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Volume 1 (of 4 Volumes)

U.S. Department of Energy

July 1980

MASTER

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

Renewable Resources: A National Catalog of Model Projects

Volume 1: Northeast Solar Energy Center 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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Renewable Resources: A National Catalog of Model Projects

Volume 1: Northeast Solar Energy Center 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
Table of Contents

Acknowledgements	i
Introduction	iii

VOLUME I
Northeast Solar Energy Center Region

STATES

Connecticut -----	CT 1 - 30
Maine -----	ME 1 - 28
Massachusetts -----	MA 1 - 48
New Hampshire -----	NH 1 - 18
New Jersey -----	NJ 1 - 42
New York -----	NY 1 - 62
Pennsylvania -----	PA 1 - 57
Rhode Island -----	RI 1 - 15
Vermont -----	VT 1 - 82

VOLUME II
Mid-America Solar Energy Complex Region

STATES

Illinois -----	IL 1 - 37
Indiana -----	IN 1 - 19
Iowa -----	IA 1 - 25
Kansas -----	KS 1 - 15
Michigan -----	MI 1 - 66

Minnesota -----	MN 1 - 62
Missouri -----	MO 1 - 15
Nebraska -----	NB 1 - 34
North Dakota -----	ND 1 - 25
Ohio -----	OH 1 - 32
South Dakota -----	SD 1 - 13
Wisconsin -----	WI 1 - 83

VOLUME III
Southern Solar Energy Center Region

STATES

Alabama -----	AL 1 - 54
Arkansas -----	AR 1 - 56
Delaware -----	DE 1 - 43
District of Columbia -----	DC 1 - 25
Florida -----	FL 1 - 48
Georgia -----	GA 1 - 129
Kentucky -----	KY 1 - 24
Louisiana -----	LA 1 - 17
Maryland -----	MD 1 - 28
Mississippi -----	MS 1 - 38
North Carolina -----	NC 1 - 36
Oklahoma -----	OK 1 - 16
South Carolina -----	SC 1 - 24

Tennessee -----	TN 1 - 45
Texas -----	TX 1 - 57
Virginia -----	VA 1 - 25
West Virginia -----	WV 1 - 61
Puerto Rico -----	PR 1 - 25

VOLUME IV
Western Solar Utilization Network Region

STATE

Alaska -----	AK 1 - 22
Arizona -----	AZ 1 - 48
California -----	CA 1 - 72
Colorado -----	CO 1 - 70
Idaho -----	ID 1 - 22
Montana -----	MT 1 - 35
Nevada -----	NV 1 - 8
New Mexico -----	NM 1 - 66
Oregon -----	OR 1 - 40
Utah -----	UT 1 - 41
Washington -----	WA 1 - 40
Wyoming -----	WY 1 - 10
Hawaii -----	HI 1 - 20

CONNECTICUT

1. Bridgeport
2. Cheshire
3. Danbury
4. Hartford
5. Higganum
6. Ivoryton
7. New Haven
8. Norwich
9. Somers
10. Stamford
11. Storrs
12. Waterbury
13. West Haven
14. Winsted

CONNECTICUT

TABLE OF CONTENTS

Commercial

Solar Hospital	1
----------------------	---

Community

Community Energy Conservation	2
-------------------------------------	---

Education

CETA Solar Training	3
Energy Roulette	4
Solar Energy Exhibition	6
Solar Hot Water Installation Workshop	7
Somers Correctional Institute	8
Energy Improvement Loans	9

Financing

Industrial Solar Loan	10
Mortgage Programs Finance Solar	11
Solar Hot Water Demonstrator	12
State Low Interest Loans	13

Housing

Solar Woodshed	14
----------------------	----

Industrial

Fighting Tiger Light and Power Company	15
Industrial Wood Heat Project	16
Wood-waste Heat Process	17

Legislation

Local Planning	18
Local Solar Tax Exemption	19
Renewable Energy for State Bldgs.	20
State Energy Performance Standards	21
State Solar Tax Exemption	22

CONNECTICUT
TABLE OF CONTENTS
PAGE 2

Low Income

Cheshire Elderly Housing Project	23
CETA Housing Rehabilitation	24
Hamden Solar Housing Development	25

State

Governor's Mansion	26
Small Business Energy Program	27
Solar Energy Evaluation Center	28

Utility

Ma Bell Goes Solar	29
Solar and Electric Hot Water Heater Unit	30

Renewable Resources— A National Catalog of Model Projects

Connecticut's Danbury Hospital has the distinction of having the largest solar energy installation of any hospital in the United States. When plans were being made to add an eight-story tower to the five-story structure, it was determined that solar energy would be feasible. It was therefore included in the building design.

An array of 600 flat-plate collector panels are mounted on the tower roof and supply space heat and supplementary hot water. When 295 panels are added to terraces on the five-story building, an average of 14.1 million BTU. a day will be collected. The solar system, which augments the hospital's oil-and-electric heating systems, is expected to save the hospital \$23,000 the first year it is in complete operation. It is expected to pay for itself in four years.

Reaction to the installation of the collector panels was "overwhelming and fantastic," according to a hospital official. Nine hundred people attended the open house the hospital held to inaugurate the system.

Category Commercial
State CT
Project Name Solar Hospital

Organization Danbury Hospital
Address 24 Hospital Ave.
Danbury, CT 06810
Contact Frank J. Kuszpa,
Jr.
Telephone (203) 797-7486

Funded By Energy Research and
Development Admin.
(ERDA), Hospital
Building Fund

Cost \$636,641

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Dismayed at the high cost of utilities, the South Arsenal Neighborhood Development (SAND) initiated an energy-conservation program in its community. The program, co-sponsored by the Energy Extension Service, was held bi-annually, once in the winter and once in the spring. The spring session was geared towards Hispanics.

A total of 12 volunteers attended training sessions to learn how to conserve energy in the apartments. The 45-minute training sessions were held once a week for about five weeks. The residents learned about energy conservation by means of slides, movies, publications, and demonstrations. Stipends of \$50 were awarded to those who completed the program.

After completing the training session, the volunteers talked to their neighbors about energy conservation. They concentrated on identifying wasteful habits.

Initially, there was some doubt whether the program would be successful because utilities are included in the rent. But residents realized it was in their best interest to save energy in order to help stave off rent increases.

Critique/analysis: It proved difficult to find energy-conservation materials written in Spanish.

Category	Community
State	CT
Project Name	Community Energy Conservation
Organization	South Arsenal Neighborhood Development
Address	45 Canton Street Hartford, CT 06516
Contact	John Wilson
Telephone	(203) 278-8460
Funded By	Energy Extension Service
Cost	\$600 (for stipends)
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Funded by a Solar Utilization, Economic Development and Employment (SUEDE) grant, the Committee on Training & Employment (CT&E) is training ten CETA workers in solar energy installations. This is being accomplished through classroom sessions, as well as "hands on" experience. The CETA workers will gain the experience by installing 20 solar domestic hot water systems in Stamford's low-income community. They will also be installing three solar greenhouses.

CT&E is one of 15 SUEDE grantees nationwide. A unique feature of CT&E's grant is the hiring of an advocate whose responsibilities are to aid passage and implementation of energy and solar-related legislation, help place the trainees, and help establish limited licensing for solar installers. CT&E's staff also includes a counselor/outreach person who helps trainees establish good working habits and helps locate sites for system installations.

Critique/Analysis: Because of the construction "boom" in Stamford, qualified and eligible CETA participants were difficult to find. This labor shortage caused major delays.

Category Education
State CT
Project Name CETA Solar Training

Organization Committee on Training & Employment

Address 433 Atlantic Street
Stamford, CT 06901

Contact Ron Cyr

Telephone (203) 357-7985

Funded By Community Services
Administration (CSA),
CETA

Cost \$250,000

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Having built a solar oven and an "energy roulette" wheel, high school students from the Norwich area displayed their wares at local county fairs during the summer of 1978. Sponsored by the Energy Extension Service, the program was able to reach thousands of people in an entertaining yet educational way.

People were lured to the booth by the aroma of cookies in the solar oven. Once there, they enjoyed playing the roulette wheel, whose spinner landed on a question about energy. Tough questions emphasized the amount of energy we use today and the impact of that usage on the future. Prizes were awarded for correct answers.

This summer, many of the same students are involved again, this time putting together puppet shows on various energy themes. After making the puppets and writing scripts, the students will again be touring on the county fair circuit. They will also be displaying a portable solar greenhouse built by the Energy Extension Service and supplying free informative pamphlets. The fairs afford an excellent opportunity for establishing contacts for the Energy Extension Service.

The Energy Service recruited between eight and twelve students, through programs at area high schools, to volunteer time during the summer. The group gets together to work two days a week for six or seven hours. In general, they need very little supervision, although building the solar oven required more staff time.

Category Education
State CT
Project Name Energy Roulette

Organization Energy Extension Service

Address 562 New London Tpke.
Norwich, CT 06360

Contact Duncan Bailey

Telephone (203) 886-2167

Funded By Energy Extension Service

Cost \$300 - \$500

Congressional District II

Compilation Date February 1980

Critique/analysis: The program was put on very cheaply. Much of the material for constructing the displays was donated by the University of Connecticut, and the fair associations allow the students free exhibition space.

Renewable Resources— A National Catalog of Model Projects

Realizing that Sun Day in 1978 had the potential for reaching many people about energy, Congressman Stewart B. McKinney decided to sponsor a solar energy exhibition. The 1978 exhibition was so successful that in 1979 he sponsored another exhibit covering a wider range of energy options.

The fee for displays was \$25 in 1978 and \$50 in 1979 (free to non-profit groups). Although sales were not allowed, businesses were allowed to set up appointments, and many sales were made later. Also, reams of free printed material and several films from the National Solar Heating and Cooling Information Center and Department of Energy were made available.

About 4,000 people visited the exhibit during its first two years. Publicity for the event was provided by press releases in local newspapers and the Congressman's newsletter, which is mailed to everyone living in the 4th district.

The day-long event was put together on a shoestring budget. The location for both exhibits was a school gymnasium ('78 in Norwalk, '79 in Bridgeport) so only custodians and policemen had to be paid. (Other expenses to consider are phone calls, mailing costs and the printing of a program, though.)

Category	Education
State	CT
Project Name	Solar Energy Exhibition
Organization	Hon. Stewart B. McKinney
Address	Federal Building Lafayette Boulevard Bridgeport, CT 06604
Contact	Sally Bolster
Telephone	(203) 579-5870
Funded By	Exhibitors
Cost	\$500
Congressional District	IV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Connecticut Solar Coalition, in conjunction with the Center for Environment and Man, the Northeast Solar Energy Center (NESEC), and the State of Connecticut, sponsored workshops on how to install a solar domestic hot water system. The day-long workshop, repeated three times in different parts of the State, offered homeowners the opportunity to learn the basics of using solar energy. A qualified solar installation expert showed participants how to install a domestic hot water system themselves and how to make sure a professional installer does it properly.

The agenda for the workshop consisted of morning classroom instruction, which was provided by NESEC. Slides and lectures were used to discuss installation principles and problems. Following this, local solar manufacturers gave short descriptions of their systems to alert participants to the range of options in buying commercial systems. After lunch, a professional went through the installation process step-by-step.

Each workshop was attended by 70 to 80 people. The workshops were open to the public and members of the State Solar Coalition were invited to attend for half price. Recruitment was done through a press release and a mailing to about 2,000 people.

Category	Education
State	CT
Project Name	Solar Hot Water Installation Workshop
Organization	Connecticut Solar Coalition
Address	Connecticut Citizen Action Group 130 Washington St. Box G Hartford, CT 06106
Contact	Mary Van Buren
Telephone	(203) 527-7191
Funded By	Northeast Solar Energy Center; State of CT; registration fees
Cost	approx. \$550 per workshop
Congressional District	I
Compilation Date	February 1980

Category	Education
State	CT
Project Name	Somers Correctional Institute

Organization	Connecticut Department of Correction
Address	340 Capitol Avenue Hartford, CT 06115
Contact	Ed Gubbins
Telephone	(203) 566-5517

Funded By	DOE, State of Connecticut Vocational Ed Program
Cost	approx. \$15,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

For almost two years, the Peoples Savings Bank has been offering "Energy Improvements Loans" to customers who want to purchase energy-conservation equipment. The special interest rate for this loan was 9 percent. Recently, it was raised to 11 percent, which is 1 percent below the regular home-improvement loan rate.

About \$2.5 million has been lent at the 9 percent rate and about \$3 million has been lent at the higher rate. No definite record of how many people have taken advantage of the program exists.

Category	Financing
State	CT
Project Name	Energy Improvement Loans
Organization	Peoples Savings Bank
Address	899 Main Street Bridgeport, CT 06604
Contact	Mr. Donald Nelson
Telephone	(203) 579-7276
Funded By	Peoples Savings Bank
Cost	\$5.5 Million
Congressional District	IV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Legislation (P.A. 79-520) mandates the Connecticut Development Authority to develop regulations to issue loans for "facilities, equipment...which conserve energy or use solar, wind, or other renewable energy devices for industrial uses." The Authority's definition of industrial use, found in Title 32, Chapter 579, of the Connecticut General Statutes, includes such applications as manufacturing processes, warehouses, and truck terminals, but not commercial or retail establishments.

Loans will be made under three existing revenue bond programs. It is expected that most loans will be to relatively small businesses through state-guaranteed revenue bonds at about 8 percent for amounts ranging from \$5,000 - \$100,000. Some loans, however, may be made at substantially higher rates, from 12 - 13 percent, and larger businesses may qualify under a program with rates as low as 7 percent.

Regulations concerning this legislation were being drafted at the time this report was compiled.

Category	Financing
State	CT
Project Name	Industrial Solar Loans
Organization	Connecticut Development Authority
Address	210 Washington St. Hartford, CT 06106
Contact	Dick Higgins
Telephone	(203) 566-4320
Funded By	State Revenue Bonds (multiple sources)
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Public Act 79-578 requires the Connecticut Housing Finance Authority (CHFA) to incorporate energy-conservation and solar energy applications into its existing mortgage programs for middle-income persons. CHFA provides mortgages of up to \$70,000 at minimal interest to families with incomes of up to \$20,100, depending on which part of the state they wish to build in.

Critique/analysis: The Housing Finance Authority has experience in providing substantial sums of money to people who otherwise might not be able to obtain mortgages. Because there is an opportunity here to effectively help Connecticut homeowners and business people implement energy-conserving and renewable-energy devices, the State's solar coalition should become involved in enforcing this act.

Category Financing
State CT
Project Name Mortgage Programs
Finance Solar Projects

Organization Connecticut Housing Finance Authority

Address 1179 Main Street
Hartford, CT 06103

Contact Lee Wallace

Telephone (203) 525-9311

Funded By Bonding Issues

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Under the Housing and Urban Development (HUD) Solar Program, \$400 grants are provided to qualified homeowners who install domestic solar hot water systems. To qualify, the owner must have installed in a condominium, single-family, duplex, or townhouse a commercially available system that has been tested and approved. A post-installation inspection is conducted.

More than 2,000 applications were received for the 900 grants distributed through the program. But it was expected that all those who applied and had the systems installed during the approved time period would receive grants because of the large number of people who had failed to meet the deadline.

The HUD initiative, a one-time program designed to stimulate the young solar industry, is also in effect in ten other states.

Critique/analysis: Judging by preliminary statistical analysis, the program has not stirred middle-income people to install solar hot water systems. It has served primarily as an incentive for suburban homeowners in the higher income brackets. Thus, the program has been successful in stimulating the industry, but it appears as if further incentives are necessary to broaden its appeal.

Category	Financing
State	CT
Project Name	Solar Hot Water Demonstration
Organization	Connecticut Office of Policy and Management - Energy Div.
Address	80 Washington St. Hartford, CT 06115
Contact	Michael V. Sartori
Telephone	(203) 566-3395
Funded By	Housing and Urban Development (HUD)
Cost	\$457,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Public Act 79-509, as amended by Public Act 79-10, Special Session of the Connecticut Legislature, provides for loans ranging from \$400 to \$3,000 to homeowners and landlords (whose buildings contain one to four living units, inclusive) for energy conservation materials, equipment improvements (e.g., furnace burner modifications), and the installation of solar heating and other alternative energy systems.

The program, which will be administered by the State's Department of Housing, has an income limitation of \$30,000, as an average, for the last two reported filings to IRS (Line 31). Interest rates for the first six million of bond authorizations for loans is set at 6.5 percent with a maximum term of ten years to repay.

The law requires equipment and/or materials approvals and random inspections to ensure that approved regulations have been met. For example, it has already been determined that any siding material, aluminum or vinyl, with backup insulation does not qualify.

Category	Financing
State	CT
Project Name	State Low Interest Solar Loans
Organization	Connecticut Department of Housing, Mortgage Finance Div.
Address	P.O. Box 2910 Hartford, CT 0610
Contact	James P. Conklin
Telephone	(203) 566-3083
Funded By	State Bond Issues
Cost	\$6,000,000 (authorized)
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Wood heats you twice: once when you're chopping it and again when you're burning it, according to Joel Gordes. In addition to heating his home with this renewable energy source, Mr. Gordes has also built a solar-heated woodshed to dry and store his fuel.

Gordes' passive solar woodshed keeps the wood dry, baking the moisture out of it quickly. The shed also brings the wood to a higher than outside ambient temperature.

The woodshed is insulated on the floor, roof, and walls, and the south exposure is double glazed for direct solar gain. It has vents so the insulation does not get saturated with moisture.

The passive system works well. One brisk day in February of 1979, for example, the temperature in the shed was a comfortable 55 degrees, some 50 degrees above the outside reading.

Category Housing
State CT
Project Name Solar Woodshed

Organization Joel Gordes
Address RFD #4
Eno Hill Road
Winsted, CT 06098
Contact Joel Gordes
Telephone (203) 379-2430

Funded By Private

Cost \$250

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Mike Corbin is producing electricity in the basement of his Corbin Gentry plant in Somers. The generator, located in the basement, is driven by a water-powered turbine left over from the days when the plant was a woolen mill. The turbine had been unused since 1910.

Corbin became interested in renovating the turbine during the energy crunch in 1973. He worked on the turbine as time permitted, making most of the parts to repair it. Corbin found out, however, that the Federal Power Commission required that he become a light and power company if he wanted to generate power. So he did, calling himself the Fighting Tiger Light and Power Company.

Since 1975 the hydro plant has been producing electricity for use in a variety of applications. Now, it is used to meet a portion of the space-heating demand. Corbin calculates that he put \$50,000 into his hydro plant, but it paid for itself through investment tax credits. And he now saves thousands of dollars each year on his oil bill.

Category Industrial
State CT
Project Name Fighting Tiger
Light and Power
Company

Organization Corbin Gentry

Address Somers, CT 06071

Contact Mike Corbin or
Al Simmons

Telephone (203) 749-2238

Funded By Self-funded

Cost \$50,000 (includes
labor, materials &
the generator)
Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

For many years now, Pratt Read, a manufacturer of piano and organ keys, has been using wood combustion to produce energy. Wood-waste products from manufacturing are used to fire a boiler, which produces steam for heating and processing. About 60 percent of the company's energy needs are met this way, displacing an estimated 200,000 gallons of oil a year.

Using wood has proven very cost effective. Not only has it provided energy, but it has also lessened waste-disposal needs.

Critique/analysis: The company had to develop handling- and firing-systems for the waste, some of which are rather difficult to manage. They also must take pains to meet air-pollution standards.

Category	Industrial
State	CT
Project Name	Industrial Wood Heat Project

Organization	Pratt Read
Address	Ivoryton, CT 06442
Contact	Mr. Nichols
Telephone	(203) 767-8282

Funded By	n/a
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Cost	n/a
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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 Rossi Corporation, a wholesale lumber company in central Connecticut, is using a wood-burning unit to convert waste produced at its Higganum facility into steam. The steam will be used for manufacturing and heating purposes.

The BTU value of the wood waste has been estimated as the equivalent of 400,000 gallons of oil per year. Because only 50 percent of the steam will be utilized by the company, Rossi plans sending the excess to a nearby elementary school starting in 1980.

Category Industrial
State CT
Project Name Wood-waste Heat

Organization Rossi Corporation
Address Main Street
Higganum, CT 06441
Contact Ted Rossi
Telephone (203) 345-4561

Funded By The Rossi Corporation

Cost \$400,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Connecticut General Assembly, in its 1978 session, passed a law requiring local planning and zoning boards to take energy use into consideration as a land-use criterion. It is only enabling legislation though, so at its own discretion each town can pass (or not pass) this ordinance.

The law may be used to, among other things, protect sun rights and promote proper orientation of buildings for optimal solar usage. As of late 1979, no Connecticut towns had taken advantage of it.

The Central Naugatuck Regional Planning Agency received a grant of \$19,500 from the Northeast Solar Energy Center to study the legal and institutional barriers to solar access, particularly how the law can be used. It will use this grant to analyze the barriers created by local land-use regulations in the state and to make recommendations or methods of overcoming these barriers. Central Naugatuck is now developing model regulations and will help the municipalities in its region adopt regulations.

Category Legislation
State CT
Project Name Local Planning

Organization Central Naugatuck Regional Planning Agency
Address 20 East Main Street
Waterbury, CT 06702
Contact Charles Vidich
Telephone (203) 757-0535

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

Renewable Resources— A National Catalog of Model Projects

Public Act 77-490 is enabling legislation that allows municipalities in Connecticut to exempt solar energy systems from the local property tax for 15 years.

The exemption, which became effective on October 1, 1976, applies to systems installed in both new and existing buildings. Under the statute, a solar energy heating or cooling system is defined as "equipment which provides for the collection, transfer, storage and use of solar energy for water heating, space heating or cooling."

In October of 1977, solar electrical systems also became exempt. And the 1979 legislature promulgated an act (72-479) that allows for the exemption of passive solar systems.

As of late 1979, 139 of Connecticut's 169 towns had passed the ordinance.

Category	Legislation
State	CT
Project Name	Local Solar Tax Exemption
Organization	Connecticut Citizen Action Group
Address	130 Washington St. Box 6 Hartford, CT 06106
Contact	Mary Van Buren
Telephone	(203) 527-7191
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

"An Act Concerning the Use of Renewable Energy in New State Buildings" (Public Act No. 79-462), requires that a gradually increasing portion of new state buildings use renewable energy.

Each year, a statewide facility and capital plan is submitted to the Properties Review Board. This plan outlines all state construction planned for the year.

Starting with the 1980 plan, at least 5 percent of the total floor area of new state buildings must use renewable energy. The next year, at least 10 percent must use renewable energy. The percentage increases by 5 percent each year up to 50 percent by 1990. The renewable source of energy can be used for space-heating and cooling, water-heating, and other applications.

For any application, the renewable energy source must supply at least 30 percent of the energy requirements. If a solar space heating system is installed, for example, solar energy must supply at least 30 percent of the heat for the building.

Category	Legislation
State	CT
Project Name	Renewable Energy for State Bldgs.
Organization	State Properties Review Board
Address	Rm G-9, State Office Building Hartford, CT 06115
Contact	n/a
Telephone	(203) 566-4608
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In an attempt to make the state practice what it preaches, the 1979 General Assembly passed Public Act No. 79-496, which was designed to establish and attain energy performance goals in state buildings.

Not later than June 30, 1980, energy-performance goals will be established for existing and new state-owned and -leased buildings. The energy performance goals will encourage maximum efficiency in energy use and maximum practical use of renewable energy. The state will then take appropriate action to attain the goals.

A life-cycle cost analysis will be required for all buildings. All design proposals for major projects must consider at least two alternative energy systems for space heating and cooling and for water heating; at least one of these alternative energy systems must be renewable.

Although the state of Connecticut already required a life-cycle cost analysis for new state buildings, considering the use of renewable energy sources was not required. Act 79-496 not only requires that renewable energy be considered, but also requires new and existing buildings to meet energy-performance goals.

Critique/Analysis: Whether the funding awarded to this program is sufficient for it to attain its objectives is open to question.

Category	Legislation
State	CT
Project Name	State Energy Performance Standards
Organization	Connecticut Department of Administrative Services
Address	Room 491 State Office Bldg. Hartford, CT 06115
Contact	n/a
Telephone	(203) 566-8186
Funded By	State
Cost	\$30,000 (other \$ available through other programs)
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Public Act No. 77-457, effective October of 1977, exempts solar collectors from the state of Connecticut's 7 percent sales tax. The act defines "solar collector" as the part of a solar system that receives the sun's direct or diffuse radiation to convert it to thermal energy to be used for space heating or cooling, or domestic water-heating.

In 1979, this law was amended to include not only solar collectors, but the entire solar energy system and component parts of the system, passive solar systems and solar electric applications.

Although the regulations are still not finalized, it appears that residents will be refunded for component parts of site-built or passive solar systems after the systems are inspected by local building inspectors.

Category Legislation
State CT
Project Name State Solar Tax Exemption

Organization Connecticut Citizen Action Group

Address 130 Washington St.
Box G
Hartford, CT 06106

Contact Mary Van Buren

Telephone (203) 527-7191

Funded By n/a

Cost n/a

Congressional District State-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

An aggressive builder applied for and received grants to build solar units in and add energy-conservation features to an elderly housing project in Cheshire.

A grant of \$50,000 was used to build ten solar units, which supply 50 units of one- and two-bedroom apartments with water and space heating. These units worked so well that an additional 50 solar units are being added to the project. Grants of \$112,000 from HUD and \$30,000 from the State Housing and Finance Authority were received for this purpose.

Housing and Urban Development also issued a grant of \$35,000 for the addition of triple-glazed windows, double-paned sliding doors, and R-2 insulation for the ceilings (R-44) and walls (R-2).

These modifications have made the Cheshire Elderly Housing Project the least expensive project in the state to heat: \$125 a year for each non-solar heating unit and \$93 a year for each solar unit.

Category Low Income
State CT
Project Name Cheshire Elderly Housing Project

Organization Cheshire Elderly Housing Project
Address Cheshire, Connecticut 06410
Contact John Capone (the builder)
Telephone (203) 272-2243

Funded By HUD, Connecticut Housing Finance Authority

Cost \$192,000

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Low Income
State CT
Project Name CETA Housing
Rehabilitation

In an unusual project funded by agencies at all levels of government, the Committee on Training and Employment (CETA) totally rehabilitated eight housing units that had been condemned. They experimented with a number of energy-conservation measures. Among them were the use of tripolymer foam in the walls and ceiling and the use of foil insulation in the basement. Two solar domestic hot water systems were also installed.

The building was purchased by the Connecticut Housing Investment Fund, and units were sold to families at a low cost. Families inhabiting public and non-profit units were thus able to become homeowners.

Rehabilitating the building also provided training to eleven previously unemployed workers, equipping them with the necessary skills to move into private sector employment.

Critique/analysis: The group found tri-polymer foam particularly hard to work with. They experienced difficulty making the foam on site, and the material was hard to install.

Organization Committee on
Training and
Employment (CETA)
Address 2 Smith Street
Stamford, CT
06902
Contact Michael Schedler
Telephone (203) 357-7985

Funded By CSA, Community Dev.;
North East Regional
Commission; Dept. of
Human Resources; CETA

Cost \$13,000 in materials

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Noting an opportunity for funding a solar project, an alert official at Connecticut's Department of Community Affairs urged the agency to apply for a grant. The result is the country's first public housing development that utilizes solar energy.

The housing project, located in Hamden, includes 40 dwelling units, half of which are equipped with solar collectors for space-water heating. All of the units have been constructed for maximum energy savings with added insulation, double-glazed windows, and earth berms on the north. Few windows are located on the east, west and north walls.

The project has been inhabited for a little over a year. The senior citizens living in the solar section experienced a few technical problems with the equipment at the beginning but are now delighted at the savings in their utility bills. Solar energy meets about 75 percent of the annual space-heating demand and 85 percent of the annual water-heating demand.

Critique/analysis: Some engineering work was necessary on the complicated equipment, but most of the quirks seem to have been worked out of the system.

Category Low Income
State CT
Project Name Hamden Solar Housing Development

Organization Connecticut Department of Housing

Address 1179 Main Street
Hartford, CT 06103

Contact Michael T. Duffy

Telephone (203) 566-3329
(203) 566-3389

Funded By Connecticut Dept. of Community Affairs; DOE; Hamden Housing Authority

Cost \$1,144,200 plus land

Congressional District III

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Connecticut Governor Ella Grasso beat Jimmy Carter to the pro-solar punch. About a year before the President retrofitted the White House, Grasso had a solar hot water system installed in the Governor's Mansion (990 Prospect Avenue in Hartford).

The Governor's system — a demonstration project undertaken to publicize solar energy and determine the amount of usable energy such a system could provide — is a flat-plate, liquid-transfer, closed-loop solar system with a gas-fired back-up system. It began operating in June of 1978.

Due to a varied hot water consumption pattern and the structural design unique to this particular residence, the installation was not intended to project the potential costs or savings associated with the use of such collectors. But two heat meters and a gas meter were recently installed, so some output data should be available soon.

Category State
State CT
Project Name Governor's Mansion

Organization Connecticut Natural Gas Corporation

Address 233 Pearl Street
Hartford, CT 06103

Contact Daniel C. Reilly

Telephone (203) 525-0111

Funded By State of Connecticut,
Connecticut Natural Gas Corporation

Cost \$9,200 (including labor)

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

As one of ten participants in a pilot program, the Connecticut Small Business Energy Program helps owners of small commercial and industrial facilities save energy and money.

Upon request, one of the program's four energy agents will visit a commercial or industrial building and conduct a free energy audit. The trained agents are able to conduct walk-through audits and are able to make recommendations that can be implemented immediately.

Employee participation in the program is strongly encouraged and behavioral changes are often recommended. Recommendations may be something as simple as using less air conditioning, turning off parking lot floodlights, or reducing the wattage in certain light fixtures. When more extensive recommendations are made, the energy agent gives company owners a list of professional energy consultants that they may hire.

Some 600 audits were conducted during the first year of the program. Approximately 78 percent of the companies have followed through with the recommendations within six months from the completion of the audit. According to the director of the program, a company will save a minimum of 15 percent and, more typically, 30 to 35 percent.

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Category	State
State	CT
Project Name	Small Business Energy Program

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Organization	Department of Commerce
Address	Small Business Energy Office 210 Washington St. Hartford, CT 06106
Contact	Neil Crowley
Telephone	(203) 566-5654

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Funded By	Department of Energy
Cost	\$216,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Solar Energy Evaluation Center was established in the spring of 1976 in response to a request from the State of Connecticut Department of Community Affairs to evaluate the collector performance of three manufacturers who were bidders for a state solar project. Since that time, the Center has continued to test systems from all over the country.

The Center, located at the University of Connecticut (UConn) campus in Storrs, is one of 11 independent test labs in the country and one of four that can test solar air systems. While it had a small research grant to start, the Center supports itself primarily by charging manufacturers for testing their collectors. Because it is a non-profit lab with relatively low overhead, the UConn test center charges less than most labs. Unfortunately, the benefits in low cost may be offset by weather-related delays in completing the testing.

In addition to testing collectors for manufacturers, the Center also does some testing for the State Department of Transportation. DOT asked it to evaluate the potential of using solar energy at a tourist rest area in Willimantic. So far the retrofit seems to be providing the expected 60 to 70 percent of the hot water for the rest area. DOT appears pleased with the system's performance and plans to install a passive solar system in one of its maintenance garages.

Unofficially, the center will answer consumers' questions. Although they cannot recommend a specific system, they can answer technical questions, refer people to other agencies, and give general information on solar collectors.

Category State
State CT
Project Name Solar Energy
Evaluation Center

Organization University of
Connecticut Solar
Energy Evaluation
Center
Address University of
Connecticut
Box U-139
Storrs, CT 06268
Contact David Jackson
Tom MacQueen
Telephone (203) 486-3478

Funded By Fees charged to
manufacturers; Dept.
of Transportation
Cost Approx. \$168,000
per year
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A solar powered telephone call? Not quite, but the Southern New England Telephone Company (SNET) is actively using solar energy, saving millions of dollars in energy costs.

Solar systems have been installed at ten SNET buildings throughout the state. Most of these systems provide hot water, but others provide lighting and heat. It's easy to recognize the buildings that conserve fuel by using solar energy because they all have a sign bearing a caricature of the sun. These buildings have saved SNET over \$10.7 million in energy costs and reduced annual energy consumption by 23.7 percent.

SNET's solar systems range from a 20-panel domestic hot water system for year-round use, to a one-panel domestic hot water system for summer use. An installation in Hartford uses an eight-panel forced warm air heating system. Ten photovoltaic panels in North Branford charge batteries and light four 18-volt bulbs. In SNET's New Haven harbor garage, a wind generator charges batteries.

Under construction in Bethany is a sun-tracking solar furnace. This unique application, funded with \$100,000 from DOE, will provide electricity for commercial service and hot water for heating or cooling the building.

Category Utility
State CT
Project Name Ma Bell Goes Solar

Organization Southern New England Telephone Company
Address 227 Church Street
New Haven, CT 06510
Contact Ed Bouvier
Telephone (203) 771-2512

Funded By Southern New England Telephone Company, DOE
Cost \$100,000 - Solar Furnace
Congressional District State-wide
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Realizing that the use of solar energy will be much more common in the coming years, the United Illuminating Company set out to study the feasibility of combining a solar, domestic hot water heater with an electric hot water heater. The results proved that a solar system with an electric back-up works very well.

The utility installed four systems for domestic hot water in single-family dwellings in its service area. Although they used three different makes, each system had three collector panels and was mounted on the ground within 50 feet of the house. The systems were equipped with meters to monitor system performance.

To locate homes for their solar systems, the utility company sent out a bill insert. It asked average-size families (four to seven members) with electric hot water heaters to contribute \$350 to the project and allow United Illuminating to monitor the system for 30 months. Nine hundred people responded. After a computer randomly ranked applicants, the Company had to check over 50 homes before they found four suitable sites.

p>Category Utility
State CT
Project Name Solar and Electric
Hot Water Heater Unit

p>Organization United Illuminating
Company (UIC)

p>Address 80 Temple Street
New Haven, CT 06510

p>Contact John Dibiaso

p>Telephone (203) 777-7981

p>Funded By UIC research and
development funds

p>Cost \$10,000

p>Congressional District III

p>Compilation Date February 1980

MAINE

1. Augusta
2. Bangor
3. Bar Harbor
4. Brunswick
5. Buckfield
6. Falmouth
7. Freeport
8. Hallowell
9. Orono
10. Portland
11. Presque Isle
12. Sanford
13. South Portland
14. South Windham
15. Waterville
16. Wilton

MAINE

TABLE OF CONTENTS

Cities

Comprehensive Community Energy Management	1
---	---

Commercial

Solar Design Competition	2
--------------------------------	---

Community

Community Energy Plan	3
Solar Panels—Vehicle Maintenance Facility.....	4

Education

Alternative Energy Street Theater	5
Cornerstones	6
EMVTI	7
The Jackson Laboratory	8
Peanut Butter Readers	9
Planning Your Energy Efficient Home	10
Solar Voc-Ed	11
University of Maine Solar Systems	12

Financing

Federally-funded Solar Programs for Students	13
Low-interest loans	15

Housing

Harley House	16
--------------------	----

Industrial

Solar Wastewater Treatment Facility	17
---	----

Institutional

Headquarter Building	18
NMVTI Solar Institute	19
Vocational Center Solar Demonstration	20

Legislation

Electric Rate Reform Act of 1977	21
Energy Conservation in Buildings Act of 1977	22

Miscellaneous Energy-related Legislation	23
Solar Energy Tax Exemptions	24

Outreach

Solar Greenhouse Workshops	25
----------------------------------	----

State

Governor's Staff House	26
Solar Hot Water Demonstration	27
Sunrise '79	28

Renewable Resources— A National Catalog of Model Projects

Category Cities
State ME
Project Name Comprehensive Community Energy Management

Organization City of Portland

Address Offc. of Energy Conservation
389 Congress St.
Portland, ME 04101

Contact Jim O'Donnell,
Energy Coordinator

Telephone (207) 775-5451

Funded By Dept. of Energy (DOE)

Cost \$162,000 (two years)

Congressional District I

Compilation Date February 1980

Portland's City Administration and City Council have become increasingly aware that energy problems -- like those of housing, transportation and the environment -- must be evaluated within a comprehensive planning framework.

During the summer of 1978, the City Council's Energy Committee submitted a proposal to DOE to participate in a pilot demonstration project, "Comprehensive Community Energy Management." Portland was one of 17 communities selected nationwide to participate in the \$3.5 million program.

The overall objective of the project is to develop a comprehensive community energy action plan that will have a positive impact on Portland's present and future (1985) energy supply and demand patterns. Developed by the project staff over a two-year period, the plan will cover all sectors, public and private, within the community.

Portland has already taken significant steps to reduce its municipal energy consumption. Already undertaken by the city have been insulation programs, electric light reduction projects, fuel- and vehicle-management programs, installation of alternate energy systems (such as wood and solar) in municipal buildings, high school solar energy courses and car-pooling programs.

The City Council's Energy Committee and staff will work with community groups during the project to get their input and involvement. The Energy Action Plan will be in draft form by the summer of 1980. After a period of review and comment, a final Action Plan will be presented to the City Council and community.

Renewable Resources— A National Catalog of Model Projects

This solar design competition, co-sponsored by the Office of Energy Resources (OER) and the Maine American Institute of Architects, was created to highlight successful solar applications in Maine. It also publicized the 20 persons who entered the competition.

Seven awards were given for new and retrofit designs in both the residential and commercial categories. Displays of these building designs have appeared at several fairs during the spring, and they have been cited repeatedly as model solar buildings.

Critique/analysis: By conducting the competition, OER hoped to demonstrate the practicality of solar energy and increase public awareness of the state's solar industry infrastructure.

The lack of funds to put together good displays on each building prevented information dissemination on a larger scale.

Category Commercial
State ME
Project Name Solar Design Competition

Organization Offc. of Energy Resources
Address 55 Capitoll St.
Augusta, ME 04330
Contact Rick McGinley
Telephone (207) 289-3811

Funded By Northeast Solar Energy Center

Cost \$450

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Freeport Conservation Commission recently developed a Community Energy Plan. The emphasis of the project was research on the availability and use of firewood for home heating. A survey of residential architectural styles and active and passive solar systems was also made. The study was conducted by a work/study student from the Center for Human Ecology Studies.

Category Community
State ME
Project Name Community Energy Plan

Organization Freeport Conservation Commission

Address Town Offices
Freeport, ME 04032

Contact Dave Whitten

Telephone (207) 865-4856

Funded By Town of Freeport

Cost \$250 (matching grant
from Center for
Human Ecology Studies)

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Passive solar panels will be constructed on the southerly section of Sanford's vehicle-maintenance facility to supplement the existing oil-fired heating unit. The system will provide space heating for the mechanics' working area.

Students from the Regional Vocational School will participate in the project's construction phase.

Critique/analysis: The town officers hope to be able to demonstrate to residents the feasibility of passive solar systems for municipal use. Participating students will also have the opportunity to increase their understanding of alternative energy technologies through this program.

The Town Garage is located on a well-traveled street, and is therefore highly visible. A project at this site is expected to receive much attention.

Category Community
State ME
Project Name Solar Panels--Vehicle Maintenance Facility

Organization Town of Sanford

Address Sanford, ME 04073

Contact Jon Carter & Anthony Hayes

Telephone (207) 324-4121

Funded By DOE-Applied Technology Small Grants Program

Cost \$4,710

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Revue is an amateur street theater group that performs shows on nuclear power, and alternate means of energy production and conservation. The 45-minute show is taken to Grange halls, town halls, summer festivals, and public meetings. Its purpose is to educate, stimulate discussion, and produce questions on energy issues.

The group evolved to its present status after seven concerned and theatrically inexperienced individuals worked with a professional Maine mime for a number of months to develop the show. As well as performing, the members conduct post-show discussions and distribute information on energy conservation, wood heat, solar energy, nuclear power and energy-efficient homes.

Category Education
State ME
Project Name Alternative Energy
Street Theater

Organization Energy Revue
Address RFD #2, Box 6
Buckfield, ME 04220
Contact Mary Wallman
Telephone (207) 836-2137

Funded By Private sources

Cost n/a

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Cornerstones is a school for home owner-builders. It provides: the information required to design a personal and economical house, support and guidance throughout the design and construction stages, and hands-on experience through the school's experimental building program.

Courses have included "Passive Solar Housebuilding," "Housebuilding for Women," "Contractor Course in Advanced House Construction," "Retrofitting Existing Structures," "Earth Sheltered Housing," and "Solar Greenhouses."

The basic Cornerstones course, "Passive Solar Housebuilding," includes study of design, tools, site and climate, structural analysis, foundations, membranes, mechanical systems, energy, wood-heat and solar heat.

Category Education
State ME
Project Name Cornerstones

Organization Cornerstones
Address 54 Cumberland St.
Brunswick, ME 04011
Contact Susan & Charlie Wing
Telephone (207) 729-0540

Funded By n/a
Cost \$150 per person to
\$550 per couple
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education

State ME

Project Name EMVTI

Organization Eastern Maine
Vocational Technical
Institute (EMVTI)

Address 354 Hogan Rd.
Bangor, ME 04401

Contact Herbert L. Fowle, Jr.

Telephone (207) 942-5217

Funded By Grant from within
the department

Cost \$500

Congressional District II

Compilation Date February 1980

"Energy Sources and Conversion Devices" is an adult education course offered by the Eastern Maine Vocational Technical Institute (EMVTI). The course is designed to teach the student about sources of energy, particularly solar energy and how to collect it.

Critique/analysis: Lack of funding has presented a problem.

Renewable Resources— A National Catalog of Model Projects

The Jackson Laboratory has installed three solar systems for heating space and/or water at its facilities.

A 16-collector panel array and a 500-gallon storage tank were retrofitted on the Morrell Park Laboratory to provide domestic hot water.

Solar collector walls were also installed on four building annexes to provide space heating. The collectors are integral with the pre-engineered metal building. With the exception of one annex, the wall collectors feed four 4,000-gallon storage tank containing enough hot water to heat the building during a winter night after a sunny day.

The panel array and the wall collectors have been in operation for more than a year and have reportedly exceeded design expectations.

A 15-collector panel array is under construction on the Biomedical Research Laboratory. The unfinished system features a 1,000-gallon tank for storing domestic hot water.

Category	Education
State	ME
Project Name	The Jackson Laboratory
Organization	The Jackson Laboratory
Address	P.O. Box 258 Bar Harbor, ME 04609
Contact	Eric A. Lanpher
Telephone	(207) 288-3371
Funded By	Jackson Laboratory
Cost	\$12,000 (for 16-collector panel)
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Children's (and adults!) attitudes about the environment and conservation have now become a focus for the Peanut Butter Readers, a group of four professional artists who originally created their movement scenarios directly from children's literature. The group offers workshops and performances on conservation, alternate energy sources and environmental awareness to elementary school, high school and adult groups.

Category Education
State ME
Project Name Peanut Butter Readers

Organization Peanut Butter Readers

Address Rural Route 1
So. Windham, ME
04082

Contact Jeanne Spurlock &
Mark Nuttall

Telephone (207) 892-2766

Funded By State Commission on
the Arts & Humanities;
N.E. Friends for the Arts,
Cambridge, MA

Cost n/a

Congressional District 1

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

For the past three years the Adult Evening Division of the Southern Maine Vocational Technical Institute has scheduled a course, "Planning Your Energy Efficient Home," which stresses passive solar heating. This program addresses site selection and land purchase, correct structure orientation, selection of building materials, types of insulation, methods of construction and the proper location and installation of wood stoves.

The drafting portion covers basic drafting procedures and techniques, drafting tools and their use, the creation of floor plans, elevation, and cross sections. The program provides the students with the ability to design their own energy-efficient home.

Category	Education
State	ME
Project Name	Planning Your Energy Efficient Home
Organization	Southern Maine Vocational Technical Institute
Address	Fort Rd. So. Portland, ME 04106
Contact	J.H. Staples
Telephone	(207) 799-7303
Funded By	Southern Maine Vocational Technical Institute
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The objective of this project was to develop a solar curriculum that could be used in conjunction with vocational programs in the building trades at the secondary-school level. The project was operated by the Portland Regional Vocational Technical Center, with curriculum and technical assistance from the Maine Audubon Society.

The project resulted in the publication of a basic solar textbook and construction of an experimental greenhouse at PRVTC. There are plans to incorporate the project material into the carpentry program.

Critique/analysis: A scarcity of funding was a drawback to the project.

Category	Education
State	ME
Project Name	Solar Voc-Ed
Organization	Portland Regional Voc-Tech Ctr. (PRVTC)
Address	196 Allen Ave. Portland, ME 04103
Contact	Martin W. Fehlau
Telephone	(207) 797-8440
Funded By	Bureau of Vocational Education, local
Cost	\$7,850 - curriculum production plus cost for teacher & materials
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Research is now being conducted under the supervision of Dr. Norman Smith, Chairman of the UMO Department of Agricultural Engineering, on a solar heating system installed on an addition of the Onwards Building in 1978. A heat pump (essentially a large electric refrigeration unit) cools the building's attic space, and transfers the heat from that space into the building.

The heat pump can remove heat from the attic even if the temperature there is well below freezing. The sun warms the attic well above the freezing point even on the coldest and cloudiest days, facilitating the extraction of the heat. Research indicates that during the late winter and early spring, about 65 percent of the energy used in the building comes from the sun.

In another project, UMO has installed an 800 ft² collector system on one of its buildings that provides heat for a heat pump. A 600-gallon storage tank holds hot water for peak period demand, while a 16,000-gallon tank provides backup heat during inclement weather.

Category Education
State ME
Project Name University of Maine
Solar Systems

Organization University of Maine
Orono (UMO)
Address Department of Industrial Cooperation
Orono, ME 04473
Contact Richard C. Hill
Telephone (207) 581-7228

Funded By Central Maine Power
Co., Bangor Hydro-
Electric Co., Hatch
Act and owner

Cost \$11,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Federal funds awarded to the Maine State Office of Energy Resources have been made available to teachers in public and private schools in Maine. On a competitive basis, grants of up to \$500 were awarded to teachers whose projects were designed to increase students' understanding and skills with respect to general energy concepts, energy conservation, renewable resources, and energy decision-making. To be eligible, an applicant also had to demonstrate that the project could be adapted or adopted by other school districts.

Although this program was not restricted to solar energy, many of the projects funded did focus on solar energy. In the first year, 13 out of 22 projects dealt in depth with the principles and applications of solar energy. (Fifteen out of 25 were solar-oriented in the next year's program.)

Among the projects funded were a solar kiln designed, built, and tested by students of industrial arts and physics at the Oak Hill High School in Wales. Junior and senior high school students at the Capital Area Regional Vocational Center in Augusta used a donated solar hot water system to study the collection, storage, and use of solar energy. The system is now used to provide hot water for the janitorial services.

Fifth-graders at the Shapleigh Memorial School in East Waterboro have designed, constructed, and operated a low-cost passive solar greenhouse.

The instructor integrated skills in math, reading, science, writing and problem-solving with the project. A corporation was formed to sell shares to raise the extra funds, which were needed to finish construction. Plants raised in the greenhouse were sold to pay back shareholders. Next year the greens will be used in the school lunch program.

Category	Financing
State	ME
Project Name	Federally-funded Solar Programs for Students
Organization	Ofc. of Energy Resources
Address	55 Capitol St. Augusta, ME 04330
Contact	Catherine Murray
Telephone	(207) 289-3211
Funded By	U.S. Dept. of Energy & local support
Cost	\$20,000
Congressional District	I
Compilation Date	February 1980

In addition, enthusiasm for the projects often resulted in widespread and effective dissemination of the results. Children gave workshops, wrote newsletters, composed books, made calendars, and held slide shows. Other teachers will benefit from the results.

An understanding of solar energy by school children also leads to increased understanding and credibility of solar energy in the community at large. In one community, five families are designing and building solar homes after seeing the local fifth-grade students design and build a solar greenhouse.

Renewable Resources— A National Catalog of Model Projects

The Brunswick Savings Institution's Consumer Loan Department has priced loans for the purchase of cars with an EPA rating of 22 MPG or more at a lower interest rate than a "gas guzzler." It has also promoted low interest home-improvement loans that promote energy conservation. These items include wood stoves, insulation, storm windows, and solar panels.

Brunswick Savings' greatest support of conservation is reflected in its solar and energy-efficient mortgage program. A home-owner who constructs a solar and/or energy-efficient property within strict guidelines drawn up by the bank's appraiser is granted a rate of one-half percent (1/2%) below current market mortgage rates.

Critique/analysis: The Mortgage Department of BSI believes it is now a leader in Maine (and perhaps elsewhere) in offering this type of financing. In fact, one of its financed properties recently received an award from the state as the outstanding example of a residential building that combines solar energy concepts with those of conventional architecture.

Category Financing
State ME
Project Name Low Interest Loans

Organization Brunswick Savings Institution (BSI)
Address 83 Maine St.
Brunswick, ME 04011
Contact Richard Page
Telephone (207) 725-5591

Funded By Brunswick Savings Institution

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Harley House is a low-tech passive solar house with four energy systems. The house is located on the southerly slope. Evergreens to the north and deciduous trees to the south provide protection from winds.

The expanded air from 300 sq. ft. of sun porch rises through air chimneys and encircles the house with warm air.

A continuous eight-inch thick brick bearing wall at the rear of the sun porch stores direct winter sun and tempers the entire house.

The roof has an R value of 38, the walls R-19 and continuous air space around the envelope contributes to the draught-free environment.

At the center of the house is a five-flue brick Russian furnace, burning two cords of hard- and softwood per year for the 1900 sq. ft. house.

The building is expected to use 40 percent less energy than would a conventional structure built to meet Title 24 standards for new non-residential building conservation.

The State has requested federal monies for a monitoring system.

p>Category Housing
State ME
Project Name Harley House

p>Organization James Harley

p>Address 295 Water St.
Augusta, ME 04330

p>Contact James Harley

p>Telephone (207) 622-7171

p>Funded By James Harley

p>Cost \$47,000
(\$24.75/ft²)

p>Congressional District I

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Town of Wilton, population 2,225, now processes all of its wastewater in a modern, energy-efficient, active/passive solar treatment plant. Constructed in 1976, the \$2.2 million facility has won various design awards, not to mention national attention, for its "integrated" architectural and technical solutions to energy conservation and environmental protection.

The facility, which went into operation in September of 1978, completely houses the treatment process. This alleviates operational problems during the winter, and allows for great reduction in process heat losses. Energy conservation is enhanced by double-glazed windows, insulated doors, and a roof structure designed to accommodate the weight of insulative snows during the harsh Maine winters. Although the structure is built into a hillside, the interior spaces reportedly receive natural lighting.

The Wilton Treatment Plant processes 200,000 gallons of municipal wastewater daily. Anaerobic digestors, heated to 95 degrees F by almost 1,500 sq. ft. of roof-mounted solar collectors, work together with energy efficient screw type pumps and rotation sludge screens to process the waste. Heat from the collectors can be used directly, or stored in the system's 2,000-gallon tank. In the event of insufficient sunlight, the system switched to a boiler system fueled by methane produced in the anaerobic process. If the facility runs out of gas, a heat pump begins removing unused heat from the treated effluent before it is discharged.

The system's 54 collectors combine with over 800 sq. ft. of passive solar panels to provide space heat for the facility.

Wilton's treatment plant is now being monitored by the U.S. Environmental Protection Agency and DOE. The system reportedly produces 100 percent of the facility's space and process heat needs on a sunny summer day. The project payback is estimated at 20 years.

Category Industrial
State ME
Project Name Solar Wastewater Treatment Facility

Organization Town of Wilton
Address Wastewater Treatment Facility
Contact James A. Thornton
Superintendent
Telephone (207) 645-3682

Funded By EPA; DEP; FHA
Cost \$2.2 million (total)
\$200,000 (solar)
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Located on the north bank of the Presumpscot River, the Maine Audubon Society's large headquarters building consists of a 2000 square foot air-type collector and a 105-ton bin of stones. The wood-frame structures, with an overall length of 80 feet and an overall width of 64 feet, bears some resemblance to a New England barn and to a saltbox house.

The building has a specially designed wood-burning furnace that serves as an auxiliary heat source.

The hot water for the building is pre-heated in a copper coil buried in the stones in the bin.

In summer, the building is cooled by natural ventilation.

table
Category	Institutional
State	ME
Project Name	Maine Audubon Society's Solar Headquarters Building
Organization	Maine Audubon Society
Address	118 Old Route One Gisland Farm Falmouth, ME 04105
Contact	William J. Ginn
Telephone	(207) 781-2330
Funded By	Maine Audubon Society
Cost	\$25,300 (Solar Heating System) \$270,000 (Entire Building)
Congressional District	
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Institutional

State ME

Project Name NMVTI Solar
Installation

Organization Northern Maine
Voc-Tech. Institute
(NMVTI)

Address Presque Isle, ME
04769

Contact Burt Tompkins, Jr.

Telephone (207) 769-2461

Funded By State

Cost n/a

Congressional District II

Compilation Date February 1980

The Alternate Energy Lab at Northern Maine Vocational Technical Institute has an 80-gallon, stone-lined hot water tank with two collectors installed on its roof. The system has an electric backup. The lab also has a solar greenhouse with a 1,000-gallon water mass for thermal storage.

Renewable Resources— A National Catalog of Model Projects

The Waterville Regional Vocational Center class of 1979 installed a solar hot water system on the Vocational Center for use during the non-heating months. A great deal of instrumentation has been added so that the production of solar hot water can be studied by students and other interested persons.

Category Institutional
State ME
Project Name Vocational Center
Solar Demonstration

Organization Waterville Regional
Vocational Center
Address Brooklyn Ave.
Waterville, ME 04901
Contact Stephen Clark
Telephone (207) 873-2751

Funded By State & local funds

Cost \$1,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Electric Rate Reform Act of 1977 requires the Public Utilities Commission to relate electric rates more closely to the costs of providing electric service, and thus to improve electric utility rate design. For this purpose, public electric utilities are required to submit specific rate design proposals to encourage energy conservation, minimize the need for new generating capacity, and minimize electric costs.

Category Legislation
State ME
Project Name Electric Rate Reform Act of 1977

Organization Maine State Legislature
Address Augusta, ME 04330
Contact n/a
Telephone (207) 289-3021

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

Renewable Resources— A National Catalog of Model Projects

The Energy Conservation in Buildings Act of 1977 requires that life-cycle cost analyses must be computed before public improvements are made or public school facilities are constructed or leased. The Bureau of Public Improvements is required to promulgate rules and procedures for determining energy-related life-cycle costs.

The rules, which are to be updated annually, cover orientation and integration with the building's physical site; the amount and type of glass and the direction of exposure; the effects of insulation and the effect on solar utilization; the variable occupancy and operating conditions; and energy-consumption analysis (alternate systems, energy consumption and evaluation).

table
Category	Legislation
State	ME
Project Name	Energy Conservation in Buildings Act of 1977
Organization	Maine State Legislature
Address	Augusta, ME 04330
Contact	n/a
Telephone	(207) 289-3021
Funded By	n/a
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Miscellaneous energy-related laws in the state include acts to permit vehicles to turn right on a red light (1977), to allocate funds for winterization and energy-conservation projects (\$225,000 in 1977), and to provide municipalities with standards for installing wood stoves (1978).

Maine has also passed legislation to require contracts for installation of insulation, to establish protective standards against unsafe and improperly manufactured cellulose fiber insulation, and to establish a state solar water-heater demonstration program.

In 1979, the state legislature passed an act establishing a \$2,500,000 bond issue for energy conservation improvements to local and county government buildings. Other acts have established energy-efficient building-performance standards for all new state structures, minimum warranties for the sale and installation of solar energy equipment, and a simple licensing procedure for small hydroelectric generating plants.

Standards for foam plastic insulation were also established, and regulation of solar energy equipment by the Maine Oil Burner Men's Board was prohibited.

The legislature endorsed a 15 percent tax credit (limit \$100) to be applied to the cost of a central heating system using renewable energy. Added to the federal tax credit (another 15 percent), this makes the purchase of a wood furnace or solar collector reasonable for many residents.

The legislature has funded a study of the environmental and economic effects of developing Half Moon Cove near Eastport for tidal power.

p>Category Legislation
State ME
Project Name Miscellaneous
Energy-related
Legislation

p>Organization Maine State
Legislature

p>Address Augusta, ME 04330

p>Contact n/a

p>Telephone (207) 389-3021

p>Funded By n/a

p>Cost n/a

p>Congressional District State-wide

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Maine's tax incentives to develop solar energy equipment as alternate energy sources are in effect until 1983. Furthermore, solar energy equipment (i.e., all controls, tanks, equipment for water or space heating and/or cooling) are exempt, for five years from the installation date, from both the state sales tax and local property taxes. The state solar tax exemption legislation was passed in 1977.

Category Legislation
State ME
Project Name Solar Energy Tax Exemptions

Organization Maine State Legislature
Address Augusta, ME 04330
Contact n/a
Telephone (207) 289-3021

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

Renewable Resources— A National Catalog of Model Projects

Over the past two years, six "hands-on" greenhouse workshops have been held by the Maine Organic Farmers and Gardeners Association (MOFGA) in cooperation with Northeast Carry.

Held over weekends, the workshops feature a four-hour instruction and discussion session, after which participants build an attached greenhouse. The organizers oversee the construction and, generally, continue instruction throughout the process.

Each site owner is responsible for meeting the cost of materials (\$1,000 - \$1,500). The Office of Energy Resources covers administrative costs and some of the instructor's and organizer's fees.

Approximately 150 individuals have participated in the workshops. Due to strong interest, the number of participants per workshop was expanded from 20 to 30. However, people still had to be turned away.

Joe and Nan Allen of West Brooksville participated in the project. Their greenhouse provides fresh vegetables throughout the year, and reduces by 20% the home's heating oil consumption.

tique/analysis: The project demonstrates the ability of attached greenhouse technology for Maine. It also disseminates solar energy information at the local level, helps stimulate local food production and develops individual construction and instruction skills.

Problems with the program included a lack of funding. Reportedly, there is enough enthusiasm for the project to hold 10 to 15 workshops annually.

Category	Outreach
State	ME
Project Name	Solar Greenhouse Workshops
Organization	Maine Organic Farmers & Gardeners Assn. (MOFGA)
Address	P.O.B. 187 Hallowell, ME 04347
Contact	Chaitanya York
Telephone	(207) 622-3118
Funded By	Ofc. of Energy Resources & workshop participants
Cost	\$1,000 - \$1,5000 (materials)
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

A four-panel solar hot water device was installed on the Governor's Staff House adjacent to the Blaine House in Augusta. The system is designed to be a public demonstration.

A display room contains the solar storage tank and controls, complete with signs describing the function of the different components. Illustrations and a cut-away of a solar collector provide visitors with visual aids for understanding the system's construction. Product literature and general information on solar hot water systems are also on display.

Category	State
State	ME
Project Name	Governor's Staff House

Organization	Ofc. of Energy Resources
Address	55 Capitol St. Augusta, ME 04330
Contact	Rick McGinley
Telephone	(207) 289-3811

Funded By	Northeast Solar Energy Center
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Cost	\$2,800
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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 the spring of 1978 the Maine State Legislature passed a bill appropriating \$16,000 for a solar hot water demonstration program. Those funds were then divided into \$400 grants. All 40 grants have been accepted, 28 systems are installed and operating, and the remaining 12 grant winners have all selected a system and put down a deposit with an installer. Over 140 persons applied for the grants on the basis of newspaper announcements and a brief media campaign. The grant winners were selected in a lottery held in July. All the applicants received an information packet containing an application form, a list of solar dealers, manufacturers and installers, and the warranty requirements for equipment used in the program.

The average system in the program cost approximately \$2,000 (before federal tax credits), resulting in over \$80,000 worth of business for Maine solar distributors and installers. Seventeen Maine installers were involved in the program, and 11 of the systems were manufactured by Maine's only solar manufacturer.

Seven of the systems in the program are being extensively monitored to determine exactly what level of performance can be expected in Maine. Each system is from a different manufacturer, and the equipment is situated over a diverse range of locations and local climatic conditions. Two of the participants have been monitoring throughout winter, and preliminary results are encouraging.

Critique/analysis: In contrast with the HUD solar hot water demonstration program in the other Northeast states, Maine's program appears successful. (Over 70% of the HUD grants still remain unclaimed after more than two years.)

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 Category | State || **State** | ME |
| **Project Name** | Solar Hot Water Demonstration |

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 Organization | Ofc. of Energy Resources || **Address** | 55 Capitol St. Augusta, ME 04330 |
| **Contact** | Rick McGinley |
| **Telephone** | (207) 289-3811 |

Funded By	State of Maine
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Cost	\$16,000
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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 State
State ME
Project Name Sunrise '79

Sunrise '79 was a comprehensive conference for professionals and citizens interested in increasing their knowledge of solar energy. Held in June, it attracted over 300 people from throughout Maine. Ten speakers gave presentations on a wide variety of solar-related topics, including passive solar, solar hot water, financing, greenhouses, solar panels, and solar policy-making. Talks on solar back-up and wood heat, as well as on insulation were also given.

Response to the conference was excellent. Many attendees requested profession-specific workshops. The Office of Energy Resources plans to follow up on these in the near future.

Critique/analysis: The concurrent sessions disappointed some people and materials ran out because more people than expected showed up.

Organization Ofc. of Energy Resources
Address 55 Capitol St.
Augusta, ME 04330
Contact Rick McGinley
Telephone (207) 289-3811

Funded By Ofc. of Energy Resources

Cost n/a

Congressional District I

Compilation Date February 1980

MASSACHUSETTS

1. Amherst
2. Attleboro
3. Baldwinville
4. Boston
5. Clarksburg
6. Concord
7. Cuttyhunk Island
8. Dedham
9. East Falmouth
10. Fitchburg
11. Gardner
12. Gloucester
13. Greenfield
14. Haverhill
15. Jamaica Plain
16. Leominster
17. Lincoln
18. Malden
19. Middleboro
20. New Bedford
21. North Easton
22. Northampton
23. Pittsfield
24. Quincy
25. Roxbury
26. Shelburne Falls
27. Somerville
28. Stockbridge
29. Tumers Falls
30. Washington
31. Weston
32. Woods Hole
33. Worcester

MASSACHUSETTS

TABLE OF CONTENTS

Cities

County Energy Planning and Implementation	1
Solar Jailhouse	2

Commercial

Maritime Terminal	3
Recycled Greenhouse Materials	4

Community

Action Community Greenhouse	5
Berkshire Community Greenhouse	6
Bridge Street Halfway House	8
Cuttyhunk Island Windmill	9
Fitchburg Action to Conserve Energy (FACE)	10
Greenhouse Workshop	11

Education

Center for Resourceful Living	12
New Alchemy Institute	13
Owner-Builder School	14
"Six Pack" Solar Greenhouse	15
Solar Habitat I	16
SUEDE	18
Umbilicus	19
Window Box Greenhouse Construction	20

Financing

Project H.E.A.T.	21
-----------------------	----

Housing

Dick Pierce Home	22
Gerry Ives	24
Granite Place	25
John Ellertson House	26
Solar Community	27
Susan Naimark Home	28

MASSACHUSETTS
TABLE OF CONTENTS
PAGE 2

Industrial

Wood Heating for Furniture Manufacturing	29
Wood Waste Cogeneration	30

Institutional

Audubon Solar Systems	31
Passive School Retrofit	32
Solar Bank	33
Solar Children's Hospital	34
Solar College Complex	35
Solar Dormitory	36
Solar Hospital	37
Space-heated Warehouse	38

Legislation

Legislation in Massachusetts Summary	39
--	----

Low Income

Cordwood Project	41
Low Income Greenhouse and Storm Windows	42
Southwest Community Corridor Farm	43
Window Box Program	44

Outreach

Center for Ecological Technology	45
NEAT-NET	46
Urban Solar Energy Association	47

State

Massachusetts State Energy Office	48
---	----

Renewable Resources— A National Catalog of Model Projects

The Franklin County Energy Project was created to advocate implementation of the findings and recommendations developed in the Franklin County Energy Study. Participants in the study outlined a history of energy use and cost in rural Franklin County, Massachusetts. They then examined conservation potential and the availability of local renewable energy resources to meet those reduced demands.

The Project has a staff of four who provide information and some technical assistance to individuals and communities who want to explore the development of renewable energy sources (solar, wind, hydro and biomass). The Project is setting up an anemometer-loan program to determine the feasibility of community wind systems, helping assess a 500-KW hydro-facility, and conducting a series of meetings with local officials and town energy committees to strengthen the local committee's ability to help make energy-related decisions in each of the county's 26 towns.

The Project is also working with groups in neighboring counties to initiate discussions on the longer-term necessity for developing a local energy-production and distribution system in western Massachusetts.

Project staff are available for speaking and to give assistance to other communities.

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Category	Community
State	MA
Project Name	County Energy Planning and Implementation

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Organization	Franklin County Energy Project
Address	Box 548 Greenfield, MA 01302
Contact	Mark Chermiack
Telephone	(413) 774-2257

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Funded By	DOE
Cost	\$30,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

One of the first solar jailhouses in Massachusetts is scheduled to be built in Northampton. The project, funded by local and state taxes, consists of a hot water and space heating system for the 700,000 ft² building. Three hundred 5' x 7' solar panels will provide 50 to 60 percent of the building's heating needs, and 100 percent of the hot water requirements.

Although the building is still in the design-development stage, it is planned that the solar system will be a liquid type. Construction is expected to begin in Spring of 1980, and will be completed in 1982.

Category	Cities
State	MA
Project Name	Solar Jailhouse

Organization	Hampshire County Jail and House of Corrections
Address	Hampshire County Court House Northampton, MA 01060
Contact	John Lawlor
Telephone	(413) 584-0557

Funded By	Local and State taxes
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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

The Maritime Terminal in New Bedford is saving money using solar energy to keep its floors from heaving.

The company has a storage capacity of 55 million pounds of food. The ground underneath the refrigerated warehouse must be kept from freezing to prevent

Prior to 1976 this was done with electric heat. For the past three years, however, Maritime has used 10 flat plate collectors in a radiant-coil system. An anti-freeze and water solution circulates through the collectors and under the floor of the storage facility. The solar application is very suitable due to the low temperatures needed. The payback rate was two years, with an annual savings of \$3,500.

Category	Commercial
State	MA
Project Name	Maritime Terminal, Inc.

Organization	Maritime Terminal, Inc.
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Address	Whaler's Wharf New Bedford, MA 02740
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Contact	G. Robert Hampson
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Telephone	(617) 996-8507
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Funded By	Private
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Cost	\$7,000
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Congressional District	XII
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Over the past three years, Greenhouses, Etc., has been dismantling large commercial cypress and glass greenhouses, and recycling the material into smaller, more energy efficient units. The group makes the recycled materials available to the public at a fraction of the cost of new materials. It also offers greenhouse design and installation services.

The materials are durable, attractive and low cost. Cypress is ideally suited for greenhouse construction. It is extremely long lasting under humid growing conditions. Glass, in addition to having a long life span, is attractively clear. Recycling allows great flexibility in shape and is ideal for custom designs as well as conventional styles.

Category Commercial
State MA
Project Name Recycled Greenhouse materials

Organization Greenhouses, Etc.

Address 396 Cambridge Turnpike
Concord, MA 01742

Contact Mark Ward

Telephone (617) 369-1354

Funded By n/a

Cost n/a

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Action, Inc., has constructed a solar greenhouse made almost entirely from recycled materials at a cost of only \$1,200. The thermal mass wall was constructed from old navy sonar buoys filled with water.

Although the 8' x 16' structure is too small for many people to use, the seedlings which it produces are distributed for community gardening projects. Part of the purpose of the greenhouse is to provide an educational demonstration. Student groups are encouraged to visit.

Category	Community
State	MA
Project Name	Action Community Greenhouse

Organization	Action, Inc.
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Address	24 Elm St., Gloucester, MA 01930
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Contact	Elliot Jacobson
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Telephone	(617) 283-7874
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Funded By	n/a
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Cost	\$1,200
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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

This solar greenhouse at the Berkshire Garden Center in Stockbridge, MA, was designed and built by the Center for Ecological Technology of Pittsfield. The project goal is to test and demonstrate the feasibility of year-round vegetable production in the Berkshires using the sun as the principal heat source. The structure is a 256 sq. ft., free-standing, passive, solar greenhouse. The system does not employ fans, pumps, or complicated controls, but makes the most of available energy with simple, efficient design.

Completed in February 1977, the greenhouse has produced abundant vegetables for two winters. The cost for materials was approximately \$2,000. Labor was volunteer. The commercial cost of this type of structure would run about \$15-20 per sq. ft. Auxilliary fuel costs for an electric heater were approximately \$25 for the 1977-78 heating season.

The Berkshire Garden Center operates as a botanical information center, receiving approximately 23,000 visitors annually. Other projects include a greenhouse adapted for children which is used to conduct a horticultural education program for about 4,000 school students. The Center has been adapted for visitation by handicapped people, and displays garden tools designed for people with physical disabilities. Gardening at the Center is done without chemical pesticides. The Center produce supplies a family of four with an abundance of salad greens throughout Berkshire winters.

The main thermal storage of the greenhouse consists of eleven black 55-gallon drums filled with water and stacked two high along the north wall. The other storage component is in the soil beds.

Category	Community
State	MA
Project Name	Berkshire Community Greenhouse
Organization	Berkshire Garden Center
Address	Stockbridge, MA 01262
Contact	n/a
Telephone	(413) 298-5530
Funded By	n/a
Cost	\$2,025
Congressional District	I
Compilation Date	February 1980

A series of monitors judge insulation on a vertical surface, indoor air temperature at plant canopy level, water temperature in the barrels, inside and outside air temperature, and humidity.

Critique/analysis: One significant fault of the greenhouse is that it was built without any provision for insulating the south wall at night. Since 86 percent of the calculated heat loss is through that surface, adding an insulating shutter or curtain would significantly lower the overall heat loss by up to 40 percent.

Renewable Resources— A National Catalog of Model Projects

A passive solar, unattached greenhouse was built by the staff and residents of a halfway house in about 7 months. The halfway house is for those people who have mental health problems, and who are preparing to move out into the community.

Vegetables grown in the greenhouse have been supplementing the house's diet plan, while flowers raised are sold to the public. The 25' x 20' greenhouse is constructed of translucent plastic and wood. Heating is supplemented by a wood stove. The house plans to experiment with the installation of photovoltaics because of its very small electrical needs.

Critique/analysis: Residents have become involved in solar research and garden management. The surplus of plants and vegetables that they grow next year will be sold to augment the low incomes of some of the residents themselves. Three of the residents have received jobs in the community because of their experience with the greenhouse. The employment has been in construction, gardening and in energy conservation auditing.

Category Community
State MA
Project Name Bridge Street
Halfway House

Organization Bridge Street
Halfway House
Address 96 Bridge Street
Northampton, MA 01060
Contact Bob Hannum
Telephone (413) 586-2023

Funded By Amherst College
Cost \$5,000-materials
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Perched atop the highest knoll (200 ft.) on Cuttyhunk Island is one of the largest wind turbine generators in the world. It is expected to meet the power needs of the entire island community during three-quarters of the year. The fifty year-round residents should receive electricity at 5.3 cents per kilowatt hour, half the present cost of power on the island.

This unit, which is presently being prepared for operational testing and evaluation, is expected to produce 200 kilowatts in a 26 mph wind. The island is an ideal "real world" testing environment, with 16.8 mph mean annual wind velocity, and a community base-load power demand averaging 100 kilowatts during the summer months, and 30 to 40 kilowatts the rest of the year.

Long-term durability and low cost per installed kilowatt have been the primary engineering objectives in the design of the horizontal-axis wind rotor. The machine has three 40-ft. rotor blades and an upward operational configuration. The blades, constructed of galvanized steel, utilize an advanced airfoil.

The initial phase of prototype testing and evaluation at Cuttyhunk suggests that the aerodynamic engineering applied in the design and construction of the wind rotor exceeds all expectations. (By evaluating the user's energy demands in relation to the potential power output of a specified wind system, the cost effectiveness of the installation can be determined prior to investment in hardware.)

The eventual production-line units are expected to have an installed cost per kilowatt of less than \$1000.

Category	Community
State	MA
Project Name	Cuttyhunk Island Windmill
Organization	Cuttyhunk Island Windmill
Address	New Bedford, MA 02743
Contact	Alfred Gross WIG Energy Systems 251 Elm Street Buffalo, NY 14203
Telephone	(716) 856-1620
Funded By	WIG
Cost	\$226,000
Congressional District	XII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Community

State MA

Project Name Fitchburg Action to Conserve Energy (FACE)

For six weeks in late 1979, citizens of Fitchburg participated in the nation's first volunteer, city-wide conservation project. The Fitchburg project was designed as a self-help program that taught residents how to weatherize their homes using low-cost and no-cost materials. Energy consumption in participating homes will be reduced by an estimated 25 percent through this simple, inexpensive approach which requires little labor.

The Fitchburg Action to Conserve Energy (FACE) was conceived jointly by the Lt. Governor, ACTION, and the Mayor's office. Resources mobilized in the community included public and parochial schools, the Fitchburg State College, citizen volunteers, and a FACE Advisory Council composed of local leaders.

FACE Centers were created, operated, and maintained by volunteers in neighborhoods throughout the city. Office space for these centers was donated by schools, community centers, and local businesses. Volunteers acted as trainers, information specialists, crew assistants, graphic artists, and writers in preparing educational materials and "hands-on" workshops held at the Centers. For six days a week over a six-week period, residents were trained in low-cost no-cost energy conservation. Those who wished to weatherize their homes purchased a materials kit after the workshop. Financial assistance was provided for those unable to afford materials, and those who were unable to do the conservation work themselves were helped.

Critique/analysis: The Fitchburg project was designed and implemented by volunteers. The broad-based support developed by these volunteers mobilized the entire community around energy conservation.

Organization Fitchburg Action Conserve Energy (FACE)

Address Office of Planning Coordination
718 Main St., City Hall
Fitchburg, MA 01420

Contact Tom Cunningham

Telephone (617) 345-1018

Funded By DOE, HUD and ACTION

Cost n/a

Congressional District IV

Compilation Date February 1980

Seventeen hundred households participated in the sessions and received free weatherization kits; 1,500 households participated and purchased weatherization kits; and 300 households received free weatherization kits and volunteer crew assistance. Each household that participated in FACE is expected to conserve the equivalent of 300 gallons of oil.

Renewable Resources— A National Catalog of Model Projects

A group of 20 to 25 volunteers, in conjunction with Community Action, Inc., helped construct a greenhouse addition to a private home in Haverhill. The totally passive 8' x 10' structure provides year-round fresh vegetables and supplemental heating.

The greenhouse has a cinder block foundation and loose stone floor. Seven tons of pea stone and six 50-gallon drums filled with water act as the greenhouse's thermal mass. The transfer of cool air from the living area into the greenhouse serves to provide the plants with carbon dioxide, as well as to stabilize the temperature.

Category Community

State MA

Project Name Greenhouse Workshop

Organization Community Action Inc.

Address 25 Locust Street.
Haverhill, MA 01830

Contact Bob O'Connell

Telephone (617) 372-7739

Funded By State Department
of Community
Affairs

Cost \$1,500 grant

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Center for Resourceful Living at North Adams State College is building a solar-heated dormitory. CETA workers are being trained to build the 85' x 35' solar dormitory, which will have an attached solar greenhouse. The greenhouse will use grey water to raise fish in a 24' x 8' x 4' tank. Both fish and vegetables grown in the greenhouse are intended for human consumption.

The dorm itself will stand 2 stories high and will make use of an active hot water and space heating system. The building will have a full basement, a kitchen with a wood stove (which is the only back-up heating system), two composting toilets, and a solar-heated wood kiln.

The Center for Resourceful Living is a two-semester self-sufficiency program sponsored by North Adams State College. This educational program is oriented around small-scale farming techniques, and stresses learning through experience. Among the courses offered are, "Field, Orchard and Wood Lot Management", "Dairy and Poultry Production", "Draft Horse Management", and "Gardening". Skills in woodworking, carpentry, leatherworking, bee-keeping, and farm animal management are also taught.

Category	Education
State	MA
Project Name	Center for Resourceful Living

Organization	North Adams State College
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Address	Daniels Rd., Clarksburg, MA 01247
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Contact	Howard B. Schechter
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Telephone	(413) 664-4511 ext. 320, 249
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Funded By	North Adams State College
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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

The New Alchemy Institute (NAI) is a small non-profit organization dedicated to research and education. Its goal is to design and test human support systems (food, energy, shelter) that are environmentally benign and economically efficient. Minimizing reliance on fossil fuels and operating on a scale accessible to families and small enterprises are NAI goals.

The work of NAI includes agriculture, aquaculture, and the design and use of wind systems and solar techniques and technologies. The agricultural program incorporates a system of gardening that relies on no machinery or fossil fuels, the evaluation and development of tree crops that are well-adopted to the Northeast, experimentation with natural predators in pest control, and the testing of the thermal efficiencies of biological approaches to energy conservation in the home.

Research in aquaculture involves the use of a dome fishery that is an integrated fish/vegetable facility designed for multi-season, small-scale applications. Sunlight enters through the fiberglass skin of a 30-foot dome that contains a 5,000-gallon pond. The water absorbs heat during the day and releases it at night. Fish production has reached a net gain of 66 pounds of edible fish over a six month period. This facility can also double as a fish hatchery.

NAI's solar algae ponds are small bodies of water contained within a free-standing fiberglass cylinder. Sunlight penetrates the translucent fiberglass to warm the water and spur algae growth. One 650-gallon cylinder will absorb and then release the heat equivalent of 30 gallons of oil over a 150-day heating season.

Category Education
State MA
Project Name New Alchemy Institute

Organization The New Alchemy Institute
Address 237 Hatchville Rd.,
East Falmouth,
MA 02536
Contact Christina Rawley
Telephone (617) 563-2655

Funded By Grants & Private contributions
Cost n/a
Congressional District XII
Compilation Date February 1980

Wind research has led to the development of an inexpensive water-pumping mill that operates efficiently at moderate wind speeds. Component parts are easy to obtain: the rotors are made from sailcloth and the pump diaphragm from a rubber tire.

NAI constructed a family-size passive solar greenhouse that incorporates both a fish pond and a garden. This 375 ft² structure produces heat, fish, and vegetables year-round with no fossil fuel back-ups. Its design and low cost make it well suited for retrofitting onto the south face of conventional houses.

The Cape Cod Ark is a larger solar structure (1950 ft²) designed to grow year-round food for both community consumption and small-scale marketing. Sunlight provides all of the space heating.

The building combines a translucent southern facade, a sunken fish pond, gardens, 14 indoor solar algae ponds, and an air-circulation system powered by a small fan. The solar algae ponds provide the bulk of the thermal storage; an enclosed rock pile contributes most of the remainder. The total effect is to create an intensive four-season production area with relatively moderate temperature swings.

New Alchemy's chief accomplishment is not a particular building or project. Its major work has been to synthesize a theory of design that integrates scientific knowledge with a concern for natural ecosystems.

Renewable Resources— A National Catalog of Model Projects

Heartwood Institute is a resource center where people of all ages and professions can learn how to plan, design and build their own low-cost energy efficient homes. Courses and workshops are regularly scheduled in new house design and construction, existing structure retrofits, and passive solar greenhouse design. Subjects covered include elements of design; site and climate considerations; heat gain and loss; structural design; heating; electrical and plumbing systems; and tools of the trade, and how to use them. Most courses are intensive, 3-week sessions costing \$300 for tuition and \$200 for optional room and board (camping is allowed). The Institute is also planning an expanded curriculum of shorter courses, for next year.

Heartwood Institute maintains a complete reference library, a building materials coop, and provides advice and support for students' projects. Opportunities for "hands on" practical experience are available through participation in the staff's experimental building program. Support and guidance is offered to course graduates throughout the design and construction phase of their personal projects. Courses and workshop classes are located in Amherst, Pittsfield, and Stockbridge.

Category	Education
State	MA
Project Name	Owner-Builder School
Organization	Heartwood Institut
Address	Johnson Rd., Washington, MA 01235
Contact	Elias Velonis
Telephone	(413) 623-6677
Funded By	Private
Cost	Courses: \$200- \$500
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The New Alchemy Institute's backyard "Six Pack" solar greenhouse is an example of a small, inexpensive structure suitable for supplying a family with year-round food supplements of fresh vegetables and fish. Designed to use only the sun as a source of heat and light, the solar "Six Pack" is inexpensive to maintain.

The 400 ft² greenhouse is oriented along an east-west axis, with the north side (and portions of the east and west sides) heavily insulated to prevent heat loss. The south face is uniquely constructed of three layers of special plastic membrane, which is covered by barrel vault-roof glazing that cuts heat loss to 25 percent of that lost through conventional glazing. Incorporation of a fish pond within the structure contributes significantly to heat storage capacity along with the concrete foundation and garden soil. Another unique feature of this project is the use of pond water, rich in nutrients, to irrigate and fertilize crops within the shelter.

Category	Education
State	MA
Project Name	"Six Pack" Solar Greenhouse
Organization	New Alchemy Institute
Address	P.O. Box 432 Woodshole, MA 02543
Contact	Hilde Maingay
Telephone	(617) 563-2655
Funded By	Private Foundations Donations
Cost	n/a
Congressional District	XII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Solar Habitat 1 at the Amherst campus of the University of Massachusetts is an energy conserving, pre-fabricated house, serving as a research laboratory and public demonstration site for a fully operational wind and solar heating system. The house design will hopefully compete in cost with mobile homes, which waste heating energy. It was constructed by undergraduate and graduate students and technicians from the School of Engineering.

The floors and wall panels of the structure are insulated. The roof has eight inches of fiberglass insulation. An inch of polystyrene insulation covered with fiberglass mesh and coated with a stucco-like mixture of cement, sand and plastic compound has been applied to the outside walls. Windows are a special triple-pane design that provides the circulation of pre-heated fresh air into the house.

The wind system, or "Wind Furnace," provides two-thirds of the home's heat and energy by supplying power to electric heaters submerged in water tanks located in the basement. Set atop a 60 foot tower, the windmill looks like an aircraft propeller. It is capable of producing 25 kilowatts in a 26 mph wind. Use of the windmill to heat the house rather than to provide electricity eliminates the need for expensive conversion and storage equipment.

The solar heating system used at Solar Habitat 1 consists of 200 sq. ft. of panel collectors, which provide about 20 percent of the house's heating requirements. Mounted vertically on the south side of the house, the collectors heat an antifreeze solution, which is circulated through four tanks located in the basement.

Category Education
State MA
Project Name Solar Habitat I

Organization University of Massachusetts
Address Univ. of Mass.,
Dept. of Mechanical
Engineering
Amherst, MA 01005
Contact Duane Cromack
Telephone (413) 545-1923

Funded By USDA, DOE

Cost n/a

Congressional District I

Compilation Date February 1980

The tanks are of different sizes to test for optimum tank size and capacity.

...tique/analysis: Although the energy systems used at Solar Habitat 1 are not inexpensive, it is hoped that they will provide important results in the future. Solar Habitat is available for public tours.

Renewable Resources— A National Catalog of Model Projects

The MA Solar Utilization Economic Development and Employment (SUEDE) project is training CETA workers to design and install passive solar units in low-income homes in Franklin, Hampshire, or Berkshire County in Massachusetts. The 40 to 45 recipient homes must meet the guidelines established by the Community Services Administration Weatherization Program, and must also be suitable to one of several passive solar system options: thermo-syphoning air panel, additional glazing (which may have some kind of water storage), windows on the south side of the home, or an attached greenhouse. Not more than \$15,000 can be spent on each system.

The CETA workers are trained in energy conservation and solar installation in an intensive three-month class. They study the energy overview, the climatic approach to energy-conserving shelters, existing residential space heating systems, weatherization, solar energy design, engineering construction skills, and architectural drawing. The class then spends the next six months in the field.

The homeowner has the responsibility of attending two to three meetings to learn about the project and the solar systems, to help SUEDE evaluate the installation and the project by keeping accurate fuel records, and to complete occasional questionnaires. They must also help educate the community by allowing others to visit the house approximately one day every three months, and by maintaining the solar system (caulk, paint, and repair when needed).

Category Education

State MA

Project Name SUEDE

Organization Energy Education
Center of the
Cooperative Extension Service
Address University of MA
Amherst, MA 01003

Contact Connie Kruger

Telephone (413) 545-2132

Funded By DOE, CSA, DOL.

Cost \$15,000 maximum
per household

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

"Umbilicus" is the name of a unique solar-heated greenhouse containing aquaculture and horticulture systems, which is designed for science classes and independent research projects at Noble and Greenough School. The school also offers solar classes to the public.

The greenhouse system design is modeled on a natural ecosystem. Four component systems harness the natural energy of the wind and sun for food production. The systems include both active and passive collectors; a three kilowatt windmill on a sixty foot tower; an aquaculture system to raise fish; and a greenhouse to grow a variety of vegetables. All food produced within the structure will be used in the school's dining facility, non-edible nutrients will be returned to the soils by means of composting.

The program will be expanded in the future as new ideas present themselves and as problems with the systems are resolved. For example, a forestry program is in the offing as an offshoot of a wood burning back-up system. Experiments in transplanting and cultivating the fish raised in Umbilicus will be tried in areas along the Charles River. The greenhouse will be altered to provide better ventilation, deeper soil beds for plants, and other improvements.

The school offers an evening adult education program on the energy crisis and solar solutions. The classes concerned with solar applications examine current obstacles to solar technology faced by homeowners, and provide theoretical and 'hands-on' instruction to resolve them. Offered during the fall and spring, the course meets weekly and costs \$2,500.

Category	Education
State	MA
Project Name	Umbilicus

Organization	Noble and Greenough School
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Address	High St., Dedham, MA 02026
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Contact	Fred Sculio
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Telephone	(617) 326-3700
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Funded By	n/a
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Cost	Estimated \$22,000
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Congressional District	IX
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Terry Bastian conducts workshops demonstrating how to build window greenhouses. The workshop cost is \$5, and if participants can pay for materials, they can leave with the "hand-made" product.

Bastian estimates the materials cost to be as low as \$25 to \$35, if materials used are recycled or bought in quantity.

The window box provides apartment dwellers with a way to raise vegetables though they do not have land. It is also an attractive addition to any room. Window boxes are one of the simplest, most low cost solar applications available. With an appropriate design, the window box can also supplement heating. Some of the models have vents which can be opened in the summer to moderate temperatures.

Category Education
State MA
Project Name Window Box Greenhouse Construction

Organization Sunshine & Co.

Address 56 Earl St., #1
Malden, MA
02148

Contact Terry Bastian

Telephone (617) 321-0734

Funded By Private

Cost \$25-\$40

Congressional District VII

Compilation Date February 1980

As part of PROJECT H.E.A.T., Charlestown Savings will serve as a clearinghouse for information on various energy-conservation services in Greater Boston.

Renewable Resources— A National Catalog of Model Projects

The lovely old duplex at 23/25 Catawba St., in Roxbury was saved from demolition and will be totally solarized by Dick Pierce. He is planning on renovating the building not only to provide solar heat and hot water, but also electricity for appliances, such as the washer and dryer. The electricity for a 12-volt refrigerator will be supplied by photovoltaic cells.

The idea of solarizing the duplex occurred to Pierce as he was doing carpentry work on houses across the street. He noticed that the sun hit the roof all day long. After some negotiations he bought the house from the city for under \$2,000, and began to work on it. The building had been boarded up for over 7 years.

Pierce first removed two south-facing dormer windows to allow more space for the solar collectors to be mounted on the roof. To provide more standing room, he raised the north side of the roof, using almost all recycled materials. Only five new timbers were purchased at a cost of \$50; new materials would have cost more than \$1000. In the attic, a brick partition separating the duplex has been taken down, and an enlarged staircase from the second floor has been constructed.

The system will use rock storage located in the attic. From the four corners of the house, solar heat will flow through air ducts to the second floor. A fan hung from the attic just above the stairs will blow hot air back downstairs. Initially, only the second floor apartment will use solar for space heating. Hot water, however, will be provided for both apartments by this means.

table
Category	Housing
State	MA
Project Name	Dick Pierce Home

table
Organization	Dick Pierce
Address	23/25 Catawba St. Roxbury, MA 02119
Contact	Dick Pierce
Telephone	(617) 445-3238

table
Funded By	Private
Cost	n/a
Congressional District	VIII
Compilation Date	February 1980

Critique/analysis: Dick Pierce describes his house this way: "Aside from the obvious energy savings and environmental aspects of this project, the main objective is to demonstrate to the urban community, and its young people in particular, the unlimited opportunities that solar technology offers in fields of solar architecture, solar law, solar mechanical and electrical engineering, solar product development and numerous other solar-related vocations and trades."

Renewable Resources— A National Catalog of Model Projects

One of Boston's oldest solar installations is a retrofit of a four-story brick row house in the South End. Its simplicity, the use of natural energy patterns, the existing building structure, as well as its financial return, make this a solar classic. The entire system including skylight, frame and glazing, ductwork, fan and automatic controls, cost about \$1,300.

The house has two 900 ft² apartments; the top one is solar heated. The building's roof was flat; therefore, the owner added a "solar shed", a wedge-shaped structure seven feet high with a vertical wall to the north, and a 40 degree slope on the south side. The shed is open to the inside of the building.

The south wall of the shed is an 8' x 11' skylight glazed with $\frac{1}{8}$ " wire glass. As the sun shines through the skylight, warm air builds up inside the shed. The air, which is heated to 100 degrees F or more, is then pulled by a 5" fan (cost \$5) through ductwork down 2 $\frac{1}{2}$ stories. At the bottom the air is blown against a brick wall for thermal storage. At night when warmth is needed, the heat within the brick wall radiates into the apartment.

Conventional heat is used in the apartment only between November and Mid-March when the sun does not shine. On a normal sunny winter day, the system collects enough energy to provide heat for 24 hours. It does not collect as much heat on slightly overcast days. Gas heat is used only on very cloudy days. During the summer, overheating is prevented by cross-ventilation. Two louvered vents in the shed sides let heat out.

Critique/analysis: Savings have been significant. Over the last three years, the average gas bill covering heating, hot water, and cooking, was \$500 per year for both apartments.

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Category	Housing
State	MA
Project Name	Gerry Ives

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Organization	Gerry Ives
Address	Dartmouth Place, Boston, MA 02116
Contact	Gerry Ives
Telephone	(617) 267-6931

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Funded By	Private
Cost	\$1,300
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Granite Place has recently been fitted with a unique electric/thermal solar energy "tracking" system. The manufacturer and installer of the device has termed it the first "marriage" of a photovoltaic concentrator array with a flat-plate hydronic array in the country.

The 11-story complex contains 275 units of elderly housing. Forty collector panels store heat in two 6,500-gallon storage tanks. Viewed as a "total energy system," both solar electric and thermal energy are provided by the technology.

Solar electric power is provided by the photovoltaic system to power a pump on the hydronic thermal array; this, in turn, provides most of the solar-heated hot water. The heat energy generated as a by-product of the solar electric input gives a thermal boost to the flat plates, and energy is provided.

The systems complement each other when the sun is shining and pumping power is needed.

Category Housing

State MA

Project Name Granite Place

Organization Granite Place Apartments

Address Granite Street,
Quincy, MA
02169

Contact Peter O'Connell
William O'Connell

Telephone (617) 773-6255

Funded By Private

Cost n/a

Congressional District XI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A solar attic was this family's solution to heat an abandoned house badly in need of repair. The two-family, wood frame house was designed for lots of air movement. Because of its poor condition, it was purchased for \$1,600. Another \$500 covered the expenses of the insulation, wood, plumbing, fiberglass and glazing necessary to convert the deteriorated roof and attic into a solar greenhouse.

Initially constructed for use as a greenhouse to grow food, this attic is now in the process of becoming a source of heat for the house. The transition will involve adding ductwork to take heat down to the basement.

Category	Housing
State	MA
Project Name	John Ellertson House
Organization	John Ellertson
Address	Fort Hill, Roxbury, MA 02119
Contact	John Ellertson
Telephone	(617) 442-0608
Funded By	Private
Cost	n/a
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Friends Community consists of 160 solar-heated townhouses grouped on 12 acres of an 85-acre village. The remainder of the land is designated for woodlots, ponds, biking and walking trails, community gardens and orchards. The village is open to all ages, races and faiths.

An air system, in which hot water in coils heats air ducts, produces space heating. Electricity is used as a back-up system, although there are also provisions for wood stoves. The community wood lot has the potential to produce 50 cords of wood annually.

p>Category Housing
State MA
Project Name Solar Community

p>Organization Friends Community

p>Address 130 Lincoln St.
North Easton, MA
02356

p>Contact Laurence and Lucia
Barber, Executive
Co-Directors

p>Telephone (617) 238-7679

p>Funded By HUD grant for first
69 units

p>Cost n/a

p>Congressional District X

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

This passive solar water heater is an inexpensive, simply designed project for urban porches such as those found on triple-deck residences. A 30-gallon tank painted black is kept inside a glazed box on the south side of the house. Water of 55 to 60 degrees F. enters the insulated tank, where, on a clear day, it is heated by the sun to about 130 degrees. The preheated water then goes to the gas water heater; if necessary, the heater warms the water more.

The efficiency of this system depends on when the hot water is used. The optimal time of usage is in the late afternoon. There is no heat storage.

Built on site, heater materials cost \$160 to \$175. However, if several are constructed at the same time, the cost drops to as little as \$110 to \$115 apiece.

Category	Housing
State	MA
Project Name	Susan Naimark Home
Organization	Susan Naimark
Address	Paul Gore St., Jamaica Plain, MA 02130
Contact	Robin White
Telephone	(617) 522-5366
Funded By	Private
Cost	\$110-\$175
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Temple Stuart burns wood scraps to provide 75 percent of its heat energy needs. Manufacturing wastes funnel into the wood-fired double steam boiler. Steam circulates throughout the plant, providing radiant heat and energy for drying and bending processes.

Electrical needs are not met by this system. A back-up, oil-fired furnace kicks in automatically when pressure in the wood furnace gets too low.

In winter, when energy needs for space heat are much greater, the system does not provide full power due to inadequate supplies of waste. Meanwhile, reduced energy demand in summer allows for an overabundance of wastes.

Temple Stuart is looking into the feasibility of constructing a 30' to 40' silo to hold summer waste for winter demand. This may prove economical as the price of oil continues to climb.

Category	Industrial
State	MA
Project Name	Wood Heating for Furniture Manufacturing
Organization	Temple Stuart Furniture Company
Address	Baldwinsville, MA 01436
Contact	Mike Fichtel
Telephone	(617) 938-5442
Funded By	Private
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

This chair manufacturing company, employing 200-250 people, has been operating a wood-fired furnace and electrical generator since 1959. The system has provided approximately half of the company's total power needs at 100 percent reliability. Total maintenance costs have been only about \$4,000 over nearly 20 years.

This combined heat and electricity generating system provides energy for the factory's light, mechanical equipment, wood drying, and space heating needs. It is estimated that a minimum of \$50,000 per year at today's costs is being saved by the wood-fired cogenerating system.

The electric generator operates on high-pressure steam, produced by the wood-fired furnace, to provide a maximum power output of 400 kilowatts. Wood scraps from manufacturing processes are supplemented by scraps purchased from other mills to meet the daily 15-22 ton requirement of the wood-burning furnace. Waste sawdust is fed through ducts into the furnace where it is burned in suspension to ensure complete combustion, thus keeping the plant relatively pollution-free and safe.

Category	Industrial
State	MA
Project Name	Wood Waste Cogeneration
Organization	S. Bent & Bros. C
Address	85 Winter St., Gardner, MA 01440
Contact	Earl Myrtti
Telephone	(617) 632-4300
Funded By	Private
Cost	n/a
Congressional District	IV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Massachusetts Audubon Society has solar installations at three of its wildlife sanctuaries.

The Drumlin Farm Wildlife Sanctuary Nature Center and Gift Shop in Lincoln, Mass. uses a roof-top collector for 50 percent of its space-heating needs. The system consists of an 840 ft² water-type collector located on the roof of the Gift Shop, and a 2,000-gallon, plywood storage tank lined with insulated vinyl. Hot water used by the Center is preheated in the storage tank. An oil-fired space heating system provides the rest of the building's heating needs.

During the first winter of operation, the system encountered several problems that considerably lowered its effectiveness. Since then repairs have been made, and it is estimated that the solar system will function to provide 76 percent of domestic hot water heating and 35 percent of space heating. The payback period is estimated at ten years. However, as oil prices increase, this time period will decrease. A display and slide show discussing this solar system is open to the public upon admission to the sanctuary.

A second installation was just completed at the Stonybrook Wildlife Sanctuary in Nor-folk, Mass. Designed and built by volunteers, the system consists of hot air roof-top collection panels that transfer heat to water-filled bottles located in the basement. The performance of the system is being monitored. There is no formal display of the system but visitors are welcome to view the building and collectors.

The Ipswich River Wildlife Sanctuary in Topsfield, Mass. has installed a solar hot water heater in its building. The heater may be viewed upon admission to the sanctuary.

Category Institutional

State MA

Project Name Audubon Solar Systems

Organization Massachusetts Audubon Society

Address Lincoln, MA 01773

Contact William Alschuler

Telephone (617) 259-9500

Funded By Private

Cost n/a

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Cambridge School Solar Building is a two-story 14,400 ft² building that was retrofitted in 1975 to utilize passive solar energy for approximately 25 percent of the building's space heating needs. The passive collection system consists of a staircase-like roof structure that reflects sunlight into the building according to the position of the sun.

Heat storage is provided by the floor and the east and west walls, all constructed of 12-inch thick concrete blocks. A major portion of the south wall consists of windows to provide a view, and to admit solar radiation directly on to the concrete walls and floor.

Partial summer cooling occurs as the overhead summer sunlight is reflected away from the roof. Heat is also absorbed by the concrete walls and floors. An oil-fired hot water system provides 100 percent of the domestic hot water needs of the school and back-up space heat during the Winter. The cost of constructing the special roof was similar to that of a conventional roof of comparable dimensions.

Category	Institutional
State	MA
Project Name	Passive School Retrofit
Organization	Cambridge School of Weston
Address	Lexington Street Weston, MA 02193
Contact	Norman Saunders
Telephone	(617) 893-5555
Funded By	n/a
Cost	n/a
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Attleboro Savings Bank has installed solar systems at a number of its branches. The latest is a hybrid system that integrates an active air and rock storage system with a passive design. The attractive arrangement of large glass windows over-looking a rock garden, and skylights above a brick wall provide additional heat retention as well as an aesthetic effect. The skylight is designed with light-and temperature-sensitive louvers that automatically open and shut. Nonetheless, sixty-six percent of the energy is lost, through building exits, with the result of increasing the payback rate to approximately 17 years.

Involvement with the housing market and concern for thrift affected the bank's decision to try a hands-on approach to solar, which has also benefited consumers. The bank would like to organize an information center, and is currently developing educational programs for the public.

Category	Institutional
State	MA
Project Name	Solar Bank
Organization	Attleboro Savings Bank
Address	Attleboro, MA 02703
Contact	John Wightman
Telephone	(617) 695-7197
Funded By	Private
Cost	Approximately \$13,000 to \$15,000 for solar
Congressional District	X
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Children's Hospital in Boston has installed solar collectors to provide 1,500 gallons of hot water per day. The system also preheats outside air, which is used for space heat.

It will take 8½ years for the system to pay for itself. Savings from last year were about \$7,000.

Category Institutional
State MA
Project Name Solar Children's Hospital

Organization Children's Hospital

Address 300 Longwood Drive
Boston, MA 02115

Contact Jim Menadue

Telephone (617) 734-6000

Funded By DOE for 79.6 percent of cost

Cost \$200,000

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Hampshire College, a small private school near Amherst has an Arts Village Complex of five buildings serviced by a passive and active solar system which provides space heating/cooling and hot water. The five buildings cover 53,800 sq. ft. of space, and house facilities for painting, music and dance, film and photography, and graphic arts and design. The complex was designed by faculty members.

Each of the buildings is single-story, 16 feet high, with eight foot earth berms at all outside walls. The berms deflect wind, insulate the walls of the structure, and insulate the 6,000 gallon hot and cold water storage tanks. The buildings are made of pre-engineered, pre-fabricated steel frame and skin structures for high-efficiency insulation. There are 10 inches of insulation in the ceilings, and 6 inches in the walls. The building has double entry doors at each entrance.

The 5,000 sq. ft. of collectors are used to form a continuous canopy, which connects the five buildings. Use of the canopy is an aesthetic breakthrough in solar energy inspired by some practical reasoning. By keeping the solar collector weight off the buildings and their roofs, no extra structural provisions had to be included in the design. The canopy also creates a courtyard for use as a recreational, social area. The collector be used effectively for year-round heating, ling and hot-water for the complex.

Category Institutional

State MA

Project Name Solar College
Complex

Organization Hampshire College
Arts Village
Complex

Address Shelburne Falls,
MA 01370

Contact Peter Gluckler

Telephone (413) 256-6400

Funded By DOE, HUD

Cost \$517,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Worcester Polytechnic Institute's Stoddard Hall, a combination dormitory and infirmary, has been retrofitted with 28 flat-plate solar collectors for domestic hot water heating. An electric hot water heater is used for back-up.

The school estimates it saves \$2,000 per year with the system.

Critique/analysis: Some problems with overheating and leaks still have to be worked out.

Category	Institutional
State	MA
Project Name	Solar Dormitory
Organization	Worcester Polytechnic Institute (WPI)
Address	Stoddard Hall, WPI Worcester, MA 01609
Contact	Edward N. Clarke
Telephone	(617) 753-1411 ext. 359
Funded By	\$20,000 HUD Grant \$18,820 WPI
Cost	\$39,350
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

St. Lukes is a 100-room complex that is receiving 44 percent of its hot water needs from solar heating. The hospital uses 36 collector panels to heat a 500-gallon system. A steam boiler is used for back-up.

The installed cost of the system was \$35,000.

Category Institutional
State MA
Project Name Solar Hospital

Organization St. Lukes Hospital

Address 52 Oak Street
Middleboro, MA
02346

Contact Allen DeHay

Telephone (617) 947-6000

Funded By Private

Cost \$35,000

Congressional District X

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Town of Concord has installed an air-type solar space heating system in its Municipal Light building. The system is retrofitted onto the one-story masonry block structure, which faces 14 degrees east of south. The building houses a garage, a warehouse and administrative facilities.

The first priority of the system is to heat 5700 sq. ft. of garage/warehouse area. Excess solar energy is used to heat the administrative area.

Critique/analysis: The purpose of this project is to demonstrate the feasibility of using air as a heat transfer medium in a large volume space heating application in the New England area. This method has proved successful.

Category Institutional

State MA

Project Name Space-heated Warehouse

Organization Town of Concord

Address Municipal Light Plant, Keyes Rd., Concord, MA 01742

Contact David Hardwell

Telephone (617) 369-8381

Funded By National Science Foundation/DOE

Cost n/a

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Property Tax Abatement - Massachusetts has a property tax abatement for solar home heating equipment. Property taxes on solar energy equipment commonly increase the annual expense of the equipment by approximately 50 percent. This increased cost can be a major economic obstacle. Hence, solar energy use will be limited where property tax abatement is not adopted.

Passage of the property tax exemption (Chapter 734, Acts of 1975) has provided an impetus to solar development in the state. The true cost of the program is very small.

Sales Tax Abatement-Sales tax abatement has also been adopted in Massachusetts. The economic disincentive of sales tax is significantly smaller than property tax, since it is paid once rather than annually.

Solar Income Tax Credit-Any owner of residential property located in Massachusetts who occupies the property as a principal residence is allowed a tax credit of 35 percent or \$1000, whichever is less, upon purchase of solar or wind systems. The credit is taken on the cost that results after federal tax credits and any grants received have been subtracted from the original cost.

Low Interest Loans-A number of Massachusetts banks and credit unions are authorized to make loans with increased maturation and amount limits.

Corporate Tax Deduction-Any Massachusetts business that installs solar energy equipment can deduct the entire cost of their system against their state tax liability.

Category: Legislation

State: MA

Project Name: Legislation in Massachusetts Summary

Organization: Massachusetts Office of Energy Resources

Address: 73 Tremont St., Boston, MA 02108

Contact: Frank DeRosa

Telephone: (617) 727-4732

Funded By: n/a

Cost: n/a

Congressional District: VIII

Compilation Date: February 1980

New Invention Exemption-Any new invention promoting energy conservation or alternative energy systems shall be exempted from tax payments on royalties for five years.

Life-Cycle Costing-The legislation requires state and local governments to consider using alternative energy systems in the design of all new public buildings.

Renewable Resources— A National Catalog of Model Projects

The Cordwood Project is a CETA-funded energy and economic development project of the Franklin County Action Corporation. The project will assist the development of a fuel wood industry in Franklin County by promoting wood management, a wood producer's coop and wood fuel use.

Forests cover 78 percent of the land in the county. However, most wood grown in the county decomposes on the forest floor.

Main activities of the Cordwood Project include:

- *Organizing a wood management program to provide healthier, more valuable forests;

- *Employing five people to cut diseased and inferior trees at Quabbin Reservoir. An estimated 700 cords of firewood will be distributed free to low income residents;

- *Developing a local wood cooperative to process and market firewood;

- *Investigating the use of firewood as a fuel for electrical generation; and

- *Publishing "Firewood Directory", a listing of cordwood dealers in Franklin County with information on wood use, safety and forest management.

Category	Low Income
State	MA
Project Name	Cordwood Project
Organization	Franklin County Action Corporation
Address	P.O. Box 148-G St., Turners Falls, MA 01376
Contact	Craig Stuart
Telephone	(413) 774-2318
Funded By	n/a
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Montachusets Opportunity Council (MOC), a federally designated anti-poverty program for North Central Mass., has designed and constructed a solar greenhouse for the Elderly Nutrition Program.

The greenhouse was constructed by CETA-employed youths with close attention paid to eliminating architectural barriers to the handicapped. It includes water and rock heat storage systems, as well as a wood stove for back-up. The greenhouse has doubled glazed transparent walls. Six-inch foil-faced fiberglass provides insulation on non-transparent walls.

MOC also coordinates a low-cost storm window program. MOC manufactures its own storm window that fits over window frames rather than in them. The window is sold at cost to agencies that provide weatherization for the poor. MOC estimates savings of \$5-7/year in heating costs per window.

Category Low Income
State MA
Project Name Low Income Greenhouse & Storm Windows

Organization Montachusets Opportunity Council

Address P.O. Box 576
305 Whitney St.,
Leominster, MA
01453

Contact Rhonda Flack

Telephone (617) 537-9126

Funded By Community Services Administration

Cost \$27,172

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A community greenhouse has provided job experience in solar installation and gardening for low income, unemployed youth in Boston.

The Southwest Corridor is a three mile strip of land which runs through the neighborhoods of Roxbury, Jamaica Plain and the South End. Community protest stopped the proposed construction of a highway on the land.

Here a 20' x 40' greenhouse was built from recycled materials. Later the Greater Roxbury Improvement Program (GRIP) solarized the greenhouse by adding drums of water for heat storage and a second layer of glazing.

Critique/analysis: Vandalism has been something of a problem to this urban-situated greenhouse. However, repair of structural damage and renovations of the greenhouse (especially in the heat-storage system) have been made possible by a HUD grant for youth employment and by the Northeast Solar Energy Center (NESEC).

Category Low Income
State MA
Project Name Southwest Community Corridor Farm

Organization Southwest Community Corridor Farm

Address 46 Chestnut St.
Jamaica Plain, MA
02118

Contact Chris Bailey
Sue Naimark

Telephone (617) 445-4242
(617) 522-1259

Funded By NESEC, HUD, Community Development Block Grant, CETA

Cost n/a

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Worcester Labor Coop will provide and install free window box solar collectors to low income families in the community. The Coop provides free labor in areas such as plumbing, wiring, and carpentry repairs. Its eighteen-member staff is funded by several sources, including DOE, the city of Worcester, and CETA. To qualify for coop programs, a resident must have an income of less than \$4,000, not including up to an additional \$1,500 for each family member.

A \$16,000 grant from the DOE will enable the Coop to install solar window box heaters in the homes of elderly and low-income families that qualify under the income guidelines. It is estimated that in an average year these solar boxes will reduce the cost of heating a house by 20 to 30 percent. The cost is about \$250 for materials.

The solar window box is a simple device installed on the southern side of the house. The 8' x 5' unit intersects the ground at a 45-degree angle.

The sun heats the air in the solar box to about 110 degrees. This air is released into the house to heat most of the first floor rooms. Cooler air is then circulated through a grate in the floor and recycled into the cellar. This cooler air (about 40 degrees) will then re-enter the box from another vent to be reheated in the solar box.

Critique/analysis: The system works best in the late winter and early spring. During sunny daylight hours, with an outside temperature of 10 degrees F., the box will provide all the heat necessary for a typical Cape-style house. The boxes do not work well during the cloudier months of November and December.

Category	Low Income
State	MA
Project Name	Window Box Program
Organization	Worcester Labor Coop
Address	2 Ellsworth St., Worcester, MA 01610
Contact	Edward Goggins
Telephone	(617) 757-2238
Funded By	CETA, DOE and City
Cost	\$16,000 or \$250 per box
Congressional District	III
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Center for Ecological Technology (CET) is a non-profit organization in Berkshire County dealing with energy conservation, renewable resources, energy management and local energy planning. CET conducts demonstration projects, produces educational publications, maintains a telephone hot-line, offers community energy workshops, administers weatherization programs for low-income and elderly County residents, and provides technical assistance to individuals, organizations, and communities.

Category Outreach
State MA
Project Name Center for Ecological Technology

Organization Center for Ecological Technology

Address 74 North Street
Room 617
Pittsfield, MA
01201

Contact n/a

Telephone (413) 445-4556

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

NEAT-NET is a non-profit, tax-exempt educational organization established to advocate and implement appropriate technologies in energy, agriculture, and community economic development in the northeast U.S.

NEAT-NET is the publisher of New Roots magazine, an appropriate technology journal for the Northeast. The magazine covers renewable energy activities, sustainable agriculture, urban/rural programs, health, women's culture, book reviews, and more.

NEAT-NET also houses the Valley Solar Center, a collection of books, periodicals, and other reference material on all aspects of appropriate technology. The Center is open to the public.

NEAT-NET sponsors the Franklin County Energy Project, a community energy-planning and development effort for rural Franklin County.

Category Outreach

State MA

Project Name NEAT-NET

Organization Northeast Appropriate Technology Network, Inc. (NEAT-NET)

Address Box 548
Greenfield, MA 01302

Contact Mark Cherniack

Telephone (413) 774-2257

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Urban Solar Energy Association (USEA) is a non-profit organization to promote conservation and renewable energy. USEA's special interests include urban application, retrofits, low cost and low technology systems, and development and dissemination of practical, hands-on information and activities at the neighborhood and community levels. (Especially those oriented towards low income urban residents and groups.)

In less than six months of existence, USEA has grown to over 260 members and has an impressive track record. The organization has distributed over 1,500 copies of a highly praised monthly newsletter; sponsored three solar greenhouse "barnraisings", involving over 70 people; compiled and distributed literature on low-cost solar retrofitting techniques; and has presented a slide show to 15 organizations. USEA's members have appeared on five radio and television appearances, and in several newspaper and magazine articles. Other public presentations include booths at energy fairs, a series of hands-on workshops in building low-cost solar rooms and greenhouses. USEA has also developed a monitoring program to document the performance of local solar installations.

In addition, USEA has provided organizational assistance, consulting, and networking contacts to a variety of local groups in Somerville, Cambridge, Allston and Dorchester. These groups are developing their own renewable energy activities. Free technical assistance has been provided to neighborhood groups in Roxbury and the South End.

USEA is now seeking non-profit status, and plans to hire permanent staff, to acquire an office, and to develop and/to fund more projects.

table
Category	Outreach
State	MA
Project Name	Urban Solar Energy Assoc.

table
Organization	Urban Solar Energy Association
Address	21 Burnside Ave., Somerville, MA 02143
Contact	Barbara Brandt
Telephone	(617) 628-5558

table
Funded By	Membership dues, seeking grants
Cost	n/a
Congressional District	VIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Massachusetts Office of Energy Resources, established in 1974, has made energy conservation the cornerstone of the Commonwealth's energy program. Educational programs, state building audits, financing, and solar options are all offered by the Office.

The Energy Office Extension Service technical teams perform audits on state buildings. The resulting conservation programs have already achieved a 20 percent savings in state-building energy use.

The Office's outreach division helps residential energy users cut fuel bills through public education campaigns, including its toll-free Energy Phone. The service is available seven days a week, including holidays, from 9 a.m. to 9 p.m.

The Office Program and Policy Development hosts several projects including a pilot urban consumer program; low-interest loans for home weatherization; public housing; MASSPOOL, a carpool/vanpool program; waste oil recovery and re-use; solar development; implementation of new thermal and lighting standards; development of insulation standards; and consumer education on proper use and installation of wood stoves.

The Office of Energy Resources sponsors a hands-on workshop on solar greenhouses. Led by members of the Conservation and Solar Division, approximately 30 participants learn how to build a solar greenhouse. A volunteer provides the building site and materials (between \$1,000 and \$2,000 depending on the greenhouse design). The 3-day workshop includes a one-day seminar of slide shows, lectures and demonstrations, and two days of actual solar greenhouse construction. A follow-up workshop is given in horticultural work.

Category	State
State	MA
Project Name	MA State Energy Office
Organization	Mass. Office of Energy Resources
Address	73 Tremont St., Boston, MA 02108
Contact	Frank DeRosa
Telephone	(617) 727-4732
Funded By	State
Cost	n/a
Congressional District	State-wide
Compilation Date	February 1980

NEW HAMPSHIRE

1. Claremont
2. Concord
3. Dicksville Notch
4. Dover
5. Durham
6. Franconia
7. Harrisville
8. Littleton
9. Manchester
10. West Lebanon

NEW HAMPSHIRE

TABLE OF CONTENTS

Commercial

Bethlehem Mink Farm Hydro Project	1
Passive Solar Warehouse	2

Community

Claremont Energy Project	3
Friends Organizing for Ongoing Development	4
North County Wood Coop	5
Salmon Falls Hydropower Association	6
SUEDE	7
Tillotson Rubber Co-generation	9

Education

New Hampshire Times	10
New Horizons for New Hampshire	11
Shugah River Energy Alliance	12

Legislation

Small-scale Electric Generation Plants	13
--	----

Outreach

New Hampshire Energy Coalition	15
TEA Energy Project	16

State

Resource Policy Center	17
------------------------------	----

Utility

Wood-powered Utility	18
----------------------------	----

Renewable Resources— A National Catalog of Model Projects

The Bethlehem Mink Farm (BMF) is studying the feasibility of re-activating a retired dam to power a Controlled Environment Agriculture (CEA) project.

BMF raises veal calves and operates a refrigerated warehouse, along with a variety of other commercial activities. The dam feasibility study concluded that a 750 KW installation would be most economically feasible.

The dam would greatly exceed the current electricity need on the site; therefore, the Mink Farm might be able to use the remaining power to extend the growing season in a self-contained agricultural system. A number of abandoned masonry buildings on the property could be converted to passive solar structures. The buildings would possibly house an integrated biological system of fish (probably tilapia or other warm-water species), vegetable production, maple syrup production, and some food drying and/or canning operations. The food produced would be marketed locally.

A preliminary study indicated that approximately 590,000 lbs. of lettuce and 282,000 lbs. of tomatoes could be produced yearly. However, a comprehensive feasibility study must be conducted to investigate the commercial viability of the CEA.

itique/analysis: Funding for the CEA and for the dam re-activation must be found in order for the project to proceed.

Category	Commercial
State	NH
Project Name	Bethlehem Mink Farm Hydro Project
Organization	Bethlehem Mink Farm
Address	Box 348 Littleton, NH 03561
Contact	Richard Polonsky
Telephone	(603) 444-2453
Funded By	DOE (feasibility study)
Cost	\$29,000 (feasibility study) \$828,000 (dam project)
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Many warehouses in the United States, with millions of square feet consuming energy for space heating, are excellent candidates for retrofitting with passive solar heating systems. The Kalwall Corporation realized this fact and decided to utilize its warehouse's large walls, one of which faces south, and thermal mass, to retrofit their building with a passive solar system.

The Kalwall Corporation of Manchester, New Hampshire, installed on a 10,000 square foot section of its solar components division warehouse a direct-gain passive solar system designed to entail low initial and life-cycle costs. The object was to gain information on the operational and maintenance costs of such a system. The project was undertaken early in 1977 under a cost-sharing contract with the Department of Energy.

The 20-year-old building received a heavy dose of insulation in preparation for the solar retrofit. The solar 1750 square foot window system installed in place of the south wall has a solar energy transmission rate of 77 percent and an R-value of 2.44. Thermal storage is provided by a black-painted concrete floor slab and by the inventory.

Five 24-inch diameter fans controlled by thermostats were installed along the south wall, with their air flows directed toward the north wall. When the air temperature at ceiling height reaches 85 degrees F or higher, the fans distribute the heat throughout the warehouse to be absorbed by the thermal mass storage to help maintain the minimum temperature of 45 degrees F. Two hot water fan heaters provide auxiliary heat during periods of prolonged cloudiness and as needed at night.

After three winters of use, Kalwall has deemed the direct gain passive system a success. The system has met the goals of low initial costs and low operating costs. It is supplying 55

Category Commercial

State NH

Project Name Passive Solar Warehouse

Organization Kalwall Corporation
Solar Components

Address P.O. Box 237
88 Pine Street
Manchester, NH 03105

Contact Tom Child
Scott Keller

Telephone (603) 668-8186

Funded By Cost-sharing contract
ERDA (DOE)

Cost n/a

Congressional District II

Compilation Date February 1980

percent of the heating requirements of the warehouse space for an estimated savings of 270 million BTUs per year. In the summer, roof overhangs and open doors provide "passive cooling."

Renewable Resources— A National Catalog of Model Projects

The Claremont Energy Project provides energy education to Claremont and the surrounding Western New Hampshire area. Since its beginning in 1978, the five-person staff and volunteers have increased awareness of local energy resources through a variety of projects. A slide show and talk on local solar energy technology is widely shown in the public schools and has become a part of course curriculum in the Claremont school system.

Last year the Project conducted a study on the hydroelectrical potential of the Shugah River (which runs through Claremont), including a dam-site inventory and a history of local mills. Presently the City of Claremont and a local electrical utility are considering revitalizing several Shugah River hydro dams. Additional projects include free home energy audits by trained staff, a heating-with-wood manual published through the city building inspector's office (5,000 free copies distributed), and a recycling center for glass (sold to Boston for road aggregate), paper (collected by a local paper mill), and aluminum (used by Reynolds Aluminum, which is donating a trailer).

Project decisions are reached either democratically or through arm-wrestling—usually the former. Steady funding is the Project's major problem. Also, the CETA program provides funding only for salaries. All office expenses (rent, phone, travel, materials, etc.) are donated by the staff.

p>Category Community
State NH
Project Name Claremont Energy Project

p>Organization Claremont Energy Project
Address 31 Pleasant Street
Claremont, NH 03743
Contact Connor Everts
Telephone (603) 543-0300

p>Funded By CETA (Department of Labor)
Cost \$40,000 annually (salary)
Congressional District II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Friends Organizing for Ongoing Development operates community gardens, a meat-purchasing cooperative, craft programs, and a firewood cooperative in West Lebanon, NH. The firewood coop is in its third season of providing fuelwood to its members in exchange for labor. In its first year the coop's 25 member families produced 100 cords. Last year 48 families worked up 225 cords.

Throughout the year the coop purchases firewood in log length from landowners at \$25 per cord. The harvesting begins in December, when logs are skidded from the woods on frozen, snow-covered terrain. In early summer, coop members work the wood into four-foot lengths, which are then trucked to member families and customers. A portion of the wood is sold on the open market at \$65 per cord, which allows the members to get their wood at no cost (sweat equity).

The coop is run by a part-time manager who is responsible to FOOD's Board of Directors. In spite of apparent success, running a firewood coop is difficult. There is the complicated task of coordinating work sessions with a large membership. Another complication concerns members who put in time at work sessions but provide minimal labor (shoot-the-bull equity). These problems might be ironed out with the hiring of a full-time manager, but no funds are available to support such a position.

Critique/analysis: The present part-time manager claims that doing hard work in a cooperative spirit is not easy. "Many groups have contacted the coop with thoughts of duplicating the project. So far, none have. There is no substitute for the hard work needed to run the operation. But as with any worthwhile task, the hard work has paid off."

Category	Community
State	NH
Project Name	Friends Organizing for Ongoing Development

Organization	Friends Organizing for Ongoing Development (FOOD, Inc.)
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Address	Firewood Cooperative 8 Prospect Street West Lebanon, NH 03784
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Contact	Roger Plant
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Telephone	(603) 298-8530
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Funded By	Internal
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Cost	n/a
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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 North Country Wood Co-op began as a church project in Franconia, New Hampshire, in 1977. The co-op obtains wood donated by wood-lot thinning operations and distributes it on Saturday mornings.

Members who meet Federal low-income criteria exchange ten hours of work per delivered cord of firewood. People who can't perform wood-handling labor are allowed to do other cash-earning tasks such as selling goods.

Co-op members whose incomes are higher must pay \$5 per cord for a household income in excess of low-income standards.

The co-op delivered 80 cords of wood to 35 households during 1979. It is anticipating the delivery of 150 cords to fifty households in 1980.

Category	Community
State	NH
Project Name	North Country Wood Co-op
Organization	Community Church of Christ
Address	Franconia, NH 03580
Contact	Rev. Bill Briggs
Telephone	(603) 832-8405
Funded By	North Country Wood Co-op
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Salmon Falls Hydropower Association is an independent organization whose members own or have interest in small hydro sites along the Salmon Falls River in the eastern part of New Hampshire. Its goals are to generate revenue from the sale of power to utilities, to produce power for on-site consumption, to increase or stabilize local property tax bases through hydro development, and generally to help support industrial development.

More specifically, the Association plans to facilitate communication and negotiation among members and work to reduce costs, facilitate the regulatory process, and maximize efficiency.

Membership in the Salmon Falls Hydropower Association does not imply any contractual obligations, but allows for participation in what is hoped will become an effort to develop the entire river basin. The member towns, cities, and private businesses receive organizational support from the Strafford Regional Planning Commission and technical assistance from the Center for Industrial and Institutional Development at the University of New Hampshire. Private utilities and state agencies are also involved in a less formal, advisory capacity.

At present, three dams on the river are generating power, and the Association is interested in conducting feasibility studies on six more. The estimated power potential from all nine sites is 18 megawatts of installed capacity (there is more total potential for the entire river). If the river basin can be developed as a whole, then each increment of hydropower can be used with maximum efficiency. The Association hopes to interest the Department of Energy in a total development project as a national model.

Category Community
State NH
Project Name Salmon Falls
Hydropower Association

Organization Salmon Falls Hydropower Association

Address Strafford Regional
Planning Commission
90 Washington St.
Dover, NH 03820

Contact Gary Mongeon

Telephone (603) 742-2523

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Project SUEDE is a joint project of four organizations in New Hampshire and Massachusetts. It was established to help unemployed persons develop conservation- and solar-related skills which they will use to install passive solar retrofits on low-income housing. The funding provides for all planning, administration, labor, materials, and other costs needed to train ten salaried persons and retrofit some thirty homes in the state.

The New Hampshire SUEDE Program started out with ten trainees: four women, one Native American, two people on work-release from the county jail, and three other unemployed people. Some trainees had college degrees. The training program focused on basic skills such as carpentry, foundation building, glazing, performing energy audits, and so on.

Three basic types of solar retrofits were developed as part of the SUEDE effort: greenhouses, thermosiphoning air panels (TAPs), and a simple air collector. Installations were made on the homes of Hillsborough County residents who met the Community Services Program's income guidelines (in which the poverty line is slightly higher than Federally set poverty levels), as long as they were already weatherized and properly orientated. Project administrators have reportedly been particularly pleased with the ease of installation and the economics of the simple thermosiphoning (TAP) systems.

Installation costs for a single unit are about \$150-\$160. The rising price of fuel has improved the payback period, which ranges from three to five years at many sites. TAP installations, which should last as long as any window, have done much to convince the public that solar is an affordable option.

Category	Community
State	NH
Project Name	SUEDE
Organization	*Southwestern New Hampshire Services
Address	Box 5045 Manchester, NH 03108
Contact	Dick Howe
Telephone	(603) 668-8010
Funded By	Labor, DOE, CSA
Cost	\$275,000 NH share
Congressional District	II
Compilation Date	February 1980

Critique/analysis: An important aspect of SUEDE has been the operating philosophy behind the project. Heavy emphasis was placed on involving homeowners in understanding and making decisions about installations. A major goal in making installations was to provide residents with "warm zones" so that even if most of the house remains unheated, they can make it through the winter. While this concept may seem extreme, in New Hampshire energy costs have become a survival issue for the poor (especially the elderly poor). Aesthetic considerations also received much attention and special effort was made to design quality installations as an integral part of a home.

*Total Environmental Action Foundation
Church Hill
Harrisville, NH 03450

Contact: William Frye
(603) 827-3374

Renewable Resources— A National Catalog of Model Projects

Category Community
State NH
Project Name Tillotson Rubber
Co-generation

Organization Tillotson Rubber Co.

Address Dixville Notch, NH

Contact Tom Tillotson

Telephone (603) 255-3161

Funded By Private Sources of
Capital

Cost \$900,000

Congressional District II

Compilation Date February 1980

In Dixville Notch, a town of 28 people tucked away in the White Mountains of New Hampshire, the Tillotson Rubber Company now uses wood to generate all of the heat the town uses and a portion of its electricity.

The town used to heat totally with fuel oil. After the 1973 oil embargo, heating costs skyrocketed and electric rates continued to climb, so a study was initiated by Tillotson Rubber to find alternative energy sources to supply the town's needs. An abandoned hydro system was restored and is currently supplying 500,000 kilowatt hours of power per year.

In the fall of 1977, construction of a steam and electricity cogeneration plant fueled by waste wood was begun at the rubber company, the town's only manufacturing industry. The plant cost \$900,000. After a year of operation, Tom Tillotson estimates the payback at 10 years. The cogeneration plant uses a wood-fired boiler that produces steam to drive turbine generators that in turn produce electricity. The waste steam from electrical production is then used for district heating and process steam.

The new plant is supplying a substantial part of Dixville's energy. In August 1979, 51,000 gallons of oil were saved by burning wood. This is a 90 percent reduction in fuel oil use. An added benefit were the eight jobs created with the switch to wood energy.

According to Mr. Tillotson, financing was the biggest stumbling block. What Tillotson settled on was a bank loan with collateral backing and internal financing.

In some respects, the situation in Dixville Notch is unique. The Tillotson family virtually owns the entire town and all energy planning was carried out by the rubber company. Although the energy system is sophisticated, complex, and based

on centralized decision-making, it does use local labor and resources to provide local energy self-reliance.

Critique/analysis: Presently there are some bugs to work out of the electrical generating system. The system is sized to provide all of Dixville's electricity, but it now produces only a portion of what is needed. The full capacity should develop over time.

Renewable Resources— A National Catalog of Model Projects

Every week, the latest word on an innovative wood stove, a controversial small hydro project, the safety of foam insulation, and other important or just-plain-interesting news concerning conservation and renewable energy reaches some 20,000 readers in New Hampshire. With no outside funding, the New Hampshire Times, the state's most popular weekly news magazine, has effectively disseminated information and raised critical questions about renewable energy.

The New Hampshire Times is not an energy journal, but it gives attention to innovative and creative activity of social concern, such as family agriculture, small-scale business activity, do-it-yourself projects, environmental quality, and so on. The most popular single issue of the New Hampshire Times for the past few years has been a special on wood. Covering everything from woodlot management to the energy content of different tree species to stove efficiency, this special has deservedly developed a national reputation. One town in Massachusetts even requested copies in bulk for general distribution to its residents. Because its pages have come to focus more and more on solar design and construction, the Times will be issuing the first of its annual solar editions this year.

Who reads the New Hampshire Times? Statistics show that Times readers (86 percent of whom have college degrees) include legislators, government officials, town selectmen, professionals, environmentalists, and many other people active in their communities and in the state. Because of this, the Times has been able to publish detailed, extensive articles that have had an impact on policy-makers, investors, and other major decision-makers.

Category Education
State NH
Project Name New Hampshire Times

Organization The New Hampshire Times, Inc.
Address 20 Montgomery Street
Concord, NH 03301
Contact Richard Wright
Editor
Telephone (603) 224-9100

Funded By Subscriptions and Advertising
Cost -
Congressional District I and II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State NH
Project Name New Horizons for
New Hampshire

New Horizons for New Hampshire, Inc., a non-profit group that assists low-income people in developing self-help skills, is sponsoring a program to build 12 to 21 greenhouses in community workshops.

Working with Environmental Service Project, a community group providing the technical skills, New Horizons will teach community participants standard construction and passive solar design techniques for greenhouses.

The group hopes that solar greenhouses utilized in homes and public buildings throughout the community will demonstrate the viability of solar energy in the northern climate. In addition, New Horizons hopes people who have participated in the construction will share their skills with others.

The major strategies of the project include community workshops to maximize public exposure and minimize construction costs; extensive follow-up on food growing techniques; and development of a greenhouse-owner's network to share experiences and ideas.

In-state consultants already experienced in solar design, construction workshops and greenhouse management will work on the program. All greenhouses will be monitored to accumulate performance data.

By the end of the grant period, New Horizons expects that fees for design work and workshops, membership dues, and newsletter subscriptions will help those involved establish a cooperative, commercial, self-funding venture.

Critique/analysis: Coordination between two separate community groups and a government agency was logistically difficult and time consuming.

Organization New Horizons for
New Hampshire, Inc.

Address 434 Union Street
Manchester
NH 03103

Contact Ruth Sourdif

Telephone (603) 669-2435

Funded By DOE, Small Grants
Program

Cost \$16,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Shugah River Energy Alliance (SREA) is a loosely knit group of residents in the Claremont area who are dedicated to developing regional self-reliance through use of local, renewable energy sources and energy conservation. SREA sponsors a variety of energy-education projects, such as county fair booths, a bi-monthly newsletter and the Speaker's Forum, which has been the most effective. Over the past three years, 24 Forums have taken place at Claremont's Fiske Free Library. Topics included "Regional Self-Reliance," "Hydropower," "Windmills," and "Economics of Energy."

Two three-part forums, "Feasibility of Regional Firewood Use," and "Feasibility of Solar Hot Water Heaters," led to the creation of community energy projects. The Tall Trees Firewood Cooperative provided wood to 35 families.

For its first year of operation, over 150 people attended the solar hot water forums. Several of them formed an organization to build solar hot water systems. (Collector plans have been selected and work space donated by the NH Vocational Technical College in Claremont.)

The success of Shugah River events is based on good planning. Evening programs early in the week draw the largest crowds. All forums are publicized through posters, press releases, radio public service announcements, and word of mouth. Speakers are chosen for their knowledge of the subject matter and ability to speak. Refreshments are part of the draw.

Category	Education
State	NH
Project Name	Shugah River Energy Alliance
Organization	Shugah River Energy Alliance
Address	Box 920 Claremont, NH 03743
Contact	Brian Pinkson
Telephone	n/a
Funded By	Internal
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Two pieces of landmark legislation regarding small-scale power production have placed New Hampshire among the top states in support of renewable energy.

The first bill, The Limited Electrical Energy Producers Act (NH RSA 362-A), accomplished three things. First, it exempted power producers whose fuel sources are non-nuclear and non-fossil and whose installations are smaller than five megawatts in capacity from classification and regulation as public utilities. Second, it mandated that the public utility, in whose franchise exempted small producers are located, must buy all the power from a site if it is offered for sale. Third, it left a decision on rates for the purchase of power up to the NH Public Utilities Commission.

Eight months after the law went into effect, the Public Utilities Commission set what many consider to be a moderately encouraging rate of 4¢/KWH for nondependable capacity and 9.5¢/KWH for dependable capacity, from small-scale hydro sites. This rate will be reviewed periodically.

The second bill amended the first, opening a crack in the monopoly maintained by electric utilities by allowing for the direct retail sale of power. Leaving certain discretionary authority concerning equity and the public good to the Public Utilities Commission, the bill allows producers of limited amounts of electricity to sell their power to a maximum of three (non-utility) purchasers and mandates that the utility transmit the power from the point of production to a private buyer, with a PUC-approved charge for transmission.

This amendment may prove very encouraging to producers who are willing to negotiate competitive, long-term contracts with buyers.

p>Category Legislation
State NH
Project Name Small-scale Electric
Generation Plants

p>Organization NH Governor's Council
on Energy

p>Address 2 1/2 Beacon Street
Concord, NH 03301

p>Contact Paul Ambrosino

p>Telephone (603) 271-2711

p>Funded By n/a

p>Cost n/a

p>Congressional District I & II

p>Compilation Date February 1980

It is important to note that while these laws were spurred by interest in small-scale hydro-electric power, they may well turn out to be quite relevant to power from wind, wood, other biomass, and eventually even photovoltaics.

Some potential difficulties presented by the legislation as it now stands will likely have to be resolved by the PUC unless more laws are passed. In particular, no specific provisions were made for dealing with the problems of sale of surplus electricity from a small producer, or for provision of back-up power from a utility. These considerations may be very important when onsite use is considered. Second, the distinction between dependable and non-dependable power is not clear enough. This is a crucial difference since .5¢/KWH can add up significantly in figuring revenue generated from a site.

Renewable Resources— A National Catalog of Model Projects

Late in 1978, a group of people concerned about the state's relatively untapped renewable energy potential formed the New Hampshire Energy Coalition.

The Coalition's first major project was to research New Hampshire's renewable energy resource base. The assessment covered the potentials of solar heating, photovoltaics, wood, solid waste, and hydroelectric power. Although still in draft form, the study is the most comprehensive account of the state's resources that has ever been conducted. Work has also begun researching energy conservation.

The Coalition next sponsored the state's sole independent computer-based electrical load forecast. The resulting projection unfortunately did not include an analysis of how growth in demand would be affected by policies encouraging conservation or renewable energy development. What it did show, however, was an annual peak load growth rate of 2.9 percent over the next 20 years, compared to the utility's projection of 7.6 percent annually for the same period.

In another project, the Coalition, working together with the Committee for Renewable Energy Education, developed a brochure designed to counter the groups' belief that local school children were receiving a one-sided assessment of energy issues. The publication outlined resource organizations throughout the state that would provide speakers, audio-visual materials, and field trips.

The Coalition also produced a slide show on the state's conservation and renewable energy potential designed to complement the renewable energy study as a popular educational tool. The show was funded by a \$500 grant from DOE's Appropriate Technology Small Grants Program, and covers the state's energy history, its present energy status, and its dependence on central electrical facilities.

Category	Outreach
State	NH
Project Name	New Hampshire Energy Coalition
Organization	New Hampshire Energy Coalition
Address	Post Office Box 4545 Manchester, NH 03180
Contact	Dick Lewis
Telephone	(603) 431-5089
Funded By	Dues, private loans
Cost	n/a
Congressional District	I & II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Total Environmental Action, Inc. (TEA) is an organization that seeks to improve the quality of life by helping individuals become more self-sufficient.

TEA has offered workshops in renewable energy since 1974. The 1- to 5-day sessions address a variety of energy-related topics, including attached solar greenhouse construction, earth-sheltered housing, residential energy conservation, passive solar building design, energy education, and wind and water power.

Other programs offered by TEA include energy design, energy-related consulting, and information services.

Category	Outreach
State	NH
Project Name	TEA Energy Projects
Organization	Total Environmental Action, Inc.
Address	24 Church Hill Harrisville, NH 03450
Contact	Bill Whyte
Telephone	(603) 827-3374
Funded By	n/a
Cost	n/a
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Dartmouth Resource Policy Center carries out long-term research concerning renewable resources. Its role is to provide analysis of resource issues for decision-makers in Vermont and New Hampshire.

The Center conducted a feasibility study on the construction of a large wood-fired power plant in north-central Vermont. The study takes into account the wood resources needed to run such a plant and also the optimal siting characteristics.

A Center study for the Vermont Department of Forests and Parks is now being conducted to determine the impacts of extensive wood harvesting. The report (expected to be completed in 1980) will present various technical, managerial, and regulatory options for Vermont to consider in order to minimize the environmental and economic impact of increased wood harvesting and new technologies such as whole-tree harvesting for wood chips.

The New England Sustainable Energy Project which was recently begun will inventory all available renewable natural resources that could be used for energy production in New England.

Category State

State NH

Project Name Resource Policy Center

Organization Resource Policy Center

Address Thayer School of Engineering
Dartmouth College
Hanover, NH 03755

Contact Dennis Meadows
Colin High

Telephone (603) 646-3551

Funded By Economic Development
Agency / VT Department of Forests and
Parks / Solar Energy
Research Institute

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Concord Steam Company, a private utility in Concord, New Hampshire, provides district heat to 125 state, commercial and industrial customers in the city's downtown area. Until November of 1978, the company's only fuel was #6 oil. Now, 15 percent of its yearly fuel supply is sawdust obtained from local sawmills. Steam heat from sawdust can be produced at a barrel-of-oil-equivalent price of \$14.

During the past year, Concord Steam's use of sawdust has displaced over 6,000 barrels of oil. Cost savings have been passed on to customers, two additional jobs have been created at the plant, and more jobs were created in the transportation of sawdust.

Within the next year, Concord Steam plans to move its operations to a larger plant with quadruple the steam load. Current plans call for 75 percent of the fuel supply to come from sawdust, other wood wastes, shredded tires, and possibly municipal waste.

Since the company's switch to sawdust, a textile mill in Maine and a paper mill in Vermont have undergone similar conversions from fossil fuel to wood. Such switches, however, are not without costs. Mr. Bloomfield, an experienced engineer, explained that the burning of solid materials is not as simple as burning oil. In particular, its use involves much more wear on equipment.

Critique/analysis: Mr. Bloomfield was surprised that Concord Steam was considered a Model Project. "What's the big deal about burning wood? Industries have used wood energy for years! Our switch to wood was strictly for economic reasons."

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Category	Utility
State	NH
Project Name	Wood-powered Utility

Organization	Concord Steam Comp
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Address	Ward Street Concord, NH 03301
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Contact	Roger Bloomfield
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Telephone	(603) 224-1461
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Funded By	Stockholders
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Cost	\$300,000
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Congressional District	II
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Compilation Date	February 1980
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NEW JERSEY

1. Basking Ridge
2. Bloomsbury
3. Branchville
4. Bricktown
5. Clarksboro
6. Dover
7. Glassboro
8. Mahwah
9. Mount Holly
10. Newark
11. New Brunswick
12. Nutley
13. Phillipsburg
14. Princeton
15. Toms River
16. Trenton
17. Vineland

NEW JERSEY

TABLE OF CONTENTS

Agricultural

Largest Totally Windmill-powered Farm in NJ	1
Rutgers University Solar Greenhouses	3

Cities

Tri-City Citizens Union for Progress	4
--	---

Commercial

Hoffmann-LaRoche Vanpooling Program	6
---	---

Community

Burlington County Solar Co-op I	8
Northwest NJ Community Action Program's Solar Trombe Wall	9
Rutgers University Recycling Program	10
Senior Citizens Solar Residence	12
Trombe Wall Retrofit on Salem County Farmworker's Home	13

Education

Alternative Energy Center	15
Glassboro State College Solar Curriculum	16
Ocean County Energy Council	17
Ocean County Vocational School's Solar Warehouse	18
Ocean County Vocational Technical High School	20
Princeton Education Center at Blairstown	21
Somerset County Environmental Education Center	23

Housing

Solar and Environmental Subdivision Developments	25
--	----

Industrial

CEA/OXY Resource Recovery Associates	27
Newark Recycling Program	28

Institutional

Environmental Education Center	30
The Ferry Street Foundation	31

NEW JERSEY
TABLE OF CONTENTS
PAGE 2

Outreach

Citizen's Energy Platform Task Force	33
Northwest NJ Community Action Program (NORWESCAP)	35

Utility

Public Service Electric & Gas Solar Water Heating Program	37
Using Waste Heat from Generating Units for Aquaculture	40
Waste Heat Agriculture Demonstration	42

Renewable Resources— A National Catalog of Model Projects

Construction consultant Robert Bellantoni and his firm have installed a 60-foot wind machine, reportedly the largest in New Jersey, on the 29-acre farm of Vito Maglio of Clarksboro, NJ. The windmill is expected to produce between 45,000 and 60,000 KWH annually. Mr. Maglio estimates that he needs only 20,000 kwh for his six-room home, and that the windmill will produce enough energy to power his farm. He is currently negotiating with Atlantic City Electric Company: he wants to sell it the surplus electricity and have it monitor the exact output of the windmill during 1980.

The steel windmill uses a 45-kw generator and is a tubular tower 36" in diameter. It has six aluminum blades. It operates at wind speeds from seven to twenty mph, past which it shuts down automatically to avoid wear and tear. There are eleven 12.5 volt industrial storage batteries, which Mr. Maglio expects will store the electricity he needs at least two days.

Although the windmill cost \$35,000, it will produce \$6,000 worth of electricity annually at current prices, paying for itself in just eight years. The windmill is expected to last 25 to 30 years with regular maintenance. The machine produces no radio or television interference since it turns slowly (60 rpm) and is relatively quiet.

Mr. Maglio has also built his own home with solar water- and space-heating system. He expects to put in an air cooling system this summer and solar heat and hot water systems in his workshop and the eight-apartment Victorian house on his property.

Category	Agricultural
State	NJ
Project Name	Largest Totally Windmill-powered Farm in NJ

Organization	Vito Maglio
Address	5 Curriden Avenue Clarksboro, NJ 08020
Contact	Vito Maglio
Telephone	(609) 423-5080

Funded By Private

Cost	\$35,000
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Congressional District T

Compilation Date February 1980

The Maglio wind machine serves not only as a practical source of power, but also as a teaching tool for those interested in wind energy. Every other week, Bob Bellantoni instructs Saturday courses that cost \$50 and generally attract from 12 to 20 people. Recently, 35 engineers from Atlantic City Electric Co. descended en masse upon Clarksboro to learn about wind power.

The future of wind power, according to Mr. Bellantoni, rests with the commercial and industrial sectors, in the 5-10 megawatt range. He hopes to install two other windmills by the end of 1980, including one that would power the Monmouth Museum at Brookdale Community College in Lincroft, NJ.

Critique/analysis: The high cost of wind machines such as Bellantoni's is one problem; it is available only to those persons or institutions that have the capital to purchase it. Another problem was that Mr. Maglio had to get a zoning variance to construct his 60-foot windmill. He sent letters to his neighbors telling them of his plans, and they were very enthusiastic. The variance was granted. In fact, a member of the local zoning board attended one of his Saturday sessions, as has a representative of the Atlantic City Electric Company.

Renewable Resources— A National Catalog of Model Projects

At the hands of Professor David Mears and students of Rutgers University's Department of Biology and Agricultural Engineering, four solar greenhouses have been built at the University. These greenhouses, built during the summer of 1976, utilize active solar systems, one of which is being tested for internal collection efficiency.

The liquid solar systems are comprised of several large, unattached collector panels. Heated water is pumped from these collectors to the greenhouses. The system provides for 30 percent of the greenhouses' heating needs.

The greenhouses were cheap (the collectors costing \$2.50 per square foot) and easy to construct.

In addition to the University greenhouses, Professor Mears and his students have worked cooperatively with a commercial grower in Allentown to partially solarize his greenhouse. About 1.25 acres of the 12-acre commercial greenhouse is solar-heated. The system used in this project is similar to those used at Rutgers.

Work-study students work in the greenhouses year-round, taking advantage of an excellent opportunity to witness agricultural applications of solar energy first hand.

Technique/analysis: The glazing material on the collectors degrades in the sunlight and must be replaced. However, this is still cheaper and more appropriate than using glass or some other expensive glazing material.

Reportedly, the greenhouses produce superior plants.

Category Agricultural
State NJ
Project Name Rutgers University
Solar Greenhouses

Organization Rutgers University
Address Dept. of Biological &
Agricultural Engineering
Rutgers University
New Brunswick, NJ 08903
Contact Prof. David Mears
Telephone (201) 932-9753

Funded By DOE, Rutgers
University

Cost \$6,000

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Cities
State NJ
Project Name Tri-City Citizens Union for Progress

The Tri-City Citizens' Union for Progress began in 1966 as a small organization of fewer than 10 volunteers, all concerned with cooperative housing management. Tri-City now has over 40 paid staff and numerous volunteers. Tri-City manages 65 buildings, 27 of which have been energy-audited by its staff.

In 1976, Tri-City received a \$15,000 grant from the New Jersey Department of Energy to perform audits of its buildings, install insulation, and make a film on energy-conservation measures for city dwellers. The film is now being used by the New Jersey Department of Energy.

Through a grant from the Victoria Foundation and assistance from D.C.'s Institute for Local Self-Reliance, an experimental solar hot water heater was installed in a three-family residence. The system, comprised of eight collector panels and two 75-gallon storage tanks satisfies 80 percent of the home's hot water needs. The grant covered the costs of training the local labor, and installing the equipment and purchasing raw materials for the system.

Tri-City has sponsored workshops on energy-conservation techniques and on the correct use of energy-conservation tools and equipment (including insulation and application techniques).

A CETA crew is involved in the rehabilitation of abandoned old buildings, two of which Tri-City has purchased. The unique feature of this program is that all work is done by the Tri-City staff and its renters. The program creates jobs in the local area, and workers are encouraged to take training in special fields with outside contractors. When subcontracting work is done, a staff member of Tri-City must be trained in this field.

Organization Tri-City Citizens Union for Progress
Address 675 South 19th Street
Newark, NJ 07103
Contact Rebecca Dogget Andrade
Telephone (201) 374-2717
Funded By State and Federal grants, private foundations and rentals
Cost \$1,000,000-annual budget
Congressional District X
Compilation Date February 1980

Critique/analysis: The program is excellent, but a restricted budget and slow government paperwork keep it from being as effective as it could be.

Renewable Resources— A National Catalog of Model Projects

Hoffmann-LaRoche, Inc., reportedly operates one of the state's largest and most effective vanpooling programs for its employees.

The Hoffmann-LaRoche program began in 1974 with three vans. It grew steadily until June of 1979, when the gas shortage brought unprecedented demand for vanpooling from employees. Now, 80 vans transport company employees to Nutley from as far away as Point Pleasant, NJ, and Brooklyn, NY. The program serves nearly 1,000 employees.

Employees, who want to start a vanpool, petition the company for a van. When the vanpool is approved, the company orders a 12-passenger van. One member of the pool is assigned to be the driver-coordinator and rides free. An alternate driver is also appointed. Depending on the miles traveled, each member of the pool is charged a fee ranging from \$1.22 to \$3.10 per day. A program administrator prepares an employee a schedule, plans routes, and estimates shared costs of the vanpool. The driver-coordinators log mileage and costs. They also are responsible for keeping more than eight passengers in the pool at any time.

The program has direct and indirect operating costs of \$171,200 and in 1978, generated revenues of \$111,050. In July of 1979, Hoffmann-LaRoche implemented an increase in fares; this was the third increase since the program began in 1974. It was instituted to keep company subsidy of the program at an acceptable level.

Category	Commercial
State	NJ
Project Name	Hoffmann-LaRoche Vanpooling Program
Organization	Hoffmann-LaRoche, Inc
Address	Nutley, NJ 07110
Contact	Gene Turkelson, or Rose Serafin, Public Affairs Dept.
Telephone	(201) 235-3315 x 4773
Funded By	Participants & Hoffmann-LaRoche, Inc.
Cost	\$171,200 (1978 FY)
Congressional District	XI
Compilation Date	February 1980

The company reports that demand for their very limited parking space has been cut considerably by the program. Employees report satisfaction in savings on gas and tolls and with the society that vanpooling provides. Other large corporate employers have followed Hoffmann-LaRoche's example. In addition, the New Jersey DOE has published two booklets, "Join A Union-Supported Vanpool" and "How To Organize A Vanpool." NJDOE also holds periodic seminars on organizing vanpools.

Critique/analysis: There have been some problems with vans breaking down, but the vans in reserve have proven adequate thus far. The program administrators attend NAVPO (National Association of Van-Pool Owners) seminars so they can continually refine and improve the program.

Renewable Resources— A National Catalog of Model Projects

In June of 1979, five families in the Burlington County area formed a solar cooperative. The objective was to pool their time, money and resources to buy and install solar hot water systems on their own homes. Neil Hatcher, of the Office of Appropriate Technology in Burlington County's Community Action Program, provided guidance and technical assistance. The families estimated that it would cost \$1,700 per family to install the systems. They purchased the five systems in bulk at a relatively low price.

The five systems were installed by the co-op over five weekends. The last system was installed at the end of November. By buying the systems in bulk and installing them themselves, the co-op saved about \$800 per system. Moreover, each of the families qualified for and received the \$400 HUD-sponsored rebate and will qualify for a \$490 federal tax credit on 1979's income tax return.

The system is an active closed-loop system with a glycol solution. Each home has an electric back-up heating system. According to Dan Rita, one of the homeowners, the co-op system worked very well, and the co-op members did a fine job of installing the systems. Mr. Rita expects the systems, comprising of two 3' x 8' collectors, to supply up to 60 percent of the homes' hot water needs. At this time, the one system being monitored has produced a 25 percent savings in the electric water heating bill.

Solar Co-op is considering beginning a co-op focusing on wind generation.

Critique/analysis: Despite frustrating delivery delays, the project functioned as a true co-op and saved the homeowners a considerable amount of money while providing them with a source of pride and self-sufficiency.

Category	Community
State	NJ
Project Name	Burlington County Solar Co-op I
Organization	Solar Co-op I
Address	30 Tinker Drive Mount Holly, NJ 08060
Contact	Dan Rita
Telephone	(609) 267-7258
Funded By	Private capital, sweat equity
Cost	\$8,500
Congressional District	IV and VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Community
State NJ
Project Name Northwest NJ Community Action Program's Solar Trombe Wall

Organization Marilyn Wickel
Address Route 579
Bloomsbury, NJ 08804
Contact Marilyn Wickel
or
Leroy Porter
Telephone (201) 479-6528

Funded By NORWESCAP Demonstration Project
Cost \$384
Congressional District XIII
Compilation Date February 1980

The Northwest New Jersey Community Action Program's Weatherization Project worked with residents of this two-family home to install a trombe wall. This project, which took place in 1976, was part of NORWESCAP's demonstration program to inform residents in Hunterdon, Sussex, and Warren counties about low-cost, efficient ways to save energy. NORWESCAP supplied some of the labor and the \$384 in materials to construct the wall. Residents supplied the rest of the labor.

The Trombe wall stands 18.5' x 37.5'. The glazing stands six inches away from the cinder-block and frame wall of the house. The exposed basement and first floor wall are of 8" thick cinderblock, painted black, and the second and third story are frame walls with 2 x 4 studs. The home is heated entirely by firewood, and the addition of the trombe wall has saved residents about one-third of the wood they previously needed to heat the home.

The wall remains in excellent shape. Relatively maintenance-free, it provides extra protection against the cold and wind when the sun is not shining, and it has made the basement a warm and liveable place.

Residents of this home are considering installing an active solar water heating system to provide a portion of their hot water needs.

Critique/analysis: The wall was cheap, quick to install, and saves the homeowners about one-third of their energy costs.

Renewable Resources— A National Catalog of Model Projects

Rutgers University Recycling Program is a joint program of Rutgers University and the City of New Brunswick. Started in 1970 by a small group of college students, it began with one recycling center, which was open on alternate Saturdays. The city cooperated by donating a site for the center and use of trucks to haul the material. The operation has since been expanded to include 20 sites (16 on the Rutgers University campuses in New Brunswick and four in the city). It collected one million pounds of paper, glass, aluminum, tin and cardboard during FY 1978-79. This has all been accomplished by a small staff, one paid coordinator, and seven part-time student assistants.

The recycling team runs two collection trucks to the recycling stations on a weekly basis. The program inherits old vehicles from Rutgers University to use in the program. The output of the Rutgers Recycling Stations breaks down to one-third glass, one-third newspaper, and one-third cardboard (from the University dining halls). A large percentage of the volume comes from Cook College, which is Rutgers' agricultural and environmental school.

The program operates two of the four city sites at fire stations, which are maintained round-the-clock. The third city site is at Birchwood Apartments, a large apartment complex where many students live. The program may expand to two more sites in 1980, including one in nearby Highland Park.

David Pearson, Program Coordinator, is planning to launch a concentrated publicity campaign. He intends to work with several public schools and to distribute more recycling notices to local residents. Overall, Pearson considers the campus operation to be an educational endeavor, a way of preparing college students for the recycling

Category Community
State NJ
Project Name Rutgers University Recycling Program

Organization Rutgers University Recycling Program
Address Cook-Douglas Physical Plant
New Brunswick, NJ 08901
Contact David Pearson
Telephone (201) 932-9768

Funded By Rutgers University
Cost \$15,000 annually
Congressional District XV
Compilation Date February 1980

work that can be done in communities and businesses they will enter after graduation.

Pearson and the Youth Environmental Society (YES), a non-profit group, will soon build a new recycling station in another New Brunswick garden apartment complex. YES received a grant from the DOE's Appropriate Technology Small Grant Program for the purpose of collecting recyclables and conducting a study to determine the best methods for increasing curbside collection volume.

Critique/analysis: There have been some problems with equipment breaking down, but the program has been running smoothly for six years and in the black since Fall of 1979. Two efforts at starting curbside collection of newspaper in New Brunswick failed. The program always needs more volunteers.

Renewable Resources— A National Catalog of Model Projects

In July of 1977, a 61-unit senior citizens residence in Morris County, New Jersey, received a solar hot water system. The Dover Housing Authority installed the system under a HUD demonstration grant.

Installation of the system was completed in three months. Sixty-six roof top collectors and seven heat pump panels heat water and circulate it to existing electric heaters that supply the building's hot water. The system uses a non-toxic glycerol solution.

The system has worked successfully for two years with minimal upkeep, supplying 60 percent of the building's domestic hot water. During one of New Jersey's coldest winters, a performance check run without tenants' knowledge certified the system's competency.

The system is expected to save \$6,000 a year with a payback period of ten years. Before the installation of air conditioners, the system caused a \$400 decrease in monthly energy bills.

Information for this project was obtained from the Exxon Publication, "Solar Spectrum", July 1979.

Category Community
State NJ
Project Name Senior Citizens Solar Residence

Organization Dover Housing Authority
Address 215 East Blackwell
Dover, NJ 03820
Contact n/a
Telephone (201) 361-9444

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

Renewable Resources— A National Catalog of Model Projects

Solar contractor Frank Ponti, with help from a professional carpenter, has designed and constructed a vertical solar wall collector at the home of Columbus Hayes, a farmworker living in rural Salem County, NJ. The \$3,000 grant for the solar wall retrofit was given by the National Association of Farmworkers Organization (NAFO) to the Farmworkers Corporation and was one of fifty grants given nationwide through the Community Services Administration and the National Center for Appropriate Technology. An additional \$800 was recently approved to make system improvements and to add a heat monitoring device.

The vertical wall collector is an active solar system that uses two fans to move the solar heated air from the collectors into the living room and kitchen. Temperature inside the collectors can reach 350 degrees F. With some exceptions, all the materials used in the wall were obtained from a local lumber yard. The glazing material of the collector is not inexpensive, but it should last 20 to 25 years. The material is reinforced fiberglass, of 4' x 8' sheets, and is .04" thick. The solar wall is expected to provide Mr. Hayes with about \$300 savings in heating bills. It took four months to build.

The greatest impact of the solar wall is that upon the farmworker community. Local press and interested neighbors and citizens have interviewed Hayes and Ponti about the wall. The object, which was officially dedicated November of 1979, has already generated community awareness of conservation and solar energy. The Farmworkers Corporation has not held any workshops at the site yet, but will do so if there is sufficient community interest. They are producing a slide show about the project.

Category	Community
State	NJ
Project Name	Trombe Wall Retrofit on Salem County Farmworker's Home
Organization	Farmworkers Corporation, Inc.
Address	36 West Landis Avenue Vineland, NJ 08360
Contact	Frank Ponti
Telephone	(609) 358-3835
Funded By	CSA, National Center for Appropriate Technology
Cost	\$3,800
Congressional District	II
Compilation Date	February 1980

Critique/analysis: The glazing tends to buckle in high temperatures, but this hasn't been a problem as yet. The Farmworkers Corp. would like to see wide replication of this project, but funds are not available.

Renewable Resources— A National Catalog of Model Projects

The Alternative Energy Center was begun in 1974 by a group of students and faculty members of the Environmental Studies Department at Ramapo College. The Center consists of two buildings located on campus: a solar greenhouse, and a storage building. The greenhouse is passively heated and also contains a wood stove and a back-up electric resistance heater. The electricity for the building is supplied by a 2,000-watt wind generator located on a 65-foot tower. The system also contains a 36-volt DC battery that runs power tools and the heating system. Weather and data collection instruments are used to research the surrounding environment.

Students and faculty run workshops on organic gardening, canning, recycling, bicycle maintenance, and so on for the general public in conjunction with special events. Tours of the Center, the wind generator site and the storage building are conducted by work-study students. Classes on such topics as Alternative Energy Systems, Small Scale Biological Agriculture and Environmental Design are offered at the Center.

Other Center projects include a campus-recycling center, construction of a clivus multum system, and various aquaculture projects. All of the work at the Center is done by students and faculty, aided by their one full-time director. The Center offers students a place to acquire "hands-on" experience and serves as an example of environmentally sound living.

Critique/analysis: The only problem with this project is that funds are very limited. Except for the CETA grant, all money has come from the college's budget.

Category	Education
State	NJ
Project Name	Alternative Energy Center
Organization	Alternative Energy Center
Address	Ramapo College of NJ 505 Ramapo Valley Road Mahwah, NJ 07430
Contact	Jim Markstein or Bill Makofske
Telephone	(201) 825-2800 Ext. 433
Funded By	Ramapo College-School of Environmental Studies, CETA
Cost	\$26,600
Congressional District	VII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Glassboro State College has a comprehensive education and technical training program in solar energy and alternate energy applications. Directed by Dr. Leigh Weiss, a professor at the college, Glassboro State trains builders, contractors, installers and other interested people in the appropriate use of solar energy. The curriculum is part of an overall major in Industrial Technology and Specialized Energy.

The program has evolved gradually over the last ten years, shifting its focus from the environmental per se to a contemporary to "design, installation and troubleshooting for active and passive solar energy systems." Two courses, Basic Solar Energy Systems and Advanced Solar Energy Systems, are supplemented with courses in world energy resources, house design, architecture, and computer graphics.

Glassboro State draws people from as far away as Connecticut and Rhode Island to its solar training courses, which run for sixteen weeks. Currently, the National Solar Heating and Cooling Information Center is using Glassboro State to train its Philadelphia-based telephone answering staff. Approximately 150 participants enroll each semester. Dr. Weiss credits the program with "translating a complex technology into a relatively easily understood one," and calls the NJ Department of Vocational Education as a leader of the appropriate technology movement in New Jersey.

Currently, Weiss is building a trailer to be used as a mobile educational unit for high schools and community colleges around New Jersey. The trailer, which will include working displays and exhibits of solar and related systems, should be completed by January of 1980.

Category Education
State NJ
Project Name Glassboro State College Solar Curriculum

Organization Glassboro State Coll

Address Department 84, Solar Lab
Glassboro, NJ 08028

Contact Dr. Leigh Weiss

Telephone (609) 445-5000

Funded By NJ Department of Vocational Education

Cost \$40,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Ocean County Energy Council started in 1973 as a response to the gas crisis. Initially run by 15 volunteers, the program now has three paid staff members (from County and CETA funds) and 18 volunteers that meet once a month. The Council circulates a newsletter to 1,800 people throughout the County. This circular contains information concerning local energy programs and ideas. The Council also runs an office library on energy conservation and alternatives, and transmits this information to local citizens who call and request information.

Under a \$10,000 grant from the DOE Region II, the Council has developed a Youth Energy Conservation Corps composed of 52 teachers and students. The Corps has organized two solar workshops and fairs, and have developed a teaching curriculum for grades K-12.

The Energy Council also works closely with the Vocational Schools in solar related projects, and in conjunction with the Ocean County Community Action Project's weatherization program for low-income and senior citizen groups. The Council provides a speaking service for schools in the area; it started a carpool for county employees.

Critique/analysis: The Energy Council has an effective program in which the community is involved. The positive impact is shown by the increasing number of inquiries for the newsletter and library information.

The major problem with this program is the budget, which is limited to \$4,000 a year for operations.

Category	Education
State	NJ
Project Name	Ocean County Energy Council
Organization	Ocean County Energy Council
Address	127 Hooper Avenue Toms River, NJ 08753
Contact	Sally T. Burt
Telephone	(201) 244-2121
Funded By	Ocean County, DOE Region II and CETA
Cost	\$4,000—operating/yr. \$24,400—salaries
Congressional District	II
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

When the Ocean County Vocational Schools needed a warehouse, school administrators announced a plan whereby vo-tech students would build the warehouse and install a solar system and other conservation measures to make the building as cost-effective as possible.

The vocational schools are interested in teaching their students about solar energy since their administration believes it will be an important trade to know within a decade or so, providing many new jobs in plumbing, sheet metal work, carpentry, and so on. When the opportunity for students to work on the solar system was announced, classes were filled almost immediately, and absenteeism was extremely low.

The solar system installed on the warehouse roof has thirty flat-plate collectors, which heat the building in the winter and pump hot water to the nearby Toms River, NJ branch of the vocational school system. Mr. Samson estimates that the solar system will save the school system about \$2,600 in energy costs per year at 1978 price levels and will have a 16-year pay-back period.

The system uses a water and anti-freeze solution as the heat-collection medium, and it has a 750-gallon storage tank. When heat is needed, hot water flows from the tank through copper tubing, which has been laid in a serpentine pattern throughout the concrete warehouse floor. The entire warehouse is insulated.

Except for two very small jobs, vo-tech students built this project themselves. The Ocean County Vocational Technical High School now offers a one-year course on solar energy as part of its Climate Control and Refrigeration curriculum. (About forty students participate in the solar course each year.) The school also

Category Education

State NJ

Project Name Ocean County Vocational Schools' Solar Warehouse

Organization Ocean County Vocational Technical High School

Address Chambersbridge Road
Bricktown, NJ 08723

Contact George Samson

Telephone (201) 920-0050

Funded By NJ Department of Vocational Education,
Ocean County School System

Cost \$9,106 (1978-79)
\$6,880 (1979-80)

Congressional District VI

Compilation Date February 1980

offers an adult education course on solar in the evening.. (This course accommodates another forty students annually.) The teachers of these courses have been trained in the applications of solar energy and wind power at Glassboro State College in Glassboro, NJ.

Critique/analysis: The students found many problems with the plumbing while installing the system, partly bacuse the systems designs were unnecessarily complex.

Renewable Resources— A National Catalog of Model Projects

Ocean County Vocational Technical High School offers a unique combination of solar course- and field-work. Teachers at the high school are trained in the applications of solar and wind energy at Glassboro State College in Glassboro, NJ. Upon completion of training, they teach vo-tech students the skills needed to install and workmanship on active solar systems.

Thirty solar collectors on the high school's roof provide all the necessary hot water for the school's operations. The "radiant heat system" is the product of professional design, but students constructed and installed it. The collectors are a showpiece for the school, which is an active proponent of appropriate technologies.

Critique/analysis: The students find many problems with the plumbing of the solar systems, but troubleshooting is part of what they are learning.

Category	Education
State	NJ
Project Name	Ocean County Vocational Technical High School
Organization	Ocean County Vocational Technical High School
Address	Chambersbridge Road Bricktown, NJ 08723
Contact	George Sampson
Telephone	(201) 920-0050
Funded By	NJ Department of Vocational Education, Ocean County School System
Cost	\$9,106 (1978-79) \$6,880 (1979-80)
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State NJ
Project Name Princeton Education Center at Blairstown

The Princeton Education Center at Blairstown is an educational facility that conducts programs in outdoor education and environmental awareness. The center, located on 270 acres, was formerly a summer camp. In 1972, trustees of the center began plans to create a year-round environmental education and energy-awareness center that would feature energy systems that utilized the power available from the surrounding natural environment.

Many of the existing buildings have already been improved to be more energy-efficient. To date, two-thirds of the cabins and the conference hall have been weatherized with insulating materials and fitted with wood-burning stoves. An active solar system meets 100 percent of the main wash house's hot water needs, while the space is heated by passive reradiation. The Hunt Lodge, which contains the dining hall, has been retrofitted to include an active hot water heater and a wood-burning stove. Where applicable, water recycling and saving applications have been added.

A wind generator has been installed which provides electricity that is stored in portable batteries. In the future when visitors arrive, they will have to pick up not only the key to their cabin but also a charged battery to meet their electrical needs.

The Center plans to install a hydrogenerator run by the 25 to 30 foot waterfall and to build passive solar greenhouse for food production.

A \$55,000 DOE grant will provide funds for the completion of a maintenance building that will be heated and cooled totally by a passive solar system. A 32-guest conference center

Organization Princeton Education Center at Blairstown

Address 5 Ivy Lane
Princeton University
Princeton, NJ 08540

Contact Everard K. Pinneo,
Exec. Dir.

Telephone (609) 452-3340

Funded By Princeton Alumni,
Private Funds,
Donations, DOE

Cost \$55,000 DOE Grant
for Solarized
Maintenance Building
Congressional District V

Compilation Date February 1980

(workshop, dining hall, meeting rooms, and kitchen) utilizing composting toilets will also be covered by this grant.

The center's purpose is to show guests how solar energy, conservation, and other environment-saving applications are economically feasible and operable.

(Information concerning the Blairstown Center was made available to the Center through Harrison Fraker, Architects.)

Renewable Resources— A National Catalog of Model Projects

The Environmental Education Center (EEC) was conceived, planned and developed by the Somerset County Park Commission, an agency of county government with a voluntary appointed Board. The purpose of the E.E.C. is to stimulate awareness and understanding of our total environment, natural and altered, among people of all ages by providing learning experiences that cannot be duplicated in any other type of facility, and to develop a sense of responsibility for the care and wise use of our natural resources.

Solar heated and cooled, the Center rests on 400 acres of unspoiled land and wetlands in New Jersey's famed Great Swamp. The building consists of a library, exhibit hall, classrooms, a large conference room, dark room, greenhouse and offices. This 18,000 ft² facility has about 63 percent of its space heating needs met by 135 aluminum-flat-plate collectors. The collectors, which cover 3,105 ft² of roof area, are "set in" the roof, making it easy to remove them from inside the building. There are two storage tanks, one holding 4,000 and the other 2,000-gallons, that can be used separately or together. The roof is built at an 18 degree pitch, while the collectors are positioned for year-round use at 40 degrees.

The solar heating system was expected to supply about 54 percent of the facility's heating needs, but is averaging about 60 percent a year. The system is reportedly holding up well, saving the Center about 6,000 gallons of oil each year.

The Center operates programs on Teacher and Adult Education, Naturalist Training, Vocational Education in Environmental Science, College Intern Experience, Guided Tours, and more. It also displays an aquaculture experiment, a small wind machine, and passive heating devices.

Category Education

State NJ

Project Name Somerset County Environmental Education Center (EEC)

Organization Somerset County Park Commission

Address Environmental Education Center
190 Lord Stirling Road
Basking Ridge, NJ 07920

Contact Walter Jones
or
Paul Becker

Telephone (201) 766-2489

Funded By Board of Freeholders,
HUD, NJ Green Acres,
ERDA, USDOJ

Cost \$2,074,000

Congressional District V

Compilation Date February 1980

Critique/analysis: The EEC lost its federal funding after its first year because its monitoring and evaluation instruments were not sophisticated enough to meet federal government requirements. Thus, the experimental and testing nature of the facility was somewhat hampered.

The water chiller installed is far less efficient than had been expected. The Center expected about 70 percent efficiency, but is getting only about 20 percent efficiency. As Paul Becker explains, however, "It was an experiment, so you expect a few things to go wrong. On the whole, it's working out very well."

Renewable Resources— A National Catalog of Model Projects

Category Housing
State NJ
Project Name Solar and Environmental Subdivision Developments

Organization Karl Khede
Address Route 1, Box 534A
Branchville, NJ 07826
Contact Karl Khede
Telephone (201) 875-3114

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

Citizens of New Jersey now have the opportunity to become residents of an innovative and environmentally oriented subdivision. One of the three new subdivisions is complete, and two are in the development and planning stages. Environmental considerations have been given high priority in the design of all the communities.

Heron Park, the completed subdivision, is located in Lafayette, New Jersey. This development is 86 acres total, with 26 homes built on 66 acres, and 20 acres donated to the New Jersey Trust for Public Land. The environmental safeguards of the subdivision include the absence of run-off sewers and curbs; smaller roads, wells, and septic tanks; and southern-oriented lots. At present only one home has an active solar system, but many have passive design features.

Forest Park in Boonton Township has an area of 113 acres, with 32 homesites on 68 acres and 45 acres donated to the NJTPL. Forest Park is presently under construction. Its design is basically the same as Lafayette's.

"The Farm at Sussex" in Frankfort Township is a proposed 110-unit townhouse community. The acreage for this project is 312, with 100 acres to be used for redevelopment and 212 to be donated to the NJTPL. The townhouses will be equipped with active solar water- and space-heating, attached passive solar greenhouses, clivus multrum composting systems, complete recycling systems, air heat pump systems.

The developer and the NJ Public Interest Research Group are expecting to work together to establish 12 farms to demonstrate appropriate technologies that can be used by New Jersey farmers. These farms will be constructed on the undeveloped land of "The Farm at Sussex" subdivision.

Critique/analysis: The major problem with these developments is the lengthy process involved in gaining zoning board approval.

Renewable Resources— A National Catalog of Model Projects

Combustion Equipment Associates/ Occidental Petroleum Corporation (CEA/OXY) Resource Recovery Associates will privately finance, construct, and operate for 20 years a resource-recovery facility, valued at \$90 million, in Newark, New Jersey.

This facility will initially recycle municipal solid waste from Newark and eventually cull waste from the surrounding region. It will convert this refuse into powdered Eco-Fuel II, which will be purchased by Public Service Electric and Gas Company to burn with oil at their Bergen Generating Station. The City of Newark has agreed to provide all of its 700 tons per day of solid waste to the facility, except for the material that is recycled through source-separation programs (such as Newark Recycling, Inc.).

This facility will have several benefits. Most important, it will resolve Newark's solid waste disposal problem for 20 years. The city will receive 25 percent of fuel revenues, 50 cents per ton of solid waste delivered to the facility from outside Newark, and payroll and property taxes from the facility. Over 20 to 30 months, 500 construction jobs will open up in Newark, and more than 100 permanent jobs will be created when the plant is operating at full capacity. In addition, Public Service Electric and Gas Company will conserve 700 to 3,500 barrels of imported fuel oil per day under this contract.

This facility was developed by the City of Newark and CEA/OXY Resource Recovery Associates. It is a joint venture of Combustion Equipment Associates and Occidental Petroleum Corporation in conjunction with Public Service Electric and Gas Company.

Construction of the plant will begin in May of 1980. The plant should be operational by the Spring of 1982.

table
Category	Industrial
State	NJ
Project Name	CEA/OXY Resource Recovery Associates

table
| Organization | CEA/OXY Resource Recovery Associates |
| Address | City Hall, Rm. 410 920 Broad Street Newark, NJ 07102 |

table
| Contact | Frank Sudbury |

table
| Telephone | (201) 733-6683 |

table
| Funded By | Combustion Equipment Associates, Occidental Petroleum Corp. |

table
| Cost | \$90 million (approximately) |

table
| Congressional District | X |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

Newark Recycling, Inc. (NRI), is a non-profit low-technology source-separation recycling program in Newark, NJ, that employs former offenders as its labor force. NRI began in 1975 as Project Resource, operating under the joint auspices of Newark's Department of Engineering and the State Law Enforcement Protection Agency. In October of 1977 the project directors incorporated the program and began to build a business that now handles about 450 tons of material and employs 40 people annually. It is reportedly the largest urban recycling program in New Jersey.

To date, NRI has collected, processed, and sold over 1,375 tons of news and office waste materials. It has employed more than 215 former offenders, 87 of whom have found jobs in private industry.

NRI currently has a five-year contract with the City of Newark for a city-wide program to collect newsprint, to continue the office wastepaper-recycling program, and to establish recycling programs for other types of material such as aluminum, glass and wood. NRI also has a ten-year contract with Garden State Paper Company for the sale of all newspaper processed by NRI. NRI operates a residential collection program for Newark's North, South, and East Wards, and hopes to incorporate Newark's Central and West Wards in the near future. NRI also expects to work with other community organizations to recycle aluminum and glass through satellite reclamation centers. It expects that this program will help generate greater community understanding of recycling and facilitate cooperation among neighborhoods.

NRI uses desk-top trays and recycling receptacles in its office waste collection program, and waste is voluntarily separated by the office workers when they discard materials.

Category	Industrial
State	NJ
Project Name	Newark Recycling Program
Organization	Newark Recycling Inc.
Address	215 Central Avenue Newark, NJ 07103
Contact	Donald Bernard President
Telephone	(201) 643-0400
Funded By	Newark CETA Private Foundations EPA, LEAA and the Newark business community
Cost	\$500,000 (1979 FY)
Congressional District	X
Compilation Date	February 1980

Recently, NRI expanded some of its operations to include the adjacent town of East Orange, NJ. The project received an award as Outstanding Urban Recycling Program of '88 by the New Jersey Department of Energy.

Renewable Resources— A National Catalog of Model Projects

In 1973, a solar climate-control system for the Center was designed by Halsey and Ryder (Architects) in collaboration with Becht Engineers. Building began in 1974. The Center's solar energy system provides year round climate control. It features 135 solar collectors (3,100 square feet), 6,000 gallons of water (heat) storage, and a 25-ton absorption chiller. It is fully instrumental for monitoring data, and it has conventional heating and cooling back-up systems.

The 18,000 ft² building has south-facing roofs with conventional 18° slope for solar energy collection. There are double-glazed windows with skylights and eaves to provide summer shading and maximize winter sun.

Category Institutional
State NJ
Project Name Environmental Education Center

Organization Environmental Education Center
Address Somerset Country Park Commission
Lord Stirling Park
190 Lord Stirling Rd.
Basking Ridge, NJ 07920
Contact n/a
Telephone (201) 766-2489

Funded By Energy Research and Development Administration

Cost \$463,000 and another \$ 97,000

Congressional District V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1975, a group of students at the New Jersey Institute of Technology decided to renovate a home on Ferry Street in Newark for their living residence at college. The home, abandoned for ten years, was to be made energy-efficient and retrofitted with a solar hot water system. The home would then become a residence for future students of the Institute. The Ferry Street Foundation was formed to implement the student's ideas.

The students obtained a \$23,000 interest free loan from the owner of the house, to be repaid through rental income over five years. The Foundation also received a \$50,000 grant from the NJIT Foundation to insulate and retrofit the house and to put in a new baseboard hot water heating system. They installed enough insulation to give the roof a R value of 30 and the walls an R value of 19.

In 1977, the Ferry Street Foundation received a \$41,320 HUD grant to build and install the solar hot water heating system. Under the supervision of Dr. Kirshner of the Architecture School, the students retrofitted the house with this system, comprised of 160 square feet of collectors, with two 65-gallon stone-lined hot water storage tanks and one 80-gallon gas-fired back-up system. The students expected that the data collection and monitoring devices would be installed by November of 1979 to measure the performance of the system.

The residence now houses twelve students round.

Category Institutional
State NJ
Project Name The Ferry Street Foundation

Organization The Ferry St. Foundation/NJIT
Address 332 Ferry St.
Newark, NJ
07105
Contact Dr. Bob Kirshner
NJIT School of Arch.
Edward Brzezowski
Telephone (201) 472-4421

Funded By NJIT Foundation,
HUD grant & private
loan

Cost \$74,400

Congressional District X

Compilation Date February 1980

Critique/analysis: The only real problem the students have is that students generally all take showers at the same time, so there are too large demands on the system, instead of constant low-to moderate-use of hot water throughout the day and evening. This forces the back-up system to be used more often and results in inefficient use of the solar-heated water for most of the day.

Renewable Resources— A National Catalog of Model Projects

The Citizen's Energy Platform was originally conceived by the New Jersey Mobilization for Survival and was formulated by a group of about 50 citizens representing various student, energy, environmental, law, political, religious, and senior citizen groups that met at Rutgers Law School in Newark on June 23 of 1979. The group heard presentations from the Executive Director of NJPIRG, a representative of the Bergen Energy Network, a member of NJ Solar Action, and a professor from the Rutgers Law School. It then passed eleven resolutions to make up the platform.

Among the resolutions are a ban of the transportation or permanent storage of high-level radioactive waste in New Jersey and a prohibition on the inclusion of the operating costs and maintenance costs of new nuclear fission plans in the utility rate base until the waste disposal problem is solved. The group also called for the adoption of various measures to promote conservation and the use of solar energy: state tax credits for individuals, and businesses for installing conservation and solar measures, the application of life-cycle cost analyses on all new publicly-financed construction and renovation, and a state conservation/solar bank to provide long-term low-interest loans for owners and builders to install solar systems or conservation measures.

The task force took the platform back to their own groups to ask for endorsements and donations. The purpose of the platform was to poll Assembly candidates on these eleven issues to release to the press the results of the poll before Election Day. Groups that endorsed the platform include the NJ Federation of Senior Citizens, NJ Solar Action, NJPIRG, Americans for Democratic Action, the SEA Alliance, Mobilization for Survival, NJSANE, New Jersey Citizens on

Category Outreach
State NJ
Project Name Citizen's Energy Platform Task Force

Organization Citizen's Energy Platform Task Force
Address 32 West Lafayette Street
Trenton, NJ 08608
Contact Edward Lloyd
Telephone (609) 393-7474

Funded By NJ Public Interest Research Group, NJSANE and Mobilization for Survival
Cost \$1,000—approximately
Congressional District State-wide
Compilation Date February 1980

Utilities and Energy (CUE), and Maplewood environ-
Action. Sixty-two of the Assembly candidates
supported all or parts of the Citizen's Energy
Platform. The poll was released to the press one
week before the election.

Critique/analysis: Many candidates did not re-
spond to the pool, even after repeated urging.
Only candidates who would endorse all or part of
the poll seemed interested in answering it. Thus,
the results were not as broad as the task force
had hoped. It was useful, though, since it forced
the candidates to go on record before the election.

Renewable Resources— A National Catalog of Model Projects

Category Outreach

State NJ

Project Name Northwest NJ
Community Action
Program (NORWESCAP)

The Northwest New Jersey Community Action Program (NORWESCAP) serving Warren, Sussex and Hunterdon counties, operates a Weatherization Assistance Program for low-income, elderly, and handicapped persons. Under the administration of the Department of Community Affairs and local supervision by county CAP agencies or Equal Opportunity Commissions, each dwelling receives a maximum grant of \$800 for materials and labor. The measures installed under NORWESCAP's program are insulation, caulking, weatherstripping, repair of storm windows, and installation of solid doors. The program helps tenants and homeowners, as long as applicants meet the program's income eligibility requirements.

Besides the Weatherization Program, NORWESCAP has received a CSA grant to educate people on the benefits of solar energy and energy conservation for the home. Three courses are offered under this grant: Energy Management In The Home, Residential Energy Conservation, and Solar Energy Applications. These courses are offered in six week sessions at high schools in each of the three counties for two hours every week.

The program actively encourages practical applications of energy conservation. Low-income homeowners taking this course are immediately eligible for a \$250 weatherization grant, and most eligible people have used this grant for insulation. The program's popularity in the community is high.

It is hoped that at the end of the program Warren County Adult Education program will offer the courses NORWESCAP has developed.

Organization Northwest NJ
Community Action
Program (NORWESCAP)

Address Old Firth School
Prospect Street
Phillipsburg, NJ 08865

Contact Ron Beruta

Telephone (201) 454-7000

Funded By CSA

Cost \$50,000

Congressional District XIII

Compilation Date February 1980

Other creative approaches NORWESCAP takes to solve energy problems include commissioning Bruce Anderson and others, to write The Fuel Savers (a how-to guide for building and installing various affordable conservation and solar devices), and beginning a community-education project concerning the construction of solar greenhouses for residential heating purposes. A NORWESCAP crew will soon begin adapting a local resident's back porch into a south-facing greenhouse.

Critique/analysis: Like most anti-poverty agencies, NORWESCAP needs more money to adequately reach their constituents, to educate its constituents, and publicize its demonstration projects. Overall, however, its projects are very successful.

Renewable Resources— A National Catalog of Model Projects

Public Service Electric and Gas Company will begin a residential solar water heating program for homeowners in their electric service area. The new program will offer the homeowner the "opportunity to obtain a soundly engineered solar water heating system installed under PSE & G's supervision to insure quality work backed by service from the company," according to the company's Chairman of the Board.

To qualify for the program, homeowners must live in a household of no more than five persons. They must also own a home whose roof is well-constructed, made of wood or asphalt shingles and positioned at a slant of 30 to 50 degrees. The roof must have a south-facing unshaded portion on which solar collector panels can be mounted. It must also allow adequate working clearance, so the storage tank and piping can be installed.

The program will provide installed residential solar water heaters to qualified customers at a fixed price of \$2,000 to \$2,600. The system will consist of three 45 to 60 ft² flat-plate collectors, a 120-gallon glass-lined storage tank containing a solar heat exchanger and a 4,500-watt resistance electric immersion supplementary heater. Other equipment provided will include a circulating pump, controller and associated plumbing, insulation, and safety devices. It is estimated by PSE & G that the sun will provide for 40 to 50 percent of the annual hot water requirements for a family of five.

The supplementary electric energy required by the immersion heater will be all off-peak energy and will be billed under a solar provision of the Residential Land Management rate.

Category	Utility
State	NJ
Project Name	Public Service Electric & Gas Solar Water Heating Program
Organization	Public Service Electric and Gas Co. (PSE & G)
Address	80 Park Place Newark, NJ 07101
Contact	Arthur Lenehan or Edward Anderson
Telephone	(201) 430-7000
Funded By	Private
Cost	\$2,000-2,600 per system
Congressional District	X
Compilation Date	February 1980

The company will be the purchasing agent for the complete solar system. Qualified contractors selected by competitive bidding will install the systems. Federal tax credits of 30 percent of the first \$2,000 of cost and 20 percent for the amount above that will be applicable. There is no state sales tax on the equipment, and there will be no increase in property taxes due to the addition of a solar system.

Critique/analysis: The announcement of this program has raised considerable controversy and opposition among small and independent solar businesses in New Jersey and elsewhere.

As stated in DOE's Residential Conservation Policy Act Pt. I, Title II, "no covered utility may supply, install or finance the supply or installation of any conservation or renewable resource measure," unless supported by the Governor and granted a waiver from the Assistant Secretary. On September 17 of 1978, when PSE & G's Chairman of the Board proposed the aforementioned solar program, he reportedly did so without an official waiver.

As a result of this proposal, independent solar industries are losing business. One company in particular allegedly lost \$60,000 within one month proceeding PSE & G's proposal.

Other solar businesses and advocates are concerned for several reasons, including PSE & G's previous negative publicity: the utility has claimed that solar systems have a 15-to-30 year payback period. Other objections are that the proposed system will supply far less hot

water than could many of the HUD-approved systems already on the market, that PSE & G will gain most of the market because people recognize its name and will not resist "one-step shopping" for their solar system, that electric back-up is the most inefficient way to heat water, that PSE & G has less experience in the solar field than existing businesses, that collectors used in PSE & G's three-year solar demonstration program performed poorly, and that PSE & G will choose only one or a few contractors to serve their customers, thus driving out the other solar businesses.

Renewable Resources— A National Catalog of Model Projects

Category Utility

State NJ

Project Name Using Waste Heat From Generating Units for Aquaculture

The purpose of this project is to investigate the potential for using the waste heat from electric generating stations for commercial aquaculture (raising trout, shrimp, catfish, eels and striped bass). If the idea proves feasible, Public Service Electric and Gas Company could then "rent" its "warm water resources" to aquaculture businesses or sell the fish directly.

The research is a joint project involving Trenton State College, Rutgers University, the NJ Department of Agriculture, Long Island Oyster Farms, and PSE & G. Research began in the summer of 1973. A \$212,000 grant from the National Science Foundation was received in July of 1974 to continue the pilot project, and an additional grant of \$1,163,960 was received from NSF in November of 1976 to begin a proof-of-concept aquaculture research program.

The potential practical benefits of this project include the more efficient use of energy; reduction of thermal pollution of waterways; the development of new high protein sources of food; and the establishment of a new commercial industry in NJ.

The aquaculture research project is located on Public Service's Mercer Electric Generating Station in Hamilton Township on the Delaware River. Up to 3,100 gallons per minute of warm water is diverted from the Mercer water discharge system and passed through the aquaculture facility, giving up some of its heat prior to being released to the river. It is this extra heat that stimulates aquaculture species to grow more than they would normally in the natural environment.

Since the natural temperature of the Delaware River water varies seasonally from 32 F to 87 F, and since the Mercer Station's effect on the water taken in for cooling is to raise those temperatures about 11 F, optimum aquaculture would require a warm water species and a cooler

Organization Public Service Electric and Gas Company (PSE & G)

Address 80 Park Place
Newark, NJ 07101

Contact Dr. Bruce Godfriaux

Telephone (201) 430-6638

Funded By National Science Foundation and Public Service Electric and Gas Company

Cost \$1,375,960 to date

Congressional District IV

Compilation Date February 1980

water species. Catfish appears promising as the main warm water species and trout as the cold water species.

Critique/analysis: Shrimp production was demonstrated to be uneconomic, and many striped bass were lost to a fungal infection. Fel, trout, and catfish were reared most successfully.

Renewable Resources— A National Catalog of Model Projects

Public Service Electric and Gas Company (PSE&G) began a waste-heat agriculture demonstration project in the mid-1970s to determine the feasibility of utilizing heated discharges from electric generating stations to extend the growing season for tomatoes and other crops throughout the entire year. The program is a joint effort of Research Corporation and Rutgers University.

Construction of a prototype greenhouse was finished in June of 1978. The 960 ft² greenhouse consists of a metal frame structure covered with two layers of plastic. Within the greenhouse, perforated pipes mounted along the ceiling pump heat discharge water throughout the greenhouse to facilitate winter growth. Water is also circulated through a porous concrete floor. During the summer, fans at the end of the greenhouse are used for cooling.

Among tests currently under way are those to evaluate different plastics for use in the greenhouse, heat distribution, and evening hour insulation. Preliminary estimates of greenhouse production indicated that up to 4800 pounds of tomatoes could be produced in the prototype greenhouse. It is anticipated that a yield of 10 pounds of tomatoes per plant will be obtained in the future.

Evaporative cooling pads are located in the rear of the greenhouse. During the winter months, they remove all heat from the cooling water discharged by the station. During the summer months, all heat is removed except during periods of very high temperatures and humidity.

Further tests are to be performed to determine the feasibility of greenhouses serving as horizontal cooling towers for generating stations.

Category	Utility
State	NJ
Project Name	Waste Heat Agriculture Demonstration
Organization	Public Service Electric and Gas Company (PSE&G)
Address	80 Park Place Newark, N.J. 07101
Contact	Arthur Lenehan Information Services
Telephone	(201) 340-5980
Funded By	PSE&G and the National Science Foundation
Cost	n/a
Congressional District	IV
Compilation Date	February 1980

NEW YORK

1. Albany	13. Millbrook
2. Ballston Spa	14. New Paltz
3. Bethpage	15. New York City
4. Bronx	16. Old Westbury
5. Brooklyn	17. Potsdam
6. Buffalo	18. Rochester
7. Clifton Park	19. Staten Island
8. Corning	20. Syracuse
9. Edinburg	21. Troy
10. Flushing	22. Wayland
11. Huntington	23. West Seneca
12. Latham	24. White Plains

NEW YORK

TABLE OF CONTENTS

Agriculture

Demonstration of Wind Power Utilization on a Working Dairy Farm.....	1
---	---

Commercial

Jolly Tiger Restaurant.....	2
-----------------------------	---

Community

Bronx Frontier Development Corp.....	4
Eleventh Street Movement.....	5
Energy Conservation and Development Plan.....	6
Farmworker Solar Training and Demonstration.....	7
RIT Energy House.....	8
Solar Energy Wall.....	10
Wood for Fuel.....	11

Education

Adirondack Alternate Energy.....	12
Boy Scouts Solar Workshop.....	13
Center for Energy Policy and Research.....	15
Consumer Action Now's Council on Environmental Alternatives.....	17
Concentrating Solar Collector	18
Environmental Technology Seminar.....	20
Five Rivers Environmental Education Center.....	21
Johnny Solarseed Campaign.....	22
Lebost Augmentor Wind Turbine.....	23
The Long Island Food and Energy Project (LIFE).....	25
Mobile Energy Workshop.....	27
RPI Energy Curriculum.....	29
Solar Energy Curriculum.....	31
TARP Wind Energy System.....	32
Thermal Diagnostic Workshop.....	33
Wagner College Solar Energy Demonstration Project.....	34
Wind and Solar Power Project.....	36

Industrial

Design Competition & Construction Demonstration.....	37
Prototype Wind Energy System.....	38

Institutional

Alumni House Conference Center.....	39
Ballston Spa Central School District.....	40
Plant Science Building.....	42

New York
Table of Contents
Page 2

Institutional (con't)

Solar Town Hall.....	43
Syracuse Savings Bank.....	45
WKBW-TV Energy-Efficient Building.....	46

Legislation

Home Insulation & Energy Conservation Act.....	47
--	----

Low Income

Energy Task Force.....	49
Occupied Building Energy Retrofit.....	50
SUEDE Low Income Solar Project.....	51
Upper Hudson Regional Energy Program.....	52
The Westchester Community Opportunity Program.....	53

State

New York State Energy Conservation Plan.....	55
NYS Energy Research and Development Authority.....	56
NYSERDA Hydro Project.....	57

Utility

Gas Recovery Project.....	59
The Rockville Center Municipal Power Plant.....	61

Late Additions

Winter Olympics Photovoltaic System (Sports)	62
--	----

Renewable Resources— A National Catalog of Model Projects

The Demonstration of Wind Power Utilization on a Working Dairy Farm is a joint effort of five contractors: the local utility company, Clarkson College, the Department of Environmental Conservation, and David McKnight, owner of the farm.

A Windstream 25, a 15-kw wind generator, was installed in 1976 as a demonstration project. The generator is connected to the electric grid with a synchronous converter. Surplus power enters the grid and farm requirements in excess of the generator's output are drawn from the grid. Extensive tests are to be made to reveal the advantages and disadvantages of wind generation.

It is hoped that these tests will establish a basis for estimating benefits that may be derived by farmers and utilities from wind power utilization. It should also establish capital and operating-cost targets and provide a data base to use in developing incentives for increased use of this renewable energy source.

Critique/analysis: The Dairy Farm project answered many questions relative to noise, interference, and instrumentation, and enabled the producer to go ahead with the Windstream 33, which is in operation in Denver, Colorado, and Long Island, New York.

Category Agricultural
State NY
Project Name Demonstration of Wind Power Utilization on a Working Dairy Farm

Organization McKnight Dairy Farm

Address Route 3,
Potsdam, NY 13676

Contact David McKnight

Telephone (315) 328-4201

Funded By NYSERDA

Cost \$236,391

Congressional District XXX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Jolly Tiger Restaurant Project in Colonie, NY is an experiment in the application of energy-reclamation systems to the restaurant industry. The project was a team effort of various government agencies, research and engineering firms, Sambo's Restaurant, Inc., and Sambo's equipment supplier. Various energy-conservation techniques and waste-heat recovery measures were incorporated into the system and are now being monitored by a sophisticated data-collection and processing system. The comprehensive energy system designed for the restaurant seeks to accomplish three goals: the reduction of energy consumption, energy reclamation, and the utilization of reclaimed energy.

Samples of energy consumption-reduction measures include a lighting conservation system that takes advantage of outdoor light, and an air economizer system that uses outside air in place of mechanical cooling whenever possible.

Energy-reclamation measures include a system to extract heat from the dishwasher effluent to preheat incoming domestic hot water, a refrigerator rack reclamation system, and grill- and refrigerator-heat reclamation. Besides the special features, certain operating procedures, some of which are automated with timers and variable controls, and others operated by employees, are followed.

Critique/analysis: Nearly all negative reaction appears due to the complex interaction between subsystems. The experiment is not true to life in this respect, since it is highly unlikely that all of the features tested would be used in a single restaurant.

Savings of up to 35 percent are achieved in many areas, and, with the solar hot water system now being installed, a further 20 percent is predicted.

Category	Commercial
State	NY
Project Name	Jolly Tiger Restaurant
Organization	Atmospheric Sciences and Research Center
Address	ESB, Room 324 State University of NY 1400 Washington Avenue Albany, NY 12222
Contact	Donald McClenahan
Telephone	(518) 457-4824
Funded By	DOE, NYSEDA, Sambo's Restaurant, Inc. and others
Cost	n/a
Congressional District	XXVIII
Compilation Date	February 1980

This project has stimulated many fast food chain operators to incorporate many of its tures into their operations.

Renewable Resources— A National Catalog of Model Projects

A corporation dedicated to the redevelopment of the South Bronx through land reclamation and recycling operations, the Bronx Frontier Development Corporation is now using renewable technology to achieve neighborhood self-sufficiency. With the assistance of the Energy Task Force (ETF), a 40-KW windmill has now been installed at the Development Corporation's East River compost site.

The original impetus for the Bronx Frontier project came from the desire to make the compost site, which each day converts more than 40 tons of leaves and garbage from the Hunt's Point Produce Market into compost, a valuable commercial product.

Controls and batteries for the windmill are housed in a passive solar building that was designed by ETF. The building also serves as an environmental education center, demonstrating a variety of conservation, solar, and waste-recycling technologies.

The first federally funded wind-energy and community-gardening conversion system, the Bronx Frontier Development Corporation project has grown to address a wide range of technical, economic, and policy issues.

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 Category | Community || **State** | NY |
| **Project Name** | Bronx Frontier Development Corp. |

Organization	The Bronx Frontier Development Corp.
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Address	738 Kelly Street Bronx, NY 10455
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Contact	Irma L. Fleck
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Telephone	(212) 542-4640
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Funded By	Community Service Administration, DOE, Noyes Foundation
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Cost	\$40,000
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Congressional District	XXI
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

After the apartment building located at 519 East 11th Street in Manhattan had been struck by 13 fires in two weeks, members of a local group (appropriately called the Eleventh Street Movement) decided to reconstruct the building themselves.

The Energy Task Force helped the Movement obtain a grant from the Community Services Administration to insulate the building and construct one of the country's first urban solar hot water systems. A 2-KW windmill was later installed. In a precedent-setting case, the Public Service Commission ruled that the windmill could be interfaced with the utility grid and that Con Edison (the utility) must pay residents for any excess power they fed back.

The reconstruction proved highly successful. Insulation cut the building's heating demand by 50 percent, and the solar system provides 70 percent of the apartment's hot water. And although a minimum of \$18.56 must be paid for the monthly electric bill (while only 2.3 cents per KW for wind-generated power is received), the way has been cleared for future projects.

Category	Community
State	NY
Project Name	Eleventh Street Movement
Organization	The Eleventh Street Movement
Address	519 East Eleventh St. New York, NY 10009
Contact	Edwin Sosa
Telephone	(212) 982-1460
Funded By	Community Services Administration
Cost	\$30,000.
Congressional District	XVIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Conservation and Development Plan of the Southern Tier Central Region of the State of New York is an ambitious plan developed under the auspices of the Southern Tier Central Board by four citizen's energy groups from a three-county region. Through massive use of various forms of renewable energy and the enforcement of strict conservation measures, the plan seeks to reduce conventional energy consumption in Steuben, Schuyler, and Chemung counties by 60 percent in the next ten years.

The energy plan calls for the use of energy sources that can be developed within the three-county area, keeping money in the area's economy, and allowing for continual expansion. Because concentration is on energy resources that can be developed by individuals and institutions in the region with local capital, nuclear, oil-fired and gas-fired power plants are not considered.

The citizens groups, formed in January of 1979, worked independently in developing their respective energy plans. Each group stressed education, recommending that the Southern Tier Central Board serve as a source of information and technical assistance on conservation and renewable energy matters. They also recommended that the board help provide capital to entrepreneurs and local governments for renewable energy development and demonstration projects and that it foster and insure a continuing citizen-based planning function for local energy projects.

table
Category	Community
State	NY
Project Name	Energy Conservation and Development Plan

table
| Organization | Southern Tier Cen Regional Planning Dev. Board |

table
| Address | 53½ Bridge Street Corning, NY 14830 |

table
| Contact | Steven Weisman |

table
| Telephone | (607) 962-3021 |

table
| Funded By | Oak Ridge National Laboratory |

table
| Cost | \$75,000 |

table
| Congressional District | XXVII, XXXIII, XXXIX |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

The Farm Worker Alternative Energy Training and Demonstration Project investigated low-cost renewable energy heating systems and the practicality of utilizing these systems for supplementing residential energy needs of low-income seasonal farmworkers, and then constructed systems in the homes of two farmworkers.

The purpose of this demonstration was to create an awareness of the alternative energy hardware that is presently available and to demonstrate the capability and economic feasibility of this hardware when it is used to heat living area and domestic water in dwelling units occupied by seasonal farmworkers.

The original plan was to install nine systems, but after a fire destroyed the first one just before it was finished, it was decided to conduct two projects accompanied by Community Awareness Workshops in renewable energy. Both received national and local coverage by television and newspapers.

The first project was a multi-family farmworker residence located in Albion that demonstrated the capabilities of existing rock construction to absorb and retain heat from the sun by means of a Trombe wall. The system utilized 68 feet of the building's south-facing stone wall, composed of local field stone, as a thermal storage center. Through adaptation of the building's former air flow circulating system, heat collected with the Trombe wall is distributed throughout the building. In addition, a passive air greenhouse was added to the dwelling.

Another farmworker residence in Mexico, NY, was outfitted with a multi-component solar water-heating system. Water in this system is heated with energy supplied by three solar collectors, each of which is different in both design and material composition. Monitoring of the components of the system by the resident provides

Category	Community
State	NY
Project Name	Farmworker Solar Training and Demonstration
Organization	Project REACH, Inc.
Address	18 South Lackawanna St. Wayland, NY 14572
Contact	Thomas Carey
Telephone	(716) 728-5010
Funded By	National Association of Farmworker Organizations
Cost	\$29,415
Congressional District	XXXIX, XXX and XXXVI
Compilation Date	February 1980

sufficient data to determine the relative effectiveness of each collector and the entire system. A conventional electric heating element supplements the solar system.

Renewable Resources— A National Catalog of Model Projects

Category Community
State NY
Project Name RIT Energy House

The RIT Energy House is the result of a study conducted by Dr. Paul Wojciechowski, a professor in the Department of Mechanical Engineering at the Rochester Institute of Technology (RIT), to build "a solar heated, heat pump assisted residence." This project, a joint effort of RIT, Rochester Gas & Electric Corp., and the Rochester Home Builders Association, along with many volunteers and donations, was a total community project to demonstrate and research many concepts, designs, and technologies in an energy-efficient home.

Most of the ideas used in the Energy House can be used in other new homes and many can be incorporated into existing structures. Some of the outstanding energy-saving features involve siting, landscaping, windows, doors, ventilation, and the fireplace.

The house is situated on a southern slope with a ring of trees on its north, east, and west sides, which acts as a natural buffer to northerly and westerly winds.

All windows are triple-paned casement type. There are only six small windows and two skylights on the north, east, and west sides of the house. On the south side, a beautiful expanse of windows is used to advantage to allow the winter sun to help heat and light the house. A one-meter overhang outside the windows conveniently blocks the high-angled summer sun from entering the house—keeping the house cooler during those months.

All exterior doors are made of steel, insulated with polyurethane foam, and sealed with magnetic weather-stripping to make a tight seal.

Organization Rochester Institute of Technology (RIT)
Address Department of Mechanical Engineering
Rochester, NY 14623
Contact Dr. Paul Wojciechowski
Telephone (315) 475-2163

Funded By RIT, Rochester Gas & Electric, Rochester Home Builders Assoc.

Cost \$65,000

Congressional District XXXV

Compilation Date February 1980

For ventilation, there is an opening in the interior walls from all the major downstairs rooms into a central two-story interior atrium. In the summertime, when the clerestory windows are open, warm air rises up and out of the house through the atrium. During the winter months the atrium serves the opposite function: when cold air falls to the basement through the atrium, it is reheated and circulated through the house.

The fireplace is designed to use only outside air for combustion. Air enters the combustion chamber or firebox from two outside ducts. Glass doors across the front of the firebox prevent indoor air from being drawn up the chimney. In addition, inside air can flow through a bottom grill, move behind the firebox to be warmed, and exit back into the room through the top grill.

Renewable Resources— A National Catalog of Model Projects

The CUANDO Solar Energy Wall, New York City's first passive solar energy system, was built during the summer of 1978 by members of CUANDO—a Black and Puerto Rican youth organization, the Energy Task Force, and summer Youth Corps workers participating in a seminar on energy alternatives.

The CUANDO Wall, a variation of the Trombe Wall, was built amid controversy and numerous attempts at eviction. The controversy stemmed from the fact that members of the group of Black and Puerto Rican youths that runs educational, recreational, and counseling programs for Lower East Side teenagers were squatters without heat and hot water at the building for nearly four years before constructing the wall.

The 500 ft² system heats the third floor gymnasium of the CUANDO Community Center in the winter and ventilates it during the summer. The solar wall, which is bolted into a brick south-facing wall and thereby receives a steady stream of sunlight, works like a radiator. Behind the fiberglass panels, black-painted metal absorber sheets are heated by the sun. The sheets then heat the air in the space between the bricks and panels, and the hot air rises and flows through the upper vents into the gym. During the summer cooling vents on top of the collector are opened and the upper vents are closed. This causes the hot air to flow outside, ventilating the gym.

The Cultural Understanding and Neighborhood Development Organization Solar Energy Wall has illustrated the potential of south-facing masonry walls for solar retrofit. Another important outcome of the project was the participants enhanced sense of power and responsibility.

Category Community
State NY
Project Name Solar Energy Wall

Organization Energy Task Force

Address 156 Fifth Avenue, #825
New York, NY 10011

Contact Margaret Morgan

Telephone (212) 657-1920

Funded By National Center for
Appropriate Technology

Cost \$4,000

Congressional District XVIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Ulster County Wood for Fuel Project is a one-year research/action project to promote the safe and effective use of wood for fuel and the management of timber resources through a community-controlled, cooperative firewood business. The goal of this project is to assess the feasibility of establishing a community-based non-profit fuel wood supply, processing, and marketing cooperative.

The first phase of the project involves marketing, economic, and policy analysis of local wood markets (current and long-term). The organization and staffing plan for the cooperative is also being developed. A second phase of the project will demonstrate the viability of the wood-processing and marketing phases of cooperative operations.

A recent survey showed that one in four single-family households in Ulster County uses wood as a primary or supplementary heat source. The wood fuel users surveyed identified several reasons for doubt about the future long-term availability of seasoned wood with high energy content. The survey found that current competition among local suppliers, many of whom are untrained in forest management, has caused concern about the declining productivity of local woodlots and the possibility that unseasoned firewood is being marketed. A stable supply of wood would be assured by providing professionally supervised forest-management services either to owners of local woodlots in exchange for waste wood or to the cooperative's own leased or purchased woodlots. This woodlot management would increase the value of forests for future commercial lumber production.

As a result of its work, the Project hopes to acquire the expertise, contacts and financial resources necessary to start an exemplary project that could be duplicated elsewhere in the Northeast.

Category	Community
State	NY
Project Name	Wood for Fuel
Organization	Ulster County Community Action Committee, Inc.
Address	Box 966 New Paltz, NY 12561
Contact	David Strong
Telephone	(914) 255-8519
Funded By	NYSERDA, CETA and UCCAC
Cost	\$65,900
Congressional District	XXV and XXVII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Adirondack Alternate Energy is an innovative company that attempts to totally involve the potential homeowner/builder in the process of constructing a low-energy requirement (LER) house.

A designer, engineer, and marketer of LER homes, a unique solar heat sink and a heat energy battery, Adirondack Alternate Energy also conducts workshop-tours of a typical low-energy requirement home. The subjects discussed during the tour include passive solar design, thermal storage insulation, and post-and-beam construction. Persons seriously considering building LER homes are invited to discussions concerning their plans. The company uses the information obtained to produce a line sketch and a reasonable estimate of the proposed package. If the prospective owner/builder decides to advance to the blueprint stage, he is charged a fee that is credited to his account when a standard package is purchased or a custom house is designed.

The low-energy requirement home is unique, maintaining a near constant temperature and a comfortable humidity level without a conventional heating system, according to its producer. The company uses various building techniques, solar orientation, rigid board insulation and heat storage in an effort to produce superior houses at a cost comparable to that for a conventional home.

Energy for the LER home is supplied primarily by heat from the daily living cycle, which is normally wasted. The solar orientation is the second biggest heat supplier. Back-up heat for severely cold periods or periods when the house is unoccupied for several days is supplied by various renewable sources, and a fairly intricate "Interlocking Air Handling System" is used to regulate heat and air flow.

Category Education
State NY
Project Name Adirondack Alternate Energy

Organization Adirondack Alternate Energy

Address Edinburg, NY 12134

Contact Bruce Brownell

Telephone (518) 863-4338

Funded By Commercial Business

Cost Varies

Congressional District XXIX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Boy Scouts' Solar Energy Workshop is designed to introduce young people, ages ten to 18, to the basic principles and applications of solar energy. Toward this end, a solar energy seminar has been developed to cover in detail the principles of solar energy, the history of its use, current applications, and future possibilities. Participants have the opportunity to construct, handle, and use solar equipment: solar reflector cookers, ovens, water heaters, showers, collectors, fresnel lenses, solar cells, sun dials, and photovoltaic electrical devices.

Using both purchased and Scout-made solar cookers and ovens, participants prepare entire meals for groups of 80 to 100 Scouts, providing them with the opportunity to see solar energy perform practical functions. Besides attending the solar seminar, the boys must perform two exercises, such as cooking their own solar meal or constructing their own solar device. For the past three years, a special contest has been held to challenge the boys to come up with ideas for the use of solar power in the future. Entries last year ranged from solar-powered aircraft carriers to solar street lamps. Winners are awarded prizes of solar-powered devices.

The program, created by its director, Jesse Slome, is now in its sixth year and includes all four camps at the Ten Mile River Scout Camp in Narrowsburg. About 2,000 scouts participated in the program during the summer of 1979. Using grants from the Exxon Corporation, the program has purchased solar apparatus for use by workshop participants. In addition, plans for the construction of simple solar-powered devices have been developed in the program and are used by the Scouts.

Category	Education
State	NY
Project Name	Boy Scouts Solar Workshop
Organization	The Boy Scouts
Address	Box 14D 43-44 Kissena Blvd. Flushing, NY 11355
Contact	Jesse R. Slome
Telephone	(212) 582-7373 (days) (212) 886-0570 (eve.)
Funded By	The Exxon Corporation
Cost	n/a
Congressional District	XXVII
Compilation Date	February 1980

Critique/analysis: The Solar Energy Workshop has met with remarkable success and has garnered a great deal of publicity. In particular, many schools and libraries have requested copies of the solar booklet for their students. During the non-summer months the workshop is carried on by a local Troop, which puts on displays in shopping centers and helps prepare the program for the forthcoming season.

Renewable Resources— A National Catalog of Model Projects

Category Education
State NY
Project Name Center for Energy
Policy and Research

The Center for Energy Policy and Research was established by the New York Institute of Technology to inform public and private decision-makers and the public in general of the complexities of energy utilization and conservation, and to participate in the development of viable energy policies and alternative energy systems. The Center undertakes both research and information-dissemination activities, and it assists public and private sector organizations in the energy field.

In 1975, NYIT authorized the organization to establish a major information resource in the field of energy conservation and related matters. Developed and expanded since then, the information facility is now nationally recognized as an outstanding, comprehensive information source covering every aspect of energy conservation and related technology, including conservation programs and practices, alternative energy systems, energy legislation, and public policy development in the United States and abroad.

Among current enterprises is a contract between the Center for Energy Policy and Research and the U.S. Department of Energy under which the Center operates an information library and a Practical Materials Clearinghouse for the National Energy Extension Service and distributes current informational materials on energy conservation, alternative energy systems, energy programs, and energy policy to all of the states and U.S. territories.

Other activities have included the operation of a DOE-sponsored pioneering Energy Advisory Service (consisting of an Energy Hot Line, tri-state Referral Service, and a series of television seminars for professionals on energy management); the operation of the official New York State Energy Hot Line for the NYS Energy Office; the development of a national energy-information facility for the Energy and Education Action

Organization New York Institute
Technology
Address Old Westbury, NY 11568
Contact Gale Tenen Spak, PhD
Telephone (516) 686-7578
Funded By The Institute, DOE
and others
Cost Varies
Congressional District IV
Compilation Date February 1980

Center of the U.S. Office of Education; the organization of an Energy Efficient Community Program at the local level; the publication of a model energy conservation newspaper supplement; and the production and broad distribution of a variety of video cassette programs on energy conservation and alternative energy.

Renewable Resources— A National Catalog of Model Projects

Consumer Action Now's Council on Environmental Alternatives, Inc. is a national professional solar organization composed almost entirely of women.

Past projects of Consumer Action Now (C.A.N.) have included establishing an office in Washington, D.C., devoted solely to lobbying for solar energy and promoting energy conservation (this office, the first of its kind, recently merged in 1978 with several other groups to form The Solar Lobby); securing a HUD grant for a solar hot water demonstration project in a New York City apartment building in 1977; spearheading Sun Day in New York City in May of 1978; and directing a study of the potential cost-effectiveness of energy-conservation measures and the use of renewable resources.

Consumer Action Now is presently attempting to provide consumers with adequate information about safe energy options; educate decision-makers as to their roles in decreasing our dependence on non-renewable and dangerous energy sources; implement solar technologies and promote efficient energy use; and help citizens achieve a measure of energy independence while retaining their right to make choices.

Because women have traditionally been social activists and tend to manage the family budget, and because the renewable energy field offers a new range of opportunities in an area unmarred by stereotypes, C.A.N. is developing the Energy Education Project for Women. This program is designed to demonstrate that women can lead the way in the nation's transition to renewable energy.

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Category	Education
State	NY
Project Name	Consumer Action Now's Council on Environmental Alternatives

Organization	Consumer Action Nc
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Address	355 Lexington Avenue 16th Floor New York, NY 10017
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Contact	Irmgard Hunt
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Telephone	(212) 682-8915
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Funded By	n/a
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Cost	varies
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Congressional District	XVIII
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

Category Education
State NY
Project Name Concentrating Solar Collector

The Rogers Concentrating Solar Collector (Heliostat) is one of the most efficient and economically feasible means of producing high-grade energy out-put from direct solar radiation. It is being developed at RPI and will soon be ready for commercialization. Development factors include high performance, high quality and durability, easy production and maintenance, adaptability, safety and economic feasibility. A full-scale 70-KW model has been developed to produce steam for industrial heating and cooling, as well as electricity, with cogeneration, at costs competitive with those of other energy sources.

This model reflects sunlight from a large area of mirrored glass (864 ft²) into a cavity receiver at the focus. Very high temperatures (easily above 2,000 degrees C or 3,632 degrees F) can be obtained at this focus since so much energy is concentrated on a small area. This receiver, situated on the mast in front of the collector, is easily insulated and protected from the wind.

To utilize each hour of sunlight most efficiently during the day, sophisticated (though inexpensive) electronic controls turn the entire collector from east to west and the rows of mirrors up and down as the sun rises, travels across the sky, and sets. This two-axis tracking mechanism allows the collector to capture the maximum amount of sunlight throughout the year, collecting as much energy in one hour

December as in June. These automatic controls so keep the mirrors protected (upside down) when the sun is not out and position them at the proper angle to be washed by the rain.

Organization Rennselaer Polytechnic Institute
Address Department of Mechanical Engineering
Troy, NY 12181
Contact William Rogers
Telephone (518) 270-6301

Funded By NYSERDA and DOE

Cost \$99,591

Congressional District XXIX

Compilation Date February 1980

To make the energy from the solar collection system competitive with traditional alternatives, a system must survive the toughest weather conditions without being damaged. By extending the movement of the mirrored columns to a face-down position, the mirrors are protected from the damaging effects of snow, high wind, or hail. Excessive wear of parts is also avoided: the machine's weight and wind forces are distributed over many components, which can last thirty years or more. Glass is relatively hard and stable and should not deteriorate over many years of outdoor exposure.

Components of this collector are either off-the-shelf items or are designed to be produced in quantity using readily available manufacturing machinery. Most are light, easily handled by one person, relatively small, and replaceable. Spreading wind loads and the weight of the collector over many members and joints has eliminated the need for exotic metals and heavy, expensive assemblies.

Category	Education
State	NY
Project Name	Environmental Technology Seminar

Organization Environmental
 Technology Seminar, Inc.

Address Box 391
 Bethpage, NY 11714

Contact Jean M. Wood
 or
 David Lubell

Telephone (516) 931-3200

Funded By Members and other
sources

Cost	n/a
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Congressional District III, IV, V

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The N.Y.S. Department of Environmental Conservation (ENCON) has equipped its Five Rivers Environmental Education Center near Delmar with a solar system for heating water. It is an air system: solar heat is stored in gravel and in an 80-gallon tank of water imbedded in the gravel. It is also a do-it-yourself system, designed and constructed by ENCON personnel. The system incorporates recovered materials in its collectors, thereby supporting two of the department's policies—energy conservation and reuse of resources. All aluminum used is recycled scrap, including several hundred aluminum beverage cans and aluminum sheeting which was purchased from an offset printing plant at low cost.

The Five Rivers system uses the heat produced by solar radiation to pre-heat water before it goes to the conventional electric water heater. Thus, the temperature of the water is raised from about 55 degrees F at least part way to the usual 140 degrees F temperature. The more the water is heated by the sun, the less it has to be heated by the electric heater.

With the Education Center hosting about 40,000 visitors annually, the system is expected to go a long way toward promoting solar heating in eastern New York. Literature and bibliographies are available, as is assistance from the staff.

p>Category Education
State NY
Project Name Five Rivers
Environmental
Education Center

p>Organization N.Y.S. Department
of Environmental
Conservation
Address 50 Wolf Road
Albany, NY 12233
Contact Donald C. Hunter
Telephone (518) 457-7454

p>Funded By ENCON
Cost Minimal
Congressional District XXVIII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

To promote home-energy conservation techniques and All Through the House, a book on the subject, the Center for Environmental Options and the Lamoureux Foundation have launched the Johnny Solarseed Campaign.

Taking the identity of Johnny Solarseed, Dennis Lamoureux, technical advisor to the Center and co-author of All Through the House, set out in January of 1980 on a four-month tour across the northern United States. Lamoureux's four wheel solar home, a 1951 Dodge pick-up complete with a wood-stove and a passive solar bedroom, is a colorful introduction to solar technology and conservation at a time when home energy issues are a great public concern.

The Solarseed Campaign will include home-energy workshops for neighborhood, church, and social groups, and Lamoureux will construct solar greenhouses when conditions permit. All Through the House, which a reviewing engineer called "the best and most complete book I have encountered on this subject", is written in terms a layperson can understand and will be heavily promoted as part of the campaign. It is hoped that conservation efforts and projects will sprout after this four-month period of "planting".

Category	Education
State	NY
Project Name	Johnny Solarseed Campaign
Organization	Center for Environmental Options
Address	196 Morton Avenue Albany, NY 12202
Contact	John A. Oster, Jr.
Telephone	(518) 472-9760
Funded By	Lamoureux Foundation
Cost	Open
Congressional District	XXVIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Leobost Augmentor Wind Turbine is an innovative water-heating wind turbine, designed to provide safe and efficient energy to densely populated areas in the form of hot water directly through frictional dissipation of mechanical energy, not electricity. This full-scale model, 20-feet in diameter with four five-foot-high, dynamically curved blades encased in a 21-foot diameter aluminum domed shell, is the nation's largest urban wind energy conversion system. This prototype is mounted on a 90-foot tower located on the roof of the Applied Science Barney Building at New York University, a six-story building whose hot water the system is expected to provide.

The system operates on the principle that friction produces heat. The wind turbine consists of a partially open dome shell (one-quarter of its face is cut away to allow the wind to enter), that shrouds the turbine blades inside. The wind drives two protruding fins, automatically rotating the dome so that the opening always faces the wind. Thus, the wind is concentrated, and its power is augmented up to four-fold. Wind entering the dome's opening rotates the turbine, which is attached by a vertical shaft that goes through the roof to a heat brake installed in the plumbing system that heats the water.

Other significant features of the Lebast Turbine are its shrouding, which acts both as an augmentor and safety device (thus making it feasible for populated areas). It also has a vertical axis, which enables it to use the wind, whatever its direction, without significant reorientation. The conversion of mechanical energy to heat energy is more than 90 percent efficient with this system, which is many times more efficient than if used for electrical conversion (which is a poor use of prime energy). The heat brake can be driven at peak turbine

Category	Education
State	NY
Project Name	Lebost Augmentor Wind Turbine

Organization : New York University

Address Department of
Applied Science
26-36 Stuyvesant St.
New York, N.Y. 10003

Contact Martin Hoffert

Telephone (212) 598-2471

Funded By NYSERDA, NYU,
DOE and SERI

Cost	\$187,500
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Congressional District XVIII

Compilation Date February 1980

efficiency at all wind speeds. The use of heat energy, which can be conveyed efficiently only over short distances, tends towards decentralization.

If this turbine receives widespread use, it could supply more than one-third of the domestic hot water needs of a metropolitan area. It is also estimated that commercial systems should pay for themselves in energy savings within three to seven years of installation. This system should be ready for commercialization by the end of 1980.

Renewable Resources— A National Catalog of Model Projects

Category Education
State NY
Project Name The Long Island Food and Energy Project (LIFE)

The Long Island Food and Energy Project (LIFE) is a combined effort of the Long Island Appropriate Technology Group (APTech) and Friends World College to begin developing some of the most promising natural and man-made resources for the benefit of both the College and local community.

LIFE operates as a demonstration and educational service in search of ways to meet today's critical challenges of converting to regenerative energy sources, creating greater self-reliance in food- and energy-production, promoting conservation, and demonstrating these objectives to the community. This project is of broad scope, and the key staff now includes more than a half dozen technically trained participants who carry out the project objectives.

The project's immediate and long-range objectives are both educational and economic. By using the solar greenhouse in winter as an alternative to conventional hothouses, it demonstrates the practicality of using organic, biodynamic methods of growing high-quality produce on the Island all year round.

Once production difficulties are eliminated, the increasing vegetable yields will provide a low-cost, environmentally constructive, and highly nutritious food supply to the college students and staff, as well as to senior citizens, low-income groups, and local coops.

The members of the project see LIFE as an opportunity for personal growth and self-education, which is broadening out to the community in a series of lectures, workshops, and "hands on" mini courses.

Three acres of land were prepared in the Fall of 1979 for Jerusalem artichokes for ethanol production. In the Winter, a crop of vegetables will be raised in the retrofitted passive solar green-

Organization Friends World Col
Address Plover Lane
Huntington, NY 11743
Contact Norman Weiner
Telephone (516) 549-5000
Funded By Suffolk County Legislature & CETA VI
Cost \$58,000
Congressional District III
Compilation Date February 1980

house, which has back-up heat from the wood-burning stove that they constructed. By spring of 1980, they will be well on their way toward an intensive organic food-production program that includes community gardening.

Renewable Resources— A National Catalog of Model Projects

The Syracuse Research Corporation Energy Workshop, a trailer that can be transported for fairs, workshops and various displays, aims to serve as a focal point for training workshops in New York State, to stimulate community awareness concerning the importance of energy conservation techniques, to function as a workshop for experimenting with various alternative technologies, and to demonstrate the practicality of sound, inexpensive, energy-conscious design.

The Workshop is configured to display a modest library on energy and alternate technology, a group of tools that are of special help in various weatherization tasks, safety equipment that crews should employ, and samples of materials that are used to stop air infiltration and make windows more energy efficient. In addition, it features showings of slide shows and films that describe the weatherization program, examine passive solar systems in detail, shows how to construct greenhouses, and give a history of the construction and evolution of the Energy Workshop.

The Energy Workshop show that passive solar dwellings that use large expanses of glass on their south sides are simpler than dwellings that use active systems and that the large southern exposure can be delightful. The Energy Workshop incorporates over 100 ft² of insulated glass in its 36-foot-long south wall and none in its north wall. It also has solar collectors that become radiant panels at night to control the temperature of the workshop.

The Energy Workshop includes an experimental solar hot water heater that allows for the construction of efficient and cheap collectors quickly and without soldering.

Category	Education
State	NY
Project Name	Mobile Energy Workshop
Organization	Syracuse Research
Address	Merrill Lane Syracuse, NY 13210
Contact	Antonio Gauthier
Telephone	(315) 425-5149
Funded By	Office of the Community Services Administration
Cost	n/a
Congressional District	XXXIII
Compilation Date	February 1980

The Workshop also demonstrates an efficient wood stove that can be used for cooking, as well as for space heating. The trailer incorporates a stove pipe design which allows fresh air from outside the trailer to be pulled in around the chimney, thus pre-heating the air and cutting up-the-stack energy losses.

A home-made windmill is also included on the Energy Workshop to illustrate another alternative technology that is likely to become more important soon. This one directly drives a 180-watt, 12-volt generator of the sort often found on a truck engine. The output of the windmill charges the 12-volt batteries on board the Energy Workshop. The windmill was constructed for the Energy Research Center by the Community Energy Network in Ithaca, New York.

Although the greenhouse area on the Energy Workshop measures only 24 ft², it is large enough to allow a study of its micro-climate as a function of various shutter and vent settings, as well as of the conditions around it.

Renewable Resources— A National Catalog of Model Projects

Barriers to the Application of Wind Energy Conversion Systems (WECS) in Urban Settings is an interdisciplinary study by the Mechanical Engineering, Aeronautical Engineering and Mechanics Departments, the School of Management, and the Center for Architectural Research of Rensselaer Polytechnic Institute. The project's sponsor is the New York State Energy Research and Development Authority.

The Barriers project aims to complement Federal programs, which test large-scale WECS at centralized power-supply locations, by stressing decentralized applications in an urban setting, at points of utilization. Its purpose is to study the many aspects of WECS in an urban setting to determine the technical advantages and disadvantages of that setting, identify the laws and codes that are barriers to their use, and develop incentives that could be provided for their installation. Model statutes will be developed that a city could adopt to encourage the use of Wind Energy Conversion Systems.

The advantages of installations at the tops of high-rise structures (where wind speeds are higher than at ground level) and of flexibility in meeting the full spectrum of energy demands of multiple users, are evaluated against safety, environmental, cost, and institutional considerations, especially in relation to the service utility grid. These analyses can be made best by controlled "hands on" demonstrations conducted cooperatively with the consumers and the utilities, both of which have expressed the desire to work together in this project.

Category	Education
State	NY
Project Name	RPI Energy Curriculum
Organization	Rensselaer Polytech Institute
Address	Peoples & Burdett Ave. Troy, NY 12181
Contact	Professor Robert Duffy
Telephone	(518) 270-6260
Funded By	NYSERDA
Cost	\$50,000
Congressional District	XXIX
Compilation Date	February 1980

To identify technological, community, economical, industrial, legal, and proprietary barriers in urban settings, many issues need to be examined. Among them are building code reform, safety and housing law modification, zoning changes, contractual arrangements, wind obstructions and access, monopolistic legislation, environmental restrictions, interference with communications, tax shelters and other incentives, insurance requirements, and development of uniform model statutes.

Renewable Resources— A National Catalog of Model Projects

The Secondary School Solar Energy Curriculum is a cooperative effort of science educators and scientists that has developed a comprehensive Solar Energy Curriculum for Grades 7 to 12. The curriculum, which was developed by the New York State Department of Education and the Atmospheric Science Research Center at the State University of New York at Albany with support from the U.S. Department of Energy (DOE), is now available for national distribution.

The Secondary School Solar Energy Curriculum, designed for integration into existing science classes, was developed by 80 secondary school science teachers working with technical and educational experts. Field-tested nationally during the 1978-79 school year, the curriculum includes a teacher's guide, 43 classroom activities, a text, and reader. The activities are arranged in five packets according to subject area: Junior High Science, General Solar Topics, Earth Science, Chemistry and Physics, and Biology. Each activity includes directions to the student and explanatory information for the teacher.

Supportive materials include the solar energy text, the reader, and the teacher's guide, which includes plans for integrating the activities, directions for constructing solar demonstration projects, a solar bibliography, and solar activity ideas for the non-science teacher.

Although each activity contains a teacher-resource section, the text, written for teachers, is available to those who want more comprehensive information on the technical, social, and economic aspects of solar technology. The text also provides the framework for a short course in solar energy.

All components of the curriculum are available from the U.S. Government Printing Office, Washington, D.C. 20402.

Category Education
State NY
Project Name Solar Energy Curriculum

Organization NYS Department of Education
Address NYS Dept. of Education
Washington Avenue
Albany, NY 12234
Contact Dale Westcott
Telephone (518) 456-6010

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

Renewable Resources— A National Catalog of Model Projects

The TARP wind energy system is a unique application of wind power that requires no tower and can be adapted to a wide variety of common base structures. For example, TARP may be interfaced directly with off-shore platforms, high rise buildings, water storage tanks, communication stations, silos, highway illumination or even a self-sufficient residence. The augmentor increases the flow of air to the rotors, thereby requiring smaller ones producing more power. It also has partial shielding, providing greater safety.

Category	Education
State	NY
Project Name	TARP Wind Energy System
Organization	Rensselaer Polytechnic Institute
Address	People & Burdett Ave. Troy, NY 12181
Contact	Alfred L. Weisbrich
Telephone	(518) 270-6260
Funded By	n/a
Cost	n/a
Congressional District	XXIX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Thermal Diagnostic Workshop is an energy audit program that provides homeowners with an educational experience aimed at motivating them to reduce the heat loss in their homes. The Workshop Program, which began in January of 1977 with an energy-conservation workshop, uses a system of simple numerical relations to illustrate the relative severity of heat loss throughout the home. The workshop extends the analysis to cover improvement opportunities ignored in many energy-audit procedures.

One of the organizers of the Thermal Diagnostic Workshop, Denis Lamoureux, along with the Energy/Shelter Interest Group of the Cooperative Self-Reliance Campaign of the Center for Environmental Options, has trained a team of home energy auditors and developed a program of home energy workshops.

The Thermal Diagnostic Workshop has also published an adult-education workbook entitled All Through the House for use by school, neighborhood, and church groups.

Category Education
State NY
Project Name Thermal Diagnostic Workshop

Organization The Thermal Diagnostic Workshop

Address 196 Morton Avenue
Albany, NY 12202

Contact John A. Oster, Jr.

Telephone (518) 472-9760

Funded By Lamoureux Construction, Inc.

Cost Open

Congressional District XXVIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State NY
Project Name Wagner College Solar Energy Demonstration Project

Organization Wagner College
Address Grymes Hill
Staten Island, NY
10301
Contact Dr. E. Thomas Henkel
Telephone (212) 390-3049

Funded By NYSERDA, Brooklyn
Union Gas Co., Con-
solidated Edison Co.

Cost \$1,088,730

Congressional District XVII

Compilation Date February 1980

The Wagner College Solar Energy Demonstration Project is the largest in New York City, and one of the largest in the Northeast and of the New York State Energy Research and Development Authority. It will demonstrate a new, highly efficient evacuated-tube collector with a heat-exchange loop for back-up heat. The project is one of a few to retrofit a solar system to existing cooling equipment. The system, located in the Science Hall and Communications Center Complex on Staten Island, will heat 84,000 square feet of floor area and provide domestic hot water.

The solar collector field consists of 792 drainable evacuated-tube collectors (12,800 square feet), mounted on top of a 22,000 square foot platform constructed over the parking lot adjacent to the Science Hall. Potable water (180 gpm at temperatures of 190 degrees F to 240 degrees F) is delivered to a 20,000-gallon insulated storage tank. The solar-heated water is circulated through the buildings' heating systems with a conventional medium-temperature water system as back-up.

The cooling system of solar-heated water powers a 350-ton absorption water chiller operating at 150-200 tons, with a conventional medium temperature water system as back-up. The control system consists of two micro-processors for the solar system control, energy management, and data acquisition.

Energy conservation measures and the solar system are expected to save approximately 65 percent of the present heating and cooling load, providing a payback of the entire system in about 13 years, assuming a ten percent per year increase in energy costs.

The Wagner project, highly visible and easily accessible, is expected to accomplish a number of

goals: demonstrating the feasibility and advantages of harnessing solar energy in the New York City area; demonstrating the feasibility of retrofitting existing buildings and absorption air-conditioning systems for solar energy; providing an opportunity to research the problems associated with building costs and construction techniques and materials; and becoming an important public education tool.

Renewable Resources— A National Catalog of Model Projects

Category Education
State NY
Project Name Wind and Solar Power Project

Organization West Seneca East Senior High School

Address 4760 Seneca Street
West Seneca, NY 14224

Contact C. David Gierke

Telephone (716) 674-5300
Ext. 310

Funded By Energy Research and Development Administration (\$ 2,000);
Donations (\$11,000)

Cost \$13,000

Congressional District XXXVIII

Compilation Date February 1980

Although they were the only high school in a field of 80, competing against 79 of the nation's best engineering colleges and universities, the eight students from West Seneca East Senior High School who went to Richland, Washington, in 1977 for the Student Competitions on Relevant Engineering Energy Resource Alternatives (SCORE ERA II) weren't intimidated, nor should they have been. West Seneca's Automatic Tracking Parabolic Concentrating Solar Collector and American Chalk Wind Turbine were awarded the grand prize in the Combined Systems Division.

The prize winner consisted of an 8-foot diameter automatic tracking parabolic concentrating solar collector, lined with 1994 2 inches square plate glass mirrors and a 12 ft. American Chalk Wind Turbine. Both systems were engineered to produce electricity. Judging was based upon machine performance criteria and three oral presentations before a panel of experts on cost analysis, marketability, and innovative utilization of current technology.

Unofficially, many of the judges evaluated their entry as the most professionally engineered and fabricated apparatus seen at the competition.

West Seneca East's Energy Technology curriculum has been in operation since 1969 and now includes a thorough introduction to energy technology, plus courses in wind and solar power, transportation, experimentation with energy systems, internal combustion engines, and energy and the environment. The next competition that the school plans to be engaged in also involves renewable energy--peddle power. It is attempting to break the world speed record for bicycles.

Renewable Resources— A National Catalog of Model Projects

The New York State Energy Research and Development Authority sponsored a Passive Residence Design Competition and Construction Demonstration of single-, two-family, and town-house residential projects that incorporate the use of energy conservation and passive solar energy measures. The primary objective of this competition was to provide an incentive for designers, builders, and developers in the residential, new, and retrofit market to consider passive approaches that minimize energy use, make effective use of passive energy conservation, and optimize solar building designs.

Many active systems have been developed, and marketing information has been prepared and distributed by solar equipment manufacturers as part of their sales program. But no such marketing constituency has been developed for passive projects, so it is to this void that the competition is addressed.

Over the past several years, increasing attention has been focused on passive solar concepts because numerous cost-benefit analyses have shown them to be substantially cost-effective. As a result, NYSERDA is initiating a broad-based research, development, and demonstration program to promote a wide-scale acceptance of passive design principles and to develop a broader spectrum of residential designs tailored to New York climates.

Awards of \$10,000 were made to selected teams of designers and builders. Their designs are to be published in a catalog, which will be distributed at both the state and national levels.

Category	Industrial
State	NY
Project Name	Design Competition & Construction Demonstration
Organization	NY State Energy Research & Development Authority
Address	Agency Bldg., #2 Nelson A. Rockefeller State Plaza Albany, NY 12223
Contact	James Barone
Telephone	(518) 465-6251
Funded By	NY State Energy Research & Development Authority
Cost	\$160,000
Congressional District	State-wide
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

A prototype wind energy generator system, the Alcoa (or Agway) Project, is mounted on a silo located in an open field near the Potsdam Airport. The generator is capable of generating up to twelve kilowatts of electricity. Construction began in the summer of 1978, and the system began operating in the fall of the same year.

Designed to be mounted on existing silos, this unusual 'Darrieus' system resembles a giant eggbeater, 30 feet high and 18 feet in diameter. It is cantilevered, rather than secured to the ground with guy wires, and it has special provisions for withstanding severe winter conditions. Its unique vertical-axis design enables it to receive wind from all directions, unlike most stationary, propeller-type models. Its special design and silo mount should make it cheaper to install, sturdier, and more accessible for maintenance and repair. Atop the silo, winds are more constant and free from the obstruction of nearby buildings.

The first phase of the project was conducted at Clarkson College under the leadership of Dr. Edward Kear, who conceived the idea of the silo mounting. The next phase of the project involved the installation of another Darrieus wind turbine on top of a 60-foot silo located at the Agway Farm Research Center in Fabius and another unit erected on a pedestal on a commercial farm in Pennsylvania, late in 1979.

Category Industrial
State NY
Project Name Prototype Wind Energy System

Organization Clarkson College of Technology, Agway and many others
Address Department of Mechanical & Industrial Engineering
Potsdam, NY 13676

Contact Dr. Edward B. Kear

Telephone (315) 268-2321

Funded By Nine Private Companies

Cost n/a

Congressional District XXX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Alumni House Conference Center on the University of Albany Campus is an 8,000 square foot building that combines contemporary architecture with experimental, energy-conserving solar heating systems. Besides serving as a conference center and housing offices, it is designed to facilitate the testing of energy-conserving solar heating systems, both passive and active.

Energy was conserved by incorporating high insulation standards, maximum use of a minimum amount of glass, insulating glazing, adjustable lighting levels, adjustable ventilation rates, weather-tight construction techniques, and other passive solar details. Siting was also fine-tuned to the micro-climate.

The project was conceived to examine the merits of heat-pump assist for solar heating and to compare the performance of a solar-assisted heat pump and a more conventional air source heat pump.

Three heating systems have been tested from 1977 to 1979. These were: direct solar heating system composed of liquid flat-plate collectors, water storage, and electric auxiliary; a solar assisted heat pump system that utilizes the direct solar system with heat pump assist; and an air source heat pump system. The solar-assisted heat pump was a modified heat-reclaim chiller (a water-to-water heat pump).

Another phase of the Alumni House project involves an investigation of the impact of a solar energy heat pump system on the peak-load demands of the utilities.

Critique/analysis: Analysis of the solar-assisted heat pump system has identified potential for improvement with respect to both performance and cost-effectiveness.

Category	Institutional
State	NY
Project Name	Alumni House Conference Center
Organization	Atmospheric Sci Research Center
Address	ESB, Room 324 St. Univ. of NY 1400 Washington Ave. Albany, NY 12222
Contact	Ronald Stuart
Telephone	(518) 457-7584
Funded By	n/a
Cost	n/a
Congressional District	XXVIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Ballston Spa Middle School Project is one of the largest solar space-and water-heating systems in the world. This demonstration has been designed to retrofit a building, typical of recent construction, with adequate conservation measures as well as a renewable energy system that is readily and economically replicable in similar buildings. This 136,000 square foot school contains more than eighty independently controlled heating, cooling, and ventilating systems.

The unique component of the project is a new maintenance-free, lightweight collector box made of low-cost fiberglass and a very inexpensive, light-weight tube and sheet copper absorber plate. Although this collector system could be easily roof-mounted, problems discovered on the roof of this particular building and other considerations made ground-mounting it on a "pole barn" type structure the wiser option.

The system is basically designed to collect energy on an array of flat-plate solar collectors with a total aperture of 18,000 square feet. The heat transfer fluid (plain water) is maintained in two 15,000-gallon storage tanks located on the ground adjacent to the array.

The site work and plumbing have been so designed as to allow for the simple retrofit of a third storage tank of similar size and configuration to the two existing ones. When installed, the third tank will have electrical elements to provide the complete back-up requirement. This project will replace the present sophisticated and failing back-up system, and, if the utility provides an off-peak rate, allow a constant charge to the back-up at a cost far less than would normally be paid for back-up heating.

It is estimated that the solar and conservation measures will supply about 64 percent of the space heating and 88 percent of the hot water, and, through increased ventilation, that the cooling load can be eliminated. The estimated payback

Category	Institutional
State	NY
Project Name	Ballston Spa Central School District
Organization	Ballston Spa Central School District
Address	70 Malta Avenue Ballston Spa, NY 12020
Contact	Brian E. May
Telephone	(518) 885-5361
Funded By	NYSERDA, DOE, NYS Ed. Dept.; the Sch. Dist.; Equipment Contractor
Cost	\$806,473
Congressional District	XXIX
Compilation Date	February 1980

period, discounting interest on the loan and inflation, is 15 years. It is also estimated that the systems can be duplicated at another school for half the cost.

Upon the completion of this project, dissemination activities will include articles in newspapers and trade journals, demonstrations at the school site for school building superintendents and other officials, and seminars for architects, building trade groups, and district education planners.

Renewable Resources— A National Catalog of Model Projects

The Cary Aboretum's Plant Science Building is an environmentally sensitive and energy-efficient structure that integrates environmental, ecological, and engineering aspects. Very careful consideration was given to placing the structure so as to take maximum advantage of the terrain's natural characteristics while minimizing any deleterious effects.

The building is nestled against deep woodlands, sheltered by a range of small hills. Roughly two-thirds underground, it has natural insulation. Energy for the Plant Science Building is almost totally supplied by the sun via roof-top solar collectors, which are the building's most striking feature.

Arranged in a sawtooth pattern on the roof, the seven rows of collectors cover a total area of 5,650 square feet. A mixture of antifreeze and water circulating inside the collectors is warmed and then transfers the heat by means of a heat exchanger to water stored in underground tanks. The hot water is released from these tanks into a series of heating coils, and fans circulate air over the coils. This warm air is, in turn, circulated through the building's ducts. But approximately 85 percent of the sun's heat is used directly, without aid from the solar assisted heat pump.

The building is cooled by a combination of evaporation (from nearby trees, roof overhangs on the south side of the structure, thick insulation, the cooling effect of the earth against the walls,) and, most importantly, direct use of well water to cool the air.

The environmental systems in the building are interconnected to allow selection (according to weather conditions) of one of 12 different methods of operation.

table
Category	Institutional
State	NY
Project Name	Plant Science Building

table
| Organization | The Cary Aboretum |

table
| Address | Box AB Millbrook, NY 12545 |

table
| Contact | Daniel F. Brown or Jeanette K. Gorman |

table
| Telephone | (914) 471-4500 (914) 677-5343 |

table
| Funded By | Mary Flagler Cary Charitable Trust and other sources |

table
| Cost | \$2,354,800 (estimate) |

table
| Congressional District | XXV |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

Category Institutional

State NY

Project Name Solar Town Hall

Organization Advance Cooling Mfg.
Corp.

Address P.O. Box 387
Rt. 146
Clifton Park, NY 12065

Contact Edward J. O'Hanlon

Telephone (518) 371-2140

Funded By U.S. Dept of Commerce—
Eco. Dev.; Fed Rev.
Shar. funds., sale of
old Town Hall

Cost \$723,777 (for 16,000
square feet)

Congressional District XXIX

Compilation Date February 1980

The nation's first solar operated Town Hall, located at Halfmoon, NY (designated by the NY State Legislature as Solar Town, U.S.A.), is a well oriented, heavily insulated solar collector. The south-facing windows receive the sun's rays, and conduction and convection move heat into the storage medium below the floor ("Solarbank"), which radiates heat during the night and on sunless days to provide comfortable conditions.

This new Town Hall is a "Zero energy" solar building. It runs on heat from the sun, from human beings, and from lights. Solar energy also provides water-heating and heat for the building's occupants. The structure is cooled with air from the outside, which enters the building through "Capelators" or through an underground bed of ice below a tower.

Basically, the system works in two ways-- it captures and stores solar energy in much the same way a battery works; and during times of heat accumulation, the building is designed to rid itself automatically of excess heat. One innovative feature of this building is the ability to move heat downward without the use of electricity, pumps, or devices. Since absolutely no maintenance is required, the system should last indefinitely.

The building's components and a 2500-ton sand "Solarbank" containing 68,000 gallons of water provide thermal storage. Four underground concrete vaults that are insulated with four-inch-thick "Zerotherm" use SO₂ to make and store ice during the winter for summer cooling. These represent unique patent-pending ideas within this building. Heating and air conditioning rely on both the sun and nocturnal irradiational cooling.

The measurement of a successful solar and energy-conservation demonstration should be the total purchased power consumed. Given the data from the first year of operation,

the total energy consumed for heating, cooling, appliances and lights should not exceed 15¢ per square foot per year. The Town of Halfmoon expects to set a standard of low energy use that will induce other communities to match their performance.

Renewable Resources— A National Catalog of Model Projects

The Syracuse Savings Bank's Onondaga Hill office has its electric, heating, and air conditioning requirements partially met by solar energy. The system, believed the first of its kind installed by a savings institution, features a series of solar collectors housed in a sealed, weather-tight roof exposure.

The conical collectors have mirror-like reflective surfaces that collect the solar energy, which is subsequently transferred to photovoltaic cells. A deviation type tracking system enables the collectors to automatically change position to accommodate the seasonal declination changes.

The cells are capable of providing in excess of 1,000 peak watts of electrical energy, as well as eight kilowatts of thermal energy—nearly 50 percent of the daily electrical and heating requirements of the building. The module is connected to a 25 kilowatt battery-storage system, the energy from which is used for lighting (thus eliminating the need for an inverter).

The heat produced by the collectors is captured in the sealed roof area and propelled by fans through the heating system as required.

One of the most important aspects of the bank's system design is that it is a dry system capable of producing both electrical and thermal energy. Bank customers and visitors are able to inspect the system, which has a monitoring system to measure the electrical and thermal energy being produced, used, and stored. A permanent lobby display on solar energy is also present.

Category Institutional
State NY
Project Name Syracuse Savings Bank

Organization Syracuse Savings
Address One Clinton Square
P.O. Box 4821
Syracuse, NY 13221
Contact Frederick G. Schwartz
Telephone (315) 471-7101

Funded By Syracuse Savings Bank
Cost \$17,000 (Solar System only)
Congressional District XXXI
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The headquarters of WKBW-TV, Channel 7, falo, is an energy-efficient building that uses no fuel specifically for space conditioning or water heating. (It has only an emergency back-up electric coil for prolonged subzero periods.) The system has been built to be aesthetically pleasing and cost effective.

Much heat is generated by the equipment in the TV facility by normal lighting, by virtually all the machines, and by people's body heat. This heat is captured and stored in a simple heat-exchange system of a closed-loop water-cycle consisting of 32 air-to-water heat exchangers connected on one long, meandering piece of plumbing.

This system not only heats the living environment; it also takes heat out, to absorb it and store it. Storage consists of two 10,000-gallon orange tanks from which water flows throughout the closed-loop system and back again. In the summer, the heat-exchange system therefore becomes an air-conditioner, shedding heat with its sleek, reflective, stainless-steel siding.

The purpose of the two-story design is to optimize the efficiency of the studio operations, make the building energy-efficient, and make the project cost-efficient (i.e., keep its costs down to those of conventional, energy-inefficient buildings). It is expected that the heat-exchange system will pay for itself in four to five years.

Plans have also been made to install two large Darieus (vertical-axis) windmills to meet at least part of the station's large electrical demands. With the successful operation of its new offices and studios, Channel 7 hopes nearly to eliminate energy expenditures, to generate further interest and commitment to similar projects in Buffalo, and to demonstrate convincingly that energy efficiency in the private sector can be creative, successful, profitable, and unregulated.

Category	Institutional
State	NY
Project Name	WKBW-TV Energy-Efficient Building
Organization	Stieglitz, Stieglitz, and Tries (Architects)
Address	487 Delaware Avenue Buffalo, NY 14202
Contact	David T. Stieglitz
Telephone	(716) 881-6338
Funded By	Private
Cost	n/a
Congressional District	XXXVII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Legislation
State NY
Project Name Home Insulation & Energy Conservation Act

The Home Insulation and Energy Conservation Act, signed into law in August of 1977, requires the nine major electric and gas utilities in New York State to offer energy audits to their customers and to arrange for utility-guaranteed financing for eligible customers to use to install energy conservation measures. Shortly after this program began in the state, the National Energy Conservation Policy Act was enacted. Among other things, the Act requires the nation's utilities to establish a program that closely parallels New York's.

The New York program is available to owners and, with certain restrictions, to occupants of one- to three-family residences who are electric or gas residential rate customers. Upon request, a customer can obtain an energy audit, and, if eligible, help in obtaining technical and financial assistance.

Energy Audit workbooks are available from the utilities, the Energy Office and in many public displays (shopping centers, banks, fairs etc.). One can compile the audit and have the utility process it for a \$3 fee or have a complete on-site audit for a \$10 fee. The fee is waived for low-income customers.

The program provides loans to anyone taking energy conserving measures. The total cost of the project must be more than \$200, but not more than \$2,500 for a one-family, \$3,500 for a two-family, or \$4,000 for a three-family house. The project—any combination of energy conservation measures—must have a pay-back period of less than seven years. The interest rate is the overall rate of return that is allowed to the utility. The loan is repaid in up to seven years, with a minimum monthly payment of \$10.

Organization N.Y.S. Department Public Service
Address Agency Building, #3 Albany, NY 12223
Contact Shirley Anderson
Telephone (518) 474-1931
Funded By The Public Utilities
Cost n/a
Congressional District State-wide
Compilation Date February 1980

Anyone obtaining an audit is under no obligation to have the recommended work done or have it be financed through the program. The work may be completed by the utility as a contractor, a subcontractor of the utility, a contractor from the utility's recommended list, or by the homeowner. But it must be done according to recommended standards and there are random inspections.

Renewable Resources— A National Catalog of Model Projects

The Energy Task Force (ETF) is a small group of architects, engineers, and educators who have been struggling to provide energy advice and assistance to New York City's low-income residents, especially those in multi-family dwellings. Working with homesteaders who are rehabilitating abandoned buildings, they have established energy-conservation practices and built solar energy and windmill systems that exemplify energy efficiency. The approach has been to attack basic energy problems at the neighborhood level, using technologies that are accessible and ready for application.

The Energy Task Force began in 1975 with an idea that at that time was considered novel—that rising fuel costs are the major cause of building abandonment. With the aim of reducing fuel costs for low-income co-ops, ETF has conducted conservation retrofit experiments (see Occupied Building Energy Retrofit), started an energy audit service, and constructed active and passive solar heating systems (see CUANDO Solar Wall).

The struggle to develop, finance, and carry out this work has shown that appropriate technology must be an integrated part of neighborhood revitalization plans. ETF is committed to showing low-income people how the energy crisis contributed to local problems and ways they can use technology as a tool to solve those problems. The Task Force therefore conducts job-training programs to transfer technical skills and is developing a community-based business to employ trainees and serve local needs. Finally, ETF serves as an advocate, communicating the energy concerns of the urban poor to policy-makers and the public. Their in-the-field experiences have pointed out problems, issues and potentials for the continued growth of appropriate energy systems and demonstrate that alternative technology can make important contributions to urban environments.

Category Low Income
State NY
Project Name Energy Task Force

Organization Energy Task Force
Address 156 Fifth Avenue, #825
New York, NY 10011
Contact Margaret Morgan
Telephone (212) 675-1920

Funded By Varied
Cost Varies
Congressional District XVIII
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

An Occupied Building Energy Retrofit conservation plan instituted by the Energy Task Force (ETF) allowed members of a low-income co-op to avoid relocating.

Members of the co-op, which is located at 219 East Fourth Street on the Lower East Side, were on the verge of giving up their home because of skyrocketing fuel costs. But the retrofitting of the building, which involved the repair and sealing of the windows, the addition of insulation, the cleaning and upgrading of the heating system, the installation of hot water flow-reduction valves, and the use of other fairly simple techniques, cut fuel consumption by more than 50 percent. Fuel savings this past winter were expected to total 3,600 gallons of oil, or about \$2,880 at 80 cents a gallon.

Through the work done at 219 East Fourth Street, the Energy Task Force has developed an energy retrofit strategy for occupied buildings.

Category Low Income
State NY
Project Name Occupied Building Energy Retrofit

Organization Energy Task Force

Address 156 Fifth Avenue, #825
New York, NY 10011

Contact Mary Christianson

Telephone (212) 675-1920

Funded By Community Services Administration

Cost n/a

Congressional District City-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The SUEDE - Solar Utilization, Economic Development and Employment Project - is the Energy Task Force's (ETF) largest project. It is part of a national program to build solar heating systems in low-income neighborhoods while training solar technicians at the same time. Fifteen low-income people, mostly of minority groups, are the first solar mechanics in NYC. They are installing a dozen varied solar systems. One-half of the installations are on single- or two-family homes, some are large- and medium-scale systems, and some are passive wall-heating systems similar to the CUANDO Solar Wall.

SUEDE is working closely with equity housing groups by employing former equity workers and by selecting project sites at which local groups become fully involved in the design, maintenance, and monitoring of the systems.

The long-range plan is for SUEDE to evolve into a community-based solar installation and maintenance business.

The Solar Utilization, Economic Development and Employment Project (SUEDE) is a cooperative federal program funded in 1978 by the DOE, CSA, and DOL. The SUEDE Program was designed to provide employment and on-the-job training in assembly and installation of solar equipment on dwellings of low-income families.

Category Low Income
State NY
Project Name SUEDE Low Income Solar Project

Organization Energy Task Force

Address 156 Fifth Avenue
Suite 825
New York, NY 10011

Contact Robert K. Bedell

Telephone (212) 675-1920

Funded By CSA, DOE, DOL

Cost \$448,000

Congressional District City-wide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Upper Hudson Regional Energy Program (UHREP) is a facilitating organization responsible for coordinating resources and expertise for the benefit of low income energy consumers in a nine-county area of upper Hudson Valley. UHREP believes that appropriate technology offers the poor an important opportunity to increase their self-reliance and to reduce their dependence on markets that have traditionally exploited them.

Some projects under way are: Albany County Opportunity, an appropriate technology project conducted jointly with the Albany County Department of Employment and Training; a Grist Mill project in Rensselaerville; a Wood for Fuel Project along with wood-stove seminars in Schoharie; a Furnace Tune-up Project; and an Appropriate Technology Information Center.

Category Low Income
State NY
Project Name Upper Hudson Regional Energy Program

Organization Upper Hudson Regional Energy Program

Address 258 Broadway
Troy, NY 12180

Contact John Ahearn

Telephone (518) 272-6020

Funded By CSA and New York State
Division of Economic Opportunity

Cost Varies

Congressional District XXVIII, XXIX
and XXXI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Westchester Co-Op Solarization Project was an experimental solar energy program that involved the installation of solar hot water systems in weatherized homes. The major stipulations were that C.E.T.A. laborers employed by the project be trained in basic solar technology and that the units be installed on low income, privately-owned homes in Westchester County. The goals were two-fold: to expose people to renewable methods of energy production and to aid low income persons in the battle against rising fuel costs by providing solar heated water.

In June of 1979, the first shop-made collectors were installed. Because of budgetary restrictions, the systems could not be built to size according to individual needs. Each unit consisted of two collectors, a 40-gallon aqua-coil heat exchanger, a differential thermostatic control, a circulating pump and a set of mounting racks and brackets. The time required for a system was about two weeks—one week to build the collectors and another to install them. The cost of the sytem varied greatly with each installation, depending on the location of the tank in relation to the collectors. The cost of materials, however, averaged \$1,000 per system, excluding labor. By the end of October (the end of the program), eight completed systems had been installed in various parts of the county.

Critique/analysis: The units have been successful. During the summer and early fall months, the water heated by the systems reached temperatures of 175 degrees. Even during the winter, systems will work effectively as a pre-heat unit. The actual savings have not been computed but based on the temperature reading it has been substantial, with estimates of up to 80 percent.

Category	Low Income
State	NY
Project Name	The Westchester Community Opportunity Program
Organization	The Westchester Community Opportunity Program
Address	105 Wilday St. Tarrytown, NY 10591
Contact	Cathy Edwards
Telephone	(914) 332-1068
Funded By	The Westchester Office of Manpower
Cost	n/a
Congressional District	XXIII through XXV
Compilation Date	February 1980

An even more viable success than any monetary savings has been the use of a few of the installations as field trips for science, current events and grade school classes. Members of the community who are do-it-yourselfers have come to the project in need of some technical assistance. On the whole, the impact of this project on the community has been very beneficial.

Obstacles were confronted in this project, though. The most restrictive aspect of each installation was the cost of the licensed master plumber to make the required hook-up to the tank and the connection of the controller. There were also some major delays in getting building permits in two of the towns, due to the inexperience of the building departments with solar energy. The difficulty of obtaining some materials needed to complete the systems was another drawback.

One of the aims of this project was to try more than one type of system. The follow-through of this aim led to the only failure. One unit was installed as a draindown system with a second tank. Unfortunately, the existing water tank did not have the storage capacity needed so there were no significant savings.

Renewable Resources— A National Catalog of Model Projects

The New York State Energy Conservation Plan (SECP) was developed and begun in 1977 to reduce the State's overall energy consumption by at least seven percent by 1980. It involves the implementation of energy savings across all energy-consuming sectors by employing 25 specific programs and strategies.

The programs are designed to: increase energy efficiency in state buildings and operations; promote furnace/boiler inspections, tune-ups, and the installation of energy-saving devices; offer energy advice to industry; promote energy conservation in the agricultural sector; increase the energy awareness of local governments; support a comprehensive solar commercialization effort; and promote the development of indigenous renewable resources.

Codes on efficient lighting and construction (thermal efficiency), a home audit program, transportation systems management, vanpooling/carpooling, weatherization for low-income people, pilot light ban, review of state and local codes, individual metering of multi-family dwellings, and utility efficiency programs have been established.

Efforts are also being made to increase the availability of funds for conservation-investment programs, and conduct policy research.

Category State
State NY
Project Name New York State Energy Conservation Plan

Organization New York State Energy Office (SEO)

Address 2 Rockefeller Plaza
Albany, NY 12223

Contact Staff

Telephone (800) 342-3722
(518) 473-4888

Funded By United States
Department of Energy

Cost Varies Yearly

Congressional District Statewide

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category State
State NY
Project Name NYS Energy Research
and Development
Authority (NYSERDA)

The New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation of the State of New York, is one of the nation's leading state-operated energy research, development, and demonstration organizations. NYSERDA's programs are directed at developing and implementing new energy technologies consistent with economic, social and environmental objectives, and at developing and encouraging energy conservation technologies. Broadly stated, NYSERDA works to achieve two fundamental goals: increasing new energy supplies and reducing energy demands. Its programs emphasize both the development of New York's indigenous and renewable energy sources, including water, wind, solar, biomass, and geothermal; and using energy more efficiently in all sectors of the economy.

In its role as a developer of new technologies, NYSERDA acts principally as a catalyst, moving large research and development organizations to action by providing technical leadership. Programs stem from research originated both inside and outside the Authority, whose staff develop projects with private industry, the utilities, academic institutions and the federal government. Substantial outside support contributes to the overall funding of NYSERDA-sponsored projects, with a current ratio of outside funds to NYSERDA funds of 10-1.

NYSERDA is governed by a 12-member Board of Directors, consisting of four state agency heads who are permanent ex-officio members, and eight individuals appointed to six-year terms by the Governor with the advice and consent of the Senate. These serve without compensation. Gubernatorial appointees must include an engineer or research scientist, an economist, a representative of a non-profit environmental group, a representative of a non-profit consumer group, and an officer of an electric utility. The State Energy Commissioner, James L. Larocca, serves as Chairman.

Organization New York State Energy
Research and Develop-
ment Authority
Address Agency Building #2
Rockefeller Plaza
Albany, NY 12223
Contact Charles D. McKirney
Telephone (518) 465-6251

Funded By Assessments against
intrastate sales of
gas and electric
utilities
Cost Varies
Congressional District Statewide
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category State

State NY

Project Name NYSERDA Small
Hydropower Project

The New York State Energy Research and Development Authority's Small Hydropower Project is a comprehensive program to develop, restore, and expand hydropower sites in the state. It is estimated that New York State has potential sites for small hydro-electric plants that could produce power equivalent to that of three large conventional electric generating plants and could add three thousand megawatts to the electric capacity of the state's energy system, the equivalent of ten percent of its present capacity. NYSERDA announced a program to develop this potential as rapidly as possible in December, 1978. As part of the plan, it sponsored a statewide conference on small hydropower opportunities for potential developers and for manufacturers of hydro-electric equipment.

This program grew from NYSERDA's inventory of the state's small or low-head hydropower capacity. The initial stage of that inventory, completed in the summer of 1978, included assessment of over 1700 sites with a potential of at least fifty kilowatts each. Half of these would require little or no rehabilitation of existing engineering, little or no storage, and minimal change in the river.

The principal objective of the program is to demonstrate the economic feasibility, the environmental compatibility, and the positive contribution of small hydropower to the state's overall production. Many projects are already in progress or finished. A demonstration program is underway for nine sites with existing dams and generating facilities that have been shut down.

To further ensure that small hydropower will be given the best possible chance, NYSERDA is taking steps to provide potential developers with technical and financial services, including effective coordination among government agencies, utilities, and interested parties, assistance to developers in finding capital funding, help in dealing with institutional barriers, and the establishment of information programs.

Organization NYS Energy Research
and Development
Authority

Address Agency Building #2
Rockefeller Plaza
Albany, NY 12223

Contact Stephen Burke

Telephone (518) 465-6251

Funded By DOE and the Authority

Cost Varies

Congressional District Statewide

Compilation Date February 1980

Meanwhile, the site inventory is being enlarged and expanded; sites are being reviewed and classified for development and owners' interest is being determined. Research is continuing into ways to make more effective use of New York's small hydropower sites.

These studies have shown a number of benefits small hydro can bring besides increased energy supplies. Some of the sites are now operated by industries which can expand their work forces if power was increased at a reasonable cost. Other sites will permit the revival of old industries or can create new ones. Municipal governments may be able to stabilize their power costs through small hydropower, and, when reservoir storage is available, it may help utilities meet peak electric load requirements.

Renewable Resources— A National Catalog of Model Projects

The Fresh Kills Sanitary Landfill Fuel Gas Recovery Project on Staten Island is a demonstration landfill methane-extraction system that is providing valuable information of use to landfill operators throughout the state. This three-phase project is located on a 40-acre section of the 3,000-acre landfill composed of ordinary household and commercial waste stored 50 feet below the surface.

During the first phase, four 40-foot wells and eight pressure probe wells were installed. The wells were connected by plastic piping and a propane-fueled vacuum pump and vent stack (gas flare) were installed.

The second phase continued the gas extraction tests developed in Phase I. Optimum pumping rates and well radius-of-influence parameters were refined utilizing a new vacuum pump and other equipment installed at the site. Simultaneously, the normal methane-generation rate and release rate were modeled. Also, a laboratory gas-firing test program was conducted: combustion tests were made using the landfill gas in various gas burners and appliances.

Phase three involves a demonstration of electricity generation at the test site using a gas-engine generator. The electricity will be used to supply part of the electric demand at the Fresh Kills barge-unloading facility. The program calls for design, construction, and operation of a 100-KW gas-engine generator at the landfill site.

A maximum sustained flow of approximately 72,000 ft³ per day was achieved when only one well operated at a time. The sustained flow of 200,000 ft³ per day was achieved when all four wells operated in parallel. This data compares most favorably to a flow of 200,000 to ten million ft³ per day usually extracted from typical

Category	Utility
State	NY
Project Name	Gas Recovery Project

Organization	Brooklyn Union G Company
Address	195 Montague Street Brooklyn, NY 11201
Contact	James Timlin
Telephone	(212) 643-2288

Funded By	NYSERDA & DOE
Cost	\$651,000
Congressional District	XVII
Compilation Date	February 1980

commercial natural gas wells that are generally 12,000 feet deep. Methane concentrations in the extracted gas ranged from 50 to 60 percent of the natural gas.

At the conclusion of this project, a manual oriented toward landfill owners and operators will be published to enable them to recover methane from the state's landfills.

In another section of the Fresh Kills Landfill, a privately funded commercial joint venture of Reserve Synthetic Fuels, Inc. and Getty Synthetic Fuels, Inc. will utilize 400 acres to produce methane as the first large-scale landfill gas-recovery project on the East coast.

Renewable Resources— A National Catalog of Model Projects

The Rockville Centre Municipal Power Plant is a pilot model demonstration project in cogeneration and waste-heat recovery. Mechanical Technology, Inc. (MTI) has designed, developed, fabricated, and installed the Binary Rankine Cycle System in this power generating plant. The system is unique in that it employs two commonly used power fluids--steam and freon--to recover heat from the exhaust of turbo-charged diesel engines. The use of the two fluids, which have different boiling points, permits each fluid to operate efficiently over a wide temperature range. It should also be noted that a relatively high efficiency recovery process is obtained without employing toxic, flammable, and/or explosive power fluids.

The recovery system is based on the fact that two-thirds of the heat energy released during a diesel engine's combustion process is not converted into electricity. Half of that amount is used to cool the system and prevent overheating, and the other half becomes waste heat that is discharged into the environment via the engine exhaust.

The system recovers 500 kilowatts from the exhaust of turbo-charged diesel engines used to generate electric power. It then uses the diesel exhaust gas, which has a temperature of 520 degrees, to generate steam at 430 degrees. Next, the exhaust from the steam turbine is used to vaporize the Freon, which in turn operates another turbine. The output of the two turbines provides enough power to drive a second generator.

Category Utility
State NY
Project Name The Rockville Centre Municipal Power Plant

Organization Mechanical Technology Inc. (MTI), Contractor
Address 968 Albany-Shaker Rd.
Latham, NY 12110
Contact Philip J. DiVirgilio
Telephone (518) 785-2211

Funded By DOE and NYSERDA

Cost \$1.8 million (for equipment plus R&D)

Congressional District IV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The 1980 Winter Olympics in Lake Placid, New York, demonstrated that solar energy can be tapped even in a snowy, winter wonderland. A photovoltaic system took over for the local utility grid, serving as the primary source of power for a telephone communications system linking the Olympics command center with the top of Whiteface Mountain, where the major downhill and slalom races were staged.

In the fall of 1979, twenty photovoltaic panels were mounted on the roof of Whiteface Ski Lodge, at the bottom of the mountain. Throughout the Olympics, this 400 peak-watt system provided back-up power for the telephone and radio communications systems that were installed to coordinate events and summon emergency aid.

Photovoltaic solar cells convert the sun's radiant energy directly into electricity without first converting it to heat or mechanical energy, as solar heat collectors do. The cells have no moving parts, generate no waste products, contain components with long lifetimes, require little or no maintenance, and provide an unlimited energy source.

The photovoltaic system's storage batteries, filled to the brim, were capable of providing enough power to run all of the events scheduled for Whiteface, even if clouds had prevailed throughout. The system and its storage batteries

also power the radio communications system two hours if the primary AC system had failed.

(In fact, the photovoltaic system was preferred by military technicians operating the radio gear because the AC power normally used produces a background hum that hampers radio transmissions while the DC photovoltaic system does not.)

Category Sports
State NY
Project Name Winter Olympics Photovoltaic System

Organization Northeast Solar Energy Center (NESEC)

Address 470 Atlantic Ave.
Boston, MA 02110

Contact Steve Nelson

Telephone (617) 292-9319

Funded By ARCO Solar, Inc.
U.S. Dept. of Energy

Cost n/a

Congressional District XXX

Compilation Date February 1980

PENNSYLVANIA

1. Bethlehem
2. Butler
3. Catawissa
4. Clifford
5. Coatsville
6. Cornwells Heights
7. Coudersport
8. Emporium
9. East Norriton
10. Farmington
11. Franklin
12. Glenmoore
13. Gettysburg
14. Harrisburg
15. Harrisville
16. Huntingdon
17. Lancaster
18. Lebanon
19. Lehigh Valley
20. McConnellsburg
21. Mont Clare
22. Norristown
23. Philadelphia
24. Pittsburgh
25. Pottstown
26. Schnecksville
27. State College
28. Stoneboro
29. Stony Run
30. Uniontown
31. Upper Darby
32. West Chester
33. White Hall
34. Williamsport
35. York

PENNSYLVANIA

TABLE OF CONTENTS

Agricultural

County Energy Coordinator	1
Solar Still	2

Cities

Philadelphia Comprehensive Community Energy Management Program ..	3
---	---

Commercial

Energy Design Associates	4
First Bank of Pennsylvania Goes Solar	5
Friendship Federal Savings & Loan	6

Community

Alternative Energy Cooperative	7
County Energy Office	8
Lancaster Solar Project	9
Lower Paxton Community Energy Management Plan	10
Practical Technology Club	11
Solar Greenhouse Workshop	12

Education

Alternate Energy Technology Curriculum	13
Alternative Energy "E-Lab"	14
Alternative Energy Fair	15
Butler County Teacher Energy Seminars	16
Central Pennsylvania Solar Group	17
College Building Retrofit	18
Community Energy Education Project	19
County Conservation Program	20
Energy Stewardship Program	21
Fourth Grade Solar Projects	22
High School Solar Experimental Program	23
Junior High School Solar Project	24
Lehigh Valley Manpower	25
Lehigh Valley Solar Energy Association	26
Mid-Atlantic Solar Energy Association (MASEA)	27
Mobile Solar Demo.	29
Options in Energy	30
Practical Technology & Curriculum Research	31

PENNSYLVANIA
TABLE OF CONTENTS
PAGE 2

Project CLUE	32
School Greenhouse and Wind Turbine	33
Seminar for Teachers	34
Solar Ceramics Kiln	35
Solar Demonstration Project	36
Solar Hardware Demonstration	37
Solar Heated Cold Frame	38
Solar Retreat	39
Solar Systems Theory & Lab	40
Solar Technicians School	41
Solar Water Heater Workshops	42

Legislation

City of York, Pennsylvania	43
York Conservation Program	44

Low Income

Philadelphia Home Weatherization Program	45
--	----

Outreach

County Energy Programs	46
County Energy Technician	47
Energy Conservation Service	48
Fulton County Cooperative Extension Service	50
Lancaster Solar Project	52
Lebanon County Energy Management Program	54
Solar Earth Shelter	55
Western Pennsylvania Solar Energy Ass'n.	56

Utility

Energy Conservation Cooperative	57
---------------------------------------	----

Renewable Resources— A National Catalog of Model Projects

Category Agricultural
State PA
Project Name County Energy
Coordinator

The Energy Coordinator of Huntingdon County has promoted alcohol production with local farmers. The lowest-cost production method found to date is the solar still. One solar still project in the area is in the experimental production stage. It may be in commercial operation in 1980.

The Energy Coordinator also distributes information on solar heating, solar cooking, insulation, wood heating, wind power, and water power.

Organization County Energy
Coordinator
Address c/o Frederick E.
Cuthbert
Court House
Huntingdon, PA
16652
Contact F. E. Cuthbert
Telephone (814) 643-6613

Funded By Huntingdon County
Commissioners

Cost \$1,000

Congressional District IX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A solar alcohol distillery capable of providing 100 to 250 gallons of alcohol daily is presently under construction in Harrisville. The fuel will be distributed to local farmers for farm use. This system is being adapted to an existing building with a metal roof. A radiant floor-heating system will also be built to aid in the sprouting of the corn so enzymes will not have to be used. The system is designed to operate during a seven-month period on small amounts of energy.

Category Agricultural

State PA

Project Name Solar Still

Organization Kriley Solar Distributors

Address R.D. #2, Box 2243
Harrisville, PA
16038

Contact Donald B. Kriley

Telephone (412) 735-4489

Funded By U.S. Department
of Energy

Cost \$25,000

Congressional District XXV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Comprehensive Community Energy Management Program (CCEMP) was founded by the Department of Energy to develop a plan for saving and creating energy, including solar energy, in the Philadelphia area.

The project's goals are to define energy consumption patterns, to set energy conservation and energy supply goals, and to evaluate alternative strategies for saving and creating energy in Philadelphia. The program will also draft and implement a city energy management action plan, and establish a new energy management organization.

Philadelphia was one of 17 municipalities selected to participate in the program, which will be monitored by the Department of Energy and the Academy for Contemporary Problems. Continued financial support will be contingent upon performance.

The project began in October of 1978, and is funded through September of 1980. Several project tasks are completed, including the development of a work program and the establishment of an energy-management organization. Also completed are a community energy audit and the formulation of local energy management goals.

Over the next year the program will evaluate alternative energy strategies for Philadelphia according to their availability and impact.

Category	Cities
State	PA
Project Name	Philadelphia Comprehensive Community Energy Management Program
Organization	Department of Energy
Address	1401 Arch St. Rm. 900 Philadelphia, PA 19101
Contact	Court Daspit
Telephone	(215) 686-8814
Funded By	Dept. of Energy
Cost	\$450,000 contract over two years
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Energy Design Associates is a young architectural firm dedicated to designing energy efficient buildings. The company specializes in earth-sheltered residences for middle-income families.

Category Commercial
State PA
Project Name Energy Design Associates

Organization Robert J. Kobet

Address Second Level
Diamond Building
Butler, PA 16001

Contact Robert J. Kobet

Telephone (412) 285-3444

Funded By n/a

Cost n/a

Congressional District XXV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The natural gas shortage of 1977 was a shock to officials of the First Bank of Pennsylvania which was forced to close 29 of its branch offices.

But the crisis prompted bank officials to take action on another plan for a 3,850 ft² solar-heated branch building, which was subsequently opened November 28 of 1978. Designed as an energy-conserving facility, the bank was also outfitted with solar-collection equipment, including active solar hot water and space-heating systems, and a heat pump.

The solar systems are designed to provide 60 percent of the heating and 80 percent of the building's hot water needs. Twenty-seven collectors provide 864 ft² of collector surface.

Construction took four months. The branch was ceremoniously inaugurated: a parabolic reflector was used to burn the ribbon.

Critique/analysis: Based on 1978 utility costs, average savings from the \$36,000 investment amount to \$4,300 annually or what would be about one-half the predicted energy bill with a conventional system. Officials expect the system to pay for itself in 8.3 years.

Category Commercial
State PA
Project Name First Bank of
Pennsylvania
Goes Solar

Organization First Bank of
Pennsylvania
Address c/o Robert J. Gross
NE Corner of Swede
Road & Rt. 422
E. Norriton, PA
18401
Contact Robert J. Gross
Telephone (215) 786-5000

Funded By First Bank of
Pennsylvania

Cost \$36,000

Congressional District XIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In an effort to reduce its dependence on outside fuel sources, the Friendship Federal Savings and Loan Association has constructed three branch offices that use solar energy as a primary heat source. Much public support and interest has been associated with the projects.

An active solar system retrofitted to the bank's Greensburg office roof supplies 60 percent of the building's space- and water-heating requirements.

An active collector array incorporated into the design of the partially earth-sheltered Ingomar office building supplies 60 percent of its space-heating and 80 percent of its water-heating requirements.

A passive system provides a major percentage of annual heating requirements for the Mercer Road office in Butler. Primary back-up for the system is a massive fireplace located in the lobby of the bank.

Category	Commercial
State	PA
Project Name	Friendship Federal Savings & Loan
Organization	Friendship Fede Savings & Loan
Address	217 N. Highland Mall Pittsburgh, PA 15206
Contact	Robert McCullough Manager of Marketing
Telephone	(412) 665-4000
Funded By	Friendship Federal Savings and Loan
Cost	n/a
Congressional District	XX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Alternative Energy Cooperative (AEC), sponsored by the Chester County and Southern Chester County chapters of the Keystone Alliance, provides free labor for alternative renewable energy system installations in Chester County.

The AEC's first project was to install a rebuilt wind generator on the Jonathan Inslee residence in September of 1979. About 50 AEC and Keystone members, curious neighbors and friends joined in the work. The installation was reportedly successful, and received prominent coverage in the local press.

Cost to Inslee for the generator and materials was \$2,000. The system is designed to provide complete domestic electricity service. A wood stove and solar hot water panels had previously been installed in the house.

The AEC will work on any residential project whether or not the project sponsor (the homeowner) reciprocates by volunteering labor for other projects. Members also help each other install energy devices on their own homes.

Critique/analysis: Ironically, the AEC's major problem has been in finding projects. It is now advertising in newspapers and participating in local alternative energy fairs.

Category	Community
State	PA
Project Name	Alternative Energy Cooperative

Organization	Alternative Energy Cooperative of Chester County
Address	c/o Jonathan Inslee 330 Country Club Rd. Coatsville, PA 19320
Contact	Jonathan Inslee
Telephone	(215) 384-2411

Funded By	Private
Cost	\$2,000
Congressional District	V & VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Coordinator for the Adams County Housing Authority has her hands full with a number of vitally-important programs, including working with community-action and migrant-program staffs to develop energy alternatives for the poor in Adams County.

Since her appointment in May of 1979, Susan Stoller has also contacted various community groups concerning solar access, earth-sheltered homes, alternative waste disposal and co-generation. She informed an audience at a senior citizens' center about weatherization and retrofitting.

Critique/analysis: The main problems with the project involve time and money. A greater financial commitment from any source would provide incentive and greater staff options, making the setting of long-range goals more realistic.

Category Community
State PA
Project Name County Energy Office

Organization Adams County Housing Authority
Address c/o Susan Stoller
Lincoln Square Bldg.
Gettysburg, PA 17325
Contact Susan Stoller
Telephone (717) 334-1518

Funded By CETA-PSE, Title II

Cost \$8,000

Congressional District XIX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Working with ten CETA workers, the six-person staff of the Lancaster Solar Project is now installing low-cost solar systems on low-income homes in Lancaster County. The project is committed to developing the most cost-effective systems for its clients, whose names all appear on a list of participants in a previous weatherization program.

The project tries to match the type of installation with the client's needs. For example, the project will not install a solar greenhouse retrofit on homes of people who do not garden.

Among the systems built or installed through the project are enclosed porches (materials cost \$200), solar hot air heaters for mobile homes, solar hot water systems, and greenhouse retrofits (\$500 for materials). The project members also construct simple solar air heater units for mobile homes. (The blackened trailer siding is used for the collector surface.) The system costs \$150 for two 4 foot by 8 foot panels.

Critique/analysis: The project is demonstrating that solar energy is affordable and effective. Fuel bill comparisons reportedly demonstrate that the installations work. Project officials are proud of the CETA workers. One crewleader is held his own solar workshops, and several other workers have benefitted from their training by receiving some commercial solar work. It has been noted that this type of project is not too expensive for a city or county to fund. Also noteworthy, the project has dealt successfully with and gradually won the support of other agencies.

Category	Community
State	PA
Project Name	Lancaster Solar Project
Organization	The Community Action Program of Lancaster County
Address	c/o Steven Steinbacher Director 127-133 N. Concord St. Lancaster, PA 17602
Contact	Steven Steinbacher
Telephone	(717) 299-7301
Funded By	SUEDE, CSA, HUD
Cost	\$81,581 (CETA) \$90,543 (CSA)
Congressional District	XVI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Lower Paxton Township, a community east of Harrisburg, has developed its own Community Energy Management Plan to define the town's energy needs and resources and to develop strategies for meeting future energy needs.

The plan, which is being prepared with the assistance of the Pennsylvania Department of Community Affairs' Bureau of Community Energy, will provide the framework for the community to prepare implementation strategies for selected energy conservation and management actions based on supply-and-demand records and projections. Recommendations will address the costs and benefits associated with implementation strategies.

Category	Community
State	PA
Project Name	Lower Paxton Community Energy Management Plan
Organization	Lower Paxton Town
Address	Bureau of Community Energy P.O. Box 156 Harrisburg, PA 17120
Contact	Robert J. Hefferon Coordinator
Telephone	n/a
Funded By	Energy Extension Service (in part)
Cost	\$30,000
Congressional District	IX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In spring of 1978 a small number of adults gathered to talk about energy, education, technology and youth. One month later the group and 20 young people formed the Practical Technology Club of Fulton County.

During its first year, the Club met weekly to discuss passive solar principles and to update status reports on several different solar energy projects being carried out by members.

The level of support from interested community members has been unusually high. To exhibit their work and to familiarize themselves with other energy groups, the Club members have sponsored exhibits at two local fairs. The group also helped plant ten woodlots of black locust trees during spring of 1979.

After nearly a year of successful programs, the Cooperative Extension Service, the Club's sponsor, received a small grant from Penn State to expand its appropriate technology programs for youth. The money will be used primarily for energy-education materials.

Critique/analysis: Through community and government agency contacts, the Practical Technology Club has become visible and has enriched the lives of many of its members. Learning about energy problems and alternative energy solutions helped members increase their overall independence and self-sufficiency.

Category	Community
State	PA
Project Name	Practical Technology Club
Organization	Practical Technology Club of Fulton County
Address	c/o Margaret Balitas Courthouse Annex McConnellsburg, PA 17233
Contact	Margaret Balitas
Telephone	(717) 485-4111
Funded By	Penn. State University
Cost	\$5,000
Congressional District	IX
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

A team of community-based organizations will join together to construct a solar greenhouse attached to a two-story community facility. The facility houses several social services for the low income population, including projects in weatherization, community, food nutrition, Headstart, and day care.

The solar greenhouse project will serve to educate the community in energy conservation through field trips, workshops, media releases, and guest speakers. In addition, the greenhouse will be used to start plants for the community gardens for the economically disadvantaged in Cameron, Elk, McKean, and Potter Counties. It will also provide a focal point for nutrition education and gardening skills.

Category Community
State PA
Project Name Solar Greenhouse Workshop

Organization Northern Tier Community Action Corp.

Address P.O. Box 389
Emporium, PA 15834

Contact A. J. Grimone
Executive Director

Telephone n/a

Funded By Northern Tier Community Action Corp.

Cost \$5,000

Congressional District XXIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Alternate Energy Technology Curriculum, offered by the Lehigh County Community College, is for high school graduates (or others with training in heating, ventilation and air conditioning) who want to become trained solar technicians, installers, and sales personnel.

The program includes courses in alternative energy systems, including solar, wind, geothermal, biomass and small-scale hydro. Courses in design, sizing and installation of solar heating systems, passive solar, and photovoltaic and wind-electric systems are also offered.

The coursework augments a program currently offered by the college in sheetmetal work, piping and hydronic systems, and conventional burner technology.

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Category	Education
State	PA
Project Name	Alternate Energy Technology Curriculum

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Organization	Lehigh County Community College
Address	c/o Robert J. Artz Lehigh County Community College Schnecksville, PA 18078
Contact	Robert J. Artz
Telephone	(215) 799-1500

Funded By	State Vocational Education Funds
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Cost	\$100,000
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Congressional District	XV
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

E-Lab is an energy education project operating in the public Faust Elementary School. Teachers, students and community volunteers have designed, and are constructing, a cabin in the school courtyard. The building will be heated by an air-type solar collector with a rock storage system and by a passive greenhouse room. K-12 graders have been studying designs, implementation and installation of the solar building materials and equipment.

Once completed, the cabin will be used for studies of insulation, insolation and weather, and for coursework in instrument reading, data recording, and electricity use.

Category Education
State PA
Project Name Alternative Energy
"E-Lab"

Organization Faust Elementary School

Address Faust Elementary School
2901 Bellview Dr.
Cornwells Heights,
PA 19202

Contact Robert Carron

Telephone (215) 752-0531

Funded By Bensalem School District, Project E-3

Cost \$3,000

Congressional District VIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Over 2,000 people attended the Limerick Ecology Action alternative energy fair held near Pottstown in July of 1979. The fair featured electric cars, solar cells, methane production, wood stoves, and a large range of energy conservation tools.

The fair emphasized do-it-yourself energy projects, and it was designed to demonstrate alternatives to nuclear power.

Other fair exhibits included solar greenhouses, solar hot water systems, low-head hydroelectric, and solar projects for children.

Critique/analysis: According to the event's organizer, Jim Crater, who has built two wind generators and partially finished a solar still, the individual approach is a good one. "You get a good feeling that goes beyond saving energy. It makes people feel like they can get things done."

Category Education
State PA
Project Name Alternative Energy Fair

Organization Limerick Ecology Action

Address c/o Jim Crater
1211 Temple Road
Pottstown, PA
19323

Contact Jim Crater

Telephone (215) 323-7447

Funded By Private; Limerick Ecology Action

Cost \$50

Congressional District V (and parts of XI & XVI)

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Butler County, through its Conservation District Office, has made a commitment to energy education by providing its teachers with course materials and helpful information services.

The district's environmental education coordinator has made the services of consultants specializing in alternative energy available to public school instructors, many of whom also participate in the county's various in-service training seminars in conservation education. Recently the district held a five-week course on environmental education. The course included work in solar energy and woodlot management.

The district's program includes the distribution of a free interdisciplinary handbook on environmental education for grades K-10. The district has also provided several schools with a display of available publications and materials for class studies.

Category	Education
State	PA
Project Name	Butler County Teacher Energy Seminars
Organization	Butler County Conservation District
Address	Lafayette Building Butler, PA 16001
Contact	n/a
Telephone	(412) 285-4731
Funded By	CETA
Cost	\$10,000 annually
Congressional District	XXV
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Central Pennsylvania Solar Energy Society (CPSES) was founded shortly after Sun Day in 1978 as an offshoot of Eco-Action, a student environmental organization at Penn State University.

Since its formation, CPSES has sponsored public meetings on a wide variety of topics in an effort to consolidate the regional solar community. Conference topics included passive solar design, solar greenhouses, and hot water systems. A designer of a novel wind generator technology spoke about his work, including plans for a system to power his home's heat pump.

In addition, CPSES has jointly sponsored workshops with other organizations. In May of 1979, it worked with the Center Region Energy Conservation Steering Committee, the Energy Extension Service and Eco-Action to organize a second Sun Day.

Following the energy fair, nine CPSES members opened their homes for inspection. Several hundred people took advantage of the occasion to see solar at work in the "second cloudiest spot in the country."

In the future, CPSES hopes to become a sub-chapter of the Mid-Atlantic Solar Energy Association (MASEA.) The group plans to sponsor an energy conservation conference for the home-building industry. Under consideration are plans to publish a local directory of renewable resource businesses, and to form a buying cooperative for hard-to-get solar hardware items.

table
Category	Education
State	PA
Project Name	Central Pennsylvania Solar Group

table
| Organization | Central Pennsylvania Solar Energy Society |

table
| Address | c/o Jim Perkins Box 1378 State College, PA 16801 |

table
| Contact | Jim Perkins |

table
| Telephone | (814) 237-1513 |

table
| Funded By | Donations |

table
| Cost | \$200 |

table
| Congressional District | XXIII |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

In the 1978-79 school year, three teachers and six students retrofitted two college buildings with domestic hot water solar systems. One is a 20-collector, drain-down system. The other is a five-collector, propylene glycol, closed-loop system.

In addition, a maintenance building was insulated and retrofitted with a 40-collector hot air system. The building uses an oil-fired air furnace as a back-up heating system. Heat storage is provided by ten tons of river rock located in a storage bin specially designed for this project.

The two hot water systems have 80- and 120-gallon water storage tanks, respectively. By early 1980, systems will be fully instrumented with micro-processors and data terminals.

Category Education
State PA
Project Name College Building Retrofit

Organization Lehigh County Community College
Address Lehigh County Community College
Schnecksville, PA 18078
Contact J. Robert Walker & Robert J. Artz
Telephone (215) 799-1500

Funded By Lehigh County Community College
Cost \$60,000
Congressional District XV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Community Energy Education Project (CEEP) was founded in March of 1979 as an outgrowth of Montgomery County's Weatherization Program. The organization offers a wide variety of services, including residential energy audits, "hands on" solar hot water heating workshops, and free weatherization information. CEEP also has a number of renewable resource demonstrations, including windowbox collectors, solar cells, a wind generator and an electric car.

The program's highlight is an energy bus that annually visits some 60 schools, and as many shopping and community centers, with its solar and conservation displays.

The project also offers an energy hotline, (215) 935-0138.

p>Category Education
State PA
Project Name Community Energy Education Project
p>Organization Community Energy Education Program of Montgomery County (CEEP)
Address c/o Nancy Dunleavy Box 65 Mont Clare, PA 19453

p>Contact Nancy Dunleavy

p>Telephone (215) 935-0138 (hotline)

p>Funded By Department of Community Affairs: CMA

p>Cost \$130,000 annually

p>Congressional District V and XIII

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Huntingdon County households considered below the national poverty level are eligible for a multifaceted energy-conservation packet under the Huntingdon County weatherization program.

The packet covers the retrofit of insulation above all living spaces and around hot water heaters, and installation of storm windows. Work is performed by a team of CETA employees, who thus receive invaluable training experience in energy conservation. The program also operates as a clearinghouse for energy information.

The project has recently obtained approval from the Department of Community Affairs for an attached solar greenhouse at Trough Creek Youth Forestry Camp. The program will solicit help from interested community members in construction of the building.

Within the state the program is sponsored by the Department of Community Affairs' Bureau of Community Energy. At the county level the commissioners are the sponsoring agent.

Critique/analysis: The program has very successfully provided help to the elderly, the handicapped, and the low-income persons limited in their capacity to maintain their residences as energy-efficient units. The greatest satisfaction of the job has been the gratitude and respect of these people. The program also provides a unique training opportunity for the hard-core unemployed.

The most glaring problem of the program is the lack of funding with which to pay qualified trainers.

Category Education
State PA
Project Name County Conservation Program

Organization Huntingdon County Commissioners

Address c/o Michael Colyer
Courthouse
Huntingdon, PA
16652

Contact Michael Colyer

Telephone (814) 643-2343

Funded By DOE & CETA

Cost \$7,000 monthly for
Personnel wages

Congressional District IX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Stewardship Program (ESP) is a comprehensive energy-education project designed to inform the community of the importance of energy conservation as it relates to personal lifestyle, economics, education and government.

The program consists of minicourses lasting one to six weeks each that offer "hands on" experience in a range of energy-related subjects for students in grades K-12. The program also sponsors numerous seminars to increase the motivation of participating teachers.

Critique/analysis: ESP asks that school districts adopting the program allow for a two-day training session to incorporate program material into existing classroom curricula.

p>Category Education
State PA
Project Name Energy Stewardship Program

p>Organization Lakeview School District

p>Address R.D. #1, Box 173
Stoneboro, PA
16153

p>Contact Denise Olczak

p>Telephone (412) 376-7135

p>Funded By School District
Title IV-C Grant

p>Cost \$6,000 (approx.)

p>Congressional District XXV

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State PA
Project Name Fourth Grade Solar Projects

For the past three years, Glennis Farnsworth's fourth-grade classes have participated in renewable resource projects that have won publicity from local newspapers and the support of the school administration.

The classes have constructed a solar hot water heater and window box collector. This fall the students are perfecting a small wind turbine designed to run a small generator.

Although Farnsworth has developed the designs, the students are responsible for much of the construction, learning the use of simple tools in the process. They also experience solar energy in action.

"My feeling," Farnsworth said, "is to get them started early. Then these things whirl around in their minds until they are older and mechanically inclined and can start working on them themselves."

The demonstration models have been shown to other schools and to those who visit alternative energy fairs. Some of the models show innovation: the class added small tin cans to the window box collector surface to increase heating capacity.

Organization Ringing Rock Elementary School
Address c/o Glennis Farnsworth
Ringing Rock Elementary School
Pottstown, PA 19323
Contact Glennis Farnsworth
Telephone (215) 323-0903

Funded By School & Teacher

Cost \$25

Congressional District VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A commercial hot-water active solar thermal collector is being used to provide heat to two greenhouses.

Students assembled both greenhouses, constructed the collector support, installed all system plumbing, and designed and constructed the heat-exchange mechanism.

Students also monitor the system and are planting and caring for vegetables grown in the greenhouse and charting their growth.

Current projects include an experimental planting bed heater and a hydroponics unit.

Category Education
State PA
Project Name High School Solar
Experimental Program

Organization Upper Darby High
School
Address Upper Darby High
School
Lansdowne Ave. and
School Lane
Upper Darby, PA 19084
Contact David Becker
Telephone (215) 622-7000

Funded By Upper Darby High
School, Project E-3

Cost \$3,000

Congressional District VII

Compilation Date February 1980

Category	Education
State	PA
Project Name	Junior High School Solar Project

Organization Rhodes Middle Sch

Address 29th & Clearfield St.
Philadelphia, PA
19128

Contact Michael Fleigshman

Telephone (215) 221-0805

Funded By School District of
Philadelphia, Project
E-3

Cost	\$1,000
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Congressional District I-IV & XIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Lehigh Valley Manpower (LVMP) administers a number of grants in direct support of energy-related projects.

The most significant of these is the Solar Utilization, Economic Development and Employment (SUEDE) program, in which eligible CETA personnel are trained in solar-related skills. The \$290,000 federal grant also provides for installation of 75 domestic hot water systems to reduce low-income homeowners' bills, and construction of 10 solar greenhouses and several window box space heaters.

The same CETA crew will install 21 domestic hot water heaters and 30 wood-burning stoves under a \$65,000 program funded by the state Department of Community Affairs and administered by LVMP.

Other LVMP-administered projects include the Youth Employment Training Program, a 34-week course in construction and energy-related disciplines for 25 students, ages 17-21. Students apply their knowledge on the job, repairing heating systems and installing hot water systems and wood stoves in the homes of the low-income. The \$100,000 program is federally funded.

The staff of a \$70,000 Optimum Weatherization Program is currently attempting to determine the cost-effective method of weatherizing homes in 16 locations around the county. LVMP also oversees the Area Agency on Aging Weatherization Project, designed to weatherize senior citizens' residences. Labor is provided by YETP students. The project cost is \$10,000.

Category Education
State PA
Project Name Lehigh Valley
Manpower

Organization Lehigh Valley
Manpower
Address c/o Richard Strimple
or Jeff Curry
3155 Schoenersville
Road
Bethlehem, PA 18018
Contact Richard Strimple or
Jeff Curry
Telephone (215) 867-9711

Funded By DOE; DOL; CSA;
Department of Community
Affairs

Cost State \$65,000
Federal \$300,000

Congressional District XV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Lehigh Valley Solar Energy Association was created to increase public awareness of alternative energy and energy conservation. In one year the non-profit public interest group has grown from 17 to 114 members.

Monthly informational programs are held on varying topics and are open to the public. Projects include occasional public tours to wind-powered sites and local solar homes. There are workshops for constructing solar greenhouses, solar breadbox collectors and moveable window insulation units.

The group plans to sponsor a one-day seminar for bankers and real estate people to acquaint them with energy conservation and solar energy options in residential construction and the domestic housing market.

A speakers' bureau is being formed as a service to civic groups.

A portable educational display is to be constructed for use in banks, libraries and other public buildings.

The group has brought one nationally-known lecturer on underground design to speak at a local university. The association plans to continue its sponsorship of one to two prominent speakers annually.

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Category	Education
State	PA
Project Name	Lehigh Valley Solar Energy Association

Organization	Lehigh Valley Sol. Energy Association
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Address	P.O. Box 2563 Lehigh Valley, PA 18001
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Contact	Pam Gruver
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Telephone	(215) 264-4861
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Funded By	Membership Dues and Fund Raising
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Cost	n/a
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Congressional District	XV
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

The Mid-Atlantic Solar Energy Association (MASEA) is a non-profit organization of solar professionals and lay people who share a belief in the potential of solar energy. MASEA provides a forum in which to exchange ideas and share technical developments as they evolve.

As a chapter of the American Section of the International Solar Energy Society (AS/ISES), MASEA's region includes Pennsylvania, New Jersey, Delaware, Maryland, and Washington, D.C. The membership of MASEA consists of more than 900 people from the region and around the country. Members of MASEA receive bi-monthly newsletters, notification of monthly programs, discounts on books, and reduction in admission fees to major conferences.

MASEA hosted the "Second National Passive Solar Conference" in Philadelphia in March 1978. The conference, sponsored by the U.S. Department of Energy, brought together 150 speakers and more than 1,000 attendees to assess the state of the art of passive solar energy. The conference papers have been compiled in a 3-volume set of proceedings distributed by MASEA.

"Solar Glazing: 1979 Topical Conference," which was held in Stockton, New Jersey in June of 1979, was much smaller and more specialized. It offered the opportunity for solar practitioners and glazing manufacturers to present information about glazing materials and applications.

To extend its impact throughout the region, MASEA is creating a network of sub-chapters. There are now three official chapters (Lehigh Valley, Western PA, and Delaware), and others are forming around the region. The sub-chapters offer programs including tours of solar homes and wind installations, exhibits at malls, "hands on" workshops, and lectures on solar and renewable resources.

Category	Education
State	PA
Project Name	Mid-Atlantic Solar Energy Association (MASEA)
Organization	M A S E A
Address	2233 Grays Ferry Ave. Philadelphia, PA 19146
Contact	Linda Knapp
Telephone	(215) 963-0880
Funded By	Northeast Solar Energy Center, Memberships, Book sales
Cost	n/a
Congressional District	I-IV & XIII
Compilation Date	February 1980

MASEA has received an Appropriate Technology grant from the U.S. Department of Energy to retrofit a solar greenhouse and Trombe Wall on its office building.

Plans are now under way for a conference in the spring of 1980. In May of 1981 MASEA will organize special events for the general public, including tutorials, tours and workshops, for the annual AS/ISES Conference in Philadelphia.

Renewable Resources— A National Catalog of Model Projects

The "Energy Van" is a non-profit mobile display designed to provide the general public with basic solar energy information.

The van houses an electricity-generating windmill, a solar water heater, insulation and weatherizing samples and a large display of free energy-related publications. The van's exhibit is completely self-contained and self-operated. A windmill supplies electricity to the solar water heater pump, the solar air heater fan, all vehicle lights, and a tape player that continuously describes the systems on display.

The pamphlets contain information on energy conservation, wind and hydro power, and wood-burning systems.

Since 1977, the van has traveled approximately 10,000 miles annually to fairs, conferences, schools and other gatherings.

Critique/analysis: It is reported that the van is a highly successful educational tool. Construction cost was less than \$2,000 (excluding vehicle).

p>Category Education
State PA
Project Name Mobile Solar Demo

p>Organization Christopher Fried

p>Address R.D. #3
Box 229G
Catawissa, PA
17820

p>Contact Christopher Fried

p>Telephone (717) 356-2501

p>Funded By PA Dept. of Community
Affairs (until 10/79)

p>Cost \$10,000 for display
\$10,000 annual
operation
Congressional District XI

p>Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In response to growing concern among its readership regarding the rising cost of energy and the accompanying social and political problems, The Daily Local News printed a 48-page supplement to the regular daily edition of September 25, 1979. The publication focused on strategies that citizens can use to counter rising energy prices. Included were articles on passive and active solar space heating and water heating, wood heat, insulation, gasoline conservation, wind and photovoltaics, and alternative energy gadgets.

All stories were written for the average reader, citing average energy costs and cost-effectiveness of transition to renewable energy as well as conservation.

Critique/analysis: The supplement was written in six weeks by the regular newspaper staff. The advertising department admitted surprise at the enthusiastic response of local business people. This response added another benefit, making the supplement a fairly complete directory of solar equipment in Chester County.

Category Education
State PA
Project Name Options in Energy

Organization The Daily Local News

Address P.O. Box 517
West Chester, PA
19380

Contact Hanna Gardner and
Tom Simon

Telephone (215) 696-1775

Funded By n/a

Cost n/a

Congressional District V & VI

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1977, the James Buchanan High School, funded by a National Center for Applied Technology grant, formed a Student Applied Technology Club.

School educators realized that many of the school's graduates did not go to college, but instead, after graduating, promptly joined the work force. The Applied Technology Club was formed in order to give these students experience with energy technologies.

Club students have constructed concentrators, window boxes, and energy displays. They also conducted energy-conservation surveys of area businesses and churches. The survey conducted on the high school helped to save the school district \$7,000 on an \$81,000 electricity bill.

The grant also funded research into an energy curriculum. The curriculum, which will begin in the Fall of 1980, will integrate cooperative industrial and trade work programs with the traditional curriculum. The energy curriculum will equip three high school students who are not college-bound with usable skills in the fast-growing energy job market.

(Information concerning this project was made available to the Center through the National Center for Appropriate Technology.)

Category	Education
State	PA
Project Name	Practical Technology and Curriculum Research
Organization	James Buchanan High School
Address	Rt. 1, Box 184 Mercersburg, PA 17236
Contact	Bryon G. Ashburn
Telephone	(717) 328-2146
Funded By	National Center for Appropriate Technology
Cost	\$4,900
Congressional District	XXIV
Compilation Date	December 1979

Renewable Resources— A National Catalog of Model Projects

Through project CLUE (Colonial Looks at Utilization of Energy), an air-transfer, rock-storage solar thermal collector has been designed and constructed by Plymouth-Whitemarsh High School students for installation in the facility's courtyard.

The thermal collector is used to heat a one-room cabin, also built by the students and located in the courtyard.

Students attached a traditional greenhouse to the one-room cabin and mounted a wind generator on the cabin roof to provide much of the building's electricity.

Students also designed, installed, and monitored an experimental solar water heater, a weather station, a demonstration photo-electrical circuit, and a strip-chart temperature recorder.

Category Education
State PA
Project Name Project CLUE

Organization Plymouth-Whitemarsh High School
Address Plymouth-Whitemarsh High School
Germantown Pike
Philadelphia, PA 19962
Contact Jerry Miklosh
Don School
Telephone (215) 825-1500

Funded By Colonial School District, Project E-3
Cost \$5,000
Congressional District XIV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

About 50 high school students and two part-time teachers have built a passive solar attached greenhouse capable of producing greens for the school lunch program. Plants and greens are also grown as food for the school's collection of resident goats, which provide milk and cheese for school students.

A 200-watt wind generator meets some of the school's electrical needs. As an educational project, the students are actively involved in all phases of greenhouse construction, planting, and caring for the crops and goats. They also monitor the project.

table border="1" style="width: 100%; border-collapse: collapse;">
Category	Education
State	PA
Project Name	School Greenhouse and Wind Turbine

table border="1" style="width: 100%; border-collapse: collapse;">
Organization	Uppatinas School
Address	Uppatinas School R.D. #1, Box 378 Glenmoore, PA 19343
Contact	Terry Burlingame
Telephone	(215) 458-5138

table border="1" style="width: 100%; border-collapse: collapse;">
| **Funded By** | Uppatinas School, Project E-3 |

Cost	\$1,000
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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

Alternative energy specialists met with high school teachers for a six-day workshop earlier this year to discuss effective methods of teaching new alternative energy technologies.

Structured sessions included lectures, films, and panel discussions. Others were devoted to field experiences. Teachers worked with energy professionals and each other to develop "hands on" materials and approaches for use in the schools.

The teachers returned to their districts this fall to try out their curriculum and to serve as resource people.

Category Education
State PA
Project Name Seminar for Teachers

Organization Department of Community Affairs
Potter County Planning Commission
Address c/o Frank J. Sullivan
Potter County Planning Commission
Courthouse, Coudersport
PA 16915
Contact Frank J. Sullivan
Planning Director
Telephone (814) 274-8254

Funded By Dept. of Community Affairs
Potter County Planning Commission

Cost \$36,000

Congressional District XXIII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State PA
Project Name Solar Ceramics Kiln

Art professor and solar energy innovator Zeljko Kujundzic two years ago led his class in a unique experiment: the construction of the first solar ceramics kiln. Using nothing more than a cardboard box, crumpled newspaper, an acrylic lens and stoneware clay, the group built a kiln which successfully fired.

Later Kujundzic, a Fayette campus faculty member, upgraded the solar kiln prototype using a refractory-lined coffee can for a firing chamber, four gallons of wine as the kiln's lens, and a plywood frame. The kiln achieved a temperature of 2,600° F in only eight minutes.

Kujundzic formulated a special clay mix to withstand the sudden heating. Certain glazes like zircon, which tends to bubble in conventional furnaces, behave perfectly in the \$425 solar kiln. A more elaborate device constructed with a 52-inch chrome-plated mirror costs \$2,200 according to the professor.

In a related effort, Kujundzic developed a ceramic air cooler capable of lowering the temperature in a 16' x 20' room by ten degrees using no more energy than a 100-watt light bulb. The cooler is made of hollow tubes of cooler unglazed clay, behind which is mounted a small fan. The cooler is filled with water, which seeps through the clay to the outer surface and evaporates (a process the fan serves accelerate).

Organization Penn State Univ.
Office of Academic
Instructions
Address c/o Zeljko Kujundzic
R.D. #2
Box 533
Farmington, PA 15437
Contact Zeljko Kujundzic
Telephone (412) 329-4767
Funded By Penn State Univ.
Fayette Campus
Advisory Board
Cost \$425 prototype
\$2,200 updated model
Congressional District XX
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Central Montgomery County Area Vocational-Technical School is teaching high school students the design, installation and maintenance of solar domestic hot water systems. This addition to the curriculum was inspired by the rapidly growing solar business in Montgomery County.

Besides the basic instruction, classes will run tests to determine relative efficiencies of two collectors - one a drain-down model, the other a closed-loop type. Students will also study how the collector orientation affects efficiency.

School officials hope to develop and build a mobile structure to allow demonstration of the collectors throughout Central Montgomery County.

Category	Education
State	PA
Project Name	Solar Demonstration Project
Organization	The Pennsylvania Department of Vocational Education
Address	c/o Clayton Reid Plymouth Rd. & New Hope St. Norristown, PA 19401
Contact	Clayton Reid
Telephone	(215) 277-2301
Funded By	The Pennsylvania Dept. of Vocational Education
Cost	\$4,500
Congressional District	XIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

An energy-efficient structure fitted with flat-plate solar collectors was built by students of Building Technology at the Williamsport Area Community College. Today that building serves as a demonstration model for the solar production of hot water. For students, it offers an opportunity to observe and evaluate solar technology.

At present the project does not include solar space-heating displays, although plans call for such a system.

Category Education
State PA
Project Name Solar Hardware
Demonstration

Organization Williamsport Area
Community College

Address c/o George Krause
and Frank Beatty
1005 W. Third St.
Williamsport,
PA 17701

Contact George Krause and
Frank Beatty

Telephone n/a

Funded By Federal and Local Funds

Cost \$20,000

Congressional District XVII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The staff at the Schuylkill Valley Nature Center has designed an inexpensive solar-heated cold frame that homeowners can build themselves. It also has conducted community workshops to teach residents how to make these cold frames.

The cold frame is designed to extend the vegetable growing season in the home garden, as well as to maintain a suitable environment for a salad garden throughout the winter.

Twenty-five people attended the first workshop, held in the spring of 1979, and participated in the construction of the cold frame.

Critique/analysis: There has been no follow-up to determine how useful the workshop was in inspiring further construction.

table
Category	Education
State	PA
Project Name	Solar Heated Cold Frame

table
Organization	Schuylkill Valle Nature Center
Address	8480 Hagy's Mill Rd. Philadelphia, PA 19128
Contact	Rick Studenmund
Telephone	(215) 482-7300

table
Funded By	Owner
Cost	n/a
Congressional District	I-IV & XIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Solar Retreat was set up by Shelter Design in 1977 as an alternative to standard indoor, highly technical and often expensive conferences.

The first retreat was held in August of 1977. Participants included architects, educators, builders, writers, and fabricators, all of whom came equipped with their own tables, chairs, chalk boards, projectors, screens, tents, and sleeping bags. Food and entertainment were catered. The retreat was a relaxing and educational way for solar experts and enthusiasts to share and learn more about solar energy.

A second retreat is being planned for March of 1980. Expenses for the first retreat totaled about \$500.00, paid for through registration fees of \$20.00 per participant.

Topics on the retreat agenda included job training for solar energy systems solar design in residential, commercial and industrial uses, solar equipment and construction, and solar education.

About 30 participants attended the first conference.

Category Education
State PA
Project Name Solar Retreat

Organization Shelter Design
Address c/o Mic Curd and
Penny Kerr
P.O. Box 66
Stony Run, PA 19536
Contact Mic Curd and
Penny Kerr
Telephone (215) 756-6112

Funded By Registration Fees
Cost \$20.00 per partici-
pant
Congressional District XV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Solar Systems Theory is an 80-hour course that studies in-depth methods by which solar energy may be captured and utilized for space- and water-heating. The course gives the student experience in solar control systems, system components, equipment sizing, solar radiation data, and solar economics.

Solar Systems Lab supplements Solar Systems Theory through experimentation and student demonstrations. Sufficient class time will also be provided for lectures on topics such as passive solar design, photovoltaics, solar space heating and other energy alternatives. The course totals 200 hours.

Category Education
State PA
Project Name Solar Systems
Theory and Lab

Organization Triangle Institute
of Technology
Address 635 Smithfield St.
Pittsburgh, PA
15222
Contact James S. Gould
Telephone (412) 255-6170

Funded By Triangle Institute
of Technology
Cost \$25,000
Congressional District XIV
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Pennsylvania State University offers a two-year program in solar heating and cooling. The course is designed to prepare solar technicians for the expanding solar industry and related fields. Students are taught how to design, test, and install residential and commercial heating and cooling systems using recognized standard components. Participants are also taught how to calculate cost estimates for solar systems.

The program operates its own laboratory facilities, outfitted with such technologies as the heat pump solar systemizer, an absorption chiller package, and a domestic hot water pre-heat package. The school plans to add an evacuated tubular collector array, and an air-heating collector with a rock bed storage system. The labs have sophisticated weather-monitored equipment.

Category Education
State PA
Project Name Solar Technicians School

Organization Penn State Univ.

Address c/o David Meredith
P.O. Box 519
Uniontown, PA
15401

Contact David Meredith

Telephone (412) 437-2801
Ext. 76

Funded By State

Cost \$200,000

Congressional District XX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Since early 1979, Christopher Fried, energy consultant, has held "hands on" workshops throughout the state in which participants both learn the basics of energy conservation and solar energy, and build components for a low-cost, high-quality solar water heater. Participants construct the systems during a weekend workshop (for a material cost of approximately \$650.00), or assist in the construction of a co-participant's system.

The program is funded in part through a grant from the State Department of Community Affairs.

The workshops are highly successful educational tools. Collector and tank for at least two systems are constructed at each workshop. When installed two weeks later, they act as local demonstrations of practical solar heating.

By mid-1979, interest in the workshop had developed so rapidly that one workshop was being held almost every weekend.

Critique/analysis: It is worth noting that besides plumbers, builders, teachers, utility employees, and housewives, workshops have been attended by members of local and state government.

Category	Education
State	PA
Project Name	Solar Water Heater Workshops
Organization	Christopher Fried
Address	R. D. #3 Box 229 G Catawissa, PA 17820
Contact	Christopher Fried
Telephone	(717) 356-2501
Funded By	Workshop Registration Money (\$20-\$30)
Cost	System cost: \$650 Fried: \$100 per day
Congressional District	X
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

City leaders have drafted a Solar Access Protection Ordinance that would allow for voluntary private easements and would establish building permit guarantees and code protection for those who wish to harness wind and sun power.

The project is awaiting passage by the city council.

The ordinance consists largely of subdivision and zoning amendments that would allow retrofit and/or new construction of solar energy systems. According to Steven Rhodes, assistant to York's mayor, the legislation will free homeowners from excessive complications or cost when installing the systems.

Critique/analysis: Rhodes says present problems stem mainly from past omission of solar considerations in municipal legislation. City law places height limitations on buildings, for example, but leaves exemptions for chimneys. Under the ordinance solar collectors could be included in the list of exemptions.

Category Legislation
State PA
Project Name City of York, Pennsylvania

Organization City of York, PA

Address c/o Stephen Rhoads
Assistant to the Mayor
York City Hall
York, PA 17405

Contact Stephen Rhoads

Telephone (717) 843-8841

Funded By Municipal

Cost n/a

Congressional District XIX

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The City of York, PA, has established a conservation grant program using Community Development funds (\$147,000 over three years) that will provide homeowners with up to \$500 in grant funds and loans at 5 percent. Work is now under way to expand the program to include passive solar systems.

In addition, York is developing an in-house conservation program for city-owned vehicles and buildings. According to Stephen Rhoads, assistant to the mayor, conservation investments of \$50,000 to \$70,000 would be paid back in energy savings in approximately 10 months.

Category Legislation
State PA
Project Name York Conservation Program

Organization City of York
Address York City Hall
York, PA 17405
Contact Stephen Rhoads
Telephone (717) 843-8841

Funded By City's Community Development Block Grant
Cost \$147,000 over three years
Congressional District XIX
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Since its inception in March of 1976, the Philadelphia Home Weatherization Program has weatherized 1,967 homes for low-income families to help them conserve fuel. Current funding calls for weatherization of an additional 1,500 homes in fiscal 1980 under the Department of Community Affairs contract. Caulking, weather-stripping, insulation, minor repairs, tightening and reglazing of windows, and, if necessary, addition of storm windows are included. All homes must be resident-owned and the elderly and handicapped are given first priority. All houses are inspected after weatherization to ensure that the job was done properly.

The project is jointly sponsored by the Philadelphia Allied Action Commission the Philadelphia Department of Community Affairs, and the Philadelphia Area Manpower Council.

Category Low Income
State PA
Project Name Philadelphia Home Weatherization Program

Organization Philadelphia Allied Action Commission

Address 1316 Arch Street
Philadelphia, PA
19107

Contact Nancy Sennott

Telephone (215) 686-3932

Funded By Philadelphia Allied Action Commission

Cost \$1.7 million in
Fiscal 1980

Congressional District XIII & XIV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Venango County Extension Service Energy Programs provide a three-county region in northwestern Pennsylvania with energy information. It distributes a monthly newsletter, fact sheets, and other publications.

The Extension Service coordinates workshops, seminars and fairs on various solar topics, and it inspects solar construction sites. The service also assists individuals or groups in obtaining the information they need to conserve energy.

Recently the organization received \$5,000 for construction of a solar greenhouse to provide passive heat for its community building.

Category	Outreach
State	PA
Project Name	County Energy Programs
Organization	Venango County Cooperative Extension Service
Address	c/o Jeff Allio RFD #1 P.O. Box 468 Franklin, PA 16323
Contact	Jeff Allio
Telephone	(814) 437-7607
Funded By	CETA
Cost	\$11,000
Congressional District	XXIII
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Throughout Fulton County many projects and programs are under way and many of these receive the help, guidance, or suggestions of John Kiefer. John Kiefer is no longer with the Extension Service, but the position has been filled by Dorothy Scott, the County Energy Technician.

In January of 1979, Kiefer was hired by the Extension to run a twelve-month program with funds from the Fulton County CETA Program. The position may be renewed for an additional six months.

Since January, Kiefer has been working with county residents to establish helpful and self-sustaining programs. His efforts have included advising individuals on the safe, efficient use of woodstoves; providing technical advice on the design and construction of solar homes and the retrofitting of active and passive solar systems; conducting meetings and classes on energy conservation and solar design and construction; maintaining a resource center of publications, books, plans, films, slides and brochures on alternative technologies; and assisting in the preparation of two successful grant applications for greenhouses. In addition Kiefer has served as an advisor to the Practical Technology Club of Fulton County and to the non-profit Community Energy Resources of Fulton County.

critique/analysis: The program has been successful. In Kiefer's words, an "awareness has been created" among the county's residents.

Category	Outreach
State	PA
Project Name	County Energy Technician

Organization	Fulton County Extension Service
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Address	Dorothy Scott Courthouse Annex McConnellsburg, PA 17223
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Contact	Dorothy Scott Margaret Balitas
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Telephone	(717) 485-4111
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Funded By	Fulton County Coop. Extension Service; CETA
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Cost	\$12,760
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Congressional District	IX
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Compilation Date	February 1980
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Renewable Resources— A National Catalog of Model Projects

The Energy Conservation Service of the Environmental Center for Northeastern Pennsylvania (ECONEP) in Clifford, PA, is a pilot program in rural energy-conservation education. The Service provides residents of a six-county area in northeastern Pennsylvania with comprehensive information and technical assistance on a broad range of energy conservation-related subjects.

Special emphasis is placed on information with practical application to the needs of the primarily rural population of the service area: Bradford, Sullivan, Susquehanna, Tioga, Wayne and Wyoming counties. All services are provided free of charge to the public.

Principal activities of the Energy Conservation Service include technical consultation and interpretive services, operation of a library-resource center, and community outreach programming.

Free technical and interpretive consultation is available to the public in the areas of home building and design, insulation techniques, food production, self-sufficiency, agriculture and the utilization of energy alternatives such as wind, water, solar, methane and wood.

The Energy Library contains a broad selection of over 700 books, pamphlets and periodicals on energy that may be checked out for three weeks by any area resident. Residents are also allowed to borrow library books by mail.

Category	Outreach
State	PA
Project Name	Energy Conservation Service
Organization	The Energy Conservation Service Environmental Center for N. E. Pennsylvania (ECONEP)
Address	Box 100, Main St. Clifford, PA 18413
Contact	Larry Wilson
Telephone	(717) 222-4946
Funded By	Governor's Energy Council
Cost	\$75,000
Congressional District	X
Compilation Date	February 1980

In addition, the Energy Conservation Service demonstrates appropriately scaled energy equipment, operates a recycling service and tool-program, and sponsors public programs and workshops. One of its special projects involves donation of energy-related books to public libraries throughout the region. To date, thirty-four libraries have received eighteen books and two periodical subscriptions.

Renewable Resources— A National Catalog of Model Projects

Fulton County's alternative energy program might best be described as a citizen effort with lots of support from the County Cooperative Extension Service. Throughout the county, projects and programs have been initiated to help ease the effect of the energy crunch.

Activities of the Extension Service, coordinated in large part by John Kiefer, energy technician, include advising individuals on the safe, efficient use of woodstoves, providing technical advice on the design/construction of solar homes and the retrofit of passive and solar systems, and conducting meetings and classes on energy, solar design and construction.

The Extension Service office houses a resource center containing publications, books, films, slides, and brochures on alternative energy technology.

With the support of Kiefer, the Service also sponsors classes in the Fulton County Schools in solar design. Kiefer is presently arranging for a Fulton County conference on fuel-alcohol, and serves as advisor to the Practical Technology Club of Fulton County. In the first year the club members constructed solar food dryers, a concentrating cooker, a hot-air collector, and a solar hot water system.

In spring of 1979, the Cooperative Extension Service, received a grant to expand its educational programs in appropriate technology for youth. Much of this money will be used to purchase materials for the county's three school districts.

Critique/analysis: Throughout Fulton County, concern over energy supply and price is being translated into action. Individuals are enthusiastically experimenting, and youth are learning to think about energy, and public agencies

Category	Outreach
State	PA
Project Name	Fulton County Cooperative Extension Service
Organization	County Cooperative Extension Service
Address	Courthouse Annex McConnellsburg, PA 17233
Contact	Margaret Balitas, Dorothy Scott
Telephone	(717) 485-4111
Funded By	CETA Penn State University
Cost	\$12,760 (CETA) \$ 5,580 (PSU)
Congressional District	IX
Compilation Date	February 1980

like the Cooperative Extension Service, the Fulton County CETA, and the county Weatherization Program are helping and offering guidance.

In September of 1979, Robert Shinn, director of the Governor's Energy Council, visited Fulton County. He visited with members of the Practical Technology Club, school students, and with other alternative energy enthusiasts from the county. At the end of his visit, Shinn reportedly remarked, "When I heard what individual citizens have done here, it just boggles the mind." Dorothy Scott is the current county energy technician.

Renewable Resources— A National Catalog of Model Projects

With a staff of six and a training force of ten, the Lancaster Solar Project is installing low-cost solar systems on houses throughout the county. The project provides low-income homeowners with cost-effective systems that reportedly bring immediate and substantial fuel savings to the client.

In the winter of 1977, Lancaster County ran out of money for its emergency fuel fund. At that time, Mark Hopkins and the Community Action Program (CAP) of Lancaster County began casting around for ideas to reduce energy demands there permanently. In April, CAP funded a preliminary study of the heating needs of low-income people in Lancaster. Shortly afterward, Hopkins became the Project's first director. He was given \$35,000 and the authority to build several attached greenhouses and to initiate energy education programs.

A Solar Energy Utilization Economic Development and Employment (SUEDE) grant and other financial support enabled the Solar Project to attain its present level. Three construction crews, consisting of a staff person and several CETA workers, carry out projects throughout the county. Enclosed porches, attached greenhouses, solar hot air collectors, and mobile home retrofits have been installed by the workers. The Project's solar collectors reportedly fared very well when compared with five commercial systems in a test conducted by the University of Delaware.

Fuel bills and temperature comparisons in passive installations indicate that the Project's efforts have made a significant impact. The two-story attached solar greenhouse built for Bertha and Harry Riley of Marietta in 1978 reportedly cut fuel bills by 40 percent. Harry Riley said the greenhouse warms to 90 degrees F within 15 minutes after the sun rises on a winter day. "The cat comes right over here and asks for the door to be opened," he noted.

Category Outreach
State PA
Project Name Lancaster Solar Project

Organization Lancaster Solar Project
Address 127-133 N. Concord
Lancaster, PA.
17062
Contact Steven Steinbacher,
Director;
Michael Carey, Info.
Coordinator
Telephone n/a

Funded By CETA (\$81,581)
CSA (\$90,543)
HUD
SUEDE

Cost \$172,124

Congressional District XVI

Compilation Date February 1980

The Riley solar system has been installed on 13 residences to date. It includes an 80-gallon passive hot water heater installed on the second story, which heats over one-half of the incoming water to 90 or 100 degrees F.

Clients for the program must own their homes and meet income guidelines to qualify for the program. Many participants' homes were weatherized previously by the Lancaster County program. The outreach system tries to match the client with an appropriate system. The project will not, for example, build a greenhouse for a family that does not garden.

In another example, two workers installed simple solar collectors (materials cost: \$150) to a mobile home in Peach Bottom. The collectors completely heat the home on a sunny day. There is no storage; the intent is to take advantage of the heat when it is available.

Critique/analysis: The message of the Lancaster Solar Project is that solar systems do not have to be costly or complex to work. The Project was recently recognized by the Lancaster Historical-Architectural Board of Review for adding a solar hot water system to an old home being restored into three low-income apartments by the Spanish-American Civic Association.

Renewable Resources— A National Catalog of Model Projects

The Lebanon County Energy Management Program serves as a clearinghouse for information, and as coordinator of building energy audits under the Pennsylvania Technical Assistance Program. It also organizes special projects for business, government, and the community, and it advises Lebanon County educators.

The program maintains a resource library of over 700 pieces of information and literature, and it has held various energy seminars for the business and educational sectors. The program's coordinator serves on several local committees, such as the Transit Authority, as advisor on energy issues.

The office works with human services agencies in the community to provide information, to disseminate literature, and to coordinate energy-related activities.

Category Outreach
State PA
Project Name Lebanon County Energy Management Program

Organization Lebanon Valley Chamber of Commerce Governor's Energy Council
Address c/o Lee Ann Kleinfelter
P.O. Box 899
Lebanon, PA 17042

Contact Lee Ann Kleinfelter

Telephone n/a

Funded By Lebanon Valley Chamber of Commerce Governor's Energy Council

Cost \$34,000

Congressional District XVI & XVII

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Shelter Design provides a guide to low-cost solar products and conservation methods to residents in the Lehigh Valley. In addition, it specializes in the construction of a low-cost "earth shelter" solar home.

The home is built on a modular system, supported by reinforced concrete block walls and a precast concrete plank roof covered with urethane insulation and water-proofing. The roof is covered with an 18-inch layer of soil and mulch, and the glazed south-facing wall is exposed to the sun. The whole building serves as a thermal storage tank. A 60-foot diameter cooling tube also serves to dehumidify the home.

Shelter Design offers customers information on solar education, wind power, hydroelectric, biomass conversion, and many facets of solar construction.

Category Outreach
State PA
Project Name Solar Earth Shelter

Organization Shelter Design

Address c/o Mic Curd and
Penny Kerr
P.O. Box 66
Stony Run, PA
19557

Contact Mic Curd and
Penny Kerr

Telephone (215) 756-6112

Funded By Private

Cost \$60,000 per home
(. \$35/ft²)

Congressional District XV

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Western Pennsylvania Solar Energy Association (WPSEA) was recently organized as a sub-chapter of the Mid-Atlantic Solar Energy Association to promote the understanding and use of solar and related energies.

In its first year, WPSEA plans to identify the appropriate energy technologies for the Western Pennsylvania region. Exploring options through a series of lectures and demonstrations, topics will include wood energy, conservation, photovoltaics, active solar systems, earth-sheltered structures, wind energy, glazing and insulation, and solar greenhouses. If possible alcohol production and low-head hydro power will be addressed. The series will culminate in the spring with "hands on" greenhouse construction.

The membership of WPSEA consists of architects, engineers, bankers, homeowners, contractors, students, and general enthusiasts.

In coming years the Association will emphasize "hands on" workshops for self-help and employment preparation.

table
Category	Outreach
State	PA
Project Name	Western Pennsylvania Solar Energy Ass'n.

table
Organization	Western Pennsylv Solar Energy Ass'n.
Address	405 West Pearl Street Butler, PA 16001
Contact	Luanne Kobet
Telephone	(412) 282-7627

table
| Funded By | Membership Dues, Fund Raising |

table
| Cost | n/a |

table
| Congressional District | XXV |

table
| Compilation Date | February 1980 |

Renewable Resources— A National Catalog of Model Projects

Valley Rural Electric Cooperative (VREC), serving 14,000 members in a seven-county area, is involved in a variety of energy-conservation services, including free home energy audits and energy information distribution.

In addition, the Cooperative sells cellulose fiber insulation at cost to customers wishing to further weatherize their homes. Machines to blow the insulation into side walls and attic are provided by the company. The cooperative also sells super-insulated, low-wattage water heaters, solar collectors and solar water heaters to its customers.

VREC is currently involved in designing experimental "time of day" rates as potential incentives for future energy conservation. It has also undertaken load-management studies.

The cooperative employs a full-time director of energy conservation, who is responsible for using new technology to improve and update the organization's conservation programs.

Category	Utility
1	1
2	2
3	3
4	4
5	5
6	6
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8	8
9	9
10	10
11	11
12	12
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State	PA
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Project Name Energy Conservation Cooperative

Organization Valley Rural
Electric Cooperative

Address c/o Leonard Parson
Box 447
Huntingdon, PA
16652

Contact Leonard Parson

Telephone (814) 643-2650

Funded By n/a

Cost	n/a
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Congressional District IX

Compilation Date February 1980

RHODE ISLAND

1. Block Island
2. Cranston
3. Hope Valley
4. Jamestown
5. Narragansett
6. Providence
7. South Kingston

RHODE ISLAND

TABLE OF CONTENTS

Cities

Solar Hot Water for Restrooms.....	1
Utilization of Methane Gas.....	2

Commercial

Low-Head Hydro Electric Generation.....	3
---	---

Community

Center for Community Technology.....	4
--------------------------------------	---

Education

Automobile Test Clinic.....	5
"Solar Barn" Headquarters.....	6
Solar Collector Workshop.....	8
Solar Domestic Hot Water Systems (City).....	9
Solar Greenhouse.....	10

Housing

Utilization of Wind.....	11
--------------------------	----

Institutional

Senior Citizens' Solar Apartment Complex.....	12
---	----

Utility

Large Wind Machine.....	13
Project RISE.....	14

Renewable Resources— A National Catalog of Model Projects

Category Cities
State RI
Project Name Solar Hot Water
for Restrooms

The resort town of Narragansett made international headlines when it built a solar-heated domestic-hot water system for its downtown restroom.

The roof structure supports four flat-plate liquid-type collectors, and a utility room houses the solar tank.

Because of seasonal variations in the amount of water needed in a tourist town, the solar system has provided all of the required warm water.

Organization Town Hall
Address Narragansett, RI
02882
Contact Robin Dragon
Telephone (401) 789-1044

Critique/analysis: This application is practical throughout the southern part of Rhode Island.

Funded By Federal
Cost \$4,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Cities
State RI
Project Name Utilization of
Methane Gas

For 30 years, the sewage-treatment facility for the city of Cranston has been using anaerobic digestors to produce methane gas. Each day, the plant produces 70,000 ft³ of gas, which is used to heat an administration building. The methane saves approximately \$185 daily.

Organization Cranston Water Contr
Facility

Address Glen Road
Cranston, RI 02910

Contact D. Joseph Mattera

Telephone (401) 461-1000

Funded By City of Cranston

Cost \$5,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Hydro power is staging a comeback in Hopkinton since Bill Johnson designed his own turbine, which is rotated by water from a nearby pond. Johnson purchased an abandoned mill that a century ago used hydro power and renovated the facility to produce 2,500 kilowatts per month.

The spinning turbine, linked by a rubber belt to a generator, powers the lights and machinery of his small shop. Two-thirds of the electricity will be sold to the local utility because it is in excess of what Johnson needs.

Tests will be conducted to check the electrical output of the generator at each of a number of turbine wheel settings, with the hope of soon being able to commercially produce small turbines and kits for sale.

Category Commercial
State RI
Project Name Low-Head Hydro
Electric Generation

Organization New Found Power Co.
Address Box 576
Hope Valley, RI 02832
Contact Bill Johnson
Telephone (401) 539-2335

Funded By DOE and Owner

Cost \$10,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Center for Community Technology is a project of the Providence Corporation, a private, non-profit United Way organization. The Center is funded through the Corporation by Action, United Way of Rhode Island, and DOE.

The Center is dedicated to the development of low-income areas of the city with regard to four areas. One is community food production (organizing community gardens, farmers' markets, etc.) The second is community food distribution (organizing food Co-ops, etc.). The third is food energy; under a \$10,000 DOE Appropriate Technology development grant, the workability of a fuel-wood Co-op (e.g., harvesting, processing, distribution) that would serve inner-city consumers is being investigated and such problems as wood-stove safety for limited mobility people in dilapidated housing are under study. The fourth is solar energy/energy conservation (establishing a do-it-yourself assistance center to provide training, plans, materials, and tools for people interested in weatherizing their homes or building solar installations, especially greenhouses).

The Center has been in the process of finding land in the city that they can use for community gardens. Research is still under way on the feasibility of a wood Co-op. It looks as though a Co-op, if started, would mainly work in distribution of wood. The Center has amassed large quantities of greenhouse glass for solar greenhouse construction, but it lacks a workshop or storage area. It is also working on the concept of a Resources Exchange Program, which will enable neighborhood members to exchange services for goods with each other which will aid in the overall community development.

Category . Community
State . RI
Project Name Center for Community Technology

Organization Providence Corporat
Address 204 Cranston Street
Providence, RI 02907
Contact Paul Stonberg
Telephone (401) 421-2540

Funded By Action, United Way
of Rhode Island
DOE
Cost \$80,000
Congressional District I & II
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Last spring, the second annual Automobile Test Clinic for evaluating cars for fuel efficiency, was sponsored by the Cranston Community Action Program (CCAP) in cooperation with the Governor's Energy Office and the Garden City Merchants.

Garden City Mayor Di Prete proclaimed April 22 to 28, 1979 to be "Auto Efficiency Week." Three hundred and thirty-eight automobiles were tested for free at the Garden City Shopping Center to illustrate proper auto standards.

Items tested included: front-end alignment, tire condition, tire pressure, the carburetor air cleaner, and the engine exhaust emission. Each automobile driver received a copy of the test, and if a hazard existed the motorist was advised to correct the condition. This testing program brought to the drivers' attention problems that could endanger life and many whose correction would also increase the automobile's mileage.

Some 80 percent of the automobiles tested "failed." A common failure was under-inflated tires. One owner, when told that the air cleaner was very dirty, surprisingly reappeared with a new filter and passed his test. Another driver asked if he could return with his family cars. A group of girls had five different cars tested. From the giggling, an attraction to the school mechanics was suspected.

Domenic Bucci, CCAP Energy Coordinator, planned and supervised this effort with the assistance of a high school automobile teacher and seven students.

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tr { border-bottom: 1px solid black; }
 Category | Education || **State** | RI || **Project Name** | Automobile Test Clinic |

Organization	Cranston Community Action
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Address	30 Rolfe Street Cranston, RI 02910
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Contact	Domenic Bucci
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Telephone	(401) 467-9610
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Funded By	Governor's Energy Office
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Cost	\$420
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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

The Young Adult Conservation Corps (YACC) headquarters contains an integrated energy system including active and passive solar, wind, wood and composting toilet. YACC, which operates a one-year training program for young adults ages 16-23, needed a headquarters to house their office, library, work area, and equipment. The site, located off Pleasant Valley Avenue, was leased to the YACC for 1.00 per year by the Town of Smithfield. The town Conservation Commission also contributed \$6,000 for materials, and YACC trainees built the "Solar Barn," as the headquarters is now called.

The siting of the Solar Barn's extensive south-facing glazed area makes practical use of the sun. This side incorporates a 15' x 10' greenhouse and a work area containing water tanks to store heat. A wood-burning stove serves as a back-up heater for cloudy, cold days. The 55' x 78' structure is built completely of Rhode Island pine lumber that was dried for two years.

The toilet system is a dry-type compost device of Swedish design. The resulting compost is used in the greenhouse, thereby completing a natural cycle.

The building's electric requirement is met by a wind generator set on a 65-foot tower. It is anticipated that excess electricity will be fed back to the electric company.

The daily work crew consisted of five people on the project, and during the early stages of construction as many as 14 at a time pitched in.

Category	Education
State	RI
Project Name	"Solar Barn" Headquarters

Organization	Youth Adult Conservation Corp.
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Address	150 Washington Street Providence, RI 02903
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Contact	Barry Devine
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Telephone	(401) 277-3750
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Funded By	DOL and Town of Smithfield
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Cost	\$10,000
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Congressional District	I
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Compilation Date	February 1980
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Critique/analysis: The Solar Barn has become a center of attraction for the townspeople. The Barn is open for public viewing during the evenings and on weekends to demonstrate practical use of wind and solar energy.

Renewable Resources— A National Catalog of Model Projects

Category Education
State RI
Project Name Solar Collector Workshop

Organization RI College

Address 600 Mount Pleasant Ave.
Providence, RI 02908

Contact Dr. Edward D. Bzowski

Telephone (401) 456-8000

Funded By Northeast Solar Energy Center

Cost \$10,500

Congressional District I

Compilation Date February 1980

The Rhode Island College Industrial Education program sponsored a six-day solar energy workshop for secondary vocational/industrial teachers in 1979. Fifty-three teachers constructed hot water and hot air flat-plate collectors during the workshop.

Dr. Edward D. Bzowski planned the program, supplied the materials, designed the collectors, and co-ordinated the event, which was funded by the Northeast Solar Energy Center.

After attending morning sessions of theory and application, ten teams began building collectors from construction plans. The collector designs were selected to represent standard dimensions and a variety of materials. Workshop participants worked with rigid and thin-film plastic, galvanized iron, and corrugated aluminum and copper tubing. They built several types of systems, including drain down and trickle-type.

The flat-plate collectors were then tested under sunny, calm conditions. A solar BTU-meter measured the insolation, and efficiency calculations were made. Results are being tabulated.

It is hoped that the workshop experience will inspire the teachers to introduce solar energy in their respective schools with lectures and construction projects.

The collectors built by the class will be displayed and, weather permitting, put into operation in public places. The collectors will be available to responsible groups for demonstration purposes.

Renewable Resources— A National Catalog of Model Projects

Category Education
State RI
Project Name Solar Domestic Hot Water Systems (City)

The Cranston Community Action Program (CCAP) trains unemployed people in energy-related skills using CETA funds. CCAP helps would-be workers learn to assemble and install solar assisted domestic water-heating systems on the homes of low-income people with large families. The systems are maintained and monitored for efficiencies and cost-effectiveness. In all, eleven systems have been installed since 1976, seven on roofs and four ground mounts.

"Hands-on" classes in carpentry skills were taught at the Vocational Technical Facility by the evening teaching staff. Two CCAP-designed flat-plate copper collectors were built from purchased materials. The first installation was on a flat roof with a pre-fabricated wood collector support frame. The two school-built collectors were assembled to the frame. When the solar tank and piping were connected, the system immediately produced useful heat.

The city government has contributed \$10,000 and has widely publicized the advantages of solar heat. The installations have been viewed by school children, and a slide show of the installation procedures has been shown at schools, association meetings, social clubs, colleges, and universities. On Sun Day, many of the solar homes offer tours and the owners describe the operation and cost savings.

Organization Cranston Community Action
Address 30 Rolfe Street
Cranston, RI 02910
Contact Domenic Bucci
Telephone (401) 467-9610

Funded By New England Regional Commission and the City of Cranston

Cost \$60,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Fifteen participants from the Young Adult Conservation Corps, the Cranston Community Action Program, the South County Community Action Program, and the Governor's Energy Office built an attached greenhouse with solar domestic water heating last summer. In seventeen working days, the greenhouse was attached to the south side of a group home for boys located in West Kingston, Rhode Island. The community-training solar workshop utilized local materials to construct the 10' x 15' greenhouse.

The greenhouse also provides passive hot air heating to an adjacent kitchen and crawl space. This heating will eliminate recent water pipe freeze-ups.

The boys have started plants from seed, including flowers and winter vegetables, in the greenhouse. They are recording minimum and maximum inside temperatures.

Category Education
State RI
Project Name Solar Greenhouse

Organization Cranston Community Action Program, Inc.
Address 30 Rolfe Street
Cranston, RI 02910
Contact Domenic Bucci
Telephone (401) 467-9610

Funded By New England Regional Commission

Cost \$5,000

Congressional District II

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A 60-foot windmill in Jamestown provides most of the electricity for a cottage. Bill Smith purchased a used electrical generator for \$450. At an additional cost of \$4,500, he connected a working system that can store electricity in 12 batteries for about 10 days.

Depending on wind speed, the system can generate 300 to 600 kilowatt hours a month. A meter connected to the local utility will use, record, and measure Smith's excess electrical production.

The shore line of Rhode Island offers a perfect location for the installation of wind generators, and the shore communities provide a ready market for excess electricity fed into the local utility company.

Smith's windmill has been running since its construction in 1976.

Category Housing
State RI
Project Name Utilization of Wind

Organization Bill Smith
Address Jamestown, RI 02835
Contact Bill Smith
Telephone (401) 423-0433

Funded By Private

Cost \$4,950

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The solar panels were installed this winter on the largest solar energy project yet to be constructed in Rhode Island. The 54-panel solar array is designed to provide the domestic hot water for Peace Dale House, a 100-apartment building for the elderly.

The solar energy system is expected to satisfy more than 70 percent of the hot water needs for the units. This represents a yearly savings of between \$10,000 and \$12,000.

The building also has many conservation features.

Category	Institutional
State	RI
Project Name	Senior Citizen's Solar Apartment Complex
Organization	Peace Dale House
Address	Saugatucket Road South Kingston, RI 02881
Contact	John M. Robinson
Telephone	(401) 791-8380
Funded By	HUD demonstration grant
Cost	\$94,000
Congressional District	
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Department of Energy and the National Aeronautics and Space Administration have built the nation's third experimental large-scale wind turbine on Block Island, 12 miles off the Rhode Island coast.

With blades stretching 123 feet from tip to tip, the wind machine should, in an 18 mile per hour wind, be capable of generating 200 kilowatts of electrical power, enough to meet the needs of 50 homes.

Island residents currently get electricity from diesel fuel that is brought in by barge.

Category Utility
State RI
Project Name Large Wind Machine

Organization Block Island Utility Company

Address Block Island, RI 02807

Contact Mr. Renz
or
Henry Dupo

Telephone (401) 466-2323

Funded By DOE, NASA

Cost \$2 million

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Rhode Islanders Saving Energy (RISE) is a non-profit corporation set up as a joint venture of the State government, the U.S. government and the state's utility companies to provide free energy audits and to facilitate energy-conservation work undertaken as a result of the audits. An assessment of solar potential is included in the audits, but solar energy is not otherwise part of the RISE program. RISE has so far conducted some 5,700 audits, which have precipitated about 900 weatherization contracts.

When the program first began in 1978, RISE "marketed" itself through utility inserts, a television commercial, four paid advertisements, and several newspaper articles. It has done no advertising for the past several months, since it now has a substantial backlog of work.

RISE provides consumers with a free audit, a contractor, a list of banks that offer interest rates for energy-conservation loans at 4 to 6 percent below market rates, and an inspection and guarantee of the work done. Contractors associate with RISE on a voluntary basis and pay a fee that averages 20 percent for work received. After a contractor has qualified with RISE, they are given jobs on a rotating basis. Sixteen contractors are now working in the program.

The six-member RISE Board of Directors consists of representatives of four of the state's utilities and two people from businesses not connected with energy conservation. The Chairman of the board is from a business that provides financial services to corporations.

Category Utility
State RI
Project Name Project RISE

Organization Rhode Islanders Saving Energy (RISE)
Address 334 Westminster Mall
Providence, RI 02903
Contact Ron Ward
Telephone (401) 272-1040

Funded By DOE, RI, Northeast Solar Energy Center, Utilities
Cost n/a
Congressional District State-wide
Compilation Date February 1980

Critique/analysis: The RISE program has been cited as a model for federal, state, and utility cooperation. It has also come under some criticism for charging such a stiff fee to contractors, especially since some contractors claim the program is difficult to work with. Some also fear that the free energy audits could put small auditing companies out of business.

VERMONT

1. Avon	22. Norwich
2. Barre	23. Orwell
3. Benson	24. Pawlet
4. Brattleboro	25. Plainfield
5. Bristol	26. Rutland
6. Burlington	27. Shoreham
7. Colchester	28. South Burlington
8. Danville	29. South Hero
9. Dorset	30. South Royalton
10. East Calais	31. Springfield
11. Enosburg	32. St. Johnsbury
12. Essex	33. Wardsboro
13. Fairlee	34. Warren
14. Ferrisburg	35. Waterbury
15. Johnson	36. Westminster West
16. Lyndonville	37. White River Junction
17. Mendon	38. Williamstown
18. Middlebury	39. Windsor
19. Montpelier	40. Winooski
20. New Haven	41. Woodstock
21. Newport	

VERMONT

TABLE OF CONTENTS

Agricultural

Agricultural Extension Solar Program	1
Cate Farm	2
Methane From Cow Manure	3

Cities

Emergency Energy Planning	4
Senior Citizen Housing	5
Waste Utilization	6

Commerical

Hydro-powered Feed Store.....	7
Hydro-powered Housing and Offices	8
North Wind Power Co.	9
Passive Solar Retrofit	10
Plee-zing Market	11
Renewable Energy Art Gallery	12
Retrofitting an Historic Hotel	13
Simple, Effective Energy Conservation	14
Solar Banks	15
Solar Motel	16
Wind-powered Truck Dealership	17
Wood-heated Restaurant	18
Wood-pellet Manufacturing Operation	19

Community

Give and Take Barter Center	20
Half-way House Greenhouse	21
Handicapped Opportunities and Programs in Employment	23
Hydro Feasibility Study	24

Education

Ad Hoc Community on Energy	25
Community Energy Library	26
Do-it-yourself Windmill Classes	27
Energy Information Resource Center (ERIC)	28
Energy Show	29
Fairbanks Museum	30
Greenhouse Hot Water Preheater	31
Insulating Venetian Blinds	32

VERMONT
TABLE OF CONTENTS
PAGE 2

Education (contd)

Regional Solar Education	33
Residential Wood-fired Steam Plant	34
Solar and Non-solar Greenhouse Comparisons	35
Solar Classes for Students and Teachers	36
Solar Curriculum Projects	37
Solar Greenhouse	39
Solar Greenhouse and Aquacultures	40
Solar Index in the News	41
Solar Seminars for Bankers.....	42
Solar Training for Teachers	43
Solar Workshops	44
Wave Energy Module	45
Wind Conference	46
Wind Whiz Kid	47

Housing

Dimetrodon	48
Solar Pre-fab Homes	49

Industrial

Energy Conserving Cheese	50
Solar Hot Water for Manufacturing	51
Solar Shoe Company	52

Institutional

Cathedral Square Elderly Housing	53
Solar High School	54
School Trombe Wall	55

Legislation

Bottle Bill	56
Property Tax Exemption	57
State Tax Credits	58
Town Energy Coordinator	59

Low Income

Low Income Energy Advocacy	60
----------------------------------	----

VERMONT
TABLE OF CONTENTS
PAGE 3

Outreach

Dynamic Integrations Corporation	61
Manchester Community Energy Planning	62
Memphrenagog Group	63
Middlebury College Energy Program	64
New England Solar Energy Association	65
Solar Association of Vermont	66

State

Ad Hoc Committee on Wind	67
Energy Advisory Board	68
Home Energy Audit Team	69
Large Wind Workshop	70
Small Wind Energy Conversion	71
State Conservation Program	72
State Wood Programs	73
Tax Credit	74

Utility

Electrical Generation With Wood	75
Large Wind Units	76
Small Dam Retrofits	77
Utility Dam Retrofits	79
Wind Research	81
Wood Energy Conversion	82

Renewable Resources— A National Catalog of Model Projects

The Agricultural Extension Service at the University of Vermont has undertaken a cost-sharing program to assist farmers in the use of solar energy for livestock production. The Extension Service offers help in the design, planning, and financing of solar space- and water-heating installations. Matching grants (50/50) are available to participating farmers.

The goals of the program are to provide visible examples of solar installations on farms, to demonstrate the feasibility and cost-effectiveness of using solar energy for farming, and to disseminate technical information to farmers. The two most promising applications are a solar greenhouse attached to the livestock barn to provide space heating and seed germination for early spring crops, and the use in dairy operations of solar-heated hot water for cleaning, pasteurizing, and bottling operations. For this second function, a wood-fired boiler serves as a supplemental heating source.

Critique/analysis: The relatively low heating requirements of dairy operations (50 degrees F) makes the cost-effectiveness of solar heating marginal. Mixed-use barns, veal operations and poultry barns seem to provide the most promising opportunities for solar applications.

Category	Agricultural
State	VT
Project Name	Agricultural Extension Solar Program
Organization	University of Vermont Extension Service
Address	Burlington, VT 05401
Contact	Grant Wells
Telephone	(802) 656-2001
Funded By	DOE
Cost	\$63,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Faculty and students at Cate Farm, an agricultural research and education center for Goddard College, are working to make the farm totally energy self-sufficient, stressing the ecological and social processes involved in agriculture. Areas of study include soil enrichment through the recycling of organic matter, grain cultivation that requires tillage only every seven years, and the development of renewable energy resources.

Cate Farm currently has two solar greenhouses, one active and the other passive, a large solar food drier, and four windmills of different varieties. The philosophy at the Farm is to allow the students to participate and learn from their mistakes.

Category Agricultural

State VT

Project Name Cate Farm

Organization Goddard College
Institute for Social
Ecology

Address Cate Farm
Plainfield, VT 05667

Contact Charles Woodard

Telephone (802) 454-8311

Funded By Tuition only

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Agricultural

State VT

Project Name Methane From
Cow Manure

Organization Michael Messer,
Dean Wilson & John
McClaughry

Address 20 Clarks Ave.
St. Johnsbury, VT
05819

Contact Michael Messer, Dean
Wilson & John
McClaughry

Telephone (802) 748-4244

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Three Vermont farmers are developing a system for producing methane gas from cow manure to fill 100 percent of a farm's fuel needs. The benefit to Vermont farmers of such a project should be great because 90 percent of the farms in the state are dairy farms.

The chief problem with methane in Vermont is keeping the digester warm enough (90 degrees F) in winter to induce the necessary chemical reactions. The farmers have designed a two-state system, the first for producing a low-grade gas for heating internally and the second for producing a high-grade fuel.

The second major problem is application. The gas needs about 1740 lbs per square-inch containment to liquefy; this is no problem for stationary usage, but the majority of applications would be for fueling moving tractors, which presents a safety problem (one they are convinced can be overcome). The farmers are encouraged by the amounts of gas that can be produced over digestive periods, and see the potential for farming towns to easily become energy self-reliant via local pipe networks, from farms to town.

Renewable Resources— A National Catalog of Model Projects

Realizing the potential severe impact of a possible shortage of heating fuels, the Danville Energy Board, working with the Civil Defense chairman of the town, developed a plan of action to inventory the town's energy use and resources. Questionnaires have been sent to each household as part of an energy survey, which will permit the town to note energy use of each user or structure and to prioritize actions to reduce energy use.

The citizens of the town will be notified of both the general results of the survey and of their own energy use (as compared with that of other residents of the town).

Workshops and other educational activities are planned to help the citizens winterize their homes, generally reduce energy use, and rely more on renewable energy forms (solar and wood).

Meetings will also be held with community service groups and community leaders. The object will be to get the assistance of these groups and individuals in a bootstrap conservation effort—particularly in establishing relocation plans should a fuel shortage displace some individuals.

Category	Cities
State	VT
Project Name	Emergency Energy Planning
Organization	Danville Town Energy Board
Address	Danville, VT 05828
Contact	Jim Ashley
Telephone	(802) 684-3491
Funded By	State Energy Office
Cost	\$775
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Lower Champlain Valley Housing Authority is a non-profit housing group formed by citizens in four Addison and Rutland County towns. The group is building 60 housing units for the elderly, 15 in each of the towns. All will be solar heated.

Three of the projects will involve new construction, and one will be a renovation of an historic structure. The new, two-story housing will be set into southern hillsides. Such orientation will minimize heat loss and make relying on a passive solar heating system and wood as a back-up source easier. Possibly, wood pellets will be used in a central wood furnace.

Critique/analysis: Aside from the energy saving design, the project is unusual in two other aspects. It represents the cooperative efforts of several communities, and the development will be built on a non-profit basis.

Category Cities
State VT
Project Name Senior Citizen Housing

Organization Lower Champlain Valley Housing Authority

Address Benson, VT 05731 and Orwell, VT 05760

Contact Martin Harris

Telephone (802) 623-7146

Funded By Vermont Housing Finance Agency

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Two of Vermont's Regional Planning Commissions are studying the possibility of using their area's solid waste to generate low-grade steam for industrial use. Currently, the 30 towns of Southern Windsor County, Northern Windham County, and Sullivan County, N.W. are each paying \$250,000 a year to dispose of their refuse in landfills.

A site has been chosen in Claremont, N.H. for construction of a \$5-\$10 million resource-recovery plant capable of providing steam to existing industry in the area. The plant would handle 150 tons of combustible material per day.

A phase one feasibility study has been completed with matching funds from the U.S. Environmental Protection Agency (EPA). Phases two and three, land procurement and design, are now under way at a projected cost of \$200,000. Construction could start in 1983.

Rutland County, VT., is also undertaking a feasibility study of a resource recovery plant for the generation of processed steam.

Critique/analysis: The idea of turning waste into a means of producing energy for industry sounds inviting. However, also worth considering are the implications of entering into a system dependent upon the production of waste. Therefore in some indirect way the project might actually encourage waste and discourage the "recycling" option.

Category Cities
State VT
Project Name Waste Utilization

Organization Rutland/S. Windsor Regional Planning Commissions
Address 96 Main St.
Springfield, VT 05156
27 Center St.
Rutland, VT 05701
Contact Steve Wood (S. Windsor)
John Vihinen (Rutland)
Telephone (802) 885-4138
(S. Windsor)
(802) 775-0871
(Rutland)

Funded By U.S. Environmental Protection Agency matching funds

Cost \$200,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Houghton Cate, owner of a feed store in E. Calais, has restored an abandoned dam site on his property. Starting in 1975, Cate built a new penstock and installed a turbine and generator capable of producing 15 KW of power. The hydro unit now provides heat and electricity for the feed store and his home. Cate estimates he saves about \$1,500 per year in electricity costs.

Category Commercial
State VT
Project Name Hydro-powered Feed Store

Organization Moscow Mills (Feed Store)
Address Box 33
East Calais, VT 05650
Contact Houghton Cate
Telephone (802) 456-8833

Funded By Private

Cost \$8,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

An old manufacturing site with a dam is being revitalized in downtown Montpelier to provide housing for senior citizens, condominiums, and office space, with electricity to be supplied by retrofitting the dam.

Both the buildings and the dam of the Lane Shops manufacturing site in Montpelier along the banks of the north branch of the Winooski River are being rehabilitated to their original character. The dam (with a 15' head and 25-30 acre impoundment area) was last used in the '50's, generating mechanical power for the manufacturing of sawmill and granite-cutting equipment.

Fifty units of housing for the elderly have been completed with the condominiums, office space and additional housing planned, using a mixture of rehabilitated mill structures and new construction. The electric potential is about 125 kw, which would meet about two-thirds of the complex's electrical needs.

Critique/analysis: This project is an example of how an experienced developer, having a desire to look at all possible avenues in the development of a project, has been open-minded enough to recognize the valuable resource existing in the many abandoned water-power sites across New England. But he has been frustrated by the regulatory and institutional barriers which accompany such "alternative" thinking. By reusing old buildings and tapping existing water potential, the project saves both material resources and natural energy resources. Its mixed-use program will help maintain the life of the area. Being in downtown Montpelier, the project and the benefits of its "alternative" energy system are very visible. People living here will be much more in touch with where their energy is coming from. The possibility of having the power plant owned cooperatively is also being considered.

Category Commercial
State VT
Project Name Hydro-powered Housing and Offices

Organization Lane Shops
Address 500 Pine Street
Burlington, VT 05401
Contact Dave DeBrul
Telephone (802) 658-3800

Funded By Secured loan
Cost \$125,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Commercial
State VT
Project Name North Wind Power Co.

Organization North Wind Power Co.

Address Box 315
Warren, VT 05274

Contact Don Mayer,
John Norton

Telephone (802) 496-2955

Funded By DOE Contract

Cost n/a

Congressional District I

Compilation Date February 1980

North Wind Power Company was started in 1974 by David Sellers and Donald Mayer, who gathered up 150 "extinct" wind generators developed in the 30's and 40's from the Midwest and brought them East to take apart, overhaul, and rebuild into reliable generators. They found these old Jacobs, Chicago Wind Power, and other generators to be more reliable than the contemporary models from Switzerland and Austria. The experience gained in this massive renovation project gave them the know-how to develop a 2-kw machine of high reliability. Their reconditioned units have been used along the Trans-Alaskan pipeline and on off-shore oil platforms.

This Fall, Sellers and Mayer are also directing the energy design exhibition and seminar activities at the Stratton Arts Festival, an event that attracts thousands of visitors.

Renewable Resources— A National Catalog of Model Projects

The Rutland Group has retrofitted a standard pre-engineered steel building with passive solar heating. Two-thirds of the roof and southern exterior wall surfaces are covered with a lexan acrylic glazing. A rock storage bed provides enough thermal mass for two to three days of heat storage. The system is fan-assisted, with dampers and baffles in the air-convection loops to control heat flow and prevent reverse thermosiphoning at night. The system can also be used for summer cooling. The designers expect the system to meet 80 percent of the building's space-heating needs.

Critique/analysis: The system shows promise for widespread application to other industrial steel buildings because it is simple and low-cost.

Category Commercial
State VT
Project Name Passive Solar Retrofit

Organization Rutland Group
Address Box 365
Rutland, VT 05701
Contact Mike Beattie
Telephone (802) 775-1981

Funded By DOE
Cost \$30,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Commerical
State VT
Project Name Plee-zing Market

Organization Plee-zing Market

Address Williamstown, VT
.05679

Contact Ron Saldi

Telephone (802) 433-5325

Funded By Private

Cost \$40,000

Congressional District I

Compilation Date February 1980

The nation's first wood-burning shopping center is housed in a converted high school gymnasium in Williamstown, Vermont. The 21,000 square foot Plee-zing Shopping Center consists of a grocery store and laundromat with office space above, a restaurant, beauty salon, insurance company, and post office. The heating system--the converted boiler from the high school, plus many of the owner's own additions--was designed and built by the owner with the help of his father-in-law and brother-in-law.

Consulting Engineers said the system would never work due to the size of the system and the distance the heat needed to travel. However, the entire space stayed warm last winter (1978-79) despite a record cold streak that kept the mercury below 30 degrees F for over a week. Over the winter, the fire was stoked three times a day, and the system burned about 30 cords of wood, or \$1200 worth. Normally, the oil bill would have been \$20,000. With the existing boiler, the forced hot water system cost about \$40,000 to manufacture and install. The building has 21 different thermostats and 15 pumps to assure the right distribution of heat. Plans are being developed to convert the oil water-heating to wood.

Critique/analysis: The project has drawn a lot of publicity: CBS did a 6-minute spot on national news, a Burlington station produced a 15-minute special on it, and it has been written up in many newspapers and periodicals. The owner has been asked to consult for others wishing to install the same type of system. The project has not only promoted civic pride, but has also boosted local employment in fuel harvesting.

Renewable Resources— A National Catalog of Model Projects

The Four Winds Gallery is a private art gallery utilizing wood, wind, and passive solar for heat and electricity. The owners' interest in renewable energy sources dates back about ten years to when they rebuilt an old barn for the gallery and installed a central wood furnace (35,000 BTUs). In 1975, they installed a six-KW wind generator.

The Borden's biggest problem was interfacing the power with the utility grid, since they decided battery storage was too expensive. They developed the electrical equipment necessary to interface with the grid, but their equipment has been shorted out twice due to surges in the power grid.

Recently, the Bordens have completed a solar greenhouse to heat and humidify an apartment above the gallery.

Critique/analysis: Not all the systems used are cost-effective, but the owners are willing to incur the extra costs to utilize alternative energy systems and to expose the potential pitfalls involved.

Category Commercial
State VT
Project Name Renewable Energy Art Gallery

Organization Four Winds Gallery
Address Four Winds Road
Ferrisburg, VT
05473
Contact Barry and Madeline
Borden.
Telephone (802) 425-2101

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The St. Johnsbury House, a 19th century hotel, may be retrofitted with conservation and solar features. The hotel was recently saved from destruction by the cooperative efforts of the concerned community and the Northeastern Vermont Development Association (NVDA). It now contains housing for the elderly, the offices of NVDA, and a public dining room.

It has been included on the National Register of Historic Structures.

NVDA has received a \$5,000 planning grant to study the feasibility of retrofitting the structure to include an active solar hot water system, water thermal mass storage in the southern windows, and thermal shutters. If approved by HUD, NVDA will receive \$50,000 for construction and energy monitoring.

Category Commercial
State VT
Project Name Retrofitting an Historic Hotel

Organization Northeastern Vermont Development Assoc.

Address St. Johnsbury House
St. Johnsbury, VT
05819

Contact Charles Carte

Telephone (802) 748-5181

Funded By HUD

Cost \$55,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Bryant-Grinder Company implemented several energy-conserving practices to help cut oil consumption from 198,000 gallons in 1958 to 70,000 gallons in 1978. This 65 percent decrease indicates an impressive cutback by an industry concerned about a future dependent upon renewable resources and conservation methods. Practices within the office and plant, which manufactures machine tools, include control of open windows and doors, conservation of heat, and general awareness of fuel consumption.

Category Commercial
State VT
Project Name Simple, Effective Energy Conservation

Organization Bryant-Grinder
Address 257 Clinton Road
Springfield, VT 05156
Contact Clayton Lester
Telephone (802) 885-5166

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Two new branches of the Merchants Bank in Vermont are utilizing passive solar design. The Winooski branch uses 18" concrete walls surrounding the vault for thermal storage. A 2000-gallon water tank on top of the vault adds additional storage. In front of south-facing lobby windows are 8' x 1' cylinders filled with water (tinted Merchants-Bank blue) to act as a passive solar water wall and to filter soft light into the space. The system is designed to be 100 percent passive until the outside temperature gets below 10 degrees F, at which time the back-up systems are triggered. A fan blows heat down from the ceiling, the 2000-gallon tank's water-to-air heat pump trips on, and the tank's two-stage coil heats water electrically as needed for space heat. In the summer, the heat pump will reverse for cooling.

The second bank, a 5000 ft² building in Vergennes, will use a simpler system—direct gain through southern windows and high mass masonry walls with 1½" of gypsum board on the inside. This solar gain will meet about 70 percent of the heating load. The remainder will be accommodated by a wood-fired system as back-up.

Category Commercial
State VT
Project Name Solar Banks

Organization Merchants Banks

Address 364 Main Street
Winooski, VT 05404

Contact Doug Taft

Telephone (802) 482-2946

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In August 1978, the Woodstock Inn installed a domestic solar hot water system. The HUD Motel and Hotel Demonstration Project, funded by the Department of Energy, cost \$300,000. The 240 collectors are set at an angle of 40 degrees oriented towards the south. A 10,000-gallon holding tank forms two roofs over the employee parking lot. The preheated water is pumped into the boilers and is used to heat water and space for the guest rooms, kitchen area and public space. On a sunny winter day 10 degrees above zero, 7,000 gallons of water are heated from 40 to 70 degrees. During the summer, in 80 degree weather, 9,000 gallons are raised from 45 to 95 degrees.

Category Commerical

State VT

Project Name Solar Motel

Organization Woodstock Inn

Address 14 The Green
Woodstock, VT
05091

Contact W. Dean Merrill

Telephone (802) 457-1100

Funded By DOE, Woodstock Inn

Cost \$300,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Gateway Motors, a vendor of commercial trucks, recently installed a 2-KW windmill. It is connected to the local utility grid, and Gateway is credited for the power it puts into the grid. The unit has been generating about \$30 worth of electricity per month and is expected to pay for itself within ten years.

Critique/analysis: Besides generating electricity, the windmill also generates a good deal of publicity for Gateway Motors and for the wind-machine company. It is situated in a highly visible spot and has helped the business of both companies.

Category Commercial
State VT
Project Name Wind-powered Truck Dealership

Organization Gateway Motors
Address Sykes Avenue
White River Junction
VT 05001
Contact Robert W. Guernsey
Telephone (802) 295-3124

Funded By Private
Cost \$5,000 - \$6,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In January of 1977, the Country Kitchen Restaurant installed its first wood stove. Since then, four more wood stoves have been added. Together, they have realized a total fuel savings of over \$3,000 annually. The stoves provide more than 60 percent of the space heating for the entire 7,000 square foot building. The restaurant is also using wood fuel to provide 80 percent of its hot water (180 degrees F) for dishwashing. The wood-fired hot water heating system is expected to save \$4,000 per year.

The wood system's designer recently received a \$9,302 DOE Appropriate Technology Grant to monitor and study the restaurant's heating systems.

Category Commercial
State VT
Project Name Wood-heated Restaurant

Organization Country Kitchen Restaurant/L.W. (Stove Works

Address Box A West Brattleboro, VT 05301

Contact Paul Morisette Dan Darrow

Telephone (802) 257-0338

Funded By Private and DOE

Cost \$9,302

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Russel Laslocky, heading about half a dozen farmers in the Shoreham area, has begun Vermont's first wood-pellet manufacturing operation. (A wood pellet is a small, highly condensed piece of wood that burns much hotter and more efficiently than other forms of wood.) The wood pellet is a potential competitor of coal, and one project goal is to convince commercial operations to switch to burning wood pellets.

Wood pellets hold advantages over wood chips and regular firewood. Pellets contain only 10 percent moisture, can be fed mechanically into commercial heating systems, are easily stored and delivered because of their condensed size, and can be used by systems that presently heat with coal. Production beginning in September will range between 10,000 and 15,000 tons the first year. The project will also focus on recycling waste paper into small pellets the size of ice cubes for heating and using sawdust to mix into the wood pellets.

Critique/analysis: A complex manufacturing process is needed to turn wood into pellets. Other Vermont firms considering wood pellet plants have been discouraged by the high capital investment needed. Laslocky has adapted his hay-and alfalfa-cubing operation to manufacture wood pellets, which may make the economics more feasible.

table
Category	Commercial
State	VT
Project Name	Wood-pellet Manufacturing Operation

table
Organization	Russel Laslocky
Address	Shoreham, VT 05770
Contact	Russel Laslocky
Telephone	(802) 897-7663

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

Renewable Resources— A National Catalog of Model Projects

Energy is a common topic at the Ecumenical Action Ministry's "Give and Take Barter Center." Established in 1978 to offer economical alternatives to those hurt by inflation and unemployment, this program arranges trades for persons who have skills or own something someone else may need to use. Bartering in the energy section is done for exchanges of chain-saws, wood splitters, pickup trucks, insulation work, weather stripping, information on domestic hot water systems, alternative lighting approaches, etc.

The center has a total of 500 members signed up to barter and about 150 active barterers. A membership fee of one dollar a month is required, which is the center's only funding source.

Critique/analysis: Give and Take Barter Center provides a way for the community to work together and reduce individual consumption.

Category Community
State VT
Project Name Give and Take Barter Center

Organization Ecumenical Action Ministry
Address 135 Church Street
Burlington, VT 05401
Contact Steve Lange
Telephone (802) 864-0449

Funded By Membership Fee

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1976, the staff of the Morningside House, a half-way house for mentally and physically disabled adults, conceived the idea of building a solar greenhouse to provide food for the household and therapeutic employment for the residents.

The freestanding greenhouse measures 16' x 32'. It has a roof with a 15 degree pitch and a slanted insulated north wall. It has wood and electric space heating as a back-up, and an automated ventilation system.

The first year of operation involved about eight people, including Peter Williams (who acted as manager). It gave the participants the opportunity to assume some responsibility and to contribute to the operation of the house.

The House was, unfortunately, closed due to financial difficulties after the greenhouse had been operating for about one year.

Critique/analysis: This project illustrates several issues concerning the different attitudes involved in planning and operating a solar greenhouse. The Department of Vocational Rehabilitation, and to a lesser degree the board of directors, considered the project a failure because it was not self-supporting economically. The Morningside director and the staff viewed economics as secondary and were more concerned with educational aspects.

Therefore, to them the project was a success. The greenhouse provided a constructive environment for the house residents to make mistakes, which is a necessary and important part of the process of developing real skills. About half the people involved in the greenhouse went on to more independent lifestyles. The environment allowed them to take responsibility for living things and work as "equal" with fellow workers.

Category	Community
State	VT
Project Name	Half-way House Greenhouse
Organization	Morningside Half-Way House
Address	Morningside Road Brattleboro, VT 05301
Contact	Peter Williams
Telephone	(413) 586-2203
Funded By	VT Dept. of Vocational Rehabilitation
Cost	\$11,000
Congressional District	I
Compilation Date	February 1980

Williams, the greenhouse manager, felt the greenhouse was too expensive and complex for the purpose of the space. In the design, too much attention was placed on the thermal performance and not enough emphasis was placed on creating a good environment for growing plants.

Renewable Resources— A National Catalog of Model Projects

Ten low-income handicapped CETA workers are constructing several solar devices to serve as demonstrations at county fairs, high schools, and town halls. The project is conducted under a program by Handicapped Opportunities and Programs in Employment (HOPE), and is a private non-profit corporation serving the needs of handicapped persons in Vermont.

The group of ten individuals operating out of Rutland will construct solar panels, solar hot water and hot air collectors, solar dehydrators and conservation displays.

The project, "Simple Energy Projects for Vermont," will run for 35 weeks. Construction began in September of 1979.

Critique/analysis: "Simple Energy Projects for Vermont" emphasizes the use of low-cost materials and makes visible the skills of the handicapped individual. This educational effort is also aimed at making the public aware of simple and appropriate energy technology, and energy-conserving practices.

Category	Community
State	VT
Project Name	Handicapped Opportunities and Programs in Employment
Organization	Handicapped Opportunities and Programs in Employment
Address	5 Moody Court Waterbury, VT 05676
Contact	Peter Gasidunia Dennis Cote
Telephone	(802) 241-2200
Funded By	DOE, CETA
Cost	\$14,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Twelve towns in the southeastern corner of Vermont have joined together to study the feasibility of hydro sites in the area, but have met with problems from their utility and with government red tape. The West River Basin Energy Committee (WRBEC), a citizen group funded by the affiliated towns, wants to study the hydro-electrical potential on the West River. It has identified for study the Ball Mountain Dam site and the Townshend Dam (both owned and maintained by the U.S. Army Corps of Engineers as flood control dams), as well as two other sites. It strives to develop locally-owned and operated sources of energy.

An \$80,000 grant from DOE to make a feasibility study was awarded pending a permit from the Federal Energy Regulatory Commission (FERC). That permit ran into trouble because the Central Vermont Public Service Corporation (CVPS), the state's largest private utility, protested the WRBEC grant. The CVPS contends that the WRBEC should not be allowed to receive DOE money because the Committee does not own the site or have an option to purchase it.

Critique/analysis: The Energy Department, while rescinding the grant, invited WRBEC to compete for a low-head hydroelectric loan. Roland Moore, chairperson of the WRBEC, said that while that option will be explored, it is something of a "Catch-22" because FERC will not grant the permit until WRBEC has the loan and DOE won't grant the loan until FERC has awarded the permit.

Category Community
State VT
Project Name Hydro Feasibility Study

Organization West River Basin Energy Committee
Address Wardsboro, VT 05355
Contact Roland Moore
Telephone (802) 896-4044

Funded By Affiliated Towns, DOE

Cost \$80,000

Congressional District n/a

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State VT
Project Name Ad Hoc Community on Energy

Organization Ad Hoc Community on Energy
Address 110 Dorset Street
South Burlington, VT
05401
Contact Steve Lange
Telephone (802) 862-4850

Funded By Volunteers

Cost n/a

Congressional District I

Compilation Date February 1980

Ad Hoc Community on Energy, in existence for one year, is a non-profit organization researching alternative energy for the greater Burlington area. It is comprised of fifteen volunteers with various backgrounds and expertise in planning, housing, water quality, forest resources, and legislation. Its purpose is to prompt an alternative energy/conservation future by stabilizing electrical demand in Burlington and developing efficient wood-energy sources.

During the winter of 1979, the Ad Hoc Community testified before the Public Service Board to emphasize the need to look at energy conservation and hydro power before building a wood-fueled electrical power plant in the Interval section of Burlington. It is concerned that the proposed large-scale electric generating plant does not represent the most efficient or necessary use of wood resources.

Renewable Resources— A National Catalog of Model Projects

Located in the basement of Lawrence Memorial Library, CERP seeks to provide the people of Bristol with a variety of post-secondary and adult educational learning opportunities.

In response to the need for practical, accurate, and up-to-date information on energy and natural resources, appropriate technologies and alternative energy sources, Community Education Resources Project (CERP) in cooperation with Bristol's Committee on Energy and Natural Resources, has assembled a small but fairly wide-ranging information library. The focus of this library is on the general concerns of food, energy, and shelter. The collection consists of a variety of books, journals, periodicals, pamphlets, newsletters, reprints, and bibliographies. It is open for public use on the premises. Information not currently available in the collection may be requested—either specifically (e.g., certain texts, journal issues, etc.) or by topic (e.g., solar water heating designs, composting toilets, etc.). CERP's energy resource center is intended to serve as a node in a network of people working on various energy issues at the local, regional, and national levels.

Category	Education
State	VT
Project Name	Community Energy Library
Organization	Community Education Resources Project (CERP)
Address	Lawrence Memorial Lib. Bristol, VT 05443
Contact	Charlie McClintock
Telephone	(802) 453-4277
Funded By	Vermont Institute of Community Involvement
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Charlie Hall is carrying the "build-your-own-solar-home" philosophy into the field of wind generators. He offers a two-week (80-hour) course in wind-tower erection, generator placement, and repair, and wind testing. He stresses techniques that require minimal outside help, and half the cost of tuition can be applied toward purchase of a wind-generating unit.

Hall has rebuilt over 100 different generators ranging in size from 750 watts to 6,000 watts. He also teaches wind mechanics at Goddard College.

Category Education
State VT
Project Name Do-it-yourself
Windmill Classes

Organization Charlie Hall's Research Center

Address Box 512
Barre, VT 05641

Contact Charlie Hall

Telephone (802) 439-5519

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Energy Information Resource Center at Lyndon State College is an information clearinghouse for the Northeast Kingdom area of Vermont. The Center's goals are to: assist the Town Energy Coordinators in their conservation and alternative energy work, establish an up-to-date energy library for public use, provide a private "hot line" for citizens with energy questions, put on energy seminars and public meetings throughout the area, and maintain a list of area loggers and firewood dealers. The program is scheduled to run 65 weeks.

Category Education
State VT
Project Name Energy Information Resource Center (ERIC)

Organization Energy Information Resource Center (L---,

Address Box L965
Lyndon State College
Lyndonville, VT
05851

Contact Andy Haaland
Tom Tracey

Telephone (802) 626-9371
ext. 165

Funded By Title I Higher Education Grant

Cost \$20,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State VT
Project Name Energy Show

Organization N.E. Coalition on Nuclear Pollution
Address Pollution Inc.
67 Main Street
Brattleboro, VT
05301
Contact Susan Cokely
Cornelia Iselin
Telephone (802) 257-0336

Funded By Donations

Cost n/a

Congressional District I

Compilation Date February 1980

The Great New England Energy Show is a creative touring group that is part theater and part technical education. It presents information on renewable energy and conservation to schools, fairs, and other interested groups throughout New England and Eastern New York. Troupe members travel in a van containing exhibits, a model windmill, a model hydropower plant and an information center with books, pamphlets and fact sheets. In addition to puppet shows, musical performances, and street theater, the group conducts slide shows and "hands on" workshops.

The New England Coalition on Nuclear Pollution, a non-profit organization, created the Great New England Energy Show in March of 1977 after realizing the need for educating the public about nuclear power and its alternatives.

Renewable Resources— A National Catalog of Model Projects

The Fairbanks Museum received a grant from the National Endowment for the Humanities to study the future role of the Museum in the community. Energy emerged as a major focus for the Museum.

Steve Gilbert, the acting energy coordinator, is currently developing an energy exhibit that displays working models of various renewable energy systems, including wind, hydro, and solar systems.

The museum is also planning a mini-course in renewable energy systems for local bankers in order to promote a better understanding of these systems among lenders and to encourage financing of local renewable energy projects. Audits of the museum buildings and town buildings are being done to improve energy efficiency.

Critique/analysis: The museum's goal is to lift the barrier between the scientists and engineers and the public by providing information for the general public via understandable exhibits. The museum's energy audits have been highly visible in the community.

Category Education

State VT

Project Name Fairbanks Museum

Organization Fairbanks Museum

Address 83 Main Street
St. Johnsbury, VT
05819

Contact Steve Gilbert

Telephone (802) 748-2372

Funded By National Endowment
for the Humanities

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Brattleboro Design Group has developed a very simple hot water preheat system for solar greenhouses. The system consists of a bread-box type of collector placed in the peak of attached greenhouses. The collectors consist of used, glass-lined hot water tanks painted black. These are enclosed in an insulated box that opens to allow sunlight to hit the tanks. The opening panels, lined with aluminum foil to reflect sun onto the tank, are manually closed at night to prevent heat loss. The panels can be focused for maximum gain at any time of year.

Category Education
State VT
Project Name Greenhouse Hot Water Preheater

Organization Brattleboro Design Group
Address Box 235
113 Main Street
Brattleboro, VT 05301
Contact Larry Purcell
Telephone (802) 257-7644

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

Renewable Resources— A National Catalog of Model Projects

An insulating venetian blind to provide solar heat and regulate heat loss on south-facing windows is being designed in Vermont. The slats have a core of 1/4 inch thick foil-faced plastic foam insulation reinforced with wood strips. A positive air seal is achieved with a V-shaped interlock along the top and bottom of each slat. A prototype shutter unit was installed in a Colorado residence in 1979.

Critique/analysis: The designer of these blinds is attempting to avoid the bulkiness and aesthetic shortcomings of many thermal shutters and curtains. He must, however, also make them cost-effective, which has not been accomplished to date.

Category Education
State VT
Project Name Insulating Venetian Blinds

Organization Alan Ross
Address 95 South Main Street
Brattleboro, VT
05031

Contact Alan Ross

Telephone (802) 257-7644
(802) 257-4262

Funded By Appropriate Technology Grant

Cost \$8,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Addison County Regional Planning Commission has been awarded a grant from the Northeast Solar Energy Center to implement a one-year comprehensive solar energy educational program. The Commission's two aims will be to effect local government public policy and land-use decisions and to influence development and retrofit decisions in the private sector.

The Commission will attempt to convince people that solar power works, saves money, and is commercially feasible. It also hopes to show local governments how they may encourage solar development through changes in zoning and subdivision regulations. A final objective is to facilitate the commercialization of solar and wood technologies in other regions in Vermont.

Critique/analysis: The project started in June of 1979. It is thus too early to evaluate. Early results do, however, indicate an increase in awareness of solar energy in the county.

Category	Education
State	VT
Project Name	Regional Solar Education

Organization	Addison County Regional Planning Commission
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Address	9 Washington St. Middlebury, VT 05753
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Contact	Kim Kellington
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Telephone	(802) 388-3141
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Funded By	Northeast Solar Energy Center
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Cost	\$20,000
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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

John Willey and Robert Lane of Waterbury are developing a small-scale wood-fired steam plant designed primarily for electric generation but adaptable to other power uses. The system is planned for residential use.

The prototype works by forcing water into a coil located within the flue of a wood stove. The water is turned to steam, which can operate either a small steam engine or a steam turbine. The system holds promise for use in rural states such as Vermont, where over 50 percent of the households are equipped with wood stoves.

Critique/analysis: Work is still very much in the research and development stages. The system may hold great potential; however, it is too early to judge its impact.

Category Education
State VT
Project Name Residential Wood-fired Steam Plant

Organization John Willey and Robert Lane
Address Cobb Hill Road
Waterbury, VT 05676
Contact John Willey and Robert Lane
Telephone (802) 244-8039

Funded By DOE Appropriate Technology Grant

Cost \$6,867

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Lorianne, James, and Donald Lilja are conducting extensive research on developing energy-efficient and cost-efficient methods of raising vegetables for future commercial marketing. By comparing the utilization of a solar greenhouse to a conventional greenhouse, they will provide data on energy-conserving growing methods. With this research, the Liljas hope to install solar greenhouses that use waste heat from the proposed wood-burning plant to be constructed in two to three years in Burlington.

The Lilja solar greenhouse, occupying an area 12' x 40', uses a highly reflective north wall. The wall, which increases the amount of collected light by two or three times, is positioned to provide maximum solar gain in the winter. A prefab lean-to, tipped and raised three feet from the wall, improves the angle and draws in more sun. Crushed rock 18 inches beneath the ground provides heat storage.

The greenhouse maintains a temperature difference of about 30 degrees F above outdoor temperatures. Presently, this is not sufficient for raising vegetables in winter, so more insulation and night curtains will be installed to improve its efficiency. The design of this solar greenhouse is taken from the Brace Research Institute at McGill University.

The conventional greenhouse the Lilja's are using in their comparison is a dutch-span design, measuring 17' x 40'. The ground beneath the greenhouse is insulated with foam mning to a depth of four feet.

This winter, tomatoes, lettuce, and herbs are going to be raised, with the University of Vermont monitoring the greenhouse's efficiency and Burlington City Electric monitoring solar gain.

Category	Education
State	VT
Project Name	Solar and Non-solar Greenhouse Compari- sons
Organization	Lorianne, James, and Donald Lilja
Address	12 Woodlawn Dr. Essex Center, VT 05451
Contact	Lorianne Lilja
Telephone	(802) 863-1308
Funded By	Private
Cost	\$12,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Talcott Mountain Science Center teaches students and teachers about energy, and operates solar systems to demonstrate the technology. The Center's 15 professional staff people work with 65 schools from kindergarten to graduate school level. Sometimes the staff visits the school, and sometimes students are sent to the Center. Programs range from general energy classes to special projects for gifted children. One group of gifted elementary school children, for example, is designing simple solar systems. At the Center, students have access to equipment, such as a computer, a weather station and other scientific equipment.

The Center is currently teaching vocational education instructors about the installation and sizing of solar systems. It also holds workshops for teachers on how to incorporate solar energy into the curriculum.

The Center itself displays these operating (or soon-to-be-operating) solar energy systems. The main building gets a major portion of its heat and hot water from a hydronic system comprised of 48 panels. The building also has passive design features. Another building will use a concentrating evacuated-tube system for space heating. The Center is also experimenting with different types of trombe walls.

table
Category	Education
State	VT
Project Name	Solar Classes for Students and Teachers

table
Organization	Talcott Mountain Science Center
Address	Montevideo Road Avon, VT 06001
Contact	Robert Amrein
Telephone	(203) 677-8571

table
Funded By	Service fee from schools, various grants
Cost	n/a
Congressional District	VI
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Category Education
State VT
Project Name Solar Curriculum Projects

Organization Town School Systems

Address Harvey Cohen
Colchester High School
Colchester, VT 05446
(802) 658-1570

Contact Vincent Pacilio
Orange Elementary
Orange, VT 05678
(802) 476-3278

Telephone Readsboro High School
Readsboro, VT
(802) 254-8202

Funded By Department of Education

Cost n/a

Congressional District I

Compilation Date February 1980

Many Vermont high schools and elementary schools are integrating solar and energy-conservation education into their curriculums. The focus on solar and energy conservation stems from a general interest and from the need to educate students to the present energy issue.

Colchester High School this fall offers a half-year energy course to juniors and seniors. The course covers the past, present, and future development of energy, its functions, and methods. In addition to classroom lectures, the course includes laboratory work and field trips.

Waterbury Elementary school, at the fourth-grade level, has incorporated into its curriculum a unit covering environmental issues. In this unit, the teacher offers options for study, including designing and building models of various solar devices. An architect serves as the resource person, advising the students on plans for their solar devices. For their part, students generally draw plans for solar systems and come up with their own explanations for the design, construction, and performance.

Orange Elementary School installed a passively heated 16' x 16' solar greenhouse. The project, funded through the Department of Education mini-grant program, cost \$1,500. The greenhouse has been operating since March of 1979 after a construction time of about 18 months. The crew consisted of students, parents, and community members. Much of the cost of the greenhouse was cut by using logs harvested from land and donated labor. The students' involvement is through their school's science program.

Last year the Readsboro High School mounted a complete energy curriculum for its 8th grade. Funded with a Department of Education mini-grant for \$1,200, the program focused on

conventional forms of energy, problems with these methods, and renewable resource and energy conserving methods. The students in this program also constructed solar devices for an Energy Fair.

Renewable Resources— A National Catalog of Model Projects

In the winter of 1979, over 250 people donated materials and labor to help Glenn Munson attach a solar greenhouse to his house. Munson is now preparing a report and a slide show; he is also researching his greenhouse's thermal performance.

In July of 1979, Munson received a DOE Appropriate Technology Grant to publicly demonstrate the cost-effectiveness of a solar greenhouse in Vermont's climate. He will publish an economic analysis in his weekly column in the Vermont News Guide of Manchester. Munson calculates that the cost of designing and building a solar greenhouse is \$15 per square foot and \$7.50 per square foot for materials only.

Munson's slide show on attached solar greenhouses and a model greenhouse he is building will be made available to schools and other interested organizations. Finally, he will research thermal performance and solar utilization for solar greenhouses as the last phase of his grant.

Munson is a writer who initially became interested in solar greenhouses while researching an article. Last year in his weekly column in the Vermont News Guide, he focused on the design, material, and construction of a solar greenhouse. This winter the column is concentrating on horticultural aspects and the types of crops that can grow well in a solar greenhouse.

Category	Education
State	VT
Project Name	Solar Greenhouse
Organization	Glenn Munson
Address	Pawlet, VT 05761
Contact	Glenn Munson
Telephone	(802) 325-3449
Funded By	DOE
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Robert Huke, a Professor at Dartmouth College specializing in the geography of the Far East and how it affects food production, four or five years ago installed a solar greenhouse with a 17.5-foot diameter plastic-covered dome. Designed from plans in the Whole Earth Catalogue, the greenhouse is built over the bottom half of a concrete septic tank about three feet deep, six feet wide, and twelve feet long. Most of the floor space is the tank, but with room around the sides for rows of vegetables. The tank itself is used for raising catfish and tilapia in the summer, and brown trout during the winter.

The dome heats up without help from mechanical heaters. Reflectors set into the north wall are designed to bounce sunlight at the center of the fish tank. The tank makes water evaporate and fills the air with humidity. The moisture hits the plastic sides of the dome, condenses, and gives off heat.

A couple of 55-gallon drums are used to filter the tank water. A biological filter system purifies the water, while a pump circulates it through the filter every two hours.

The greenhouse is mostly self-supporting in that the fish fertilize the vegetables and feed on algae floating on top of the water. Vegetables thrive under the dome for more than 200 days each year--far exceeding Norwich's 123 day season.

Huke's initial interest in solar greenhouses stems from his concerns about overpopulation, the need to increase the world's food production and decrease the amount of land used for agriculture. He wanted to create a controlled growing environment for non-farm areas.

Critique/analysis: Huke's solar greenhouse shows that with little previous experience one can build an efficient greenhouse.

Category Education
State VT
Project Name Solar Greenhouse and Aquacultures

Organization Robert Huke
Address Partridge Hill
Norwich, VT 05055
Contact Robert Huke
Telephone (802) 649-1115

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

Renewable Resources— A National Catalog of Model Projects

WCAX-TV meteorologist Stewart Hall began reporting the daily solar radiation index during his weather report. The index shows the percentage of domestic hot water for a family of four that could have been met with solar heating that day. It is based on calculations from the National Solar Heating and Cooling Information Center (NSHCIC). Government-funded NSHCIC offers its services at no charge to WCAX-TV and other stations.

Category Education
State VT
Project Name Solar Index in the News

Organization WCAX-TV
Address Joy Drive
South Burlington, VT
05401
Contact Stewart Hall
Telephone (802) 658-6300

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

Renewable Resources— A National Catalog of Model Projects

Three one-day seminars for bankers and appraisers were recently held in Vermont. A total of 60 people attended the sessions in three parts of the state. The seminars provided a basic introduction to solar passive space heat, active solar hot water heat, and the use of wood in stoves and furnaces. Each seminar included a field visit to a solar home. An attempt was made to present the facts objectively and not to force solar energy upon a traditionally conservative faction.

Critique/analysis: Participants were very enthused. The Vermont Bankers Association wants one more seminar, and it has signed up for two DOE Financial Workshops.

Category Education
State VT
Project Name Solar Seminars for Bankers

Organization State Energy Off.
Address State Office Building
Montpelier, VT 05602
Contact Dave Pinkham
Dick Cambio
Telephone (802) 828-2393

Funded By NESFC (New England
Solar Energy Corp.)

Cost \$1,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Two Vermont teachers attended a five-day solar energy training session in New York State. In turn--and as part of the bargain--they conducted two workshops for Vermont teachers serving as solar resource people for those teachers and reporting the results.

The Vermont workshops will provide two days of introductory material for building-trades instructors in Vermont's 16 area centers. The material will describe the basics of solar and show these instructors laboratory and on-site solar hot water and space heating equipment. The object is to motivate these instructors to include solar training within their two-year programs.

Category	Education
State	VT
Project Name	Solar Training for Teachers
Organization	Northeast Solar Energy Center (NESEC)
Address	State Energy Office State Building Montpelier, VT 05602
Contact	Dave Pinkham
Telephone	(802) 828-2393
Funded By	NESEC
Cost	\$14,000
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Tao Center for Self-reliance is a non-profit educational organization through which people learn to become more self-reliant in energy usage and food production.

Last winter, in response to the growing interest in energy conservation, the center included courses in solar application. This winter, four courses in solar heating design will cover background, engineering, methods of design, formulas, materials, and installation. The cost of this course is between \$55 and \$60.

Three two-day workshops are oriented to those interested in constructing their own solar heating system of minimal construction cost. The three course topics are solar greenhouses, passive solar residences, and solar hot water heating. These two-day workshops will cost about \$20 and will be geared toward those whose knowledge of building and design is slight.

Category Education
State VT
Project Name Solar Workshops

Organization Tao Center for Self-reliance, Inc.
Address 27-29 Center Street
Rutland, VT 05701
Contact Stewart Chicka
Telephone (802) 773-2042

Funded By Tuition for courses

Cost \$55-\$60 (course)
\$20 (workshop)

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Harry Hopfe has developed a wave generator called a Wave Energy Module. With the help of Charles Carver, the Director of the Fluid Mechanics Department at the University of Massachusetts, he is applying for federal funds to provide testing facilities for a prototype unit.

Hopfe and Carver have built a one-tenth scale model of a one-megawatt Wave Energy Module that would be 100 feet in diameter. The unit operates at a high efficiency (85-90 percent) by utilizing six pistons and a hydraulic pump driven by wave action. The hydraulic pump drives a generator, which in the model is a 12-volt automobile alternator.

Critique/analysis: Storage of electricity produced is still a problem.

Category Education
State VT
Project Name Wave Energy Module

Organization Harry Hopfe and Charles Carver
Address 2 Shore Road
South Hero, VT 05486
Contact Harry Hopfe
Charles Carver
Telephone (802) 372-5088

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Johnson State College in Vermont held an all-day conference on small wind-energy conversion systems in the spring of 1979. Senator Patrick Leahy attended, as did representatives from Senator Robert Stafford's Office and the Office of Congressman James Jeffords. The well-attended conference featured an economic analysis of wind systems, presentations regarding the state of the art, and a panel composed of representatives of the State Environmental Board, the Public Service Board, the State Energy Office, and the Green Mountain Club on the environmental implications of wind energy.

Category Education
State VT
Project Name Wind Conference

Organization Johnson State College
Address Johnson, VT 05656
Contact Richard Mixer
Telephone (802) 635-2356

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

Renewable Resources— A National Catalog of Model Projects

Eighteen-year-old Brent Benner has been building wind-powered generators for five years. His sixth model won him a \$1000 award and a trip to Cleveland, Ohio, this spring in the Thomas A. Edison Centennial of Light Contest.

This generator, built out of scraps, has two 12-volt storage batteries. It can put out a maximum of 20 amps in a 25 mph wind, which allows him to operate any combination of electrical appliances that draws 200 watts or less. He claims his \$25 generator can produce more power than a commercially-built model that costs \$500. Benner's generator has a few unique features including an automatic switch that activates the alternator only at a certain propeller speed and an electro-magnetic brake that stops the propeller from turning. The brake is push-button operated from Benner's room.

This September Benner is attending a program in energy studies at Worcester Polytechnic Institute in Worcester, Mass., where he plans to study solar and wind energy.

Category Education
State VT
Project Name Wind Whiz Kid

Organization Brent Benner
Address Route 7
New Haven, VT 05472

Contact Brent Benner

Telephone (802) 453-2846

Funded By Self

Cost \$2500

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Dimetrodon is the name of a group of 10 to 12 appropriate technology professionals who live and work together in cluster housing that uses an integrated renewable energy system. The group erected a superstructure of box beams, framing out spaces 100 feet long and 50 feet high, complete with all mechanical systems, and then let the individual or family owners create their own living space within the superstructure modules. The superstructure is equipped with an active solar system for space-heating and water-heating, as well as a central wood-fired furnace for back-up heat. Electricity is produced by two rebuilt wind generators.

Dimetrodon recently received a \$13,000 Appropriate Technology Grant to monitor its existing wood, wind, and solar systems, and to demonstrate the effectiveness of its cluster housing concept in contrast to that of conventional buildings.

Critique/analysis: The group would look more to passive design if they were starting over. But in other respects, they are pleased with the system.

Category Housing
State VT
Project Name Dimetrodon

Organization Dimetrodon
Address Prickly Mountain
Warren, VT 05674
Contact Bill MacLay
Telephone (802) 496-2907
(802) 496-2787

Funded By DOE, private sources

Cost \$13,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Green Mountain Homes are pre-fabricated, low-cost, energy-efficient solar homes. The design is a direct gain passive solar system using Green Mountain Homes patented "Solar-Slab" heat exchanger and heat storage concrete base, a hot water preheater, thermo-shutters, and south-facing windows. This solar system complements a wood-burning system since the houses are designed to redistribute heat efficiently. The model home solar system provides about 50 percent of the total heat load in Vermont's severe climate.

Critique/analysis: The Green Mountain Homes solar concept has been studied by the Central Vermont Public Service Corporation and Dartmouth's Thayer School of Engineering, both of which monitored the solar-equipped office/model home on a 24-hour basis.

Category Housing
State VT
Project Name Solar Pre-fab Homes

Organization Green Mountain Homes

Address South Royalton,
VT 05068

Contact Jim Kachadorian

Telephone (802) 763-8384

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Kraft Cheese Corporation installed about 34 energy-saving features as part of an overall conservation program. The program was developed to reduce energy usage and water consumption. Since 1975, Kraft has installed a boiler stock economizer designed to reduce fuel consumption between 6 and 10 percent. It has also purchased an automatic boiler air trim system to obtain the best possible fuel combustion ratio of air to carbon dioxide production.

The Kraft Corporation's "Energy Saving Committee," spearheaded at the local level, meets monthly to report to maintenance on any air, steam, or water valves leaking.

Category Industrial
State VT
Project Name Energy Conserving Cheese

Organization Kraft Foods Divi:
of Kraft Co., Co

Address Exchange Street
Middlebury, VT
05753

Contact Ron Gruber

Telephone (802) 388-6731

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980.

Renewable Resources— A National Catalog of Model Projects

Category Industrial

State VT

Project Name Solar Hot Water for Manufacturing

Organization Cone-Blanchard

Address Everett Lane
Windsor, VT 05089

Contact Dean Osgood

Telephone (802) 674-2161

Funded By Private

Cost Short of \$20,000

Congressional District I

Compilation Date February 1980

Cone-Blanchard, Inc., a manufacturer of machine tools, installed three hot water systems in the fall of 1977 at a cost just short of \$20,000. The office uses four collectors with a 120-gallon storage tank, and the hot water for the washrooms is supplied by 11 collectors, each with a 120-gallon storage tank.

An electric hot water system provides the back-up to this close-loop system, using an anti-freeze solution as the circulating fluid. As of now, there is no data on the system's cost-effectiveness.

Renewable Resources— A National Catalog of Model Projects

Famolare Shoe Company, a company concerned with engineering and design, built a total energy-conserving facility. Both the offices and warehouse use several passive solar devices.

The 22,000 square foot office, operating since late 1977, has a system of south-facing glass windows, with sliding shutters acting as collectors, and a natural lighting system provides 40-50 percent less watt-demand per square foot than conventional systems do. The majority of light in the 60,000 square foot warehouse is from natural sources. The light system excludes direct sun in summer and admits it in winter.

The warehouse also has a gravity-operated Trombe wall on the south side measuring 20 feet high by 184 feet long. Connecting the offices and warehouse is a glass bridge that acts as a passive collector. A thermostatic fan pumps excess heat into the building in the winter and discharges heat in the summer. The helicopter building uses collectors measuring 12' x 15' for direct solar gain and concrete walls for heat storage.

The solar heating system provides 34 percent of the heat from the sun on an annual basis.

Category Industrial
State VT
Project Name Solar Shoe Company

Organization Famolare Shoe Comp
Address Ferry Road
Brattleboro, VT
05301
Contact Barwell, White &
Arnold Architects
Hanover, NH
Telephone (802) 643-3772

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Cathedral Square Elderly Housing, with a \$92,000 HUD grant, installed a solar water-heating system for its 150 apartments. The 80 flat-plate collectors, installed in October of 1978, have a 3,000-gallon storage tank. Monitoring devices are collecting data on the system's cost-effectiveness.

Interesting to note is the position of the collectors, which are 42 degrees west of south due to the change in design of the buildings. Even with the collectors at this angle, the system more than adequately supplies domestic hot water to the apartments.

Critique/analysis: The problem with this solar hot water system is that there is more hot water than needed. In the HUD grant the projected consumption of water per person per day was 20 gallons, which is what is usually needed for a family for four.

Category Institutional
State VT
Project Name Cathedral Square Elderly Housing

Organization Cathedral Square Elderly Housing
Address Pearl Street
Burlington, VT 05401
Contact Bob Wheeler
Yankee Solar Systems
119 Pearl St.
Burlington, VT 05401
Telephone (802) 864-4522

Funded By HUD
Cost \$92,000
Congressional District I
Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

A new vocational high school in Enosburg Falls will be a model conservation and passive solar building. An architect won a design competition with a conventional design for the building and then convinced the school to include solar features in the 19,000 square foot structure.

The school will be well-insulated and will utilize a Trombe Wall system and the body heat of students. These heat sources are expected to achieve a heating balance even when the outside temperature dips to 0 degrees F.

Construction began in September of 1979.

Category Institutional
State VT
Project Name Solar High School

Organization Enosburg Vocational School
Address Enosburg Falls, VT 05450
Contact Doug Taft
Telephone (802) 482-2946

Funded By Private

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Category Institutional
State VT
Project Name School Trombe Wall

The Westminster West Elementary School was recently scheduled to be expanded and insulated. The contractor suggested that, instead of insulating all four walls, the school should convert just the south wall to a simple Trombe Wall passive solar system. The existing 8' x 26' concrete block wall was subsequently covered with glazing; vents for thermosiphoning were installed top and bottom; summer cooling vents were installed; and the concrete blocks were painted black. Dampers were installed to prevent reverse thermosiphoning at night.

The entire system cost only an additional \$600.00.

Critique/analysis: Town officials were at first reluctant to try the Trombe Wall. They approved the project only on condition that its performance be guaranteed by the contractor.

The project is significant in several ways. First, it represents a solar retrofit that can be widely replicated across the country on the many similar school buildings that were built in the 50's. Second, projects involving school buildings have the unique opportunity to expose a wide variety of people (including school-children) to the practicality of solar energy.

Organization Westminster West Elementary School
Address Westminster VT 05158
Contact Jim Taylor (Beaver Pond Builders)
Telephone (802) 387-5756

Funded By School

Cost \$600

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Act 105, passed on April 30 of 1975, requires at least a five-cent deposit on beer and soft drink containers sold at retail, and requires container manufacturers to reimburse retailers or redemption center operators at the rate of at least 20 percent of the amount of deposit returned to the consumer.

The Bill also establishes a "litter levy" to be paid to the Tax Department by manufacturers or distributors of wines and spirits for the bottles that contain their products.

Retailers are required to accept and refund deposits on returnable beverage containers unless a redemption center for this specific purpose is available. They label containers as refundable.

Tab-top beverage cans and containers connected to each other by plastic rings or other nonbiodegradable material may not be sold in Vermont.

A bill is pending in the General Assembly that would extend the provisions of this bill to containers for iced tea and fruit juices.

Critique/analysis: Vermont and Maine have bottle ban bills, but other New England states do not. This hampers efforts to create a regional volume of containers sufficient to establish a recycling program. Thus, the bill is not resulting in significant energy savings at this time, although the potential is there. It is however, accomplishing its primary purpose of cutting down on roadside litter.

Category Legislation

State VT

Project Name Bottle Bill

Organization Vermont General Assembly

Address State House
Montpelier, VT
05602

Contact Legislative Council Office

Telephone (802) 828-2231

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Act 226 (the property tax exemption for alternative energy sources, which passed on April 7, 1976) specifies that a town may, by majority vote of those present at a town meeting, exempt alternative energy sources from real and personal property taxation.

The bill covers structures or facilities used to produce energy or generate electricity for use on the premises (not for sale or exchange to the public). Included are windmills, solar collecting devices or installations, biomass-conversion equipment, and other not specifically named, as well as up to one-half acre of land on which the facility is located.

Critique/analysis: Only 32 of Vermont's 251 towns have passed the exemption for renewable energy systems; nine have voted to reject it. None of the major towns except St. Johnsbury has passed the exemption. More active promotion of this legislation by interested citizens is needed if it is to have any significant effect.

Category Legislation
State VT
Project Name Property Tax Exemption

Organization Vermont General Assembly

Address State House
Montpelier, VT
05602

Contact Legislative Council Office

Telephone (802) 828-2231

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Introduced by Representative Anne Just (D-Warren) and passed by the Vermont General Assembly in April of 1978, the Vermont Tax Credit (Act 210) entitles a taxpayer to claim a credit of 25 percent or \$1,000, whichever is less, against the cost of a residential energy system that uses solar, wood, wind, or hydropower. Renewable energy systems used by a business qualify for a credit of 25 percent of the system cost, or \$3,000, whichever is less. The credit is effective between January 1 of 1978 and June 30 of 1983.

Wood and wood/combination furnaces are eligible for the credit as part of a central-heating system, but wood stoves and fireplaces are not. Components of a passive solar system (such as a greenhouse) are eligible for the tax credit to the extent that they are part of the solar collection and storage function and not integral structural components of the building. Property used both for business and residential purposes is considered residential for tax-credit purposes unless more than 50 percent of the floor space is used as business property.

Category Legislation
State VT
Project Name State Tax Credits

Organization Vermont General Assembly
Address State House
Montpelier, VT
05602
Contact Legislative Council
Office
Telephone (802) 828-2231

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

Renewable Resources— A National Catalog of Model Projects

Act 226 (creation of town energy coordinators, which passed April 7, 1976) specifies that a town may authorize its selectmen to appoint an energy coordinator for a one-year term. The coordinator's duties include coordinating existing energy resources in the town, cooperating with municipal planning agencies and other governmental agencies that deal with energy, and making periodic reports of his or her activities to selectmen as required. The coordinator may also study and evaluate alternative sources of energy and ways of increasing energy efficiency, and he or she may perform other duties, studies, or examinations as required by selectmen.

Critique/analysis: Although 175 of Vermont's 251 towns have appointed energy coordinators, many of them are inactive. This is probably due to one or more factors: a lack of specific guidance and motivation from the State or the individual towns; a lack of support, including a meaningful level of funding for their activities; the difficulty of initiating community-wide projects singlehandedly.

Category Legislation
State VT
Project Name Town Energy Coordinator

Organization Vermont General Assembly
Address State House
Montpelier, VT
05602
Contact Legislative Council Office
Telephone (802) 828-2231

Funded By n/a

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Vermont Action on Energy is an advocacy group formed in February of 1979 to address the energy concerns of low-income people. The organization consists of two full-time staff members, and a ten-person advisory board made up of two representatives from each of the Community Action Program (CAP) agencies. The group is currently focusing on several state-wide issues, including opposition to Construction Work In Progress (CWIP), charges by Vermont utilities, support for a better emergency fuel program, and encouragement of State demonstrations of energy conservation and alternate energy sources in public buildings. The group is also working with the Memphramagog Research Group to develop an appropriate technology handbook for low-income people.

Category Low Income
State VT
Project Name Low Income Energy Advocacy

Organization Vermont Action on Energy
Address c/o OCCSA Inc.
10 Main St.
Newport, VT 05855
Contact Vera McFarland
John Redenburg
Telephone (802) 334-7316

Funded By Community Service Administration

Cost \$35,000

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Dynamic Integrations is working on a wide range of conservation projects. It is helping the Vermont Jaycees develop a slide/tape program on energy, working with Maine Public Television on the production of 20 shows designed for the 4th, 5th, and 6th grades on energy conservation, presenting seminars on energy management for owners of commercial and institutional buildings, working with a local oil company to develop a home energy audit for its customers, conducting energy audits of public schools, hospitals, and nursing facilities, and establishing a 1,000-volume energy library.

Category Outreach
State VT
Project Name Dynamic Integrations Corporation

Organization Dynamic Integrations Corporation

Address Main Street
Fairlee, VT 05045

Contact Andy Rudin

Telephone (802) 333-9632

Funded By DOE

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Citizens of Manchester, Vermont, have responded to the energy situation with the formation of a 200-member-organization devoted to working out energy problems on a local basis. The group has six working committees. The Education Committee works within the school system to develop an understanding of "hard" vs. "soft" energy paths. The Legislation Committee works on local initiatives to encourage conservation and use of renewable energy sources. The Alternative Energy Committee works to promote public acceptance and implementation of renewable energy technologies. The Conservation Committee works to promote public acceptance and implementation of conservation techniques. The Energy Planning Committee works to include energy in the town and regional planning process. The Nuclear Awareness Committee works to educate the public about nuclear power issues.

Critique/analysis: The Manchester community demonstrates what an entire town working to educate themselves on the energy question--and taking responsibility for working out the problem for themselves using available resources--can do.

Category Outreach
State VT
Project Name Manchester Community Energy Planning

Organization Manchester Citizens For Safe Energy
Address Box 111
Dorset, VT 05251
Contact Steve Brown
Telephone (802) 362-1203
(802) 362-3053

Funded By Contributions

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Memphremagog Group is a non-profit organization formed to provide services and conduct research that contribute to increased community self-reliance and the use of sustainable energy systems. Areas of concern include energy, shelter, food, communications, education, and community economic development. The group is comprised of nine individuals well-versed and experienced in appropriate technology. Services include renewable energy planning; energy, economic, and agricultural policy analysis; design and construction of small-scale solar and hydro systems; media production; and advocacy work. Recent activities include a greenhouse workshop at Dartmouth College and the development of low-cost monitoring equipment and methodology for analyzing the performance of passive solar homes.

Category Outreach
State VT
Project Name Memphremagog Group

Organization Memphremagog Group

Address Box 465
Newport, VT 05855

Contact Blair Hamilton

Telephone (802) 334-8821

Funded By Assorted

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Middlebury College, a small, rural liberal arts institution, has been carrying out an energy-conservation program for approximately two years. The focus of the program is on increasing both the energy efficiency of the physical facilities and the energy awareness of the students and faculty. To carry out the program, an energy council was formed. It is comprised of administration, faculty and student members.

Program elements include setting back thermostats to 55 degrees at night, continuing a program of building insulation and installing storm windows, modernizing the heating system (perhaps utilizing a water atomizing fuel process and cogeneration), adding systems to reduce peak loads in two new buildings, and sponsoring a community energy-awareness program through a newsletter and radio spots encouraging conservation and reporting the success of efforts on a monthly basis.

Category Outreach
State VT
Project Name Middlebury College
Energy Program

Organization Middlebury College
Address Middlebury College
Middlebury, VT 05753
Contact Paul Cubeta
John Woodbury
Telephone (802) 388-2046
(802) 388-2073

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

Renewable Resources— A National Catalog of Model Projects

The New England Solar Energy Association (NESEA) is a regional chapter of the American Section of the International Solar Energy Society. Membership is roughly 50 percent from the solar industry and 50 percent interested individuals. NESEA publishes a bimonthly newsletter on solar activities in New England. It also presents seminars and workshops. A recent workshop, "Coping With Home Heating", demonstrated inexpensive ways to conserve energy, as well as low cost solar gain systems.

Category Outreach
State VT
Project Name New England Solar Energy Association

Organization New England Solar Energy Association

Address P.O. Box 541
Brattleboro, VT
05301

Contact Tom Minnon

Telephone (802) 254-2386

Funded By Memberships, grants

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Solar Association of Vermont (SAVE) is a subchapter of the New England Solar Energy Association formed in the summer of 1977 as a vehicle for information exchange among solar energy advocates within the State of Vermont.

SAVE's activities include seminars on the use of solar energy, preparation of a booklet "Solar Energy In Vermont," and an educational television production about energy alternatives.

Membership dues are \$10 per year, which includes a subscription to the New England Solar Energy Association newsletter.

Category Outreach
State VT
Project Name Solar Association of Vermont

Organization Solar Association of Vermont
Address c/o John Rahill
Black River Design
73 Main Street
Montpelier, VT 05602
Contact John Rahill
Telephone (802) 223-2044

Funded By Dues of \$10.00 per year

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Called together by the Director of the Vermont State Energy Office, the committee is charged with examining the potential of wind power for Vermont. The committee is chaired by a state legislator and is composed of seven other members: one representative each from the Public Service Board (PUC), Agency of Environmental Conservation, and State Energy Office; a utility engineer; a consulting meteorologist; and the President and Director of a company that consults on wind siting and installation.

The committee is studying the environmental, economic, institutional, social, and aesthetic impact of wind-generated electricity in Vermont.

To do so, it has placed wind-measuring and -recording instruments on three mountain tops and has been gathering data on wind velocities and distribution for several months.

A professor of botany who is an expert on mountain summit ecology has addressed the committee and pointed out the special features and fragility of mountain environments above a 2,500 foot elevation. The Executive Director of the Green Mountain Club has also addressed the committee with his concerns about the environmental, aesthetic, and psychological impact of disturbing what is now penetrated solely by the Long Trail.

A report containing the findings, conclusions, and recommendations of the committee was sent to the Energy Office on December 1,

Category	State
State	VT
Project Name	Ad Hoc Committee on Wind

Organization	Vermont State Energy Office
Address	State Office Building Montpelier, VT 05602
Contact	Joseph M. Gainza
Telephone	(802) 828-2393

Funded By	Public Service Board
Cost	\$2,500
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Vermont's Lt. Governor, Madeline Konin, has organized an Energy Advisory Board to make recommendations on how local communities and the state legislature can deal with impending energy shortages in Vermont. The Board, composed of citizens, government officials, and industry representatives, will look at what can be done to encourage conservation and to alleviate fuel shortages due to either limited supplies or high costs. Much of the Board's information is being gathered by student interns from Vermont colleges.

Critique/analysis: While the Board will most certainly come up with valuable information and recommendations, the real challenge will lie in implementing the recommendations it makes. The success of the effort will depend upon spurring legislative action and launching community programs designed to help Vermonters become more energy self-sufficient.

Category State
State VT
Project Name Energy Advisory Board

Organization Lt. Governor's O
Address State House
Montpelier, VT 05602
Contact Madeline Konin
Telephone (802) 828-2226

Funded By Dept. of Energy Grant

Cost \$9,980

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

The Home Energy Audit Team (HEAT) program provides Class "A" home audits to Vermont residents free of charge. The program is being run jointly by the Vermont State Energy Office and the Extension Service of the University of Vermont. Labor is provided by CETA.

Starting in four Vermont counties as a pilot effort, the program has expanded to six counties and by the end of '79 covered all fourteen counties in the state.

Highly successful and widely acknowledged, a county HEAT team consists of two auditors who spend on the average of two hours with the homeowner examining the walls, windows, and doors and taking measurements. The team inspects the heating system and questions residents on fuel use and general household activities that effect energy consumption. The team talks at length with the residents about energy conservation and what they can do to reduce usage.

Back at the office, calculations are made. Then a report is returned to the resident. This report lists the measures that could be taken to reduce given amounts of fuel and specifies the payback period for each measure. Follow-up surveys indicate that 50 percent of the homeowners make at least some of the suggested changes. Homeowners have indicated that they consider the energy conservation talk to be the most valuable part of the audit.

As of October of 1979, the beginning of a tenth month of the program, over 2,900 audits had been completed.

Category	State
State	VT
Project Name	Home Energy Audit Team
Organization	Home Energy Audit Team
Address	State Office Building Montpelier, VT 05601
Contact	Paul Cillo
Telephone	(802) 828-2393
Funded By	CETA
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

In November of 1978, the Vermont State Energy Office sponsored a wind workshop to which every utility serving the State of Vermont was invited. At that workshop, utility representatives and representatives from every state agency that would be affected by the development of wind energy heard members of the Department of Energy and NASA's Lewis Research Center describe the Federal Wind Program as it applied to large wind electrical-conversion systems. In addition, a representative of Southern California Edison described his company's program: the placement of wind turbines on line to reduce their high fossil fuel bills. A representative from Block Island Power talked about his company's involvement in the Federal Wind Program through the placement of a 200-kilowatt machine on the island.

Category	State
State	VT
Project Name	Large Wind Workshop
Organization	Vermont State Energy Office
Address	State Office Building Montpelier, VT 05602
Contact	Joseph Gainza
Telephone	(802) 828-2393
Funded By	Vermont State Energy Office
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Field Evaluation Program (FEP) will provide two Small Wind Energy Conversion Systems (SWECS) to a residence, commercial building, or institution. The SWECS will be hooked up to the user's electrical system, as well as to the user's utility grid. An evaluation of the institutional, technical, and safety features of the system, as well as an evaluation of the wind machine, will last for one year.

The program is being run on the national level by Rockwell International under contract to the U.S. Department of Energy. This is the evaluation component of a multi-year small wind commercialization plan.

From a list of sites proposed by those people who have contacted the Energy Office because they think they have a good wind site and read about the FEP program in the Office newsletter, 75 will be considered for placement of the two machines.

All of the major utilities and many of the small utilities serving Vermont have agreed to participate in the program. (Vermont is served by 27 utilities in all: many are extremely small.)

The Energy Office chose to take the lead in implementing this program rather than have DOE/Rockwell make the selections and do the matching (these will provide all technical back-up when needed and verify the sites, users utilities). The state energy office is using the potential of wind to provide usable power in the state. Developing in-house skills related to wind was an important consideration given the widespread interest in this benign energy source in highly environmentally conscious Vermont.

Category	State
State	VT
Project Name	Small Wind Energy Conversion
Organization	Vermont State Energy Office
Address	State Office Building Montpelier, VT 05602
Contact	Joseph M. Gainzo
Telephone	(802) 828-2393
Funded By	DOE
Cost	n/a
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Vermont's Residential Conservation Corporation is a non-profit organization set up to operate a state-wide conservation program. In response to the higher fuel costs and uncertain supply in Vermont, the Public Service Board and the Vermont State Energy Office in May of 1978 began meeting with five of the state's largest utilities to establish a home-weatherization program. The groups immediately agreed that Vermont could not wait for the Federal Residential Conservation Program to get under way since the situation in Vermont, particularly for those on low-or fixed-incomes, is critical. So they set up the Vermont Residential Conservation Corporation (ROC).

ROC is a non-profit corporation employing a staff of seven and operating with a nine-member Board of Directors. It provides four major services to Vermont homeowners: It consults with the homeowner about the decision to invest in conservation measures such as insulation, it arranges to have a certified contractor perform energy retrofit work, it helps homeowners obtain financing from banks, (and low-interest loans, if available) for energy retrofit work, and it inspects each job after the contractor has completed work.

ROC plans to contract with the Home Energy Audit Team (HEAT) program, sponsored by the State Energy Office and the University of Vermont Extension Service, to perform home energy audits. The Corporation will pay the HEAT program a fee for those audits that lead to retrofit contracts with the Corporation.

Category State
State VT
Project Name State Conservation Program

Organization Public Service Bc
Address 120 State Street
Montpelier, VT
05602
Contact Richard Sawdeck
Telephone (802) 828-2321

Funded By Utilities

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In 1972, the Vermont Department of Forests and Parks began a long-range project to determine the energy potential of the state's wood resources. The programs focus on techniques to investigate the extent of available forests, studies of the feasibility of wood-use in generating electricity, forest-management research and demonstrations, and initiating a home wood-fuel program.

The Department of Forests and Parks, anticipating a higher demand for wood, assessed the state's wood potential using LAND SAT technology and satellite data collection.

The state commissioned two studies of the feasibility of wood-generated electricity, and a group at Dartmouth College is looking at the environmental and social implications of increased use of wood within the state.

The department is also looking into the development of new harvesting techniques. The object is to get the resource out of the woods with minimal impact on the environment while maintaining profitable production levels. Two experimental cutting operations are completed: one at the Victory State Forest (in conjunction with pulping operations) and the other at Duxbury State Forest (as a means of providing wood chips for the new wood-burning heating plant at the Waterbury State Hospital). These projects are meant to test new methods of clearing (clear-cut, shelter and selective cut), as well as new machinery that enables whole tree harvesting to produce wood chips for commercial wood-burning operations.

Since the number of Vermonters using wood at home has of late increased dramatically, the state is allowing the roadside cutting of marked unwanted trees in the State Forest and the cutting of firewood in "concentration yards" (lots to which loggers drag trees to be cut by individuals for a reasonable charge).

Category	State
State	VT
Project Name	State Wood Programs
Organization	Department of Forests and Parks
Address	81 River Street Montpelier, VT 05602
Contact	Brian Stone
Telephone	(802) 828-3471
Funded By	State
Cost	n/a
Congressional District	n/a
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

Vermont provides for a tax credit of 25 percent or \$1000, whichever is less, for the installation of a renewable energy system in a private residence.

Category State
State VT
Project Name Tax Credit

Organization Department of Tax
Address Montpelier, VT 05602
Contact n/a
Telephone (802) 828-2501

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

Renewable Resources— A National Catalog of Model Projects

The public utility in Burlington, the largest city in Vermont, has recently converted two out of three of its 10-MW boilers from coal to wood use. The city is also proposing construction of a new 50-MW wood-fired electrical generating facility in Burlington's Intervale area.

The 1000-lb/hr boilers were converted in 1976 and 1977 at a cost of about \$25,000 each. The conversions drew a phenomenal response from all over the world, which came as a surprise to the Burlington Electric Department (BED). The boilers burn wood chips, harvested with new whole-tree chipping operations that give low-grade forests commercial value.

The success of the conversions and an anticipated increase in electrical demand have prompted voters to issue bonds to finance an \$80 million proposed wood-burning 50-MW facility. BED is currently conducting a number of impact studies of the plant itself and of wood chip harvesting and transport.

The plant would consume 90 tons/hr of chips and require only one boiler and one turbine. Co-generation may be possible, using leftover steam for space heating. The resources required would amount to 500,000 tons of wood material/year or about 3 percent of existing potential.

A great deal of debate currently surrounds the probable impact of the facility. Also in question is the community's true need for such a facility. Many social and economic issues have been brought to the forefront with this BED proposal: growth projections, scale, forest management, and others.

Category	Utility
State	VT
Project Name	Electrical Generation with Wood
Organization	Burlington Electric Dept.
Address	585 Pine Street Burlington, VT 05401
Contact	Bob Dalken Bob Young
Telephone	(802) 658-0300
Funded By	Private; Municipal Bonds
Cost	\$8,000,000 (new plant) \$50,000 (conversions)
Congressional District	I
Compilation Date	February 1980

Renewable Resources— A National Catalog of Model Projects

The Green Mountain Power Corporation (GMP) has applied for a grant from DOE to install four wind turbines on Scragg Mountain in Waitsfield, Vermont. The turbines would have a 2,500-KW rating and a 300-foot blade diameter, making them the largest wind turbines in the world.

These are experimental units being developed by NASA/Lewis Research Center for DOE. Average wind velocities on top of Scragg Mt. are 14 mph, which are ideal for these type of turbines. If GMP gets the grant it intends to put up the initial unit in early 1980 (assuming no regulatory delays) and the other three units in 1981.

Critique/analysis: Despite considerable enthusiasm and support for GMP's initiative, reservations as to the ecological and aesthetic impact have also been expressed. Given the large size of the generators and their possible impact on the area, debate and regulatory hearings are sure to precede construction of the wind turbines.

Category Utility
State VT
Project Name Large Wind Units

Organization Green Mountain Power

Address 1 Main Street
Burlington, VT
05401

Contact Tom Bustly

Telephone (802) 864-5731

Funded By DOE

Cost \$2,000 each unit

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

Vermont's two largest utilities, Central Vermont Public Service (CVPS) and Green Mountain Power (GMP) are showing renewed interest in using latent sources of water power, since the costs look better now than the costs of other sources are rising.

CVPS is proceeding at three potential sites: Middlebury (which is well along in the planning stage), Bradford and Barnet (which are still in the feasibility study stage). The Frong Hollow site in Middlebury would be a run-of-the-river facility with generating capacity of 1.5 MW; it would provide peaking power for the New England utility grid and require some dam construction and a generating house. The falls are the focal point of the town and the original reasons for the town's rapid growth and success in the 19th century, but they have not been used for power for many years. If the revival of the power plant at the falls is handled in an aesthetic way, they would become a real focal spot once again, both visually and economically.

The company has a preliminary license from the Federal Energy Regulatory Commission and has held public hearings. However, it still considers the project a marginal investment and is hoping to get funding through DOE for 15 percent of construction costs. The projected on-line date is 1983.

A 6-MW site at the old Bolton Falls dam site in Waterbury, Vermont, is the object of an initial feasibility study funded with DOE money. It is currently looking towards more in-depth planning of the project.

Critique/analysis: Vermont's utilities are pursuing small-scale hydro power with notable skepticism since the economics are still in question and other vested interests remain strong. Federal money is on the decline: DOE paid 25 percent of construction costs on earlier projects and now will pay only 15 percent.

Category Utility
State VT
Project Name Small Dam Retrofits

Organization Green Mountain Power/
Central Vt. Public
Service
Address Green Mountain Dr.
Montpelier, VT 05602;
27 Grove St.
Rutland, VT 05701
Contact Bernie Brault (Montpe.)
Douglas Graham (Rutland)
Telephone (802) 223 5235
(802) 773-2711

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

The replicability of projects like this is very high in Vermont, as there are many former micro-hydro sites. Future investments in native power sites also generate stronger local economics and recirculate dollars that otherwise go to external centralized power purchases.

Renewable Resources— A National Catalog of Model Projects

Category	Utility
State	VT
Project Name	Utility Dam Retrofits

Because of changing energy economics, two Vermont utilities are considering retrofitting and old mill dam site in the Burlington/Winooski area to generate electricity.

During Vermont's sheep boom in the middle of the 19th century, woolen and textile mills used the river to power their machinery. Today empty brick buildings and a broken dam sit in hibernation. The buildings, however, are starting to be renovated into offices and housing.

Several studies have been done over the past decade on what it would take to develop hydro-electric power at the site, but such development has not until recently been cost-effective. As the costs of oil and gas rise, however, the site is becoming very attractive. A plant is in preliminary design stages, and licensing is under way. If everything goes smoothly, the plant should be on-line in the spring of 1982.

The project would have a generating capacity of 9.3 MW and would be a run-of-the-river operation. The penstock would be embedded in the rock of the falls, the powerhouse semi-embedded. The repair of the falls and the diversion of water into the penstock would create a pond and the roaring white water that presently flows unchecked would be quieted. The project would be very visible, located right at the major bridge connecting Burlington and Winooski--long a favorite of local fishermen and white water enthusiasts. Reaction has been red.

The city of Winooski has announced that it is interested in developing the site for its own electricity. It is pursuing the idea despite the difficulties presented by utility ownership of the distribution system.

Critique/analysis: This project is a good example of three conditions that would be common to the

Organization	Burlington Electric Department
Address	585 Pine Street Burlington, VT 05401
Contact	John Berryman
Telephone	(802) 658-0300
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Funded By	Private
Cost	Estimated around \$8,000,000; final cost \$15,000,000
Congressional District	I
Compilation Date	February 1980

development of many of the small hydro sites in Vermont. First, these sites are becoming cost-effective where they were not ten years ago. Second, many such sites are located in town centers. Third, since a concentrated population is living around the site already, many towns are starting to think that they should develop their own resources, rather than letting a utility develop. This raises possible conflict with utilities.

Renewable Resources— A National Catalog of Model Projects

Green Mountain Power is one of three utilities in the nation chosen to participate in a National Wind Power Research Project. The project, using computer models, is a major study of electric utility use of wind power.

The study is designed to compare various applications of wind power generation of electricity within a utility's system. The total project is being conducted over a 22-month period and will require nearly five person-years of effort.

Category Utility
State VT
Project Name Wind Research

Organization Green Mountain Power Corporation
Address 1 Main Street
Burlington, VT 05401
Contact Tom Boucher
Telephone (802) 864-5731

Funded By Electric Power Research Institute of Palo Alto

Cost n/a

Congressional District I

Compilation Date February 1980

Renewable Resources— A National Catalog of Model Projects

In October of 1977, the municipal utility company in Burlington succeeded in converting one of its three standard ten-megawatt power plant from coal to wood. The plant was equipped with a normal coal-fired boiler unit capable of burning three fuels: coal, oil, or natural gas.

The plant burns 1,000 tons per week of commercial, unmarketable waste wood. The wood, "culled" from dead, diseased, and dying trees, is purchased from an experimental wood-harvesting site in nearby South Duxbury.

The harvested wood is chopped up into matchbook-size pieces for burning. At the harvesting site, the trees are run through a large "chip-harvester" machine that has high-speed rotating blades that chop trunk, limbs, and leaves into chips. The chips shoot directly from the machine into tractor-trailers that transport the 20-ton loads to the Burlington generating facility. The chips are then fed through four chutes to the boiler. An automatic stoker feeds an even flow of the chips into the burner at a rate of ten tons per hour. The fuel heats 6,000 gallons of water until it turns to steam inside the boiler. Up to 100,000 pounds of the steam is fed into a turbo generator to produce as much as 10-megawatts of electricity.

The chips contain 40 to 50 percent moisture, so they must be burned at a mixture of 75 percent wood chips to 25 percent Number 2 fuel oil in order to obtain the full rating of ten megawatts. The oil is introduced with an existing overfire system only when full capacity is desired.

Wood is currently the cheapest fuel Burlington can buy: wood chips cost only \$12 per ton, compared to coal at \$50 per ton.

Category	Utility
State	VT
Project Name	Wood Energy Conversion
Organization	Burlington Municipal Utility Company
Address	Burlington, VT
Contact	Tom L. Carr
Telephone	(802) 658-0300
Funded By	The Electric Department
Cost	\$50,000
Congressional District	I
Compilation Date	February 1980