, forced air furnace for the north side, and another for the south side. The other house has a five-zone Hydronic-electric system.

The houses are variations on the Cape Cod style. They use south-facing windows with insulating coverings for a passive solar system. The north wall has only one window, which is triple glazed. There is a storage unit for excess heat (temperatures above 72 degrees F).

These homes were open to the public for three months. Wisconsin Power and Light Co. staffed them during that time, answering questions and giving tours. The homes are now for sale.

Category Housing
State WI
Project Name Passive Homes

Organization Wellnitz Builders

Address 1001 Highway 14E
Janesville, WI

Contact Ed Wellnitz

Telephone (608) 752-6985

Funded By Own internal funding
with cooperation from
Wisconsin Power and
Light Co.

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Extension Hospitality Industry Conservation Program is a two-part program designed to reduce energy use in the hospitality industry.

Forty workshops have already been given, with about 800 managers attending. The program ends in June of 1980.

On request or as a follow-up to workshops, energy audits are offered. Five hundred and fifty audits have been performed statewide. Almost all audits were of restaurants and motels.

The greatest energy savings were achieved by changing the air conditioning systems, and shifting from heat to chemical disinfectant in dish-washing.

Category Industrial
State WI
Project Name Industrial Conservation

Organization University of Wisconsin Extension

Address 432 N. Lake St.
Madison, WI 53706

Contact Ayse Somersan

Telephone (608) 263-2621

Funded By \$100,000 from State Energy Conservation Program; \$150,000 over 2 yrs. for audit program.

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This Solar Rest Stop opened June 1, 1979. The 986 ft² air collector will provide 49 percent of space and domestic hot water use. The hot water system has a 500-gallon storage capacity. The space-heating system has 600 cu. ft. of rock storage, which is not used in summer so that the building will not overheat. The back-up systems run on LP gas.

The solar system provides peak energy potential at peak traffic times. Inside the shelter is a glassed-in showcase with an explanation of how the solar system works. This interstate wayside will serve an estimated 400,000 people, per year.

Category Institutional
State WI
Project Name Solar Rest Stop

Organization Department of Transportation
Address Design Section
P.O. Box 7916
Madison, WI 53707
Contact Paul Christianson
Telephone (608) 266-8665

Funded By Federal aid for
interstates - state
matching funds from
Dept. of
Transportation
Cost Approx. \$32,000 (col-
lectors);
\$6,000 storage
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Assembly Bill 777 is an omnibus renewable energy bill which includes provisions dealing with consumer protection; demonstration projects; alcohol fuel incentives; education and training; a solar design contest; assessment standards; public information; corporate and cooperative rebates; state building requirements; and an electricity supply study.

Introduced July 5, 1979, by 42 sponsors and eight co-sponsors, the bill was given final legislative approval on April 2, 1980, and awaits action by the Governor.

This very comprehensive bill is getting considerable support from rural assembly persons because it contains several alcohol fuel (gasohol) incentives.

Category Legislation
State WI
Project Name Alternative Energy Legislation

Organization State Legislature

Address Madison, WI. 53702

Contact Assemblyman Ferrall

Telephone (608) 266-0315

Funded By n/a

Cost n/a

Congressional District Statewide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Chapter 22 of the Wisconsin Administrative Code deals with energy use in all newly constructed conventional and manufactured one- and two-family dwellings. It proposes design requirements to improve the energy utilization in one- and two-family dwellings. These include minimum requirements for materials and methods of construction and for heating, cooling and air-conditioning equipment and systems.

The standards are intended to be flexible and to permit the use of innovative approaches and techniques to achieve energy efficiency.

The code requires a design temperature of 70 degrees F for winter and 78 degrees F for summer. It requires the creation of vapor barriers wherever insulation is installed. Moisture control is stipulated and proper ventilation in ceiling and attic areas is required. The code sets insulation standards for all types of buildings (i.e., slab or conventional) and for all exposed areas of buildings (i.e., basement walls, roofs, ceilings, and windows). It also regulates air leakage at all joints and openings.

Category	Legislation
State	WI
Project Name	Building Code

Organization	Administered by the Dept. of Industry, Labor and Human Relations
Address	201 E. Washington Ave., Madison, WI 53702
Contact	Small Buildings Division
Telephone	(608) 266-3151

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

Renewable Resources— A National Catalog of Model Projects

This Building Code Evaluation and Development program is intended to update the residential and commercial building codes to make them require more energy-conservation measures. In general, the current code will be evaluated for conflicts with energy-conservation goals. More specifically, wood burning appliances and systems will be checked to see if they can meet minimum safety and health requirements, and be covered in the code. Also, the energy consumed in lighting systems will be studied to establish a data base for use in setting the energy-conservation goals that will be incorporated into the Wisconsin Administrative Code.

Category Legislation
State WI
Project Name Building Code Evaluation and Development

Organization Department of Industrial, Labor and Human Relations
Address 201 East Washington Ave.
Madison, WI 53702
Contact Richard Meyer
Telephone (608) 266-3080

Funded By Office of State Planning and Energy

Cost \$61,350

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The legislature found that it was in the state's interest to use renewable, in-state sources of energy that do not pollute the environment and that diversify the supplies of energy used in Wisconsin. Since the long-term social advantages of using many alternative energy sources are seldom reflected in the costs of these sources, the legislature declared that the expedient development of alternative sources of energy not now economically competitive should be fostered via temporary state financial incentives, which should supplement federal incentives.

Beginning in 1977, any person owning an alternative energy system installed on his property can receive a tax credit based on the total cost of the design, construction, equipment and installation of the alternative energy system, but not exceeding \$10,000 of such costs.

The tax credit runs until 1984. The percentage of credit declines during this eight-year period from 30 percent to 8 percent.

The Department of Industry, Labor and Human Relations was directed to establish performance standards that would provide the maximum practical amount of energy; conform, where feasible, with federal performance standards for alternative energy systems; require that systems pay for themselves within 25 years; and do not hamper individual development of innovative alternative energy systems.

It took a year to pass the standards and establish a mechanism for the rebate process. Consequently, there has been new legislation introduced to extend the higher rates of rebate.

Category	Legislation
State	WI
Project Name	Tax Credits (Incentives)

Organization	State Legislature
Address	Madison, WI 53703
Contact	n/a
Telephone	(608) 266-2211

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

Renewable Resources— A National Catalog of Model Projects

Section 951.101.57, Chapter 34, Laws of 1979 (part of the administrative code adopted along with the new budget) is the Alternative Energy System Incentive. This statute amends the tax rebate bill to a straight refund for any person, but not corporations. The refund does not depend upon one's tax liability, and it amounts to a maximum of \$10,000.

If the real property improvements on which the system is installed appeared on the local tax roll prior to April 20, 1977, the tax refund equals 24 percent for 1979 and 1980, 18 percent for 1981 and 1982, and 12 percent for 1983 and 1984. If the real property improvements on which the system is installed appeared on the local tax roll on or after April 20, 1977, the tax refund is one-third less in each case.

Category Legislation
State WI
Project Name Tax Credits
 (Incentives)

Organization State Legislature

Address Madison, WI
 53702

Contact n/a

Telephone (608) 266-2211

Funded By n/a

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Assembly Bill 596 exempts solar energy home-heating systems and home electricity-generating devices from property taxes. All solar energy systems that furnish 30 percent of home heating requirements or electricity-generating devices that furnish 10 percent of home electrical power requirements are eligible. The exemption includes insulation installed with the solar system. (Solar energy systems are defined as any device that absorbs, converts, or stores usable energy from solar radiation.)

The Department of Industry, Labor and Human Relations will certify the systems, and the Department of Revenue has final approval.

Category	Legislation
State	WI
Project Name	Tax Credits (Exemptions)

Organization	State Legislature
Address	State Legislature Madison, WI 53702
Contact	Representative Hasenohrl
Telephone	(608) 266-2211

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

Renewable Resources— A National Catalog of Model Projects

Life Tools Coop does free household energy audits for any interested individuals. Their two auditors and one energy consultant offer advice on designing and installing alternative energy systems.

Consultation has been sporadic, and it has resulted in only a few installations. But as the cost of fuel rises so do requests for audits.

Category Low Income
State WI
Project Name Energy Audits

Organization Life Tools Coop,
Address 401 North Clay
Green Bay, WI 54301
Contact John Bates
Telephone (414) 432-7399

Funded By CETA
Cost \$37,000
Congressional District VIII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Community Organization Planning Project is exploring ways to improve energy conservation in Fond du Lac and Winnebago Counties through developing cooperative working relationships between Wisconsin Power and Light and ADVOCAP, Inc. Community Action Programs currently operate substantial weatherization programs. Since the Public Service Commission has mandated energy-conservation responsibilities for utilities, this experiment could become a model for the rest of the state.

There will be three major products of this project. One is a service agreement to be developed between WP&L and ADVOCAP in order to specify areas of cooperation in energy conservation. Another is a mini-weatherization project to be run in conjunction with WP&L to demonstrate how a community-based organization and a public utility can cooperate in an energy conservation program. (Ten low-income homes will be included in this mini-weatherization project.) The third is a practical manual documenting how community based organizations can effectively work with public utilities to provide conservation services. It will be prepared, published and distributed to Community Action Agencies and public utilities.

Category Low Income
State WI
Project Name Energy Community Organization Planning

Organization ADVOCAP, Inc.
Wisconsin Power and Light Company
Address P.O. Box 311
Berlin, WI 54923
Contact Robert Wall
Consumer Services Supervisor
Telephone (414) 361-1414

Funded By Office of State Planning and Energy

Cost \$46,500

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Wisconsin Power and Light Company, Winneconne Jaycees and ADVOCAP are sponsoring this Energy Conservation Weatherization Project for low-income elderly persons in Winneconne.

This project combines the efforts, technical knowledge, monies and man power of WP&L, Winneconne Jaycees and ADVOCAP to insulate and weatherize the homes of low-income persons who are not physically or financially able to do it themselves.

WP&L supplies the technical knowledge, helping to determine who needs the service, and the Jaycees provide the labor. ADVOCAP supplies some material for their clients' homes and labor, when necessary.

Thus, it is hoped that energy will be conserved while the fuel bills of the elderly will be lowered.

Category Low Income
State WI
Project Name Weatherization for Low Income Community

Organization Wisconsin Power and Light Company

Address P. O. Box 311
Berlin, WI 54923

Contact Robert Wall,
Consumer Services
Supervisor

Telephone (414) 361-1414

Funded By Various

Cost n/a

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In May of 1978, the Citizens Energy Group, sponsored by the Kickapoo Valley Association, received funds from the Western District Manpower Board to assess the utilization of energy conservation, alternative energy, and renewable resources.

Awareness and utilization were very low. The focus was broadened to include education and demonstration. Kickapoo Sunrise, the resulting document, is a listing of all existing systems in the area as well as a resource directory and a how-to manual.

In addition to Kickapoo Sunrise, the Citizens Energy Group has helped local libraries build their collections on alternative energy and energy conservation; worked with three local communities assessing the feasibility of solid-waste recycling; sponsored workshops in passive solar design, small farm energy, building a solar collector (high school), and wind generation (high school); consulted with the Village of Soldiers Grove on the relocation project; held an energy conservation fair; and built a demonstration wind generator and methane digester.

Working with several agencies the Citizens Energy Group wants to develop a Community Development Corporation. The CDC would provide the organizational structure for local development of energy-conservation and alternative-energy businesses.

Category Outreach
State WI
Project Name Community Education

Organization Kickapoo Valley
Citizens Energy
Group
Address Box 153
Viola, WI 54664
Contact Jay Rick
Telephone (608) 627-1733

Funded By Western District
Manpower Board

Cost n/a

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Citizens for a Better Environment maintains a full-time staff of environmental scientists, economists, attorneys and research associates who advocate the public interest in environmental health, energy conservation, and consumer protection.

CBE's program emphasizes health hazards in the urban environment. This encompasses energy policy, toxic substance control, and air and water pollution.

To achieve these goals CBE follows a program to curtail pollution and conserve energy without causing economic dislocation or job loss. Its methods include research and public education, public representation and legal action, and monitoring and commenting on state and federal agency decisions.

As a grassroots organization, CBE strives to inform those individuals whose interests have often been ignored or thwarted by bureaucratic agencies and unfathomable legal processes.

Category Outreach
State WI
Project Name Consumer Advocate

Organization Citizens for a Better Environment (CBE)

Address 536 W. Wisconsin Avenue
Suite 502
Milwaukee, WI 53203

Contact Roger Walsh

Telephone (414) 271-7475 Milwaukee
(608) 251-2804 Madison

Funded By 85% annual door-to-door
canvass; 15% foundations

Cost \$121 000

Congressional District V, II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Wisconsin Environmental Decade, a non-profit, public interest organization, works to reorient our energy strategy away from involvement in large-scale, capital-intensive, high technology, polluting ventures. Through testimony and intervention before agencies and the legislature, WED informs the decision-makers of the advantages of conservation, the risks of nuclear energy and the practicality of renewable resource alternatives.

Category Outreach
State WI
Project Name Energy Advocacy

Organization Wisconsin Environmental Decade (WED)

Address 302 E. Washington Ave.
Madison, WI 53703

Contact Peter Anderson

Telephone (608) 251-7020

Funded By member supported

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Brown County Conservation Center, funded by the University of Wisconsin Extension Service, the University of Wisconsin-Green Bay, Wisconsin Public Service Corporation and the Green Bay/Brown County Planning Commission, has been in operation since April of 1978. The program plans to form a strong commitment to conservation, to identify the major energy problems, and produce a management plan to deal with them.

Eight basic tasks were outlined. First, a comprehensive energy-management study that led to the development of a management plan was made. The other seven tasks dealt with residential, commercial, and industrial energy audits, transportation and education.

The board of directors is primarily composed of representatives of supporting organizations, utilities, government and the University Extension.

Critique/analysis: This project has not been very successful. Up to now, it has not had a mechanism for engendering citizen participation effectively.

table
Category	Outreach
State	WI.
Project Name	Energy Conservation Center

table
Organization	Brown County Energy Conservation Center
Address	2231 N. Quincy Green Bay, WI 54302
Contact	Valdimar Stefanson
Telephone	(414) 435-1051

table
Funded By	Wisconsin Division of State Energy
Cost	\$93,369
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Wisconsin Environmental Decade will provide information on load management by electric utilities in a generic hearing on this topic to be held by the Public Service Commission. The group's testimony will demonstrate the feasibility of load-management techniques in modifying electric system load curves. Its point is that by changing load curves to eliminate inefficient oil and gas peaking units energy can be conserved.

Wisconsin's Environmental Decade will retain an engineering consultant to show to what extent practical load control can be utilized in Wisconsin, and the time and money required to do so. An economist will develop a pricing structure designed to encourage customers to make full use of practical and available load-control devices. The testimony will be presented at the generic proceeding. Final recommendations will be made to the Commission.

Category Outreach
State WI
Project Name Generic Load Management Proceeding

Organization Wisconsin Environmental Decade
Address 114 East Mifflin Street
Madison, WI 53703
Contact Peter Anderson
Telephone (608) 251-1020

Funded By State Office of Planning and Energy

Cost \$34,750

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Grant County Energy Steering Committee was organized in the fall of 1977 through the efforts of the Grant County Extension Agents. Thirty citizen volunteers joined and held monthly meetings. Staff work was done by County Extension agents.

The programs established by the committee ranged widely. 4-H youths taped two-minute conservation-related public service announcements on a local radio station. (The PSAs are broadcast twice a week). An information packet on conservation was prepared for libraries in the county, and the Youth and Agricultural Center was retrofitted from an Energy Extension Service pilot project using funds and design assistance from the University of Wisconsin-Milwaukee School of Architecture. Energy audits funded by the Energy Extension Service pilot project were conducted on public buildings. Workshops on saving gas were conducted for school-bus and social-services vehicle drivers. And a conservation-poster contest for youth was held. (Winning posters are displayed in public buildings in Grant County.)

Category Outreach
State WI
Project Name Grant County Energy Steering Committee

Organization Grant County Energy Steering Committee
Address Grant County Office
Youth and Agricultural Center
Box 31
Lancaster, WI 53813
Contact George Kiefer
Extension Resource Agent
Telephone (608) 723-2652

Funded By None direct.
Contributions from Wisconsin Gas, Grant Electric Coop., and Wisc. Power & Light Co.

Cost n/a

Congressional District III

Compilation Date February, 1980

Renewable Resources— A National Catalog of Model Projects

The State Energy Policy Project has three parts. One is developing a framework and data base so it can better analyze and evaluate state energy policy issues and actions; special attention is devoted to the transportation sector. A second part of the project involves an understanding of the economic and technical relationships involved in energy use in the industrial sector. The final part involves establishing a statewide discussion on Wisconsin's energy future by holding an energy conference with major participation from the public and private sectors. The conference was a milestone in opening communication channels among the major parties in Wisconsin's energy community.

The program objectives will be accomplished in part through a sole source contract with the University of Wisconsin Energy Systems and Policy Research Group, under the direction of Dr. Wesley Foell.

Category State
State WI
Project Name State Energy Policy Project

Organization Energy Research Center
Address University of WI
1500 Johnson Drive
Madison, WI 53706
Contact Dr. Wesley K. Foell
Telephone (608) 263-4836

Funded By Division of State Energy (DSE)
Cost \$85,919
Congressional District Statewide
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Each year the Center for Community Technology coordinates the Madison Alternative Festival. This outdoor event features displays and workshops on energy conservation, alternate energy technologies and other means of self-reliance for individuals and local communities.

The 1979 Alternative Festival was the third of its kind. Held on the Madison Capitol Square, it drew an estimated 15,000 people to view 120 exhibits and to take part in 40 workshops and demonstrations.

The Center for Community Technology also maintains a resource center, conducts workshops, gives talks to community groups and carries out demonstration projects. CCT is a non-profit organization with a small paid staff and many volunteers. Additional funding comes from the sale of literature and from demonstration projects, primarily solar greenhouses and insulating window coverings.

Category Outreach
State WI
Project Name Madison Alternative Festival

Organization Center for Community Technology, Inc. (CCT)
Address 1121 University Avenue
Madison, WI 53715
Contact Randy Korda
or
Bob Lopez
Telephone (608) 251-2207

Funded By City Grant, private contributions, exhibitors' fees
Cost \$5,000-\$10,000
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Natural Energy Workshop Inc. concerns itself with the research and development of alternative energy systems environmental designs and with education focused on both.

Ed and Joanne Doerr use the farm as the "guinea pig" for their research and development ideas. Every Saturday they hold informal 'workshops' to demonstrate their ongoing experiments in alternative energy. They also produce and sell plans for their tested, workable ideas. Ed has also conducted several more formal workshops on the subject of renewable resources.

Category Outreach
State WI
Project Name Natural Energy Workshop

Organization Natural Energy Workshop
Address Route 1, Box 130
North Freedom, WI 53951
Contact Ed Doerr
Telephone (608) 544-3013

Funded By Fees and sale of plans

Cost n/a

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This organization was originally Wisconsin's Solar Resources Advisory Panel (SRAP). Incorporated as S/ERA, it is now eligible for funding of \$24,000/year from the Mid-America Solar Energy Center. S/ERA has 200 members and a mailing list of 2,000. The organization educates the public on renewable resources, promotes the commercialization of solar and related industries, and advises state government.

In the past S/ERA has reacted to and revised the solar tax credit bill before it was implemented and helped draft the Governor's energy policy statement.

S/ERA is currently organizing publicity on the Wisconsin Solar Tax Credit, developing an anemometer loan program, and surveying agricultural projects in renewable resources.

Four quarterly statewide meetings are held each year to plan projects and share ideas. A monthly newsletter is produced by a part-time staff administrative person. A major organizational goal is to expand the membership to include labor and farmers.

Membership in the organization and all meetings are open to the general public. As yet there are no membership fees. The Board of Directors, which is elected from the membership, chooses its own officers.

Category	Outreach
State	WI
Project Name	Solar/Energy Resources Association
Organization	Solar/Energy Resources Association
Address	401 South Clay Green Bay, WI 54301
Contact	Bill Hurrle
Telephone	n/a
Funded By	Mid-America Solar Energy Complex
Cost	\$12,000-\$24,000/yr
Congressional District	State
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Solplan, an experiment in alternative energy policy decision-making, tests policy-formation processes, public opinion change and commercialization bases. Creating comprehensive alternative energy policy is complex and difficult, especially when an effort is made to include all sectors of the public and government in such decisions.

Several obstacles impede the development of policy guidelines. First, an accurate assessment of the commercial potential and obstacles inhibiting renewable energy development does not exist. Second, little knowledge of public opinion and preferences has been available. Third, persons with the necessary diversity of perspectives on alternative energy--researchers, public officials, labor, business and civic leaders--have not been gathered together, nor has the information needed to facilitate policy recommendations.

This project will attempt to fill these three gaps and produce a package of legislative, regulatory and executive policy guidelines for the diffusion of alternative energy technologies in the State of Wisconsin. The model for the development of such guidelines should be applicable to other states. The research will be executed in conjunction and consultation with the Mid-America Solar Energy Complex.

The project consists of three units: 1) a survey of the existing alternative energy industries, 2) a public opinion panel assessing barriers and incentives to the development of alternative energy systems, and 3) a conference series aimed at setting alternative energy policy guidelines for Wisconsin.

Category Outreach
State WI
Project Name Solplan
Experiment in
Policy Making

Organization Center for Public
Policy
Address 1605 Monroe Street
Madison, WI 53711

Contact Claire F. Pulevinder

Telephone (608) 257-4414

Funded By DOE and Center for
Public Policy

Cost \$261,576

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Since the home retrofit industry is growing rapidly, there is little information about the problems consumers are experiencing, the types of protections that currently exist, and the best ways to safeguard the interests of the consumer.

"Consumer Protection in the Home Retrofitting Industry" will fill that gap. Consumer-protection methods under study will be the certification and licensing of installers and energy auditors, the improvement of complaint systems, consumer education, advertising and disclosure regulation, consumer advocacy programs, and the use of industry associations.

The results of the study will be publicized in a report for state legislators, state administrators and other decision-makers. Recommendations will include legislative proposals for action by state agencies, local governments and private industry.

Category State
State WI
Project Name Consumer Protection

Organization Center for Public Representation
Address 520 University Avenue
Madison, WI 53703
Contact Mel Goldberg
Telephone (608) 251-4008

Funded By Office of State Planning and Energy
Cost \$35,450
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This community-based conservation program utilized high-school students to conduct over 4,000 home-energy audits and convey consumer-education materials to the occupants. Most of the work was done by Youth Opportunities Unlimited (YOU). (YOU provides part-time work for low-income youths during the school year.) Additional audits were conducted by high school students as part of classroom assignments.

The YOU auditors use a computerized audit developed by Dr. Neal Prochnow (University of Wisconsin-River Falls) and funded in part by the Community Services Administration. Dr. Prochnow trains the students and teachers to use the computerized audit. Frank Kelly of OASIS 2000 assists in the training.

After the audit, homeowners received a booklet describing the recommended measures in text, pictures, and diagrams.

The original project is now completed and no follow-up activities occurred. Yet, West CAP uses the YOU audit in its ongoing weatherization program.

This CAP agency includes citizens on all their boards. Their review board has one-third volunteer members and their policy council has 51 percent low-income representatives.

Category	State
State	WI
Project Name	Energy Intervention Program
Organization	West Central Wisconsin Community Action Agency
Address	525 Second Street Glenwood City, WI 54013
Contact	Carl Saueressig
Telephone	(715) 265-4271
Funded By	State Office of Planning and Energy
Cost	\$20,000
Congressional District	X
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

This study will investigate problems with home retrofitting involving insulation. The information will document the need for special rule-making by the Department of Agriculture to prevent misleading advertising claims or to prevent the installation of unsafe materials.

The study will include an analysis of the cost-effectiveness of retrofitting various parts of the house with a variety of materials, a sampling of insulation materials to determine their installed properties (such as flame retardancy, insulating value, and lifetime), and a survey of installed insulation to determine the evenness of coverage, the effectiveness of moisture control, and the potential fire hazards.

Category	State
State	WI
Project Name	Insulation Quality Study
Organization	Department of Agriculture, Division of Trade and Consumer Protection
Address	801 W. Badger Road Madison, WI 53713
Contact	Mary Kay Ryan
Telephone	(608) 266-9837
Funded By	Office of State Planning and Energy
Cost	\$50,000 estimated
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Wisconsin Department of Industry, Labor and Human Relations is establishing insulation material standards designed to keep consumers, particularly those retrofitting their homes, from buying hazardous or ineffective materials. These materials and installation standards would then be incorporated into the new code governing construction of one- and two-family dwellings. All insulation materials sold for use in new or existing homes in the state would receive state approval prior to their sale.

The standards would be phased-in to coincide with the development review and implementation of the residential construction code. A three-month period for research and review of existing standards would precede the selection of specific standards for Wisconsin by a Special Task Group.

Initially, two engineers are needed to approve materials. An educational program for building inspectors and State agencies must also be provided.

p>Category State
State WI
Project Name Mandatory Insulation Materials

p>Organization Department of Industry, Labor and Human Relations

p>Address 201 E. Washington Avenue
Madison, WI 53702

p>Contact Richard Meyer

p>Telephone (608) 266-3080

p>Funded By Office of State Planning and Energy

p>Cost \$68,000

p>Congressional District State-wide

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The University of Wisconsin has developed a program that will encourage energy savings through the analysis of daily commuter patterns in the state.

At least five major places that many people travel to daily will be selected and studied to determine the potential for mass transit, car pools and van pools.

Recommendations will be made for each "trip generator". This will detail the most viable transportation option, taking into account the wide range of technical, operational, and behavioral factors. The primary emphasis, however, will be given to vanpool programs.

Commuters will be questioned as part of the development and implementation of feasible transportation alternatives.

Category State
State WI
Project Name Travel Pattern Studies

Organization University of WI Extension
Address Office of State-wide Transportation Programs, P.O. Box 413, Milwaukee, WI 53201
Contact David Cyra
Telephone (414) 963-4891

Funded By Office of State Planning & Energy
Cost \$43,691
Congressional District State-wide
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Wisconsin Power and Light Co. (WP&L) has monitored the performance of heat exchangers in various sized dairy operations throughout its service territory. A display and an educational pamphlet have been developed for use at farm shows and extension meetings. The display pamphlet encourages the use of heat exchangers in all dairy operations. It presents actual test data on how heat exchangers work in milk houses.

Category	Utility
State	WI
Project Name	Co-generation (Wisconsin Power and Light)
Organization	Wisconsin Power and Light Co.
Address	222 W. Washington Avenue Madison, WI 53703
Contact	Kim Zuhlke
Telephone	(608) 252-3923
Funded By	Company
Cost	n/a
Congressional District	I, III, VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Wisconsin Public Service Commission will investigate the costs, reliability and environmental impacts of cogeneration in relation to conventional energy-generating facilities. Through the Utility Advance Plan the results of this study will be released to commercial, industrial and utility system planners as well as to the general public.

The PSC will develop computer models to evaluate the impact of cogeneration on electrical demand, fuel savings and system-wide effects. The final report will include recommendations on setting up cogeneration facilities in Wisconsin.

Category Utility
State WI
Project Name Co-Generation Study
(Public Service
Commission)

Organization Wisconsin Public
Service Commission
Address 4802 Sheboygan Avenue
Madison, WI 53702

Contact Hal Meyer

Telephone (608) 266-1265

Funded By Wisconsin Office of
State Planning and
Energy

Cost \$42,600

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Audit and Inspection program started in Beloit on December 21, 1977, and went company-wide on February 1, 1978. As of March 1980, there have been over 18,000 audits of residential homes.

To encourage residential home audits, WP&L's advertising program involves newspaper ads, radio spots, letters to customers and phone calls. Each division designs its own publicity program. Phone calls, with a 25 to 35 percent response rate, have been the most successful.

To increase the effectiveness of conservation advertising, several divisions offer small incentives. These incentives include tubes of caulking, caulk guns and savings bonds. This also tests the effectiveness of offering incentives to increase customer response for audit requests.

Category Utility
State WI
Project Name Energy Audit

Organization Wisconsin Power and Light Co.
Address 222 W. Washington Ave.
Madison, WI 53703
Contact Dennis Hanke
Telephone (608) 252-3234

Funded By Gas revenues collected for conservation programs under Public Service Corp. of WI ruling, Docket 05-GV-2, Sept. 22, 1977.
Cost n/a
Congressional District I, II, III, VI
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This program has tested and analyzed various types of furnace efficiency devices and modifications. These include re-orificing (downsizing) the burner, blastgates, automatic flue dampers, electronic ignitions, pulse combustion and fresh air intake. These installations are being monitored and scrutinized to determine which are most effective.

The program's goal is to most efficiently utilize heating fuel, specifically natural gas, so as to decrease fuel consumption. WP&L also wants to advise its customers which method(s) are most effective.

Category	Utility
State	WI
Project Name	Furnace Efficiency

Organization	Wisconsin Power and Light Co.
Address	222 W. Washington Avenue Madison, WI 53703
Contact	Scott Seely
Telephone	(608) 252-3943

Funded By	Gas Conservation Program (WP&L)
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Cost	\$150,000 in 1979
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Congressional District	II
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Hybrid heat pumps which use fossil fuel rather than electric resistance for back-up may offer a more economical means of heating than either conventional heat pumps or fossil fuel furnaces.

The Wisconsin Power and Light Co. (WP&L) is monitoring 20 to 25 customers who have installed hybrid units. Preliminary results indicate that about 40 percent of the heat requirement can be obtained from the heat pump in a climate like Madison's. Further, WP&L believes that fuel savings can justify the additional expenditure for a hybrid unit.

Category Utility
State WI
Project Name Heat Pumps

Organization Wisconsin Power and Light Co.
Address P.O. Box 192
Madison, WI 53701
Contact Alan Kjelland
Telephone (608) 252-3248

Funded By Company

Cost estimated \$6,800

Congressional District I, III, VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1979, Wisconsin Power and Light (WP&L) involved 5 percent of all rental property in its service area in an energy-conservation program.

To meet the energy-conservation goals for the rental properties, WP&L initiated local advisory committees to direct the program. The committee consists of rental property owners, renters, realtors, bankers, local government, and others.

WP&L promoted an energy-conservation certification seal and certificate to induce rental property owners to weatherize. Renters will be made aware that the seal indicates that the building meets WP&L energy-efficiency standards. Constant monitoring of the program on a local basis allows WP&L to make changes as necessary to maximize the weatherization and community support.

Ten percent of rental units are expected to be fully weatherized and meet WP&L's standards by the end of 1980. The landlord will be allowed to utilize the seal and certificate in advertising the unit.

table
Category	Utility
State	WI
Project Name	Rental Property Conservation Program

table
Organization	Wisconsin Power and Light Company
Address	P.O. Box 311 Berlin, WI 54923
Contact	Robert Wall, Consumer Services Supervisor
Telephone	(414) 361-1414

table
| Funded By | Company |

table
| Cost | n/a |

table
| Congressional District | VI |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Public Service Commission has issued an order requiring all class A gas utilities in Wisconsin to develop and implement comprehensive energy-conservation plans. This order requires that the utilities provide residential audit services. The Office of State Planning and Energy believes that this program will produce significant energy savings and meet the federal residential audit requirements.

To assure that the utilities' programs maximize the return on the ratepayers' dollar, the PSC will hire two full-time people. The two will evaluate utility-sponsored audit programs and assess the utility's ability to fulfill their plans. Special attention will be paid to the shortage of qualified personnel.

Category	Utility
State	WI
Project Name	Residential Conservation Service
Organization	Wisconsin Public Service Commission
Address	4802 Sheboygan Avenue Madison, WI 53702
Contact	Hal Meyer
Telephone	(608) 266-1265
Funded By	Office of State Planning and Energy
Cost	\$52,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Bernard Bauman uses the galvanized steel of his machine shed roof to dry his farm's corn in a low-temperature drying bin. A supplemental electric heater is installed in the system but is not being used.

In 1978, a natural air low-temperature grain-drying bin was added to provide a comparison to the solar bin. The fan on each bin is operated on a controlled basis rather than 24 hours a day. The solar drying operation is proving more effective than the natural air system, and it is approximately five percent cheaper.

Category	Utility
State	WI
Project Name	Solar Grain Drying Study

Organization	Wisconsin Power & Light Co.
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Address	222 W. Washington Avenue, Madison, WI 53703
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Contact	Kim Zuhlke
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Telephone	(608) 252- 3923
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Funded By	Gas revenues collected for conservation programs under Public Service Corp. of WI ruling, Docket 05-GV-2, Sept. 22, 1977.
Cost	\$24,000

Congressional District	II
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

In 1978, Wisconsin Power and Light Co. (WP&L) began a research-and-demonstration project involving 12 solar water heating units installed in residences. With the experience gained, WP&L has expanded its program to market test 90 solar water heating units throughout its service territory.

WP&L is acting as the sales coordinator, customer contact and warrantor. The equipment suppliers and local installers were chosen through competitive bid. Financing is by local lending institutions contracted by the homeowner. One-third of the systems will be monitored.

The two systems chosen are liquid with double wall heat exchangers. Either is ground- or roof-mounted. The performance is designed to meet 40 to 60 percent of annual water-heating requirements of a family of four (70 gallons a day). The price for the systems will be \$2,995 installed but will qualify for state refunds and federal tax credits amounting to 64 percent of the cost.

Future expansion of the project is pending on results of the 1979 market test.

Category	Utility
State	WI
Project Name	Solar Hot Water Program
Organization	Wisconsin Power and Light Co.
Address	222 W. Washington Ave. Madison, WI 53703
Contact	Rick Morgan
Telephone	(608) 252-3237
Funded By	Company
Cost	n/a
Congressional District	I, II, III, VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Wisconsin Power and Light Company (WP&L), in conjunction with various boards of realtors, weatherized six homes in the WP&L service territory. They were located in Janesville, Beloit, Baraboo, Mineral Point, Fond du Lac, and Stoughton. The homes were open to the public for three months with WP&L representatives present to answer any questions. Over 9,000 people toured the homes.

The program, whose goal was to educate customers on various ways to properly weatherize their homes, is being evaluated to determine its effectiveness and future direction.

Category Utility
State WI
Project Name Weatherization

Organization Wisconsin Power and Light Company
Address 222 W. Washington Avenue
Madison, WI 53703
Contact Scott Seely
Telephone (608) 252-3943

Funded By Gas Conservation Program (WP&L)

Cost \$40,000 in 1979;
\$60,000 in 1980

Congressional District I, II, VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Lake Superior District Power Company (LSDP) has completed installation of wood-handling facilities, including boiler modifications, at its Bay Front Generating Facility. This will permit using a minimum of 35,000 to 45,000 tons of wood per year as a supplemental boiler fuel.

Most of the wood fuel will be fired in Boiler #1 (one of five boilers at the plant), a 200,000 lb/hr Babcock & Wilcox spreader stoker coal unit. Wood will comprise from 20 to 40 percent of the total BTU input to this 20-megawatt boiler. Thus wood will displace an amount of coal equivalent to 4 to 8 MW at full load.

A smaller percentage of wood will also be fired along with coal in the other coal-fired boilers, displacing an additional 4 MW of coal. Consequently, wood will provide up to 12 MW of the plant's 92 MW capacity. This is enough electricity to supply all the residential and commercial customers in a city with a population of 10,000.

The wood fuel consists entirely of bark, sawdust, and chips. LSDP has contracted with two primary suppliers, though many wood-residue sources exist in the area. The Louisiana-Pacific (LP) stud mill plant in Ashland, WI will supply approximately 20,000 tons/year plus a 30,000 ton stockpile. Another LP plant in Hayward, WI will use an additional 40,000 to 60,000 tons/year.

Cost for the fuel from both LP mills is \$1/ton. The Ashland supply transportation cost is \$2/ton. The total cost from the Ashland LP mill to the Bay Front Plant is 33¢/million BTU. The next lowest priced fuel costs \$1.40/million BTU. Fuel cost savings of at least \$300,000 per year are expected. All savings will be passed on to LSDP customers. Payback on the entire \$850,000 investment will take five years.

Besides obvious benefits of utilizing a previously wasted resource as a fuel, other benefits

Category	Utility
State	WI
Project Name	Wood Fuel for Electricity (Lake Superior)
Organization	Lake Superior District Power Company
Address	101 West Second St. Ashland, WI 54806
Contact	James A. Musso, Admin., Environmental Affairs
Telephone	(715) 682-4511
Funded By	Lake Superior District Power Co.
Cost	\$850,000
Congressional District	X
Compilation Date	February 1980

include net air quality improvement with regard to SO_x emissions (since wood contains no sulfur), and the elimination of the costs to LP of licensing and disposing of this material at an approved landfill. Another benefit is support to the local economy (since a portion of LSDP's fuel expenditures will now stay within Wisconsin).

LSDP will be the first U.S. utility to install a wood fuel-handling system of this size on an existing facility. LSDP is currently considering converting an oil-fired boiler to accept coal and wood fuel.

Renewable Resources— A National Catalog of Model Projects

The rising cost of coal prompted Richland Center's Mayor LaVerne Hardy to initiate a fuel availability study. For Richland Center, which has four saw mills within its borders, presently has 45 percent of its electricity supplied by a 7.5-MW coal-fired plant.

The study, which was done by CETA workers, demonstrated that enough wood is available. An Iowa engineering firm is now conducting a feasibility study, focusing particularly on cost-effectiveness.

Category	Utility
State	WI
Project Name	Wood Fuel for Electricity (Richland Center)
Organization	City of Richland Center Light Utility
Address	Richland Center Utility City Auditorium Richland Center, WI 53581
Contact	Dick Steiner
Telephone	(608) 647-4448
Funded By	City of Richland Center Light Utility
Cost	\$14,000
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The UW System Energy Management Program covers all University of Wisconsin system facilities.

Separate energy audits will produce a manual on energy-conservation opportunity for each campus. Each campus will then implement its own programs.

The audit involves metering every unit in the system (steam condensate, electricity, chilled water use). That information will be converted to a Btu/gross ft² by a computer program. This will pinpoint energy hogs and targets for retrofit.

"Quick fix" programs have already cut fuel use by 15 percent. The target is to save 40 percent in four to five years. The University of Wisconsin pays about \$25 million/year in utility bills.

An example of a local campus program is the dormitory conservation contest initiated by Ed Cook, Energy Manager of the LaCrosse, Stout, Eau Claire and River Falls campuses. All dormitories now fitted with steam condensate and electric meters are eligible. The winner is the dormitory that uses the fewest Btu/ft². This contest began in the Fall of 1979.

Critique/analysis: It took three years to get an Energy Conservation Policy Statement approved by officials involved.

*U.S. GOVERNMENT PRINTING OFFICE : 1980 O-311-119/142

Category Institutional
State WI
Project Name UW System Energy Management Program

Organization University of Wisconsin
Address Division of Architecture
Box 8010
1913 Monroe Street
Madison, WI 53711
Contact Wade (Bud) Tumlien
Telephone (608) 263-4420

Funded By Division of Personnel

Cost n/a

Congressional District State-wide

Compilation Date February 1980