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June 1980

Decentralized Energy Studies: Compendium of U.S. Studies and Projects

James Quinn
James M. Ohi

SERI

Solar Energy Research Institute
A Division of Midwest Research Institute

1617 Cole Boulevard
Golden, Colorado 80401

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DECENTRALIZED ENERGY STUDIES: COMPENDIUM OF U.S. STUDIES AND PROJECTS

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PREPARED UNDER TASK NO. 5629.10

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PREFACE

This compendium was prepared as part of the Decentralized Energy Studies task at the Solar Energy Research Institute (SERI). The purpose of this document is to compile a brief description of some of the studies, programs, and projects in the United States that involve decentralized energy systems. This compilation was not based on a precise definition of decentralized energy systems; rather, it includes studies and projects involving energy systems that can, in some way, be described as small-scale, community-level, on-site, soft, appropriate, distributed, or renewable. Descriptions of programs and projects have been abstracted from a wide variety of sources. This compendium is not meant to be comprehensive; nor is it meant to provide more than a glimpse of work being done. It is hoped, though, that it will be useful both to the researcher in the field who wants to become more aware of related work and to individuals who want to find out more about alternatives to large, centralized energy systems.

A form is provided at the end of this report to assist in updating this material. The reader is encouraged to use this opportunity to share information on similar projects with others interested in decentralized technologies.

Any corrections, comments, or suggestions on this compendium are welcome. Please communicate any comments to:

James Quinn
Office of Solar Energy
600 E Street N.W., Room 404
Washington, DC 20585
(202) 376-9475

James M. Ohi
Community and Consumer Branch
Solar Energy Research Institute
1617 Cole Blvd.
Golden, CO 80401
(303) 231-1046

James M. Ohi

Approved for:

SOLAR ENERGY RESEARCH INSTITUTE

Robert Odland, Chief
Community and Consumer Branch

Jon M. Veigel, Manager
Planning Applications and Impacts Division

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ACKNOWLEDGEMENTS

We would like to thank the many people who provided information about the activities listed in this compendium. Most of these people are listed as contacts in the compendium, and without their interest and cooperation, information about these activities could not have been compiled. Any errors, of course, are our responsibility, and readers are encouraged to communicate any corrections to them.

Thanks also go to those people who reviewed this report and provided comments and suggestions: Mary Wolter Glass, Robert Blaunstein, and Ted Harris of the Department of Energy (DOE); David Morris of the Institute for Local Self-Reliance; and Robert Odland, Charles Unseld, Peter Pollock, and Richard Meuneir of SERI. We also thank Gerard Ridzon of the Northeast Solar Energy Center who compiled and sent us information on several community projects in that region.

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SUMMARY

Objective

This report presents a brief description of studies and projects in the United States that are devoted to decentralized energy systems.

Discussion

There is a growing awareness throughout the nation that the solutions to the United States' energy problems can come from local and individual, as well as national, initiatives. Innovative and effective alternatives to the use of limited fossil energy resources already are being developed and demonstrated at many decentralized locations. In some cases, individual efforts have stimulated government programs or have demonstrated the tremendous resources that can be mobilized locally without direct federal support. These successes can be supported, duplicated, and further improved by sharing experiences with others working toward the same goals. This compendium is one effort to establish an information network among planners, researchers, designers, and other individuals interested in implementing alternatives to large, centralized energy systems.

The listings in this compendium are subdivided into the general categories of multistate, regional, or statewide studies; technology assessments; community studies; and neighborhood development and community self-help projects. The projects and studies listed provide only a sampling of research activity in decentralized energy systems. The compendium will be revised periodically to incorporate activities that may have been omitted or that are initiated in the future.

Conclusions and Recommendations

Innovative alternatives to large, centralized energy systems are being vigorously pursued in states, communities, and neighborhoods throughout the United States. These activities are proliferating and will be difficult to keep track of unless a systematic effort is made to do so. A formal network to enable all persons, groups, and institutions interested in decentralized systems to share information and experiences should be established.

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SECTION 1.0

INTRODUCTION

1.1 PURPOSE

There is a growing awareness throughout the nation that the solutions to the United States' energy problems can come from local and individual as well as national initiatives. Innovative and effective alternatives to the use of limited fossil energy resources already are being developed and demonstrated at many decentralized locations. In some cases, individual efforts have stimulated government programs or have demonstrated the tremendous resources that can be mobilized locally without direct federal support. These successes can be supported, duplicated, and further improved by sharing experiences with others working toward the same goals. This compendium is one effort to establish an information network among planners, researchers, designers, and other individuals interested in implementing alternatives to large, centralized energy systems.

The purpose of this compendium is to identify and briefly describe some of the studies, programs, and projects that involve efforts by citizens' groups and government at all levels to find alternatives to large, centralized energy systems. It is hoped that the compendium will provide an overview of the activities that are taking place in all parts of the country and permit interested citizens and government officials to obtain more detailed information from the sources identified.

1.2 SCOPE AND FORMAT

The listings in this compendium are subdivided into the general categories of multistate regional or statewide studies; technology assessments; community studies; and neighborhood development and community self-help projects. The projects and studies listed provide only a sampling of research activity in decentralized energy systems. The compendium will be revised periodically to incorporate activities that may have been omitted or that are initiated in the future. The categories of the studies included in this compendium are:

- Multistate Regional or Statewide Studies (Section 2.0)—These studies include regional assessment work being carried out by the Assistant Secretary for Environment, U.S. Department of Energy (DOE); regional solar-electric studies by DOE; and work on distributed energy systems in California, New England, Hawaii, and Washington.
- Technology Assessments (Section 3.0)—This work includes projects and studies on community-level technology assessment of the technical and social impacts of solar energy, an environmentally-oriented technology assessment of solar energy, and a technology characterization of distributed energy systems.
- Community-Level Studies (Section 4.0)—These studies include local area energy studies and projects directed at developing alternative ways of meeting future energy demands.
- Neighborhood Development and Community Self-Help (Section 5.0)—These projects involve small group efforts to address energy problems.

SECTION 2.0

MULTISTATE REGIONAL OR STATEWIDE STUDIES

2.1 REGIONAL ASSESSMENTS PROGRAM

This program is sponsored by the Division of Regional Assessments, Office of Technology Impacts, Assistant Secretary for Environment, DOE. The program manager is Paul Cho, (202) 233-5897. The assessments are based on six multistate regions, and a DOE national laboratory has been assigned primary responsibility for each region. The program consists of three subprograms.

2.1.1 Regional Characterization Subprogram

The purpose of this subprogram is to provide basic geophysical, social, economic, ecological, and cultural data in a standard format for each region, and to provide a detailed analysis of the existing regional environment prior to the introduction of projected energy resource development. The regional characterizations will serve as a basis for test-case studies and comparative interregional analyses.

The lead laboratory is Los Alamos Scientific Laboratory; the principal investigator is Ron Lohrding, (505) 667-4567. An Energy-Environment Data Handbook for each of the six regions has been published and is available through the National Technical Information Service (NTIS).

2.1.2 Regional Issue Identification and Assessment (RIIA) Subprogram

The purpose of this subprogram is to assess the regional environmental impacts of energy resource development by applying 1990 scenarios developed by the Energy Information Administration (EIA) of DOE to the regional baseline data obtained through the Regional Characterization Subprogram. The impacts of projected energy development upon local and interregional air quality, water quality, water availability, solid waste, land use, health and safety, ecology, economics, social fabric, and institutions are studied. Reports for each of the ten federal regions are compiled in the first annual RIIA report. The contact person for the subprogram is Joan Hock, director, Division of Regional Assessments, Office of Environment, (301) 353-4258.

2.1.3 Mitigation Strategies Evaluation Subprogram

This subprogram makes information available on appropriate strategies for mitigating impacts identified in the Regional Issue Identification and Assessment subprogram. The subprogram objectives are: to assess the physical actions, incentives, and institutional constraints that must be considered on mitigation strategies; to document and evaluate implemented mitigation strategies; and to develop a mitigation strategy for each region.

An energy and environmental quality handbook that documents case histories of impact management by stages of fuel cycles will be prepared. The handbook will document specific cases of environmental impact management of air, water, thermal, and noise pollution; radiation; solid waste; land resources; and wildlife. For example, the handbook will

examine five projects in which emission-offset negotiations are required to meet air quality standards in nonattainment areas. The contact person in DOE is Joan Hock.

2.2 REGIONAL ASSESSMENT STUDIES PROGRAM

The purpose of this program is to integrate regional perspectives into solar energy research and development planning and to identify regional priorities for photovoltaic, wind, solar thermal, ocean, and biomass systems. The program provides a common basis for comparisons of solar electric technologies in each region by identifying and assessing regional market entry priorities, regulatory incentives, institutional arrangements, climatological and other critical resource constraints and opportunities, and the potential for dispersed applications. The regions under study are the Northeast, Southeast, Southwest, North Central, South Central, and Northwest segments of the United States.

The program manager at DOE is Jack Cadogan; Office of Solar Energy; 600 E Street; N.W.; Washington, DC 20585, (202) 376-9475. The program manager at SERI is Bob Withholder, (303) 231-1070. The principal investigator for and the status of each regional study is listed below.

Northeast:
Robert Neal
JBF Scientific
2 Jewell Dr.
Wilmington, MA 01887
(617) 657-4170
Status: final report in preparation

Southeast:
Donald H. Guild
Stone and Webster
245 Summer Street
Boston, MA 02107
(617) 973-2501
Status: final report in preparation

Southwest:
Donald H. Guild
Status: final report printed

Northwest:
Robert Neal
Status: in progress

North Central:
Reese Carson
Gilbert Commonwealth
P.O. Box 1438
Reading, PA 19603
(215) 775-2600
Status: in progress

South Central: Orin Merril
Science Applications, Inc.
8400 West Park Drive
McLean, VA 22101
(203) 827-4797
Status: in progress

The general approach of each regional study team is to:

- develop and analyze the projected energy-use scenario for each region to the year 2000 based on projected use patterns prepared by utilities;
- examine sensitivity of the study results to escalation of fuel costs above general inflation;
- examine the solar resources for each region;
- estimate solar electric generating costs based on projected technology; compare them with conventional generating costs, and determine the differences;
- define solar electric construction and licensing requirements;
- involve potential users of solar electric equipment in analyses, discussions, and reviews of projected results;
- identify social, institutional, and environmental barriers to solar use;
- seek potential market entry points for both dispersed and centralized cases based on cost competitiveness and user interests,
- identify approaches to overcoming barriers, including financial and nonfinancial incentives, legislation, and organizational arrangements.

2.3 CALIFORNIA DISTRIBUTED ENERGY SYSTEMS STUDY

The purpose of the project was to explore a broad spectrum of issues concerning a transition to renewable resource-based energy systems in California. The study began in the spring of 1977. The first phase report (Craig et al. 1978) included a technical analysis of a possible "energy outcome" for California in the year 2025 based primarily upon the use of energy resources indigenous to California. The initial technical analysis was supported by a number of background studies that explored key environmental, technical, and institutional issues relating to such an energy transition.

2.3.1 Phase 1 Findings

The first phase of the study explored technical issues on how far the state might move toward reliance on indigenous renewable energy forms. The first analysis assumed continued economic growth (linear growth over time, with total economic output, or Gross State Product, tripling by 2025) and continued population growth corresponding to an increase (through births and immigration) from 21 million in 1975 to 38 million by 2025. Energy prices were assumed to increase in real terms, and outcomes were based upon doubling and quadrupling of current consumer prices for energy by 2025. Relatively conservative assumptions are made about energy technologies; that is, the technologies considered either exist today or might be expected to be economically competitive in one or two decades.

Under these assumptions, the Phase 1 study concluded that the technical potential* exists to achieve a high level (86%) of energy independence by 2025. Availability of liquid fuels emerged as a key problem: the biomass resource base of the state appears to be inadequate to meet all liquid fuel needs. Further, a considerable amount of energy conservation is called for, corresponding to a reduction in the amount of energy used per dollar of gross state product to about one-third the level of today. This is a reduction consistent with long term national trends over the past century but more of a reduction than would be expected based on post-World War II experience. The study analysis also indicated that the environmental impacts of the technologies selected for inclusion (primarily biomass, wind, solar space heating, and geothermal) are likely to be substantially less than those associated with conventional technologies.

2.3.2 Phase 2 Findings

The second phase of the study concentrated on some of the key environmental, land use, economic, and integration problems in achieving a renewable energy future in California. The results of this phase of the project are summarized in Craig and Levine (1979). They noted that the keys to a predominantly renewable energy future are to encourage cost-effective conservation and to provide incentives for the accelerated development of renewable energy systems.

The contact person is Mark Levine; Lawrence Berkeley Laboratory; Bldg. 90, Room 3114; Berkeley, CA 94720; (415) 486-5238.

2.4 NEW ENGLAND SUSTAINABLE ENERGY PROJECT

The New England Sustainable Energy Project (NESEP) is a multiyear study to assist New England communities and the region to attain greater reliance on renewable energy sources. The work on this project has been structured in the three stages of activity that follow. The principal investigator is Abbie Page, the MITRE Corporation; P.O. Box 208; Bedford, MA 01730; (617) 271-2516. The DOE program manager is Mary Wolter Glass, Office of Solar Energy; 600 E Street, N.W., Room 404; Washington, DC 20585; (202) 376-9475. The contact at SERI is Jim Ohi; Community and Consumer Branch; (303) 231-1046.

2.4.1 Feasibility Assessment

In 1979, DOE commissioned a feasibility assessment (Page 1979) for the New England Sustainable Energy Project (NESEP). The assessment developed an approach to study how the New England area might supply itself with energy from sustainable resources.

The assessment proposed that a NESEP project explore alternative paths of energy development for New England that will meet reasonably conservative long-term projections of energy demands by using renewable energy resources. It proposed that the study develop technical scenarios; investigate the economic, social, and environmental impacts and their mitigation; and evaluate paths of transition from the present energy system to

*The term "technical potential" of the resource base means the maximum resource that can be used, excluding those resources whose prices are unlikely to be within a factor of two or more of economic competitiveness in the time frame of interest.

one based on sun, wood, wind, tides, peat, and rivers. Community case studies were also proposed to provide insights into implementation problems and possible implementation strategies.

The proposal was designed in collaboration with the Northeast Solar Energy Center, the Alternative Energy Committee staff of the New England Regional Commission, and the New England Congressional Caucus.

2.4.2 Phase 1

Phase 1 of NESEP was begun in June 1979 to provide an assessment of renewable energy resources available to the region and suitable technologies. The principal research products are an Atlas of the Energy Resource Potential in New England (Glidden et al. 1979), Energy Technologies for New England (Mitsock 1980), and a factor analysis procedure to assist in selecting community case studies. The first two reports are in draft form and under review at SERI. The factor analysis procedure is described in a forthcoming report (Ferris and Ohi). The contact person for the resource atlas is Dennis Meadows; Resource Policy Center; Thayer School of Engineering; Dartmouth College; Hanover, NH 03755; (603) 646-3551. The contact person for the report on technologies is Abbie Page at MITRE and for the factor analysis procedure, Gregg Ferris at SERI, (303) 231-1077.

2.4.3 Phase 2

The purpose of Phase 2, begun in the spring of 1980, is to learn more about the dynamics of transition to a renewable energy future. Six communities will be assisted in moving toward greater reliance on renewable energy sources through local planning and decision making. These communities will be chosen to represent a range of geographic, economic, social, and institutional characteristics. By working with these communities, SERI staff will be able to study problems that New England communities face in attaining greater use of renewable energy resources. In addition to the direct assistance provided to these communities, the project will alert other communities to the problems and opportunities of using renewable energy sources and will help SERI and DOE improve technical assistance programs and projects in New England and other regions of the United States.

The objectives of Phase 2 are to:

- assist selected communities in initiating or augmenting plans and activities to attain greater reliance on renewable energy resources;
- develop, test, and refine technical assistance materials and procedures at the community and neighborhood level;
- further understanding about the dynamics of community and neighborhood energy planning and implementation activities so that SERI and DOE may more effectively assist other communities in attaining greater reliance on renewable energy resources;
- encourage other communities in New England and the nation to undertake or expand renewable energy planning and implementation activities through the examples provided by the project; and

- investigate some of the important intercommunity and intraregional issues that may constrain community efforts to rely on renewable energy resources.

The following materials will be available from Phase 2 research activities by the autumn of 1980.

- a draft of a community energy guidebook that will help communities assess their immediate as well as long-term energy needs; assess locally available renewable energy resources; evaluate technologies that can tap these resources to meet these needs; and prepare action plans to achieve community energy goals;
- energy action plans prepared by citizen working groups in each of the selected communities to be implemented under Phase 2.

2.5 HAWAII ALTERNATIVE ENERGY SUPPLY STUDY

The purpose of the study is to assess the feasibility of alternative energy systems and develop scenarios designed to utilize Hawaii's renewable energy resources to reduce the state's dependence on imported oil. The scenarios will be evaluated to provide a measure of costs, possible deployment schedules, relative impacts, tradeoffs, and constraints for alternative mixes of energy technologies and three projected energy demand growth rates. The study will analyze mitigation measures to help national, state, and local decision makers form policy and plan Hawaii's energy future.

The energy sources considered include solar, geothermal, biomass, wind, and ocean thermal energy. A number of alternative energy development scenarios will incorporate high, medium, and low demand growth rates and various supply alternatives. The analyses of future energy supply scenarios will explore the consequences of expanding Hawaii's economic base to include energy-intensive industries in the event that Hawaii's geothermal and ocean thermal resources offer an economically attractive energy source. All scenarios will be analyzed for their direct and indirect capital, manpower, and resource requirements, and operating costs. The potential impacts and constraints will be reviewed, and the scenarios will be revised and reanalyzed as required. Mitigation measures will be analyzed to facilitate development of the alternative energy supply systems.

The project is a joint effort of the Lawrence Berkeley Laboratory's Energy and Environment Division and the State of Hawaii's Department of Planning and Economic Development. The project started in March 1979 and interim materials are available in limited quantities. The contact person for the project is William E. Siri; Energy and Environment Division; Lawrence Berkeley Laboratory; Berkeley, CA 94720; (415) 486-5396. The DOE program manager is Mary Wolter Glass.

2.6 POLICY ANALYSIS OF DECENTRALIZED ELECTRIC-GENERATING FACILITIES FOR WASHINGTON STATE

The purpose of the study is to explore the potential use of small-scale (less than 100 MW), decentralized electric generating technologies in Washington. Five candidate technologies (small hydro, total energy systems, wind, cogeneration, and photovoltaics) were selected through a paired-comparison weighting process. Questions concerning siting, standardization, technological diversification/vulnerability, transmission of energy,

environmental quality, lead-time/capital needs, ownership, effects on utilities and the economy, consumer reaction to neighborhood facilities, and policy options for the state legislature were studied. Also, a computer model was used to explore different centralized-decentralized combinations of energy generating facilities in cooperation with the Bonneville Power Authority.

The study is directed by Professor Barry Hyman; Social Management of Technology Program, FS-15; University of Washington; Seattle, WA 98195; (206) 543-9038. The study is funded by the Ford Foundation, the Washington State Legislature, and the University of Washington. A final report is forthcoming in the spring of 1980.

SECTION 3.0

TECHNOLOGY ASSESSMENTS OF SOLAR ENERGY

3.1 DECENTRALIZED SOLAR ENERGY: COMMUNITY-LEVEL TECHNOLOGY ASSESSMENT*

The purpose of this program is to assess at the local level the social, political, institutional, and life-style effects of deploying decentralized solar technologies and to develop a process by which communities can conduct their own assessment efforts. The program develops background information on how to create a scenario, carries out a series of case studies technology assessments in communities in different parts of the United States, and prepares research reports to document the process and refine an approach. Each of these activities and representative studies are described below.

The DOE program manager is Mary Wolter Glass. The field project manager is Sam Carnes; Energy Division; Oak Ridge National Laboratory; P.O. Box X; Oak Ridge, TN 37880; (615) 574-5950.

3.1.1 Development of Scenarios

Prototypical scenarios for solar utilization at the community level have been developed for three different types of communities—urban, suburban and rural/small town. The scenarios can be used by the community technology assessment task teams as examples of approaches to scenario construction for technology assessment. Additionally, a planning and design energy primer is being developed to help communities organize, present, and work on solar community planning and design concerns.

3.1.1.1 Baltimore, Maryland

The scenario for an urban area is being prepared by the Institute for Local Self-Reliance, and the study area is Baltimore, Md. The objective of the study is to show how solar energy can be used, together with conservation, to replace 50% of the fossil fuel requirements by the year 2000. A significant contribution has been the conceptualization of the city as a potential single energy consuming and producing system, whereby some buildings are net producers of solar electric power (e.g., warehouses) while others are consumers (e.g., multiple family units). This concept, together with appropriate storage for thermal energy, seems to indicate that the goal of 50% reduction in fossil fuel consumption is feasible. A draft report was published in October 1979. The contact person is David Morris; Institute for Local Self-Reliance; 1717 18th St. N.W.; Washington, DC 20009; (202) 232-4108.

*The sources for most of the information in this section are Bronfman et al. (1979 and forthcoming).

3.1.1.2 Suffolk County, New York

The suburban scenario is being directed from the State University of New York at Stony Brook. The scenario development begins with a review of the Nassau/Suffolk regional land-use plan. Study communities were selected to examine the use of solar energy in the context of the regional land-use plan. Bay Shore, Long Island, is studied as a redevelopment site; a new development in the neighborhood of Patchogue and Coram, Long Island, and an industrial park development are also studied. The assessment assumes that all energy needs will be met by solar energy. Impact assessment and recommended actions are organized into those specifically associated with land-use development and planning design criteria. A solar master plan will be developed to maximize the widespread use of solar technologies.

A draft report was published in November 1979. The contact person is Robert Nathans; Institute for Energy Research; State University of New York; Stony Brook, NY 11794; (516) 246-8230.

3.1.1.3 Franklin County, Massachusetts

The rural/small town scenario is managed by the Future Studies Program at the University of Massachusetts, Amherst. The focus for the study is a "soft path" for Franklin County, Mass. The major objectives of the study are to create a possible renewable resource scenario for Franklin County and to educate the public and local decision makers about their ability to influence the nature of their energy future.

The study develops two scenarios for the year 2000: a scenario utilizing traditional fuels and systems and a "soft" scenario based on renewable resources and conservation. Economic, social, environmental, and political ramifications of each scenario are discussed.

The traditional fuels scenario draws upon existing energy forecasts and historical trends of New England energy systems. The renewable resources scenario was developed by reviewing the literature on energy sources commonly referred to as soft technologies; compiling an inventory of available renewable resources in the county; calculating future energy demands for the various sectors based on the implementation of stringent conservation measures; examining financing options and institutional barriers for introducing renewable energy systems; and developing an energy supply mix for the county for the year 2000.

One of the major findings of the study is that a significant portion of the county's energy needs can be met by solar energy. Another finding is that for any renewable energy source to be viable, the county must implement an intensive energy conservation program. In fact, the safest, easiest, and most practical way for the county to address its future energy needs is to use current energy more efficiently.

Reports generated by the study are available (University of Massachusetts 1979), and the contact person is Mark Cherniak; Box 548; Greenfield, MA 01002; (413) 774-2257.

3.1.1.4 Community Energy Design Primer

The American Institute of Architects Research Corporation has developed a handbook to increase community understanding of strategies to reduce dependence on depletable sources of energy. The handbook examines the potential impact of the strategies on the community. It has four major components:

- An explanation of energy use in the built-environment, including a catalog of energy-saving ideas;
- A guide for planners for the inclusion of energy-related considerations in the planning and design process;
- A guide for community members interested in undertaking the planning process for themselves; and
- A bibliography of existing publications and case studies on energy use in the environment and available energy reduction strategies.

A draft of the handbook has been prepared, and a final version will be available soon. The contact person is Charles Zucker; Design Arts Program; National Endowment for the Arts; 2401 E Street N.W.; Washington, DC 20506; (202) 634-4276.

3.1.2 Community Technology Assessments

Various communities representing different demographic units (urban, suburban, small town, rural areas) and geographic regions of the United States are being chosen to develop a solar future based on community energy needs, economic activities, housing patterns, and local availability of solar and renewable resources. A working team that includes community leaders and technical consultants will develop a plausible solar future and assess its consequences. Possible consequences include community infrastructure requirements, environmental and quality-of-life impacts, self-reliance, convenience factors, health and safety effects, and citizen desires. Policy recommendations for federal, state, and local governments to help bring about the desired futures will be prepared.

3.1.2.1 Southern Tier Region (New York)

This project, begun in September 1978, is in the Southern Tier Region of New York (Corning is the major town) and includes Chemung, Schuyler, and Steuben counties. The working team has prepared information on the resource potential of the three county area and the technologies available for local energy development. After public meetings, about 50 citizens, representing industry, labor, community, and other interest groups, participated in the planning process. Four groups were formed, and each group was charged with sketching a plan for developing renewable resources in the three-county region, assessing the possible consequences of such development, and discussing their findings with public officials. The working team developed a structured process that involved using a resource inventory, a technology assessment workbook, and a renewable technology handbook (Miller et al. 1978).

Reports produced as part of the project are available. The contact person is Steve Weisman; Energy Program Manager; Southern Tier Central Regional Planning and Development Board; 53 1/2 Bridge Street; Corning, NY 14830; (607) 962-3021.

3.1.2.2 Richmond, Kentucky

Richmond, Ky. was selected as a representative of a southern community. The task team is made up of faculty from Eastern Kentucky University, a community assessment group representing major sectors in the local economic and social system, and the city government of Richmond. A survey of energy use in the community was taken and a solar energy reconnaissance is underway. Other major tasks in progress include an analysis of alternative community participation programs, preparation of a manual to provide a common information base on technology options for the community assessment group, scenario development, educational programs, and a community assessment.

A draft of the manual, Solar Options: Local Assessment by Richmond (SOLAR), has been prepared and reviewed. A final revision of the manual is in preparation. The project is scheduled to be completed in early summer of 1980. The contact person is Janet Patton; Department of Political Science, Eastern Kentucky University; Richmond, Kentucky 40475; (606) 622-1180.

3.1.2.3 Kent, Ohio

The community of Kent, Ohio, was selected as a representative of the midwest region. A community energy profile was prepared, and three solar scenarios have been developed. These scenarios identify energy conservation and solar energy application for short-range (to 1985), medium-range (to 1990), and large-range (to 2000) time-periods. Community meetings were held to allow citizens to consider the costs and benefits of increased solar energy use. The three scenarios will be refined after these meetings. A transition scenario for each end-state scenario will be developed. The project is scheduled to be completed in the fall of 1980. The contact person is John Ostrowski; Kent Solar Project; 319 S. Water Street; Kent, Ohio 44240; (216) 678-8100.

3.1.2.4 Franklin County, Massachusetts

The technology assessment will be based on the solar scenario prepared for the county (Section 3.1.1.3) and will be performed by a task team that has been formed from the existing Franklin County Energy Conservation Task Force. The team will develop an assessment workbook and a method for involving citizens; evaluate the solar scenario for its social, economic, and lifestyle consequences; assess the solar scenario; and prepare a final report. The project was completed in May 1980, and a final report will be available this summer. The contact people are David Pomerantz; University of Massachusetts; Amherst, MA 01003; (413) 545-2042; and Mark Cherniak (see Section 3.1.1.3).

3.1.3 Supporting Research

These efforts will support the community projects by providing resource materials, documenting project work, and analyzing the results. Sam Carnes of the Oak Ridge National Laboratory is the contact person (see Section 3.1).

3.1.3.1 Social Issue Analysis

This research is directed at understanding certain elements of the social setting in which the community technology assessments and solar energy development are taking place. The objective is to address the potential societal implications of the widespread use of decentralized solar technology.

Two efforts have been undertaken by the Institute on Man and Science in Rensselaerville, N.Y. The first effort was an analysis of value issues in technology assessment (Hornick and Enk 1979). A second effort was a workshop on the social impacts of energy decentralization held in Rensselaerville in June 1979, to specify what is known about the relationship between societal decentralization and energy production, distribution, and use in the context of various technological options. Proceedings from the workshop and an analysis will be available by Fall 1980.

The contact person is Gordon Enk; Institute on Man and Science; Rensselaerville, NY 12147; (518) 797-3783.

3.1.3.2 Social Costs Assessment

This research involves development and application of a method to assess the social costs of alternative and solar energy technologies against conventional energy technologies. Areas that are addressed include: problems of specifying social costs, measuring social costs in a variety of dimensions, aggregating costs for comparison, and interpreting results. Preliminary research findings were completed in early 1980 and a final report will be available soon. The contact person is Elizabeth Peelle; Oak Ridge National Laboratory; P.O. Box X; Oak Ridge, TN 37880; (615) 574-5948.

3.1.3.3 Legal and Institutional Barriers

This research will provide communities with a comprehensive review of work done on legal and institutional barriers to the use of decentralized solar technologies. The major legal and institutional issues are: access to sunlight, financial incentives and impediments, public utility regulations, zoning laws, deed restrictions, consumer protection laws, union considerations, manufacturer liabilities, patent restrictions, and tax laws. A final report (Schweitzer 1980) is available. The contact person is Marty Schweitzer; Oak Ridge National Laboratory; (615) 576-2726.

3.2 TECHNOLOGY ASSESSMENT OF SOLAR ENERGY SYSTEMS (TASE)

This program is being carried out by the Office of the Assistant Secretary for Environment, DOE. The focus of the program is on the environmental consequences of solar technologies. The DOE program manager is Robert Blaunstein; Office of Environment; Washington, DC 20545; (301) 223-5849.

The project is being conducted in two phases over an 18-month period. The overall objectives are to:

- examine the environmental, health, and safety impacts of widespread utilization of solar energy technologies;

- identify the physical, environmental, and institutional factors that may impose limits upon the extent to which solar technologies may replace conventional energy systems;
- investigate the impact of solar based energy systems on the physical and social structure of the community environment;
- determine regional variations that may facilitate the utilization of particular combinations of solar technologies; and
- assist in planning the design and utilization of solar energy technologies to maximize public benefits and minimize detrimental impacts.

The solar energy technologies considered are solar heating and cooling, photovoltaics, wind energy conversion, agricultural and industrial process heating, and biomass conversion. The study will create a matrix of impact indicators for various percentages of solar energy penetration for different urban spatial forms and determine whether various communities may reach a state of "nonadaptability" in which no further increments of solar based energy can be assimilated.

A summary of the following three community-level studies is available (Ritschard 1979). The contact person for the program is Ron Ritschard; Lawrence Berkeley Laboratory; University of California; Berkeley, CA 94720; (415) 486-6328.

3.2.1 Community Impact Analysis

In this analysis, the consequences of increased solar-based energy usage on typical community environments and amenities are examined. At least three hypothetical communities of different sizes are defined, based on predetermined criteria. These communities contain all the aspects of actual development, such as residential, industrial, and commercial areas; schools; public service facilities; green space; and transportation networks. The amount of solar penetration is increased according to an appropriately defined mix of technologies. An impact analysis is carried out for a minimum of two chosen measures of penetration.

The primary result of the study is a matrix of impact indicators versus the percentage of solar energy penetration for each type of community analyzed. This information provides insights into the problems that established communities may face in assimilating larger shares of solar derived energy.

A draft report has been published. The contact person is Robert Twiss; Department of Landscape Architecture; University of California; Berkeley, CA 94720; (415) 642-4022.

3.2.2 Threshold Analysis

This analysis examines the ability of communities to absorb changes incurred by adopting energy systems heavily based on solar energy technologies. The social and institutional structures of most communities are presently established around centralized energy systems. The introduction of highly decentralized solar energy technologies, applied close to the point of end use, will inevitably cause changes in the physical, social, economic, and institutional structure of established communities. An established community can ordinarily adapt to change, albeit relatively slowly, by assimilating the change without a

sharp discontinuity in its general order. If, however, the nature of the change is an abrupt departure from previous norms, conceivably there may be a point at which community structures lose their resiliency.

The goal of the study is to determine if various community forms may reach a state of "nonadaptability," at which they are not able to assimilate further increments of solar-based energy. The threshold states are examined for several possible indicators, including, but not limited to, land availability, transportation, support services, institutional arrangements and lifestyle considerations.

A final report has been published (Duffy-Armstrong and Armstrong 1979). The contact people are Joe Armstrong and Marilyn Duffy-Armstrong; Armstrong Associates; P.O. Box 541-I; Healdsburg, CA 95448.

3.2.3 Solar City—End State Analysis

This study examines typical community structures after solar energy technologies have been adopted according to predetermined year 2025 end-state assumptions. Many of the current solar energy issues, including sun rights, infrastructure needs, and costs, can be seen as transition problems for significant penetration of solar energy technologies at some future date. In this analysis, such transition difficulties are not considered. An environmental and socioeconomic analysis of the expected, emergent city explores the relative attractiveness of the end-state lifestyles and community structures.

A typical city is analyzed in its end state after a period of growth based on a "business-as-usual" scenario and after a period of growth representing a "high solar" scenario. In a third case, a city "built" de novo to maximize solar energy use but possessing the same characteristics as the typical city in the year 2025 in terms of goods and services produced, population, and energy demand, is examined in its end state. The study compares the cities in the year 2025 in terms of physical layout, environmental quality, socioeconomics, and quality of life.

A draft report has been published. The contact person is Murray Milne; School of Architecture and Urban Planning; UCLA; Los Angeles, CA 90024; (213) 825-7370.

3.2.4 Phase 2 Studies

Under Phase 2 of the project, the "base" and "maximum practical" solar scenarios developed under the Solar Domestic Policy Review will be compared to determine the difference in major energy-related environmental and socioeconomic impacts. Regional solar futures that mitigate specific environmental and socioeconomic impact will be evaluated. The specific objectives of Phase 2 are to:

- assess the regional, subregional, and community environmental impacts resulting from maximum practical deployment of solar technologies in the year 2000;
- examine alternative combinations of solar technologies in each region and evaluate the most beneficial combination with respect to regional and subregional environmental socioeconomic problems; and
- identify regional environmental and socioeconomic characteristics that should be factored into the planning of national solar programs and policy.

The contact person is Ron Ritschard.


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SECTION 4.0

COMMUNITY-LEVEL STUDIES

4.1 ENERGY CONSERVATION PROJECT, PORTLAND, OREGON

This study was begun in 1978 with the creation of an Energy Policy Steering Committee composed of citizens from business, industry, utilities, and government. The Committee has developed a proposed energy policy for Portland that contains six policy elements: the role of the city; retrofit of existing buildings and equipment for residential, commercial, industrial, and institutional sectors; land use; renewable resources and supplemental energy systems; transportation; and city government. Objectives, justification, and example programs are proposed for each element. The overall objective is to save over 30% of the energy that the people of Portland would need in 1995. This 30% savings is equivalent to 11 million barrels of oil a year.

A discussion draft of the proposed energy policy was released in May 1979. Workshops and hearings were held in May and June to discuss the proposed policy. Reports on various aspects of the project have been published. The contact person for the project is Marion Hemphill, City Energy Advisor; 620 S.W. Fifth, Room 610; Portland, OR 97204; (503) 248-5317.

4.2 ENERGY SELF-SUFFICIENCY STUDY, NORTHHAMPTON, MASSACHUSETTS

The purpose of the study was to examine the prospects for energy self-sufficiency by determining whether a small city can supply all of its energy from renewable resources located within the city. The study examined the past and present energy use of the city and develops a scenario for energy self-sufficiency. The energy sources considered for primary production were solar ponds, on-site solar facilities, solid wastes, sewage, wood, hydropower, and wind. The end-use needs were estimated for low-temperature heat; industrial process heat; lighting, appliances, and machinery; transportation; and cooking and miscellaneous heating. The average annual primary production rate was estimated to be 100 MW; the average annual end-use consumption rate was estimated to be 82.5 MW. These estimates included provision for significant increases in energy efficiency. A cost-benefit analysis showed that, even under the most pessimistic case considered, the life-cycle revenues exceed the maximum capital costs by almost $40 million.

A final report has been published. The contact person is Allan S. Krass, Associate Professor of Physics and Science Policy Assessment, Hampshire College, Amherst, MA 01002. The DOE program manager is Dick Holt; Office of Conservation and Advanced Energy Systems; Assistant Secretary for Policy and Evaluation; DOE; Washington, D.C. 20585; (202) 252-6433.

4.3 ST. LOUIS CASE STUDY: THE POTENTIAL FOR ENERGY CONSERVATION AND RENEWABLE RESOURCES

The study's purpose was to examine energy consumption characteristics and develop policy implementation recommendations, emphasizing conservation options, for the St. Louis Standard Metropolitan Statistical Area (SMSA). Four renewable energy sources were examined: active and passive solar energy, biomass, and wind. The Socioeconomic-

Environmental-Demographic Information System (SEEDIS) was used to provide a graphic display of data. Directed interviews are used to determine institutional issues.

A draft report has been prepared and is under review by DOE. The contact person for the study is Mark Levine; Lawrence Berkeley Laboratory; Bldg. 90, Room 3114; Berkeley, CA 94720; (415) 486-5238.

4.4 SHAWNEE SOLAR PROJECT, CARBONDALE, ILLINOIS

A local, nonprofit public service group has established a solar resource center for community use. The project provides consultation, energy education, demonstrations, weatherization projects, and public policy development. The project staff works with the Carbondale City Council, Southern Illinois University, and the State of Illinois on various energy programs.

The project publishes the Shawnee Sunshine Gazette, which includes articles and news on solar energy, community energy planning, and nuclear issues. The contact person is Chris Robertson; 211 Main; Carbondale, IL 62901; (618) 457-8172.

4.5 SOLDIERS GROVE, WISCONSIN PROJECT

This project involves the relocation of the central business district of the village of Soldiers Grove due to recurrent flooding of the district by the Kickapoo River. The relocation will provide an opportunity to develop and demonstrate the use of alternative energy technologies. The village is working with Argonne National Laboratory, the Wisconsin Division of State Planning and Energy, the University of Wisconsin, and DOE to incorporate the use of a variety of renewable energy resources in the new central business district. The energy options under consideration are district heating, cogeneration, solar ponds, wind generators, biomass, passive solar design, and low-head hydro. The relocation project demonstrates the integration of appropriate technologies in energy, transportation, architecture, community design, and flood prevention.

The project coordinator is Tom Hirsch; Community Development Office; Soldiers Grove, WI 54655; (608) 624-5209. The information for this section was gathered from Acorn 1979.

4.6 SAN LUIS VALLEY SOLAR ENERGY ASSOCIATION, ALAMOSA, COLORADO

The association was formed in 1975 as a valley-wide voluntary organization to promote energy conservation and the development of solar and other alternative renewable energy resources in the San Luis Valley through individual and community efforts. The association publishes a monthly newsletter, sponsors speakers, conducts workshops and tours, and publishes a directory to promote awareness and use of renewable energy resources. The association is documenting the growth of solar energy in the Valley through a slide program that provides details on various solar systems and explains success and problems encountered with these systems. An Energy Conservation Center has been established in Alamosa to promote increased energy self-sufficiency for the Valley.

The contact persons are Bob and Julie Dunsmore, codirectors; Energy Conservation Center; 529 Main Street; Alamosa, CO 81101; (303) 589-2233.

4.7 CAMERON CHAPTER EXPERIMENTAL FARM, CAMERON, NEW MEXICO

The Cameron Chapter of the Navajo Nation has built a solar greenhouse and a solar still for desalinating groundwater. The chapter is also conducting an educational campaign on alternative energy sources as part of a multifaceted self-sufficiency program.

The contact person is Jacques Seronde; Cameron Chapter Experimental Farm; P.O. Box 85; Cameron, NM 86020. Information for this section provided by People and Energy 1979.

4.8 FITCHBURG ACTION TO CONSERVE ENERGY (FACE)

The Fitchburg Action to Conserve Energy (FACE) is a community self-reliance project to make homes in Fitchburg, Massachusetts, more energy efficient. The object is to save 2.1 million gallons of oil during the 1979-1980 heating season by applying no- or low-cost energy conservation measures to every home in Fitchburg. Eight centers have been established throughout Fitchburg to serve as training and outreach facilities. These centers will be used by local volunteers to teach weatherization and energy conservation technologies to neighborhood residents. All training sessions are free of charge, and families and individuals who meet income guidelines may also receive energy conservation materials without charge.

The project is sponsored by the Office of Voluntary Citizen Participation; ACTION; 806 Connecticut Ave.; Washington, DC 20525; (800) 424-8867; in cooperation with federal, state, and local agencies. The FACE office can be contacted at 379 Main Street; Fitchburg, MA 01420; (617) 342-7341.

4.9 CITY OF LUFKIN (TEXAS) WORM RANCH

The City of Lufkin, Texas, is using earthworms to digest large amounts of the primary and activated secondary sewage sludge from its sewage treatment plant. The city plans to have all of its sludge consumed by earthworms and anticipates significant reduction in money and energy otherwise required for sludge handling. The contact person is Harvey Westerholm, City Manager; City of Lufkin; P.O. Box 190; 300 E Shepherd Ave.; Lufkin, TX 75901; (713) 634-8881.

4.10 LOCAL ENERGY ORGANIZERS PROJECT (AERO) MONTANA

This project was coordinated by the Alternative Energy Resource Organization (AERO). A local energy organization was established in eight towns in Montana that were selected on the basis of local interest in energy conservation and in the use of renewable energy sources. The purpose of the project was to aid and encourage citizens to learn about renewable energy sources and energy conservation and how they and the town are currently using energy, and to begin to take an active part in decisions and projects that will lead to energy conservation and renewable energy sources.

In each town, the energy organizer worked with a citizen committee to:

- establish a renewable energy club that will help direct activities and disseminate information;

- establish an energy self-help group to undertake projects;
- encourage citizens to become involved in energy decisions affecting the town;
- encourage citizens to establish renewable energy facilities in the town; and
- establish a body of knowledge about the use of energy in the town and about the possible use of energy conservation and renewable energy resources.

The contact person is Kye Cochran; AERO; 435 Stapelton Building; Billings, MT 59101; (406) 259-1958.

4.11 FUTURE POWER, COLORADO

The Rocky Mountain Center on Environment (ROMCOE), supported by a grant from the Carolyn Foundation of Minneapolis, Minn., developed a program called Future Power to enable communities to create their own energy futures. The overall purpose of the program was to determine how more people can become involved in developing positive energy options for themselves and their communities before severe supply curtailments or mandatory federal regulations occur. After careful evaluation, ROMCOE selected three Colorado communities for its Future Power program:

- San Luis, a rural Hispanic town of 900 people located in a mountain valley in southern Colorado;
- Grand Junction, a prosperous urban-rural city on Colorado's western slope with a population of 25,000; and
- Montclair, a middle-class urban neighborhood in metropolitan Denver with approximately 6,000 people.

In each of these communities, a local coordinator was appointed to work with a steering committee, which represented a diversity of interests in the community, to determine the actual structure of the local Future Power program.

In San Luis, the program was structured around three workshops and a classroom series on alternative forms of energy and energy conservation. A solar food dryer, a solar hot-air collector, and a solar water heater were constructed in the workshops. The classroom series focused on training local contractors in energy-conservation and alternative energy construction techniques. The San Luis Future Power program is being continued through the People's Alternative Energy Service by Arnold and Maria Valdez; Rt. 1, Box 3-A; San Luis, CO 81152, and provides technical assistance to residents of the entire San Luis Valley.

In Grand Junction, the program focused on information sharing. An information seminar was held to discuss the current energy picture in Grand Junction and to consider alternatives. Eight "solution groups" were formed to develop ideas for alternative energy futures. These ideas were displayed at an energy fair held ten weeks after the seminar. As a result of the interest created by the seminar and the fair, a Public Energy Information Office was established to promote energy conservation and to provide information and demonstrations about conservation and alternative technologies.

In Montclair, an energy workshop was held to discuss ideas on energy alternatives for the community. These ideas were displayed at an energy fair to acquaint the community with a broad range of energy choices for the future. The residents of the community built a passive solar greenhouse at the local elementary school for use by the school and to provide a focal point for the community's interest in alternative energy futures. The Future Power committee is now an officially recognized unit of the Montclair Community Association.

Booklets describing Future Power activities are available for each of the communities. The contact person is Susan Carpenter; ROMCOE; 1115 Grant St.; Denver, CO 80203; (303) 861-1260. The information for this section came from the ROMCOE Forum, Fall 1978.

4.12 COMPREHENSIVE COMMUNITY ENERGY MANAGEMENT PROGRAM (CCEMP)

The purpose of this program is to test the ability of local communities to conduct energy planning and to provide information useful to policy makers and other communities interested in energy planning. The program makes a structured assessment of specific energy goals as they are impacted by local community decisions and by the suppliers of energy to the community. An action plan for energy conservation strategies and an organizational structure to put the plan into effect will be developed. The methodology for the program will be based on the Comprehensive Energy Planning Workbook prepared by Hittman Associates (1978).

The communities participating in the program are: Philadelphia and Allegheny County, Pennsylvania; Boulder, Colorado; Dayton, Ohio; Greenville, North Carolina; Janesville, Wisconsin; King County and Seattle, Washington; Knoxville and Knox County, Tennessee; Los Angeles, California; Portland, Maine; Richmond, Indiana; Tulsa, Oklahoma; Wayne County, Michigan; South Florida Regional Planning Council; Toledo Metropolitan Area Council of Governments, Ohio; and Greater Bridgeport Regional Planning Association, Connecticut.

The contact person for the program is Don Clifford; Argonne National Laboratory; 9700 South Cass Ave.; Argonne, IL 60439; (312) 972-3990.

4.13 INTEGRATED COMMUNITY ENERGY SYSTEMS, SITE, AND NEIGHBORHOOD DESIGN PROGRAM

This program is focused on case studies of new-town design and development that use state-of-the-art techniques in energy conservation, community design, and land-use planning. The purpose of the program is to incorporate energy planning into the land development process. Energy conservation, community heating systems, passive solar design, waste heat use, solar thermal, and biomass will be considered as applicable in each case study.

The new towns selected for the case studies are: Burke Center, Virginia; Greenbriar, Virginia; Shenandoah, Georgia; Radisson, New York; and Woodlands, Texas.

The contact person is Jacob Kaminsky; Division of Buildings and Community Systems; Assistant Secretary for Conservation and Solar Applications; DOE; 20 Massachusetts Avenue N.W.; Washington, DC 20585; (202) 376-4818.

4.14 INTEGRATED ENERGY PLAN FOR RIVERSIDE, CALIFORNIA

The basic objectives of this study are to develop an integrated community energy plan for Riverside, to select alternative energy strategies that combine conservation and available alternative energy options to decrease the use of scarce fossil fuels, to increase energy stability, and to reduce locally generated environmental pollution. A subsidiary objective is to develop methods and policies for working with local, county, regional, state, and federal institutions on integrated energy and environmental problems.

The methodology is to develop a "business-as-usual" scenario and then measure various opposing options open to Riverside. The options are first screened and evaluated based on technical availability, environmental impact, public acceptance, expected cost-effectiveness, net savings of energy resources, ability to displace natural gas or fuel oil use, longevity of the resource base, and reliability of energy supply. The options are scored, and the ones that scored high are further evaluated. These options include incorporating passive solar shading and shielding requirements; replacing existing incandescent street lights with high-pressure sodium lights; developing and implementing an education program on van and car pooling, purchasing fuel-efficient vehicles, and improving driving efficiency; implementing hydrogen production for the municipal fleet; and obtaining and distributing methane from waste landfill.

A final report, Integrated Energy Plan for Riverside, California, was published in January 1979. The contact person is Kenneth E. Cochran; Riverside Community Energy Program Manager; Battelle Columbus Laboratories; 505 King Avenue; Columbus, OH 43201; (614) 424-6424.

4.15 INSTITUTE FOR ECOLOGICAL POLICIES HANDBOOK

This project involved the preparation and distribution of a nontechnical handbook to allow local government offices, regional planning organizations, interest groups, and individuals to follow a step-by-step procedure to plan and implement community energy systems based on renewable energy sources and conservation. The handbook is available through Institute for Ecological Policies.

The contact person is Jim Benson; Institute for Ecological Policies; 1413 K Street N.W., 8th floor; Washington, DC 20005; (202) 393-6700.

4.16 PHILADELPHIA SOLAR PLANNING PROJECT

The objectives of the project are:

- to plan and organize a comprehensive program for assessing and achieving the maximum use of solar energy in Philadelphia;
- to increase energy self-reliance, expand employment opportunities, foster economic development, and improve the quality of the environment;
- to determine the feasibility, organizational structure, implementation opportunitites, public policies, communication strategies, assessment practices and probable economic and social impacts for a broad range of solar energy applications to buildings in Philadelphia;

- to produce a solar program plan, planning tools, a feasible demonstration program, and a program management capability as an integral part of Philadelphia's Comprehensive Community Energy Management Program; and
- to gain the commitment of city government, private and quasi-public organizations, financial institutions, universities, energy scientists, design professionals, and contractors to achieve the maximum benefit from the application of solar energy in Philadelphia.

The Philadelphia Solar Planning Project is supported by a grant of $250,000 from the National Endowment for the Arts to the University City Science Center and is under the direction of Dr. Charles Burnette, a contractor to the Science Center. Other subcontractors are the Energy Center and the Departments of Architecture and Civil Engineering, University of Pennsylvania; Departments of Commerce, City Planning, and Housing and Community Development, City of Philadelphia; the Regional Science Research Institute; South Street Design; and Arrowstreet, Inc.

The Philadelphia Solar Planning Project is a unique, comprehensive solar planning project and is being conducted in coordination with, and as a pilot study for, the SUNACT (Solar Utilization Applied to Cities and Towns) program. The DOE program manager is Frank de Serio; Office of Solar Applications for Buildings; Room 5G-070, Forrestal Bldg.; Washington, DC 20585; (202) 376-9623. The project is being closely coordinated with the Comprehensive Community Energy Management Program of the City of Philadelphia.

4.17 CENTER FOR RENEWABLE RESOURCES SURVEY OF MODEL SOLAR ENERGY PROJECTS

The Center for Renewable Resources (CRR) is conducting a study to identify model solar energy projects through state networks. Within each state three of the projects identified will be selected for more detailed study.

The DOE program manager is Lynda Connor; DOE; Office of Conservation and Solar Applications; Forrestal Building; Washington, DC 20510. The project manager is Anita Gunn; CRR; 1001 Connecticut Ave. N.W., 5th Floor; Washington, DC 20036; (202) 466-6880.

4.18 WOOD-FIRED COGENERATION SYSTEM FOR THE UNIVERSITY OF CALIFORNIA, SANTA CRUZ, CALIFORNIA

This study will assess the feasibility of using local waste wood in a total energy system to supply both electricity and heat for the university campus. Availability of fuel, fuel handling problems, combustion and power systems, environmental considerations, and costs are studied. The study is supported by a $16,500 grant from DOE's Appropriate Energy Technology Small Grants Program.

The contact person is Robert Stayton; P.O. Box 1380; Santa Cruz, CA 95060; (408) 462-3300.

4.19 PLANNING FOR ENERGY SELF-RELIANCE: A CASE STUDY OF THE DISTRICT OF COLUMBIA

The Institute for Local Self-Reliance has prepared a study of the current energy picture of the District of Columbia and the potential for energy self-reliance. The purpose of the study is to provide a conceptual framework for viewing the energy crisis from a municipal perspective and to describe possible strategies for maximizing conservation and the use of indigenous energy resources.

The contact person is David Morris, Project Director; Institute for Local Self-Reliance; 1717 18th Street N.W., Washington, DC 20009; (202) 232-4108.

4.20 SOLAR COMMERCIALIZATION, YORK COUNTY, PENNSYLVANIA

The York County Planning Commission has been funded by the Northeast Solar Energy Center to promote the substitution of renewable energy sources for depletable fuels in York County, Pennsylvania. Other objectives of the project are to encourage the adoption of renewable energy technologies, to educate local government officials and the financial and legal communities, and to encourage county-wide energy savings.

The contact person is William J. Conn, Chief; Physical and Environmental Planning; York County Planning Commission; 118 Pleasant Acres Rd.; York, PA; (717) 757-2647.

4.21 LEGAL AND INSTITUTIONAL BARRIERS TO SOLAR HOT WATER AND PASSIVE SYSTEMS, NAUGATUCK VALLEY, CONNECTICUT

The Central Naugatuck Valley Regional Planning Agency has been funded by the Northeast Solar Energy Center to analyze the legal and institutional barriers to the development of solar hot water systems and passive solar systems in the thirteen municipalities of the Central Naugatuck Valley Region. The project will identify local regulations and institutions impeding the development of these solar energy systems and interfering with solar access. The project also will attempt to stimulate greater local awareness of the value of solar hot water heating and passive solar systems as supplements to current heating practices.

The contact person is Charles Vidich; Central Naugatuck Valley Regional Planning Agency; 20 East Main Street; Waterbury, CT 06702; (203) 757-0535.

4.22 UTILIZATION OF SOLAR AND WOOD TECHNOLOGIES, ADDISON COUNTY, VERMONT

The Addison County Regional Planning and Development Commission has been funded by the Northeast Solar Energy Center to implement a comprehensive program to encourage the widespread use of solar and wood technologies in Addison County. The project will be based on a study of existing and future energy use patterns within the county recently completed by the Commission.

The contact person is Michael H. Preziose, Executive Director; Addison County Regional Planning and Development Commission; Middlebury, VT 05753; (802) 388-4864.

4.23 ENERGY PLANNING FRAMEWORK, CORVALLIS, OREGON

The City of Corvallis has prepared an Energy Planning Framework that seeks to reduce energy consumption by more than 30% over the next few years. The plan addresses energy use efficiencies, land use planning methods, urban planning requirements, transportation and transit services, area economic development, building and construction standards, local energy resources development, alternative and renewable energy resources, and implementing mechanisms and requirements.

A copy of the plan may be obtained from the Planning Department; City of Corvallis; 180 N.W. 5th St.; Corvallis, OR 97330.

4.24 COMMUNITY APPLICATIONS OF SOLAR THERMAL AND SOLAR ELECTRIC SYSTEMS

The Urban Planning Department at the University of California, Los Angeles, is assessing the community applications of solar thermal and solar electric systems. The study will address land use, finance, and social/environmental impact issues related to these systems. Integrated community energy systems will also be addressed.

The contact person is Carl Steinberg; Department of Urban Planning; UCLA; 405 Hilgard Ave.; Los Angeles, CA 90024; (213) 825-2718.

4.25 ALTERNATIVE ENERGY FEASIBILITY STUDY, PULASKI, NEW YORK

The study examines the consumption of electric and fossil fuel energy and the potential for the application of conservation techniques and alternative energy systems for the Village of Pulaski. The study examines the applicability of energy derived from solar, wind, solid waste, sewage-derived methane, hydropower, and local natural gas sources to meet the needs of ten public and institutional facilities within the village. Technical feasibility, legal and institutional considerations, and social and environmental impacts, are among the issues assessed.

The contact person is Leonard F. O'Reilly; O'Reilly Associates, Suite 9B; 828 Bloomfield Ave.; Montclair, NJ 07042.

4.26 SOLAR DEMONSTRATION PROJECT, NORTHWEST ARKANSAS

The Office of Human Concern in Rogers, Arkansas, will build and install at least 60 vertical wall solar air heaters in a three-county area in the northwest part of the state. The objectives of the project include studying low-cost retro-tech solar technologies, standardizing retrofitting procedures, and reducing heating costs for low-income elderly people in the project area.

The results of the study will be available in August 1980. The contact person is Joel Davidson, Solar Project Director; Star Route; St. Paul, AR 72760; (501) 636-7301.

4.27 LOCAL GOVERNMENT ENERGY ACTIVITIES STUDY

The Office of Policy and Evaluation, DOE, in cooperation with the National Association of Counties, the National League of Cities, and the U.S. Conference of Mayors, has completed a study on local government energy activities in Boston, Metropolitan Dade County, Oakland/Alameda County, Minneapolis/Hennepin County, Pittsburgh/Allegheny County, Seattle/King County, and the City of Los Angeles/Los Angeles County. The purpose of the study is to identify energy activities; understand the factors influencing the choice and implementation of these activities; examine the relationships among levels of government and between government and the community; and assess the barriers experienced by local governments in their energy efforts.

The study (Lacher 1979) is available in three volumes (summary analysis, detailed analysis, case studies) and can be obtained upon request from Didi Lacher; Office of Policy and Evaluation; DOE, MS 7A-139, 1000 Independence Ave.; Washington, DC 20585; (202) 252-5982.

4.28 CENTER FOR RENEWABLE RESOURCES—SOLAR CITIES PROJECT

The object of the proposed study is to analyze the issues involved in deploying solar technologies in cities. It will examine the technical, environmental, financial, employment, institutional, and policy impacts of using renewable energy resources in cities. The analysis will include the residential, commercial, industrial and transportation sectors, investigating their special needs and opportunities. Emphasis in this study will be on the implications for government strategy and policy.

The contact person is Richard Mounts; Center for Renewable Resources; 1001 Connecticut Ave., N.W.; Washington, DC 20036, (202) 466-6880.

4.29 SOLAR CITIES PROGRAM

The object of the program is to assist cities and towns with their problems—energy supply, economic development, and urban livability—through use conservation and mixed use of solar technologies in multiple, large-scale building and community applications. The goal of the program is to maximize the use of conservation and solar technologies in urban areas through a two phase program implemented by the regional solar energy centers. The program includes planning and implementation activities aimed at providing:

- urban and community design and technical assistance;
- pilot/demonstration projects and case studies;
- federal, state, and local incentives;
- communication, education, and information; and
- analysis and planning.

Projects with a high benefit to cost ratio will be chosen for demonstration. These include the recently funded Massachusetts solar multifamily pilot project where 1700 units will be constructed using 90% state funding.

The contact person at DOE is Frank de Serio; Office of Solar Applications for Buildings; Room 5G070, Forrestal Bldg; Washington, DC 20585; (202) 252-8153. The contact person at SERI is Richard Busse; Community and Consumer Branch; (303) 231-1060.


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SECTION 5.0

NEIGHBORHOOD DEVELOPMENT AND COMMUNITY SELF-HELP

5.1 THE EAST 11TH STREET MOVEMENT*

The movement grew out of efforts by tenants and local supporters to renovate an abandoned tenement through a sweat equity loan from the City of New York. With additional loans from the Community Services Agency (CSA) and technical assistance from the Energy Task Force (ETF), the cooperators insulated and weatherstripped the building, installed storm windows, and designed and installed a solar domestic water heater that now supplies 65% of the tenants' hot water needs. The cooperators, with the assistance of ETF and CSA, installed a 2-kW wind generator to light public stairways and to run the pumps for the solar water heater. Ninety percent of the electricity generated is used at the site; the cooperators have won the right through a New York Public Service Commisssion ruling to sell back its excess electricity to Consolidated Edison.

The contact persons are Edwin Sosa and George Gonzalez; The East 11th Street Movement; 519 E. 11th St.; New York, NY 10009; (212) 982-1460. More than one hundred people are now sweat equity cooperators on East 11th St. and three additional buildings are being renovated.

5.2 CUANDO

The Cultural Unity and Neighborhood Development Organization (CUANDO) began in 1971 as an educational and recreational project for children. In 1975, CUANDO received a grant from the National Center for Appropriate Technology in Butte, Montana, to develop gardens, agriculture, recycling, and energy-related projects, including a passive solar wall for their headquarters building at 9 2nd Avenue. The wall was designed by the Energy Task Force and constructed by Youth Corps workers as part of a summer work program sponsored by CUANDO and funded by the City of New York. The project also served as an employment training program. The solar wall converted 71% of the incident radiation to heat in a test conducted in February 1978, and supplies the heat equivalent of 400 gallons of fuel oil per year.

The contact person for CUANDO is Freddie Cabrera; 9 2nd Avenue; New York, NY 10003.

5.3 PEOPLE'S DEVELOPMENT CORPORATION

The People's Development Corporation (PDC) is the organizational outgrowth of an "urban homesteader" effort to renovate an abandoned tenement in the South Bronx at 1186 Washington Street. As part of the renovation, PDC received a demonstration grant from the U.S. Department of Housing and Urban Development (HUD) to install, with technical assistance from ETF, a solar hot water system that now provides 70% of the domestic hot water used at the renovated tenement. It is currently the only solar hot water system in the South Bronx.

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*The source for Sections 5.1-5.6 is Margaret Allen (1979).

The work of PDC has expanded to include additional renovation work and job training. PDC has its own planning and design unit that prepares energy-conscious designs and construction blueprints for the renovation projects. Other PDC projects involve new parks and gardens, a solar greenhouse, an earthworm farm, a recycling project, a woodcraft and cabinetry shop that provides all kitchen cabinets and countertops for restored apartments, and an energy unit that offers locally-based services, including weatherization and boiler maintenance.

The address and phone number for PDC are 500 East 167th Street; Bronx, NY 10456; (212) 993-7770.

5.4 TRI-CITY CITIZENS UNION FOR PROGRESS, NEWARK, NEW JERSEY.

The Tri-City group has helped more than 100 families to renovate their apartments and secure cooperative ownership. In 1977, Tri-City, in cooperation with the Victoria Foundation and the Institute for Local Self-Reliance (ILSR), launched an energy conservation program. One result of this program was the construction and installation of a solar hot water heater in one of the cooperatively owned apartments. The heater provides 65% of the hot water needs of the apartment. Tri-City plans to install two more solar hot water heaters during 1979. Tri-City has also developed an in-house energy conservation team to train residents to cut heat loss, reduce energy waste and inefficiency, and install insulation and storm windows.

The contact person is Rebecca Doggett Andrade, Executive Director; 675-81 South 19th Street; Newark, NJ 07103; (201) 374-5252.

5.5 BIO-ECO SOLAR SYSTEM (BESS) GREENHOUSE PROJECT

The BESS greenhouse project is a joint effort by the PDC, ILSR, and the Trust for Public Land of San Francisco. In the BESS greenhouse system, garbage will be fed to earthworms, and the castings from the worms will be used to fertilize a vegetable garden. The worms will be fed to poultry and fish raised in the center of the greenhouse, and excess worms will be sold. The vegetables will be fed to rabbits. At full production, which is expected in five years, 40,000 pounds of poultry, rabbits, and fish should be available for sale to community residents. The BESS greenhouse demonstrates the link between garbage, urban food supply, labor-intensive business, and a cleaner environment.

5.6 BRONX FRONTIER DEVELOPMENT CORPORATION

The corporation was begun in 1976 to regreen the South Bronx. In 1977, with assistance from ILSR, the corporation began a composting operation that now collects 40 tons of vegetable waste each day for humus production. The compost is given to urban gardeners in the Bronx area. The corporation also built a 40-kW wind generator, with the assistance of ETF and local contractors, to provide electricity needed for pumps to aerate compost piles. The wind generator will produce $5,000 to $6,000 worth of energy each year at Consolidated Edison's 1979 rates, and the aeration process will double the daily output of humus and permit year-round production.

The Bronx Frontier Corporation can be contacted at 738 Kelly Street; Bronx, NY 10455; (212) 542-4640.

5.7 SOUTH MEMPHIS DEVELOPMENT CORPORATION

The corporation is training unemployed black youths to install solar water heaters in the Tennessee Valley. The installation program is sponsored by the Tennessee Valley Authority (TVA), which provides customers with a 3.37%, 20 year loan to cover the $2,000 first-cost that can be repaid at about $13 per month on utility bills. TVA will install 100,000 solar water heaters through this program and expects to save money, partly because back-up electricity for the units will be shut off during peak generating hours.

The Memphis Development Corporation can be contacted at 219 Madison Avenue; Memphis, TN 38103; (901) 521-0057. Information for this section provided by People and Energy 1979.

SECTION 6.0

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DECENTRALIZED ENERGY STUDIES AND PROJECTS

REQUEST FOR INFORMATION

For future editions of the compendium, the Community and Consumer Branch of SERI would appreciate receiving any information on decentralized community-level studies and projects concerned with energy conservation and the use of renewable energy resources. Please fill out the form provided below and send it with any additional information to: Jim Ohi; Community and Consumer Branch; SERI; 1617 Cole Blvd.; Golden, CO 80401; or call (303) 231-1046.

Thank you.

- -

Project/Study Title:

Contact:
Address:

Phone:

Purpose:

Location/Time Period:

Products/Results and
Available Data:

Cost/Source of Funds:

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This compendium was prepared as a part of the Decentralized Energy Studies task at the Solar Energy Research Institute. The compendium lists and briefly describes a number of studies, programs, and projects that involve decentralized energy systems. The purpose is to provide information about research activities in decentralized energy systems to researchers, government officials, and interested citizens. A contact person or address is given for each of the activities listed so that interested readers can obtain more information.

17. Document Analysis

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