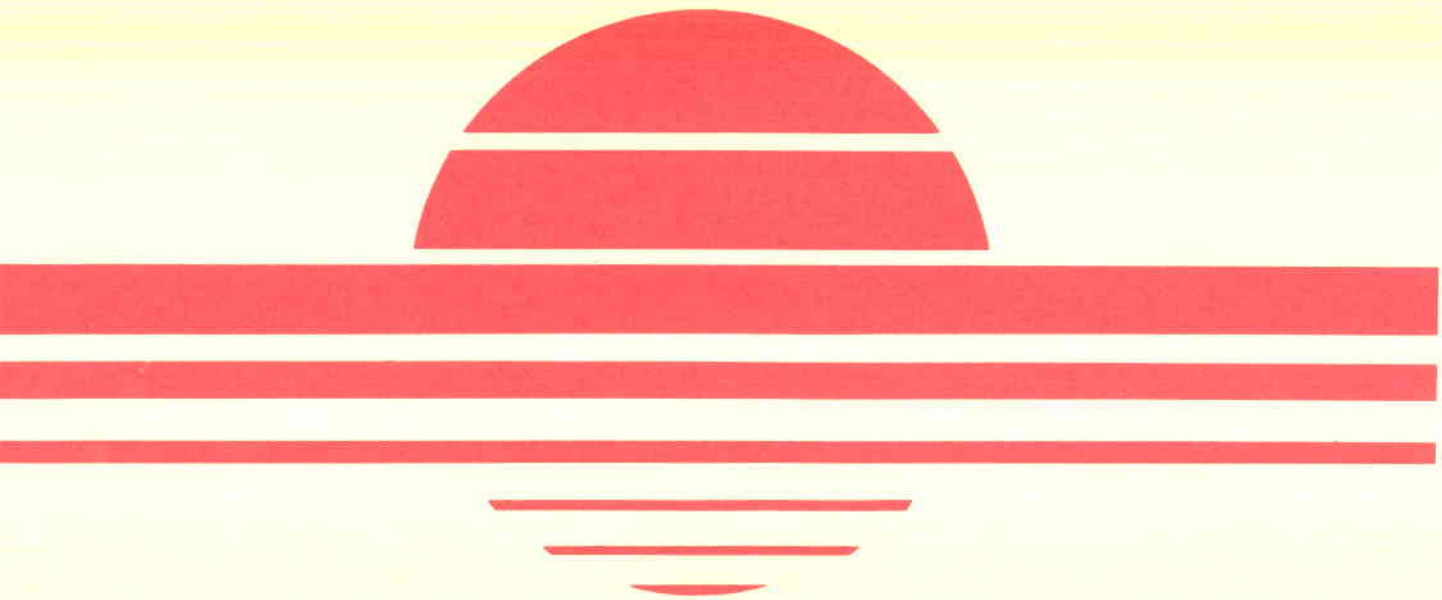
DOE/ET-0036/1

Guide to Solar Energy Programs

Revised:
June 1978



U.S. Department of Energy
Assistant Secretary of Energy Technology
Division of Solar Technology

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PROGRAM STRUCTURE

INTRODUCTION

The variety of technologies being supported by SOLAR/ET under the overall solar energy program consists of the following programs:

a. The Solar Thermal Power Systems Program.
b. The Photovoltaic Systems Program.
c. The Fuels from Biomass Program.
d. The Ocean Thermal Systems Program.
e. The Wind Energy Systems Program.

Each of these programs conducts a comprehensive development of research and development effort with continual evaluation of technical progress toward meeting national energy goals. The activities of these programs are described in the following paragraphs.

THE SOLAR THERMAL POWER SYSTEMS PROGRAM

The objective of the Solar Thermal Power Systems Program is the large-scale commercial implementation of solar thermal power systems for electric utility applications, dispersed systems applications (such as irrigation pumping, applications requiring a combination of electric and thermal energy) and applications requiring process heat alone to replace the use of critical fossil fuels.

DIVISION OF SOLAR TECHNOLOGY

The Division of Solar Technology (SOLAR/ET) is the organization having the principal responsibility for the execution of the Federal Solar Energy Research, Development, and Demonstration Program. The primary goal of this program is to stimulate and aid industry and others in developing and introducing economically competitive, environmentally acceptable, and operationally safe solar energy systems to meet a significant portion of national energy requirements at an early date. The program presently emphasizes the following two major solar technological areas:

a. Solar electric applications to provide the basis for generating electricity, thermal and mechanical energy, and products derived from electricity in mid- to long-term periods.

b. Production of biomass and their conversion to clean fuels with potentially significant long-term impact.

As a result of this reorganization, SOLAR/ET programs now include the following:

a. Solar Electric Systems

(1) Wind Energy Systems.
(2) Photovoltaic Systems.
(3) Solar Thermal Power Systems.
(4) Ocean Thermal Systems.

b. Fuels from Biomass

(1) Production and Collection of Biomass.
(2) Conversion of Biomass.

c. Environmental and Resource Assessment

(1) Satellite Power Systems.

Programs formerly part of ERDA's SOLAR and now part of SOLAR/CS include:

a. Technology Transfer

b. Solar Heating and Cooling (Thermal Applications)

(1) Solar Heating and Cooling of Buildings.
(2) Barriers and Incentives.
(3) Agricultural and Industrial Process Heat Application.
(4) Solar Heating and Cooling Research and Development.
(5) Demonstration.

Activities under the Assistant Secretary for Energy Technology focus primarily on making new energy technologies available for commercial (public or private) application as early as possible. Since technologies grouped under this Assistant Secretary are still in the development stage, the problems to be addressed will largely be technological ones.

Once a specific project in a technology has been developed sufficiently for commercial demonstration, the project will be transferred to either the Assistant Secretary for Resource Applications or the Assistant Secretary for Conservation and Solar Applications. At the same time, further development of the base technology will continue under Energy Technology to improve efficiency and costs.

Prior to October 1, 1977, ERDA's Division of Solar Energy (SOLAR) was primarily responsible for the execution of the Federal Solar Energy Research, Development, and Demonstration Program. ERDA's responsibilities were transferred to the new U.S. Department of Energy (DOE), effective October 1, 1977, and SOLAR was reorganized into two distinct organizational components:

a. The Division of Solar Technology (SOLAR/ET) under the Assistant Secretary for Energy Technology.

b. The Division of Conservation and Solar Applications (SOLAR/CS) under the Assistant Secretary for Conservation and Solar Applications.

OVERVIEW OF THE DEPARTMENT OF ENERGY'S SOLAR ENERGY PROGRAMS

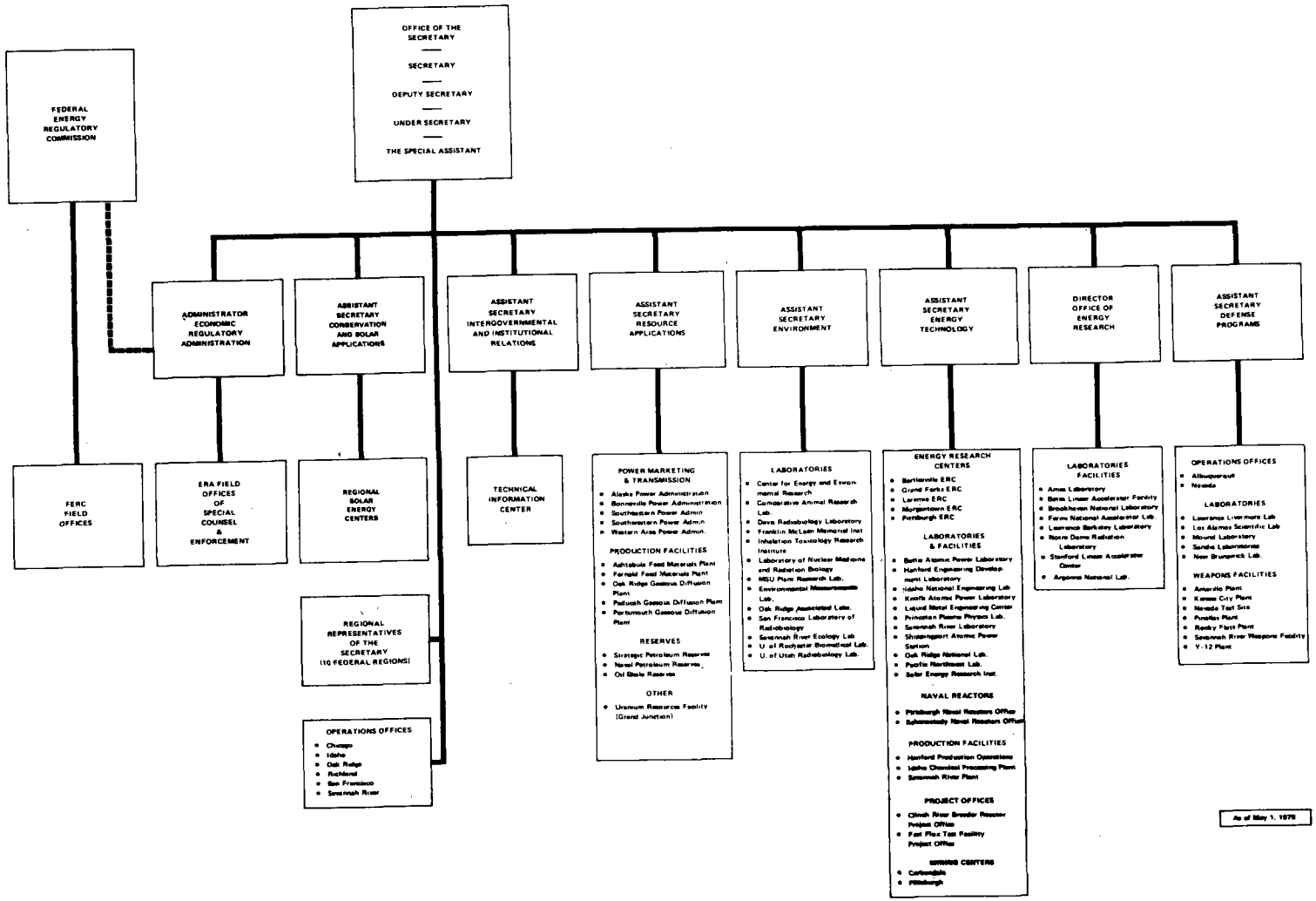
INTRODUCTION

The Division of Solar Technology is one of several organizations within the Office of the Assistant Secretary for Energy Technology. Other program divisions conduct activities related to Geothermal Energy Development, Fossil Energy Development, Electric Energy Systems, Improved Conversion Efficiency, Energy Storage Systems, Nuclear Research and Applications, Breeder Reactors, Naval Reactor Development, Nuclear Fuel Cycle Research and Development, Light Water Reactor Facilities and Fuel Storage, and Magnetic Fusion.

The Assistant Secretary for Energy Technology is responsible for overseeing and guiding these technology areas; providing policy guidance, direction, and coordination to all other DOE activities; developing energy technology strategies; and serving as the organizational focal point of DOE energy technology information. These activities are designed to determine the economics and commercial viability of new energy technologies, as well as accelerate their commercialization. Identifying means by which commercial application can be accelerated (e.g., loan guarantee programs authorized by Congress) and transferred into various sectors of the economy are of major concern. Safety, conservation, and environmental and socioeconomic consequences are also taken into consideration.

Heating and Cooling Demonstration Act of 1974; PL93-438, the Energy Reorganization Act of 1974; and PL93-577, the Federal Nonnuclear Energy Research and Development Act of 1974. Together, the four laws contain general authority for DOE and other Federal agencies to pursue a research program aimed at effective solar energy utilization. Under this authority, DOE, as successor to ERDA, works to promote a fully-coordinated solar energy program and to complement private sector efforts to develop the solar energy resources.

Realization of program goals require that non-Federal entities be encouraged to accomplish their own R&D, participate in joint projects with the Federal Government, and introduce new solar technologies when they appear to be commercially viable. The DOE program is continually reviewed to identify those activities which are no longer appropriate candidates for government support and for which industry is capable of taking the lead.



Department of Energy Field Organization

FIGURE 1

Although DOE responsibilities embrace the previous six major categories outlined, this publication focuses on the Solar Energy Program and the activities of the Division of Solar Technology (SOLAR/ET)[2]. Figure 1 presents the overall organization of DOE.

NATIONAL SOLAR ENERGY PROGRAM

The Solar Energy Research, Development, and Demonstration Act (P.L.93-473) authorizes a vigorous Federal program of research, development, and demonstration with the goal of providing the option of utilizing solar energy as a viable source for the nation's future energy needs. In response to the mandates of this Act, ERDA, the predecessor of DOE, had prepared a comprehensive program definition of a national solar energy program. This program is described in the publication "National Solar Energy Research, Development and Demonstration Program," (ERDA-49)[3]. The primary goal of the program is to work with industry to develop and introduce, at an early date, economically competitive and environmentally acceptable solar energy systems to meet a significant fraction of the national energy requirements, commensurate with its potential.

Program planning for solar energy RD&D is carried out under guidelines established by PL93-473 and by three other legislative acts passed by the 93rd Congress: PL93-409, the Solar

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[2]This Guide to Solar Energy Programs was prepared under the technical direction of the Program Coordination and Support Branch, Division of Solar Technology.

[3]ERDA-49 may be obtained from the U.S. Government Printing Office (Stock No. 052-010-00473-5).

Development and Demonstration" (ERDA-77-1)[1], and are summarized as follows:

a. Expanding domestic supplies of recoverable raw materials for producing energy.
b. Increasing use of inexhaustible domestic energy resources.
c. Transforming fuel resources into more desirable forms.
d. Increasing efficiency and reliability of energy conversion and delivery systems.
e. Transforming consumption patterns to improve energy utilization.
f. Increasing energy and use efficiency throughout all economic sectors.
g. Protecting and enhancing the general health, safety, welfare, and environment.
h. Performing energy-related research.

The DOE's overall strategy is to assist the private sector in the development of new energy technologies through policy development, limited risk sharing with the private sector, and conducting a supporting Research, Development and Demonstration (RD&D) program.

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[1]ERDA 77-1 may be obtained from the U.S. Government Printing Office (Stock No. 060-000-00067-1), Superintendent of Documents, Washington, D.C., 20402.

DEPARTMENT OF ENERGY MISSION AND OBJECTIVES

INTRODUCTION

The U.S. Department of Energy (DOE) is the Federal Agency that has the primary leadership role in creating energy choices for the future. A part of the DOE mission is to develop all alternative energy sources to make the nation self sufficient in meeting its energy needs by conducting research, development, and demonstration of new or improved energy technologies. This will permit introduction of these technologies into the marketplace by the private business sector.

DOE conducts programs in the following six major categories:

a. Energy Conservation and Solar Applications.
b. Resource Applications.
c. Energy Technology.
d. Environment.
e. Energy Research.
f. Defense Programs.

These programs contribute to attaining eight specific goals which shape the framework for a National Plan for Energy Research, Development and Demonstration. These goals have been stated in the publication "A National Plan for Energy Research,

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Guide to Solar Energy Programs

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Assistant Secretary for Energy Technology
Division of Solar Technology
Washington, DC 20545

Solar thermal power systems involve methods of collecting and concentrating the sun's energy to heat a working fluid, which in turn drives a power conversion device. The major activities in the Solar Thermal Power Systems Program are:

a. Dispersed Power Systems.
b. Central Power Systems.
c. Advanced Solar Thermal Technology.

Dispersed Power Applications. The Dispersed Power Applications activity is directed toward strategy and definition planning, establishment of a technology base, and engineering development of a variety of systems. Major activity areas are: (1) Total Energy Systems, (2) Irrigation Systems, and (3) Small Solar Electric Power Systems. Market studies, studies of institutional barriers, system reliability and maintainability studies, and systems economics studies are conducted within this activity.

The Total Energy Systems include those systems designed to utilize the heat normally dissipated in the generation of electricity for productive purposes. The primary thrust in this area relates to those systems which use heat engines or photovoltaic devices to produce electricity or mechanical work. Activities include applications analysis, component and subsystem technology development, experimentation, and demonstration.

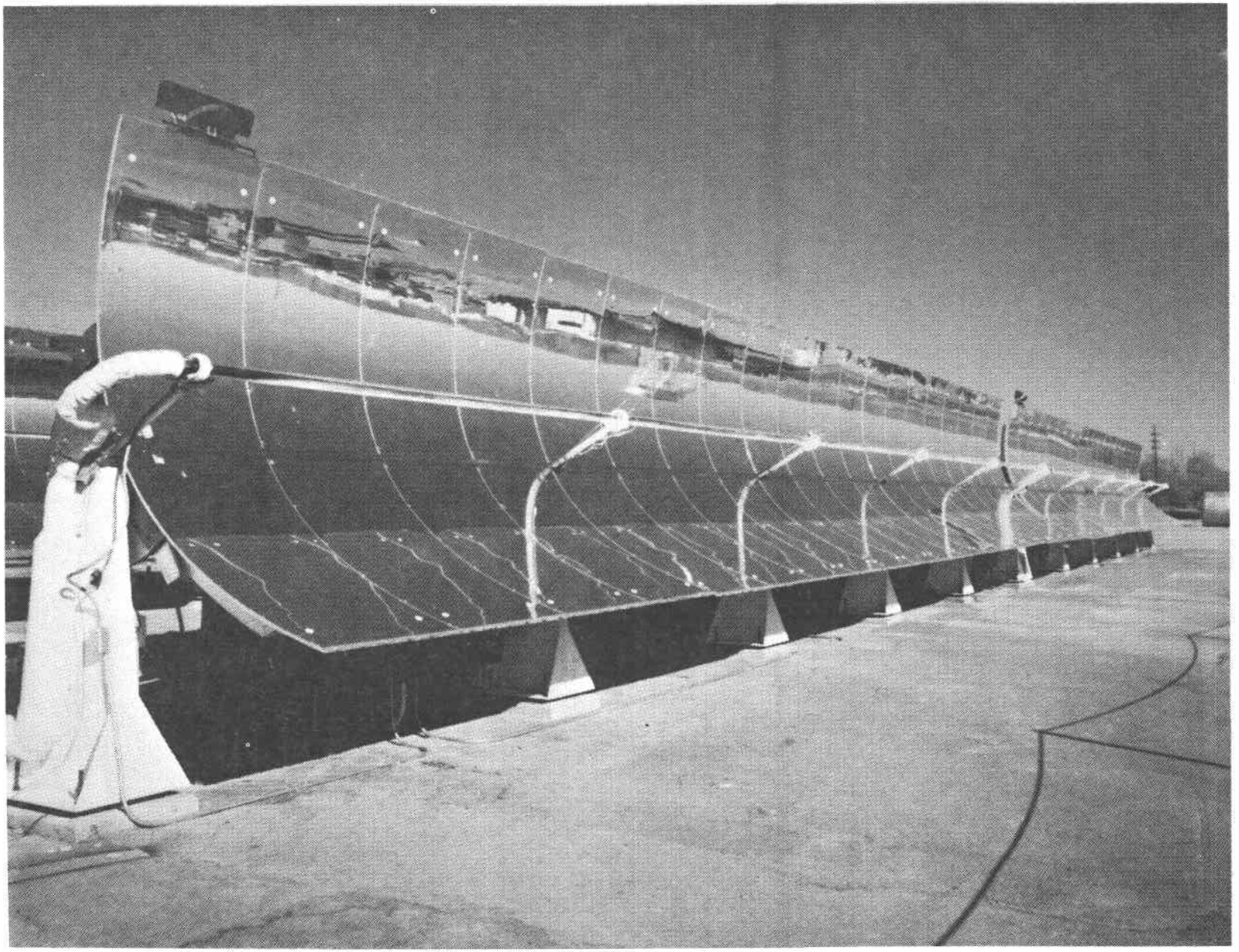

Figure 2. A Line Focusing Collector in Place at the Solar Thermal Test Facility (STTF), Sandia Laboratories, Albuquerque, New Mexico.

Activities in the area of Irrigation Systems focus on providing experimental systems for farm applications. The objective of these efforts is to provide understanding of any developmental problems within the context of an operating environment.

Activities within the Small Solar Power Systems area are directed toward identification and characterization of small community requirements, identification of the solar thermal technology that best meet those requirements, and acceleration of solar thermal systems commercialization.

Central Power Applications. This effort is directed toward the responsible execution of the Central Power Applications program element. Its thrust is directed toward: (1) advanced solar/storage systems; (2) repowering of existing fossil-fueled power plants; and (3) new solar/fossil hybrid systems.

This work in the area of advanced Solar/Storage Systems is directed toward identifying and demonstrating the technical and economic feasibility of a solar thermal central receiver plant that utilizes available steam conversion equipment under conventional operating conditions. Present efforts in this area include system definition, mission analysis, conceptual design of systems and components, and development of large central receiver solar pilot generating plants.

The repowering of existing fossil-fueled power plants is oriented toward studies of retrofitting existing plants for solar thermal power, conceptual design, and evaluation of designs for a representative power plant. An example of this concept includes the installation of solar collectors at an existing natural gas or oil-fired steam power plant of relatively small capacity.

The new solar/fossil hybrid systems consider the applications of solar thermal power technologies to augment the use of fossil fuels in the generation of electricity. Evaluation and development efforts for these applications are a near-term concern.

Advanced Solar Thermal Technology. The Advanced Solar Thermal Technology activity is responsible for that work necessary to identify new, potentially more economically attractive systems to meet the needs of the Central and Dispersed Power efforts. In addition, the Advanced Solar Thermal Technology effort conducts the generic research common to both applications programs. The major activities which this effort addresses are:

a. Supporting Technology.
b. Technology Feasibility Studies.
c. Advanced Subsystems and Components.
d. Technology Assessment and Direction.

Additional information regarding FY 1977 activities of the Solar Thermal Power Systems Program are contained in the publication "Solar Thermal Power Systems Program Summary," DOE/ET-0018/1 (January 1978). This document is available at nominal cost from the DOE Technical Information Center.

PHOTOVOLTAIC SYSTEMS PROGRAM

The Photovoltaic Systems Program is oriented toward expanding the commercial use of photovoltaic systems as rapidly as possible through a program of research, process development in support of the manufacturing industry, testing, and applications. Various competing photovoltaic options are being pursued, including flat-plate single crystal silicon arrays, concentrating arrays, and advanced material/thin-film arrays. These technological pursuits are conducted in two areas:

a. Research and Advanced Development, and
b. Silicon Technology.

The activities of the Research and Advanced Development effort include: (1) Advanced Materials and Cell Research, (2) Innovative Concepts, (3) Emerging Materials, and (4) Fundamental Support. The materials of principal interest are cadmium sulfide, gallium arsenide, and silicon thin-film polycrystalline amorphous materials. Materials not sufficiently developed, having unknown potential, are also of interest. Fundamental technical support is provided to problem areas common to all areas.

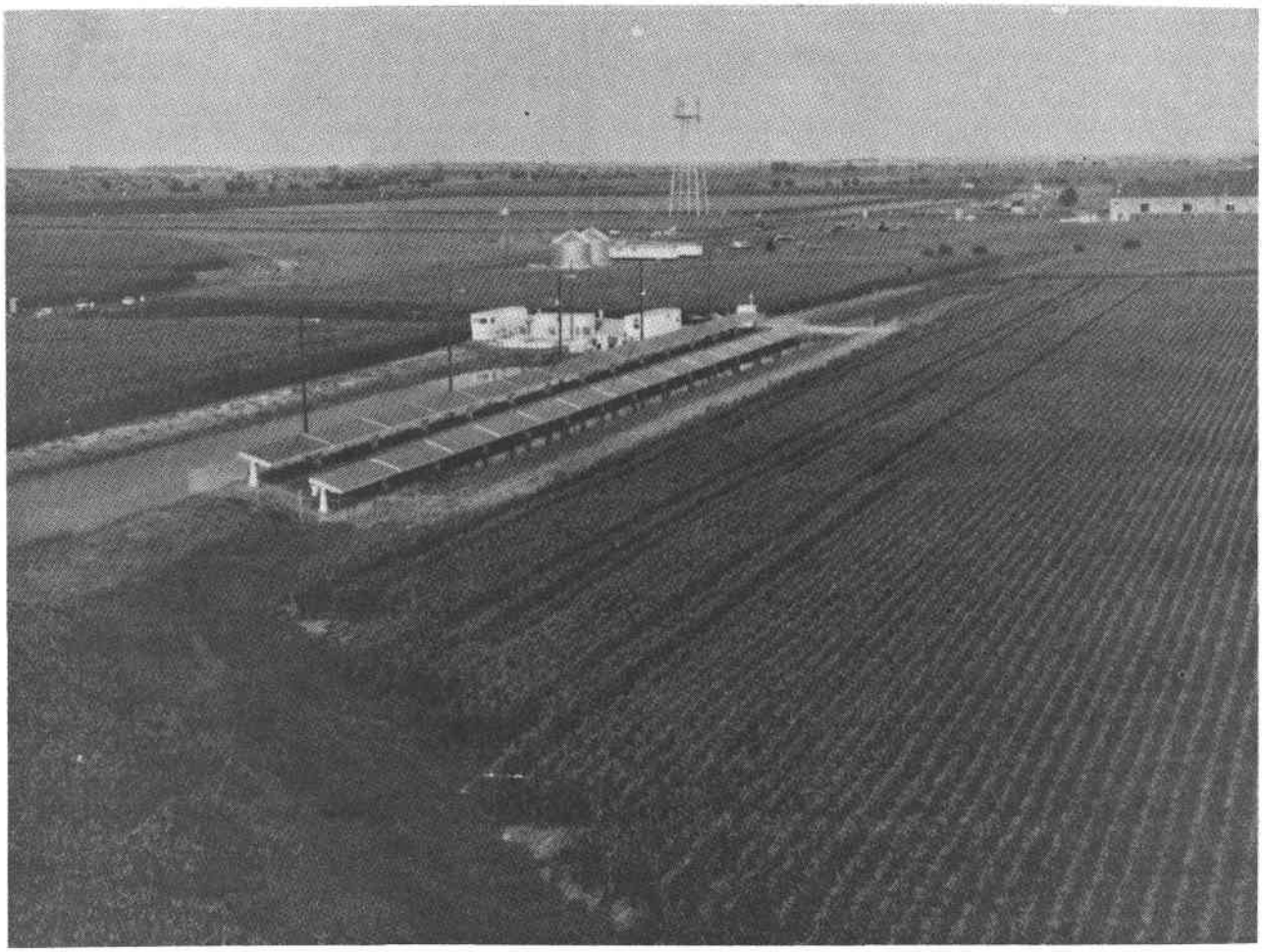

Figure 3. Photovoltaic Powered Irrigation System, Meade, Nebraska

The Silicon Technology effort exploits experience gained in the space program through silicon solar cell technology, the most mature of the photovoltaic technology options. This effort pursues the low-cost silicon solar array activities. The major thrust is directed toward: (1) developing processes for producing low-cost solar cell material, (2) developing silicon sheet suitable to solar cells, (3) developing an encapsulation method to provide 20-year protection of cells from the environment, and (4) developing low cost, high volume automated processes for conversion of silicon sheet to solar cell arrays.

Details of the Photovoltaics Program for FY 1977 are included in the publication, "Photovoltaics Program Summary," DOE/ET-0019/1 (January 1978). This document is available at nominal cost from the DOE Technical Information Center.

FUELS FROM BIOMASS PROGRAM

The overall objective of the Fuels from Biomass Program is to develop capabilities for converting renewable biomass resources into clean fuels, petrochemical substitutes, and other energy-intensive products that can supplement products made from conventional fossil fuels. These activities offer the potential for reducing dependence upon fossil fuels. The activities of this program are directed toward the production of biomass and the conversion of biomass into useful energy forms.

Figure 4. The Fuels from Biomass Program Provides for Improved Plant Growth Techniques

Production of Biomass. This program element includes growth of terrestrial and aquatic crops in energy farms. Intensive agriculture (closer crop spacing), fresh-water and marine biomass, uses for crop and animal residues, and silviculture (growth of woody plants) are presently under investigation and development.

Conversion of Biomass. The program element includes the exploitation of the many processes that can be applied to the conversion of biomass for the production of energy or chemicals. Processes of interest are anaerobic digestion, biomass fermentation, biophotolysis (hydrogen production from water), gasification and liquefaction of biomass, direct combustion processes, and photochemical conversion.

Complete descriptions of current projects conducted by this program are contained in the "Fuels From Biomass Program Summary," DOE/ET-0022/1 (January 1978). This document may be obtained from the U.S. Government Printing Office. Document number 061-000-00063-1. Price: $2.75.

OCEAN THERMAL SYSTEMS PROGRAM

The Ocean Thermal Systems Program functions to exploit applications of technology for the production of electrical energy. Areas of primary interest are: (1) Definition and Systems Planning, (2) Engineering Development, and (3) Advanced Research and Technology.

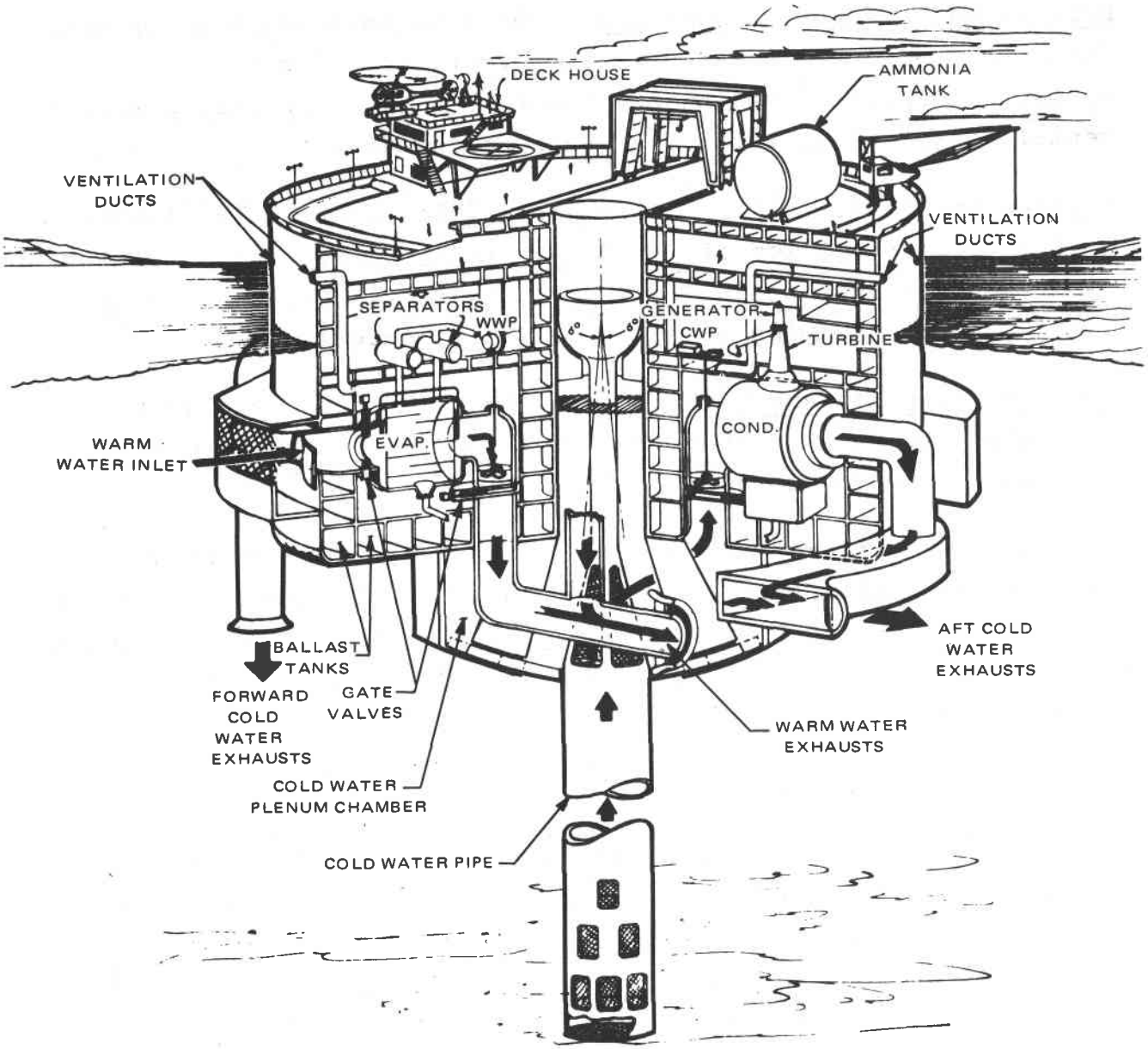

Figure 5. Artist's Conception of an Ocean Thermal Energy Conversion Plant

Definition and Systems Planning. These activities focus on systems studies, development of test programs, mission analysis, energy utilization, marine environment, siting studies, environmental impacts, and legal/institutional studies.

Engineering Development. These activities address the development and demonstration of systems, subsystems, and components for ocean applications. Power plant heat exchangers and ocean platforms are examples of activities of interest.

Advanced Research and Technology. The Advanced Research and Technology focuses on heat transfer physics, biofouling of systems and corrosion studies.

Detailed information on the Ocean Thermal Energy Conversion Program is contained in the "Ocean Thermal Energy Conversion Program Summary," DOE/ET-0021/1 (January 1978). This document is available at nominal cost from the DOE Technical Information Center.

WIND ENERGY SYSTEMS PROGRAM

The Wind Energy Systems Program is designed to foster early implementation of wind power systems for the production of energy. Research and development, performance of field testing, and the development of industrial capabilities are activities that are conducted within this program.

Areas of principal interest within the Wind Energy Program fall into five categories: (1) Program Development and Technology, (2) Small Wind Systems, (3) 100 KW Scale Systems, (4) Large Wind Systems, and (5) Large, Multi-Unit Systems.

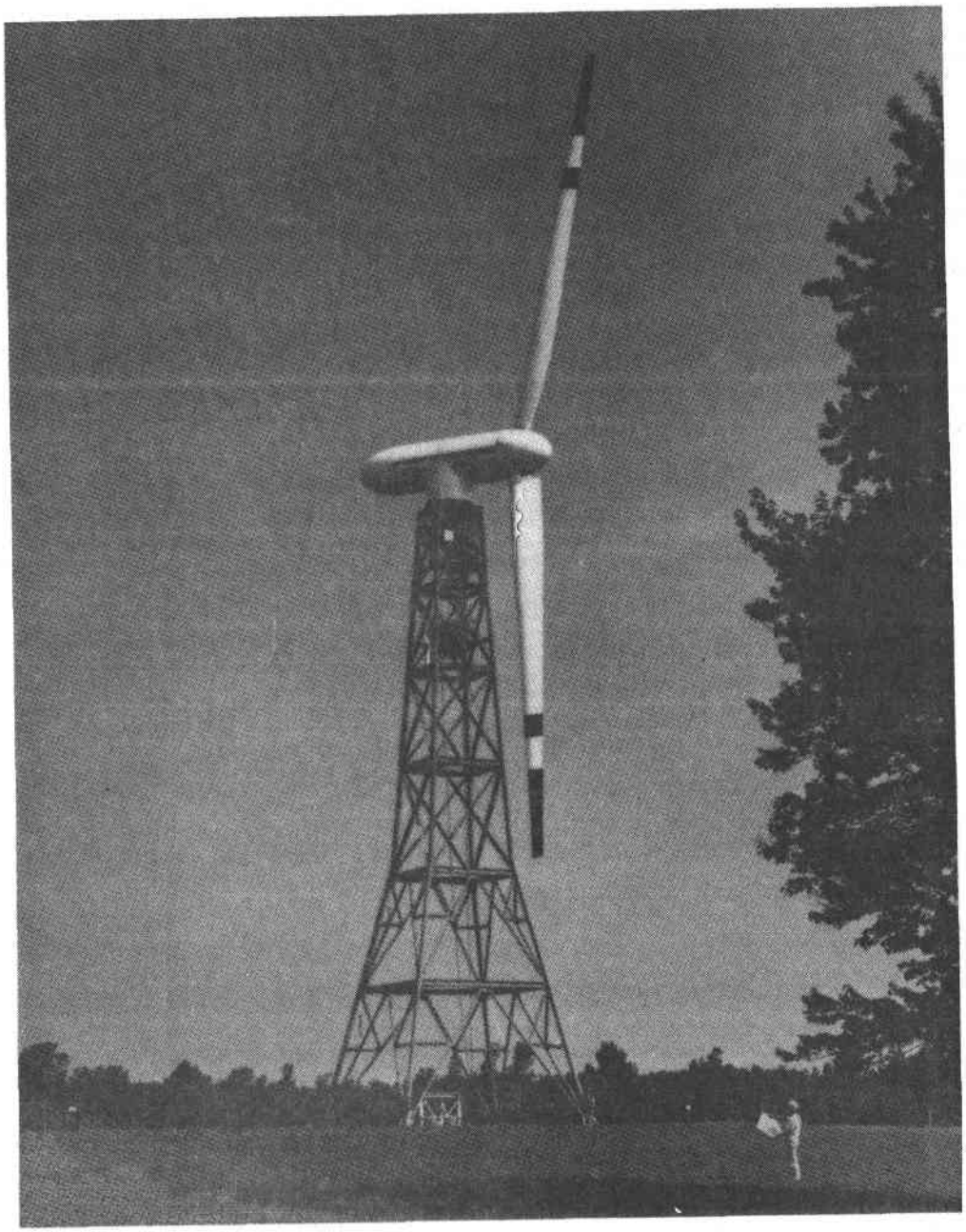

Figure 6. The MOD-0 100 KW Prototype Wind System at NASA's Plum Brook Station Near Sandusky, Ohio

Program Development and Technology. This activity focuses on the assessment of wind energy potential, analyses of regional applications, assessment of socioeconomic and environmental impacts, wind characteristics, and technology development.

Small Wind Systems. These activities address the application of wind energy technology in isolated areas, with emphasis on identifying system needs and development of advanced systems.

Large Wind Systems. These systems cover broader spectra of wind applications for serving larger energy needs, operating requirements and improvements in the cost of energy production.

Detailed current information relating to the entire Federal Wind Energy Program is contained in the "Federal Wind Energy Program Summary," DOE/ET-0023/1 (January 1978). This document may be obtained from the U.S. Government Printing Office. Document number 061-000-00050-0. Price: $2.40.

ENVIRONMENTAL AND RESOURCE ASSESSMENT PROGRAM

The Environmental and Resource Assessment Program directs its activities toward the program elements of: (1) environmental assessment of energy technologies as required by the National Environmental Policy Act of 1969, (2) technology assessments, and (3) material assessments.

Environmental assessments are performed for each solar technology area (heating and cooling of buildings, agricultural and industrial process heat, photovoltaics, thermal power systems, wind conversion systems, ocean systems, and fuels from biomass).

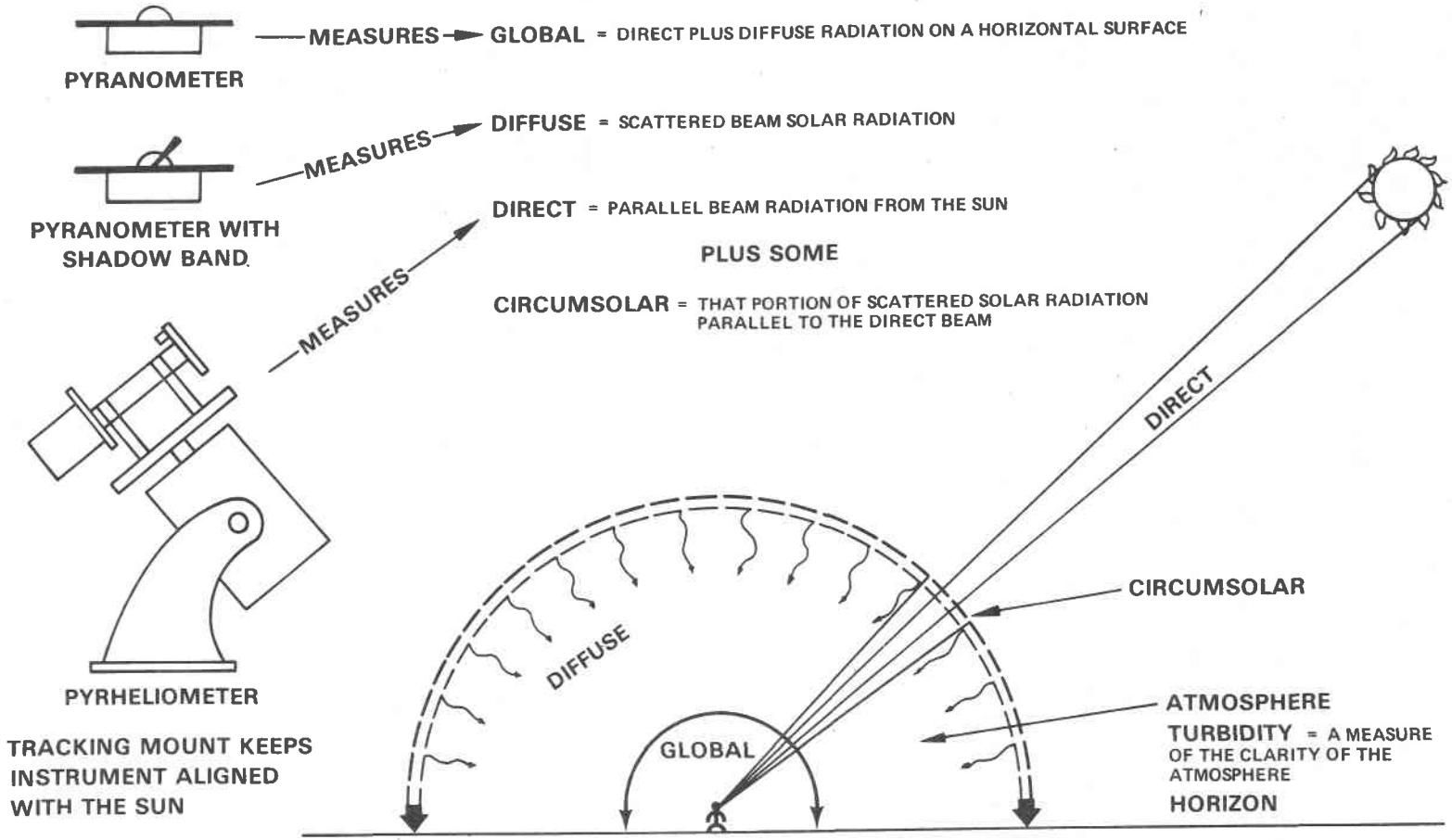

Figure 7. The Environmental and Resource Assessment Program has established a nationwide network to measure insolation. This sketch shows types of insolation and measuring instruments

Technology assessments are performed to identify unintended effects on society and embrace social, legal, industrial, and institutional consequences of introducing solar technologies.

Material assessments involve the collection, analysis, and dissemination of meteorological and resources data required for the successful development and application of solar technologies.

These assessments each have the objective of mitigating social, environmental and safety related problems that may arise from widespread use of advanced solar energy technologies.

Detailed information on these activities is contained in the publication "Environmental and Resource Assessment Program Summary," DOE/ET-0020/1 (March 1978). This document may be obtained at nominal cost from the DOE Technical Information Center.

SATELLITE POWER SYSTEM PROGRAM

The Satellite Power System (SPS) Program is aimed at developing an initial understanding of the technical feasibility, economic practicability, and the social and environmental acceptability of the SPS concept.

The SPS concept involves a large collector, several square miles in area, covered with photovoltaic solar cells. This collector will continuously convert solar energy into microwave power for transmission to earth. Earth receiving stations will convert the microwave power into electricity and feed it into a utility grid.

Areas of interest in the SPS Program include: systems definition, evaluation of environmental, health and safety factors; studies of socioeconomic issues; and comparative assessment of alternative energy systems.

Detailed information on the SPS Program is contained in the publication "Satellite Power System Program Summary," DOE/ET-0032/1, (March, 1978). This document may be obtained from the U.S. Government Printing Office. Document number 061-000-00073-9. Price: $1.40.

MAJOR PROJECTS

The Major Projects effort provides support for the development of major test facilities associated with the Solar Thermal Power Program, the Ocean Thermal Systems Program, and the Wind Energy Systems Program.

Test facilities currently in the design or construction phase include the Solar Thermal Test Facility (STTF) and the 10 MWe Pilot Plant (both associated with the Solar Thermal Power Program). Existing test facilities include:

a. The photovoltaic test facility at NASA Lewis Research Center;

b. The wind systems test facility at NASA's Plum Brook Station;

c. The Darrieus wind system test facility at Sandia Laboratories;

d. The 400 KWth solar thermal test facility at Georgia Institute of Technology; and

e. The solar thermal test facility at Sandia Laboratories.

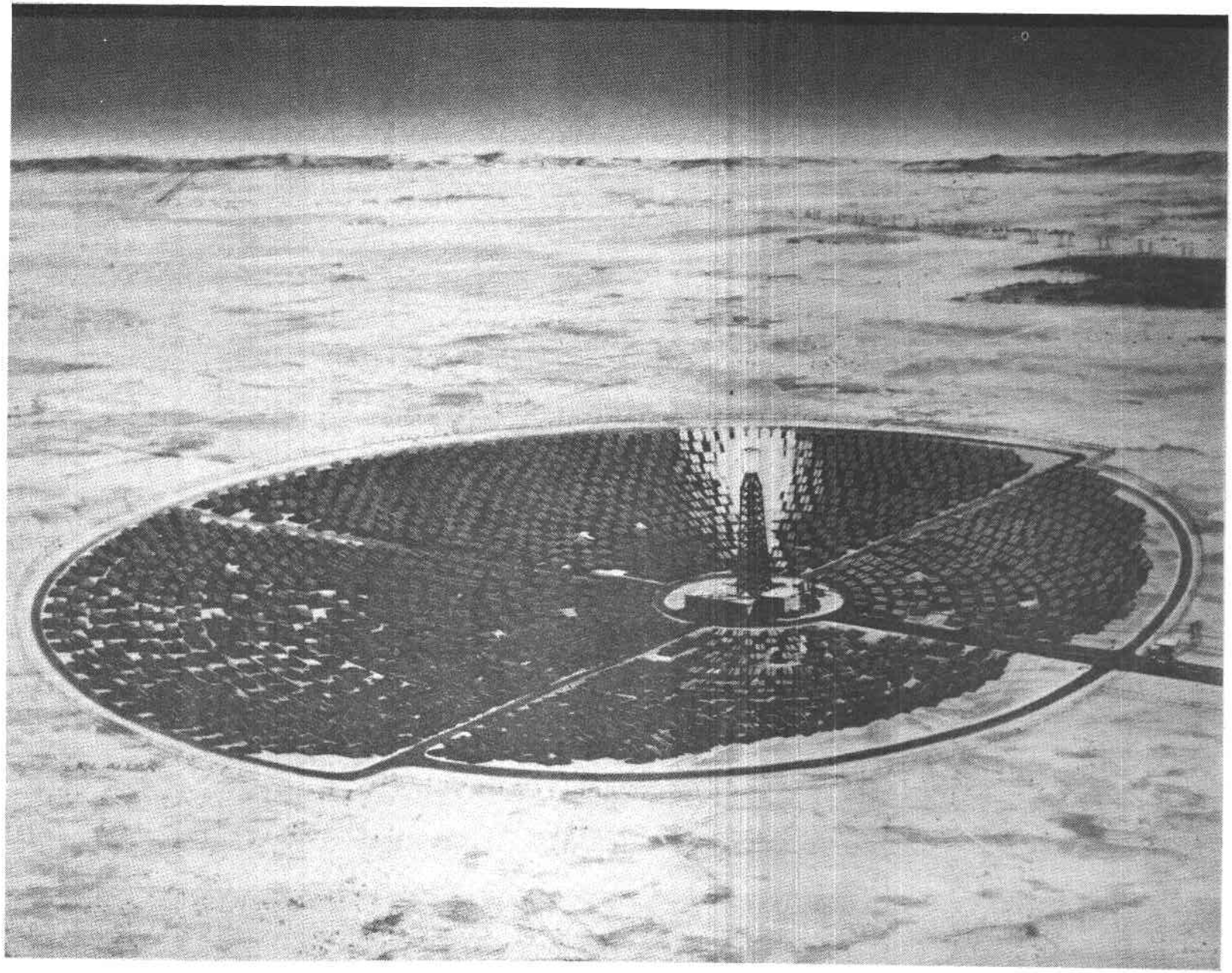

Figure 8. Artist's Conception of a 10 Megawatt Solar Power Plant

Complete information relating to these test facilities is contained in the publications: "Solar Thermal Power Program Summary," DOE/ET-0018/1 (January 1978); "Ocean Thermal Energy Conversion Program Summary," DOE/ET-0021/1 (January 1978); and "Federal Wind Energy Program Summary," DOE/ET-0023/1 (January 1978).

SOLAR PROGRAMS NOW FUNCTIONING UNDER THE DIVISION OF CONSERVATION AND SOLAR APPLICATIONS

PROGRAM STRUCTURE

The solar energy programs now functioning within the Division of Conservation and Solar Applications (SOLAR/CS) include:

a. The Solar Technology Transfer Program.
b. The Thermal Applications Program.

These programs were part of ERDA's Division of Solar Energy (SOLAR) prior to October 1, 1977.

SOLAR TECHNOLOGY TRANSFER PROGRAM

The Solar Technology Transfer Program (STTP) is the focal point within the DOE which provides the mechanism for transferring technological developments to the industrial and consumer sectors. This program provides channels of communication and personalized contact with potential users of emerging solar energy technology. The principal mechanisms of the technology transfer process are: (1) dissemination of user-oriented information, (2) generating broad public awareness of the Solar Heating and Cooling Demonstration Program, (3) identifying target opportunities for technologies having an early impact upon industry, (4) development of educational programs, (5) development of a consumer representation plan, and (6) coordination of technology transfer activities at international, federal, state, and local government levels.

Complete information regarding activities of the Technology Transfer Program are contained in the publication "Technology Transfer Program Summary," DOE/ET-0027/1 (January 1978). This document is available at nominal cost from the DOE Technical Information Center.

THERMAL APPLICATIONS PROGRAM

The Thermal Applications Program includes the following program elements which are briefly described as follows:

a. Solar Heating and Cooling of Buildings.
b. Barriers and Incentives.
c. Agricultural and Industrial Process Heat Applications.
d. Solar Heating and Cooling Research and Development.
e. Demonstration.

Solar Heating and Cooling of Buildings. This program element focuses on residential and commercial research, development and demonstration of solar heating and cooling systems. Residential demonstrations in the private sector are managed through the cooperation of the Department of Housing and Urban Development (HUD). Residential demonstration projects that are supported are selected from responses to HUD's Request for Grant Applications (refer to Program Branch Activities).

Residential demonstrations in the Federal sector are managed by the Department of Defense (DOD). Typically, projects are selected by DOD at various military installations throughout the United States.

Commercial demonstrations supported in the private sector are selected primarily from responses to Program Opportunity Notices issued by DOE. In the Federal sector, commercial-type demonstration projects are managed by agencies such as the Department of Defense, General Services Administration, and the United States Postal Service.

Agricultural and Industrial Process Heat. These applications focus on development and demonstration of solar energy technology for grain and crop drying, heating of animal shelters and other farm applications, as well as use of solar technology for industrial process heat.

Barriers and Incentives. This element directs its efforts toward addressing the existence of significant barriers to the widespread commercialization of solar energy and the incentives necessary to overcome them.

Barriers include any factor, relationship, or characteristic that has the potential to retard or limit the introduction and widespread use of solar energy systems. Barriers may involve, for example, legal problems associated with access to the sun, regulations of competing fossil fuels, and a wide range of political, social, and economic questions. Incentives, on the other hand, include any action that may be taken to encourage or accelerate the commercialization of solar energy systems.

Research and Development. This program element assists in the creation of a viable solar energy industry by improving the cost effectiveness of solar energy systems. It provides for improved performance in components, manufacturing, techniques, reduced capital costs and reduced maintenance costs.

Demonstration. The demonstration program includes commercial and residential type buildings, sponsored by DOE alone or jointly with other Federal agencies, city and state governments and private organizations. Demonstration projects provide operational and performance data to improve the general knowledge of solar energy systems and to provide definitive data for performance and design criteria and economic assessment.

SOLICITED PROPOSALS

Funds for various solar energy projects are frequently available on a competitive basis through formal, written solicitations issued by DOE, or in some cases other Federal agencies through whom DOE implements parts of the Solar Program. In response to such invitations, prospective contractors can submit proposals for specific efforts or objectives by specified due dates. Offerors who can satisfy DOE's requirements compete independently for an award by submitting priced offers responsive to the objective or effort cited in the solicitation. The following paragraphs describe various methods used in competitive funding.

All solar procurement invitations are publicized in advance in the Commerce Business Daily (CBD). The CBD is published daily by the U.S. Department of Commerce. Subscriptions may be obtained from the Superintendent of Documents, Government Printing Office, Washington D.C. 20402, at a cost of $80.00 per year. Telephone: (202) 783-3228. Payment must accompany the order for the CBD. The CBD is also available through many libraries.

Many professional, technical and trade publications frequently publish solar competitive invitation announcements.

The Division of Solar Technology uses the following solicitation instruments:

a. Request For Proposal. A Request For Proposal (RFP) is the formal solicitation of proposals to contract for a specific scope of work as defined in the RFP, terms and conditions, and proposal preparation instructions. The RFP mechanism is the solicitation method used most often by all programs when specific tasks are involved.

Each RFP contains a scope of work which describes the objective(s) of the required SOLAR/ET work. In addition, RFP's will explicitly state the specific evaluation criteria against which proposals will be reviewed.

RFP's are nearly always competitive. Proposers compete with one another for the same scope of work. RFP's have a specified closing date by which all proposals must be received.

RFP's are issued periodically throughout the fiscal year, with responses required within the limits established within the RFP. Information relating to receipt of specific RFP's may be obtained from Commerce Business Daily.

b. Program Opportunity Notice. The Program Opportunity Notice (PON) permits DOE to solicit proposals in those instances where the demonstration of a technology is desired. The objective is the solicitation of proposals from organizations and individuals for specific types of projects

which demonstrate technical feasibility, environmental acceptability, and economic potential of energy technologies on a prototype or full-scale basis.

The PON solicitation mechanism is usually associated with demonstration projects performed as part of the solar energy program.

The PON mechanism is used to solicit responses from builders, developers, State and local governments, corporations, educational institutions, and others proposing integrated solar energy demonstration projects. Integrated projects are those that include a proposed or existing building, land, financing, necessary approvals, and a technically acceptable solar energy system.

Each PON addresses the type of solar energy system of interest, the types of organizations or individuals eligible to participate, the desired level of capability of potential participants and the technical requirements of the system of interest to DOE.

Each PON contains detailed instructions for the preparation of proposals in order to facilitate orderly and expedient review and appraisal. Generally, the initial response to a PON should contain only a project summary, a technical proposal, and a business proposal. The project summary is to serve as a quick reference to the details contained in the technical and business proposals. The technical proposal will contain the offeror's approach, anticipated performance, system description, test plans, and schedule of activities. The business proposals will indicate team or subcontract arrangements, prior experience, key personnel, and proposed management controls.

PON's are issued periodically throughout the year, with responses required by a specific date as indicated within each PON. Specific instructions relating to future PON's, as well as information regarding past PON's, may be obtained from the Department of Energy, Division of Procurement, Washington, D.C. 20545.

c. Requests For Grant Applications. Requests for Grant Applications (RFGA) are the solicitation of grant application proposals for the residential portion of the National Solar Heating and Cooling Demonstration Program through the Department of Housing and Urban Development (HUD), in cooperation with SOLAR/ET and SOLAR/CS. The RFGA solicits grant application proposals from builders, developers, and solar system manufacturers who propose an integrated demonstration project employing either a combined active solar energy system and building design, or a passive system utilizing the building structure as an integral part of the energy package.

Project applications are solicited in 9-month cycles and are usually announced through solar and construction publications and through HUD's extensive solar mailing list. Application packages responding to a specific RFGA must generally contain information on the technical aspects of the solar energy system proposed, information on the state of project development, and a discussion as to why the specific project proposed should be funded as part of the demonstration program. Details are included in each RFGA.

To be placed on the mailing list for the RFGA, contact HUD's National Solar Heating and Cooling Information Center in Rockville, MD. The toll free telephone number from anywhere in the U.S., except Pennsylvania, is (800) 523-2929. From Pennsylvania, the number is (800) 462-4983.

The RFGA mechanism for solicitation is usually associated with residential buildings demonstrations projects performed as part of the Thermal Applications Solar Heating and Cooling Program.

d. Program Research and Development Announcement. The Program Research and Development Announcement (PRDA) permits DOE program offices to solicit proposals in those instances where a specific need or solution is not sufficiently definable to permit a traditional focused, competitive procurement. The primary objective is to solicit the submission of ideas from individuals and private and public entities that will serve as a basis for research and development activities in the energy field. The PRDA is not used to conduct demonstration programs.

The PRDA mechanism is used for projects involving broad technological areas and where several different and widely varying methods may be applied to address a particular technical problem. Usually, the nature of the projects covered by a PRDA cannot be described in the detail of a statement of work contained in a typical RFP. It is anticipated that proposals received in response to a PRDA will feature many unique qualifications, creative solutions, and specialized capabilities. This allows choices to be made between worthy but dissimilar concepts and approaches.

Each PRDA addresses unique problems within the context of DOE's specific field of interest. Goals, or performance targets, are usually specified, and it is expected that funding of a project under a PRDA will achieve the goals.

All responses to PRDA's are evaluated and selected for support in accordance with criteria published in the PRDA.

PRDA's are issued periodically during the fiscal year, with responses required generally within a specified period. Information relating to future PRDA's may be obtained from the DOE Division of Procurement, Washington, D.C. 20545.

The PRDA solicitation mechanism is used for a variety of the Solar Technology Program research and development activities, including the Solar Thermal Power Systems Program, the Photovoltaics Program, and the Fuels from Biomass Program. It is also used for Component and Subsystem Research and Development conducted under the Thermal Applications Solar Heating and Cooling Program.

Table 1 summarizes the uses of the various DOE solicitation mechanisms which have been previously described.

Table 1. Uses of Various DOE Solicitation Mechanisms

	DOE Solicitation Mechanisms			
	RFP	PON	RFGA	PRDA
Specific Tasks	X			
Integrated Demonstration Projects		X		
Residential Demonstration Projects			X	
Research and Development Tasks				X

UNSOLICITED PROPOSALS

An unsolicited proposal is a written offer to perform work submitted by an organization or individual, on its own initiative, and not in response to a specific request made by DOE to that proposer. Such proposals are evaluated in terms of technical merit, applicability to the DOE plan, funding availability, and whether acceptance of the proposal can be justified. When an unsolicited proposal receives favorable evaluation and the substance of the proposal is not available to DOE without restriction from another source, then the procurement may proceed. Procurement regulations prohibit consideration of any unsolicited proposals when the proposal substantially includes work covered by any of the solicitation mechanisms.

UNSOLICITED PROPOSALS - GENERAL

Solar's policy is to foster and encourage the submission of unsolicited proposals. The unsolicited proposal is recognized as a valuable means by which unique or innovative methods or approaches can be made available to SOLAR/ET in the fulfillment of its mission.

Unsolicited proposals should not merely be advance proposals to satisfy a specific requirement which would normally be procured by competitive methods. DOE conducts frequent solicitations throughout each fiscal year. In accordance with DOE Procurement Regulations, unsolicited proposals which fall into an area covered by a planned or existing DOE solicitation may not be considered.

Individuals or organizations who are interested in submitting an unsolicited proposal are encouraged to make preliminary inquiries of SOLAR/ET program managers prior to expending extensive effort in preparing a detailed unsolicited proposal. Prior contact with SOLAR/ET program managers and other personnel is permissible and encouraged, particularly with respect to developing an understanding of SOLAR/ET's needs and mission.

It is important to note, however, that unsolicited proposals dealing with the substance of any solicitation initiated by DOE may not be considered and may be rejected. This prohibition applies to all solicitation mechanisms used by SOLAR/ET (PON's, PRDA's, RFGA's and RFP's).

UNSOLICITED PROPOSALS BY INDIVIDUALS AND ORGANIZATIONS

A proposal submitted on an individual's own initiative may be accepted by SOLAR/ET as a basis for negotiation of an appropriate contract to explore an idea or carry out research development and demonstrations if the idea proposed does not unnecessarily duplicate work already under way or contemplated by SOLAR/ET, or is not already known to SOLAR/ET.

Prior contact with, or a preliminary proposal to, SOLAR/ET is permissible and encouraged in order to provide for the conveying to prospective proposers an understanding of SOLAR/ET's objectives relative to the type of effort contemplated. Indeed, such prior contact or a preliminary proposal is often perferred prior to the submittal of a formal proposal. Potential proposers should also obtain a copy of the publication "Guide for the Submission of Research and Development Proposals by Individuals and Organizations other than Educational Institutions," from:

Director of Procurement
U.S. Department of Energy
Washington, D.C. 20545

Unsolicited proposals may generally be submitted at any time to:

Unsolicited Proposal Management
Division of Procurement
U.S. Department of Energy
Washington, D.C. 20545.

UNSOLICITED RESEARCH PROPOSALS FROM EDUCATIONAL INSTITUTIONS

The Department of Energy makes arrangements for contracts and grants for research in fields related to energy with institutions of higher education, and certain other non-profit institutions that conduct educational and training activities, or whose facilities are used in joint programs with universities.

In selecting projects for support, DOE places emphasis upon the scientific merit of the proposal, background, and experience of the principal investigator, and the facilities of the institutions submitting the proposal for the performance of the proposed research.

DOE, by statute, is permitted to participate in programs or research that are energy related or which contribute to knowledge in this field. DOE, therefore, is primarily interested in imaginative, innovative, and explorative research or investigations that are related to the DOE mission. Decisions to approve acceptable proposals depend upon the availability of funds and the relative importance of projects to other proposed research. DOE customarily receives many more proposals for excellent research than it is able to fund.

A proposal for DOE assistance usually is initiated by the scientist interested in doing the work and is submitted through an appropriate administrative official of the institution. Occasionally, a request may be made to investigators to undertake research of particular interest to DOE.

Unsolicited proposals from educational institutions may be generally submitted at any time to:

Unsolicited Proposal Management
Division of Procurement
U.S. Department of Energy
Washington, D.C. 20545.

Prior to preparation and submission of a formal proposal, the interested scientist is urged to discuss the proposed project informally, by letter, telephone, or personal visit, with the SOLAR/ET Headquarters Program Division that has the greatest interest in the work. Such preliminary contact can serve to establish better understanding between the scientist and the DOE staff scientist and tends to reduce paperwork and loss of time. Assistance in contacting the appropriate division may be obtained from the Division of Institutional Programs.

It is also recommended that proposers obtain a copy of the DOE publication "Guide for the Submission of Research Proposals from Educational Institutions," from the Division of Institutional Programs.

UNSOLICITED PROPOSALS FOR SPECIAL PROJECTS IN ENERGY EDUCATION AND TRAINING

The Division of Institutional Programs accepts education and training proposals for special projects that represent innovative and unusual ideas in support of the nation's energy programs but which do not fall within the guidelines of any existing program. This office welcomes unsolicited proposals for assessing or studying a problem, or testing the proposed solutions to an energy-related problem.

The majority of proposals submitted for consideration as a "Special Project" will be submitted by a college or university on behalf of its staff member(s). Proposals may also be submitted by non-profit organizations such as professional, scientific, and educational associations or societies.

Since proposals of this type will generally vary greatly, there are no absolute guidelines for the format of the proposal. However, the proposal writer should look carefully at the criteria for the evaluation of proposals. Proposals which are submitted under the heading of "Special Projects" must involve subject areas of interest and concern to DOE and must be related to education and training.

The submission of a preliminary proposal is strongly encouraged prior to the preparation of a formal proposal. Through this procedure, the staff will be able to advise the proposer

whether the project suggested is of high or low priority for funding and may be able to provide some assistance that will facilitate the preparation of the formal proposal. Questions regarding proposals should be directed to:

Division of Institutional Programs
Room 309
400 First Street, N.W.
U.S. Department of Energy
Washington, D.C. 20545

Proposers may also obtain a copy of the "Guide for Preparation of Proposals for Special Projects in Energy Education and Training," from the Division of Institutional Programs.

Proposals will be reviewed on a quarterly basis by qualified professional personnel from the educational and industrial communities as well as other Government agencies and/or DOE. These reviewers act in an advisory capacity in reviewing proposals and program recommendations. Proposals selected for support will be those which in the judgment of the reviewers and staff are the best able to offer high quality training in the areas under consideration.

UNSOLICITED PROPOSALS FOR ENERGY-RELATED INVENTIONS

The National Bureau of Standards (NBS) evaluates energy-related inventions. Proposals for energy-related inventions should be directed to:

National Bureau of Standards
Office of Energy Related Inventions
Washington, D.C. 20234

Additional information regarding this NBS service is provided in the following section of this document.

SOURCES OF SOLAR ENERGY INFORMATION
AND
ACTIVITIES SUPPORTING THE SOLAR ENERGY TECHNOLOGY PROGRAM

There are a wide variety of informational sources to which the consumer and industry may refer in order to obtain the latest information relating to a broad range of solar energy topics. The following sources and activities are highlighted:

a. The National Solar Heating and Cooling Information Center.
b. Department of Energy Technical Information Center.
c. Department of Commerce National Technical Information Service.
d. Solar Energy Research Institute.
e. National Bureau of Standards Energy Invention Evaluation Program.
f. SOLCOST Analytic Services.
g. Department of Energy Solar Energy R&D Report.
h. Department of Energy Weekly Solar Announcements.
i. International Solar Energy Society.
j. Solar Energy Industries Association.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT'S NATIONAL SOLAR HEATING AND COOLING INFORMATION CENTER

The Department of Housing and Urban Development's (HUD) National Heating and Cooling Information Center is a contractor-operated information source which provides a one-stop service facility for all information, domestic or foreign, technical and non-technical, on all aspects of solar heating and cooling. Services provided include general or detailed information, a speakers bureau, exhibits, and review of grant applications.

Information such as basic solar data; location of solar buildings available for public inspection; names of architects, engineers, builders, and manufacturers engaged in each aspect of solar energy technology; and comprehensive listings of books and periodicals can be obtained at the Center.

A speakers bureau referral service is maintained for community or business groups interested in learning about solar energy. Exhibits for trade shows, scientific or professional conferences, and fairs may also be scheduled.

The Center also serves as a referral point, providing the names of individuals or organizations that may provide specific services, information, or expertise.

Most inquiries can be answered immediately, or information may be forwarded within a few days. Inquiries may be directed to: National Solar Heating and Cooling Information Center, P.O. Box 1607, Rockville, Maryland 20850. Telephone toll free: (800) 523-2929, or in Pennsylvania, (800) 462-4983.

DEPARTMENT OF ENERGY'S TECHNICAL INFORMATION CENTER

The DOE's Technical Information Center (TIC) is the collection, processing, and distribution point for scientific and technical information generated by solar program activities. One of the primary objectives of TIC is to ensure that federally-sponsored research is reported promptly and distributed to interested parties.

TIC locates, acquires, and evaluates energy-related scientific and technical information nationally and internationally. It also maintains a publishing capability; provides technical reference services; offers document and film request services; and carries out an educational services program devoted to aiding the general public in developing an awareness and understanding of the potential applications of solar energy technology. Services available include: information acquisition and evaluation; bibliographic processing and information retrieval; computerized data bases; document management and control; publishing, including microfiche; educational services; film library program; computer support and services; abstracting; subject indexing; conference literature coordination; and translation of foreign literature.

Additional information concerning TIC's services may be obtained from: U.S. Department of Energy, Office of Public Affairs, Technical Information Center, Oak Ridge, Tennessee 37830. Collections of DOE and foreign reports are maintained at a variety of libraries throughout the United States. These libraries are indicated in Appendix A.

TIC's Energy Research Abstracts (ERA) provide abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses and monographs originated by DOE laboratories, energy centers, and contractors.

ERA is available to the public on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The subscription rates for twelve monthly issues including an annual index is $119.60 (domestic), and $148.75 (foreign).

ERA is also available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Federal, State, and municipal agencies concerned with energy development, conservation, and use may obtain ERA free of charge. Inquiries should be directed to the DOE Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830.

TIC also publishes Solar Energy Update (SEU), which provides abstracting and indexing coverage of current scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs for all sources on solar energy. SEU is available to the public on a subscription basis as NTISUB/C/145 from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual subscription rate for one volume (calendar) year (12 issues plus cumulative index) is $27.50 for domestic subscribers and $40.00 for subscribers outside the North American Continent. A single issue is $3.25 (domestic) and $6.50 (outside the North American Continent).

SOLAR ENERGY RESEARCH INSTITUTE

The Solar Energy Research Institute (SERI) was created by Congress through the Solar Energy Research Development, and De-

monstration Act of 1974. A contract for the operation and management of SERI was awarded to Midwest Research Institute (MRI) in April, 1977, with SERI headquartered in Golden, Colorado.

SERI is mission-oriented and dedicated to supporting the widespread utilization of solar energy technology. As an active research arm of MRI, and supporting DOE, the institute is charged with providing significant support to DOE's solar energy program. Among the institute's mandates, as stated by DOE, are developing and demonstrating, "at the earliest feasible time, those applications of solar energy that are commercially attractive and environmentally acceptable," and contributing "to the establishment of a solar energy industrial base that will foster the widespread use of solar technology, thus creating a major alternative source of energy for the nation." In addition, DOE will work with SERI to establish an expanded network of regionally-based centers to encourage greater use of solar energy.

SERI's immediate goal is establishing liaison with universities, industries, national laboratories, and other government agencies already engaged in extensive solar energy research. SERI analyzes and distributes technical information, conducts educational programs, provides technical assistance, and supports international cooperative programs. Other functions include development of educational programs, promotion of solar energy expertise, providing consulting services to the public and Federal agencies, and technology transfer.

SERI responsibilities include performing research, development, and related activities for DOE. It will undertake programs specified by DOE and will have major responsibility for evaluating and recommending new programs to DOE. Technologies under investigation include:

a. Solar Heating and Cooling;
b. Photovoltaics;

c. Fuels from Biomass;
d. Wind Energy Systems;
e. Ocean Thermal Systems; and
f. Thermal Power Systems.

The SERI's research assignments will be determined by the problems encountered in developing solar energy technology. Its research division must eliminate uncertainty by overcoming technical and economic barriers to widespread utilization of solar energy. It must develop new approaches to using solar energy, assess environmental and institutional implications of widespread solar energy use, examine socioeconomic factors bearing on the technology, support development of a viable solar energy industry, and develop and transfer information to advance understanding and accelerate the timetable bringing solar energy technology to commercial importance.

Inquiries relating to SERI's activities may be directed to the Solar Energy Research Institute, 1536 Cole Boulevard, Golden, Colorado 80401, Telephone: (303) 234-7174.

NATIONAL TECHNICAL INFORMATION SERVICE

The National Technical Information Service (NTIS) of the Department of Commerce serves as a focal point for the sale and distribution of energy-related documents resulting from Federal activities other than those conducted by DOE. The energy-related work of foreign governments is also disseminated by NTIS. A weekly newsletter, "Weekly Government Abstracts: Energy" is published by NTIS citing new energy reports. The domestic subscription price for this service is $45.00 per year. Contact NTIS, 5285 Port Royal Road, Springfield, Virginia 22161. Telephone: (703) 557-4650.

NATIONAL BUREAU OF STANDARDS ENERGY-RELATED INVENTION EVALUATION PROGRAM

The Federal Nonnuclear Energy Research and Development Act of 1974 (PL 93-577) established a comprehensive national program for research and development of all potentially beneficial energy sources and utilization technologies. The National Bureau of Standards (NBS) assists in encouraging innovation in energy technology through its Energy Related Invention Evaluation Program. Individuals and small firms are invited to submit energy-related inventions for a thorough and objective review. This review may result in a recommendation that DOE consider supporting an inventor in the development of an invention.

There is no fee or obligation associated with the submittal of an invention for review. Individuals or organizations may obtain complete information concerning this program by contacting: National Bureau of Standards, Office of Energy Related Inventions, Washington, D.C. 20234. Anyone may submit an invention for review by NBS.

SOLCOST

SOLCOST is a research and development project sponsored by SOLAR/ET. It provides an analytic methodology for calculating solar system costs and performance for new and retrofitted constructions such as residential buildings and single-zone commercial buildings. SOLCOST enables users to compute optimum size and performance characteristics for solar heating, cooling, and service hot water systems. Cost comparisons are also provided between solar and conventional systems.

SOLCOST services are available to a wide variety of individuals and organizations, including: contractors, builders, engineers, architects, designers, manufacturers, equipment suppliers, educators, researchers, mortgage lenders, and bankers. A variety of user handbooks for heating, cooling, and hot water applications, as well as computer software for analytic and computational purposes, are available to the public. Complete information on available SOLCOST services is available from: International Business Services, Incorporated, Solar Group, 1010 Vermont Avenue, N.W., Washington, D.C. 20005. Telephone: (202) 628-1450. The publication "SOLCOST," DSE No. 2531/1 provides an introduction to simplified design methods for residential and commercial solar heating/cooling. It is available from DOE Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830.

SOLAR ENERGY RESEARCH AND DEVELOPMENT REPORT

The Division of Solar Technology publishes a monthly news report available to all at no cost. The report highlights current SOLAR activities, contract opportunities, availability of technical information, and milestone achievements. Subscriptions may be obtained by writing: Department of Energy, Division of Solar Technology (Attention: Solar Energy Information Request), Washington, D.C. 20545. To be placed on the mailing list, request Form ERDA-631SE.

DOE INFORMATION - WEEKLY ANNOUNCEMENTS

Those interested in following program developments within the DOE Division of Solar Technology are advised to have their names placed on the mailing list to receive the "Weekly Announcements," a collection of press releases issued each week. The "Weekly Announcements" covers such program developments as announcements of significant procurements, new program policies, etc.

Please call (301) 353-5474 to have a name placed on the mailing list for the "DOE Information - Weekly Announcements."

INTERNATIONAL SOLAR ENERGY SOCIETY

The American section of the International Solar Energy Society is a private organization that disseminates solar energy information and publishes the Journal of Solar Energy Science and Technology. Information may be obtained from the International Solar Energy Society, American Section, 12441 Parklawn Drive, Rockville, Maryland 20852.

SOLAR ENERGY INDUSTRIES ASSOCIATION

The Solar Energy Industries Association (SEIA) promotes the interests of organizations and individuals associated with the commercial advancement of solar energy. SEIA provides for exchange of ideas and advancement of the acts and sciences of solar energy systems. Information available from this association includes: commercial organizations engaged in solar energy systems installation and maintenance, solar energy suppliers, and professionals engaged in design services.

APPENDIX A. ENERGY RESEARCH ABSTRACT COLLECTIONS

The following libraries purchase and maintain microfiche collections of DOE and foreign reports that are abstracted in ERA. Most of these libraries have microfiche reader-printers or other photocopy facilities with which to reproduce enlarged copies from microfiche. Charges for reproduction services vary.

ALABAMA
- Auburn, Auburn University
- Tuskegee, Tuskegee Institute

ARIZONA
- Tucson, University of Arizona

CALIFORNIA
- Davis, University of California
- Los Angeles, University of California
- Santa Barbara, University of California

COLORADO
- Boulder, University of Colorado

DISTRICT OF COLUMBIA
- Washington, Library of Congress

FLORIDA
- Gainesville, University of Florida

GEORGIA
- Atlanta, Georgia Institute of Technology

HAWAII

Honolulu, University of Hawaii

IDAHO

Pocatello, Idaho State University

ILLINOIS

Urbana, University of Illinois

INDIANA

Lafayette, Purdue University

IOWA

Ames, Iowa State University

KANSAS

Manhattan, Kansas State University

KENTUCKY

Lexington, University of Kentucky

MARYLAND

Baltimore, John Hopkins University

College Park, University of Maryland

MASSACHUSETTS

Cambridge, Massachusetts Institute of Technology

Worcester, Worcester Polytechnic Institute

MICHIGAN

Ann Arbor, University of Michigan

MISSISSIPPI

State College, Mississippi State University

MISSOURI

Columbia, University of Missouri

Kansas City, Linda Hall Library

NEW JERSEY

Princeton, Princeton University

NEW MEXICO

Albuquerque, University of New Mexico

NEW YORK

Albany, New York State Library

Albany, State University at Albany

Ithaca, Cornell University

New York, Columbia University

Rochester, University of Rochester

Syracuse, Syracuse University

NORTH CAROLINA

Raleigh, North Carolina State University

OHIO

Cincinnati, University of Cincinnati

Cleveland, Cleveland Public Library

Toledo, University of Toledo

OKLAHOMA

Norman, University of Oklahoma

PENNSYLVANIA

Philadelphia, University of Pennsylvania

Pittsburgh, Carnegie Library

University Park, Pennsylvania State University

PUERTO RICO

San Juan, University of Puerto Rico

SOUTH CAROLINA

Columbia, University of South Carolina

TENNESSEE

Knoxville, University of Tennessee

TEXAS

Austin, University of Texas

College Station, Texas A & M University

Houston, Rice University

UTAH

Salt Lake City, University of Utah

VIRGINIA

Blacksburg, Virginia Polytechnic Institute

Charlottesville, University of Virginia

WASHINGTON

Pullman, Washington State University

Seattle, University of Washington

WEST VIRGINIA

Morgantown, West Virginia University

WISCONSIN

Madison, University of Wisconsin

DOE reports so indicated in "DOE Research Abstracts" are offered for sale by National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161.

APPENDIX B. DOCUMENTS AVAILABLE FROM DOE TECHNICAL INFORMATION CENTER AND U.S. GOVERNMENT PRINTING OFFICE

Energy Research and Development Administration, Solar Energy in America's Future (DSE No. 115/1) March 1977, Washington, D.C.

Energy Research and Development Administration, SOLCOST, a Simplified Design Method for Residential and Commercial Heating and Cooling, (DSE No. 2531/1) June 1977, Washington, D.C.

Energy Research and Development Administration, Definition Report - National Solar Energy Research, Development and Demonstration Program, (ERDA 49), June 1975, Washington, D.C.

Energy Research and Development Administration, Interim Report - National Program Plan for R&D in Solar Heating and Cooling (ERDA 76-144) November 1976, Washington, D.C.

Energy Research and Development Administration, An Economic Analysis of Solar Water and Space Heating (DSE 23-221) November 1976, Washington, D.C.

Energy Research and Development Administration, Solar Energy for Space Heating and Hot Water (SE 101), May 1976, Washington, D.C.

Energy Research and Development Administration, National Program for Solar Heating and Cooling of Buildings, (ERDA 76-6) Washington, D.C.

ERDA, Non-Technical Summary of Distributed Solar Power Collector Concepts (SE 102), Washington, D.C.

ERDA, Central Receiver Solar Thermal Power System, Phase 1, 10 MW Electric Pilot Plant (SE 103), Washington, D.C.

ERDA, Usable Electricity from the Sun, (SE 104), Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Solar Heating and Cooling of Buildings (ERDA 77-47/1) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Agricultural and Industrial Process Heat (ERDA 77-47/2) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Photovoltaics (ERDA 77-47/3) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Solar Thermal Electric (ERDA 77-47/4) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Solar Total Energy Systems (ERDA 77-47/5) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Wind Energy Conversion (ERDA 77-47/6) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Fuels from Biomass (ERDA 77-47/7) Washington, D.C.

ERDA, Solar Program Assessment; Environmental Factors - Ocean Thermal Energy Conversion (ERDA 77-47/8) Washington, D.C.

ERDA, Interim Policy Options for the Commercialization of Solar Energy (ERDA 77-62) Washington, D.C.

DOE, Summary Report - 1977 Solar Thermal Power Systems Program DOE-ET-0018/1) January 1978, Washington, D.C.

DOE, Summary Report - 1977 Photovoltaics Program (DOE/ET-0019/1) January 1978, Washington, D.C.

DOE, Summary Report - 1977 Fuels from Biomass Program (DOE/ET-0022/1) January 1978, Washington, D.C.

DOE, Summary Report - 1977 Federal Wind Energy Program (DOT/ET-0023/1) January 1978, Washington, D.C.

DOE, Summary Report - 1977 Ocean Thermal Energy Conversion Program (DOE/ET-0021/1) January 1978, Washington, D.C.

DOE, Summary Report - 1977 Environment and Resource Assessment Program (DOE/ET-0020/1) January 1978, Washington, D.C.

DOE, Summary Report - 1977 Technology Transfer Program (DOE/CS-0017/1) January 1978, Washington, D.C.

Solar Energy Research Institute, Proceedings of the Conference on Establishing The Solar Energy Regional Network, (Conf 77-0404), Kansas City, MO.

ERDA, ERDA Technical Information Center - Its Functions and Services (TID-4600) Oak Ridge, TN.

ERDA, The ERDA Facilities - A National Resource for Resolving Energy Problems (ERDA 77-80) August 1977, Washington, D.C.

ERDA, Consumer Representative Plan (ERDA 76/100) November 1976, Washington, D.C.

APPENDIX C. DOCUMENTS AVAILABLE FROM NATIONAL HEATING AND COOLING INFORMATION CENTER

DOE/Department of Housing and Urban Development, Residential Energy from the Sun, A Description of the Solar Heating and Cooling Demonstration Program, (HUDPDR No. 202) December 1976, Washington, D.C.

DOE/Department of Housing and Urban Development, State Solar Legislation, Rockville, MD.

DOE/HUD, "I've Got A Question About Using Solar Energy" (Pamphlet).

DOE/HUD, "Solar Energy" (Pamphlet).

DOE/HUD, "Solar Energy and Your Home" (Pamphlet).

DOE/HUD, "What's New Under the Sun" (Pamphlet).

DOE/HUD, "The Sun: Design Opportunity for Architects and Engineers" (Pamphlet).

APPENDIX D. READY GUIDE TO SOLAR INFORMATION SOURCES

U.S. Department of Energy (DOE):

Attn: Division of Solar Technology
Washington, D.C. 20545

Attn: Division of Conservation and Solar Application
Washington, D.C. 20545

DOE Technical Information Center:

P.O. Box 62
Oak Ridge, TN 37830
Telephone Orders: (615) 483-8611, Ext. 4352

DOE/HUD National Solar Heating and Cooling Information Center:

P.O. Box 1607
Rockville, MD 20850
Call Toll Free (800) 523-2929
In Pennsylvania, Call (800) 462-4983

Solar Energy Research Institute:

1536 Cole Boulevard
Golden, Colorado 80401
Telephone: (303) 234-7171

Mid-American Solar Energy Complex (MASEC):

1256 Trapp Road
Eagan, Minnesota 55121
Telephone: (612) 452-5300

Northeast Solar Energy Center:

70 Memorial Drive
Cambridge, Massachusetts 02142
Telephone: (617) 661-3500

National Bureau of Standards Energy Related Invention Evaluation Program:

NBS, Office of Energy Related Inventions
Washington, D.C. 20234

Energy Research and Development News Report Service:

Department of Energy
Division of Solar Technology
Attention: Solar Energy Information Request
Washington, D.C. 20545
(Request Form ERDA-631 SE)

DOE/SOLAR Information - Weekly Announcements:

Call (301) 353-5474 or (202) 376-4745 to be placed on mailing list.

SOLCOST Services:

International Business Services, Inc.
Solar Group
1010 Vermont Avenue, N.W.
Washington, D.C. 20005
Telephone: (202) 628-1450

U.S. Government Printing Office:

Superintendent of Documents
Washington, D.C. 20402
Telephone Orders: (202) 783-3238

National Technical Information Service:

5285 Port Royal Road
Springfield, VA
Telephone Orders: (703) 557-4650

International Solar Energy Society, American Section:

12441 Parklawn Drive
Rockville, MD 20852

Solar Energy Industries Association:

1001 Connecticut Avenue, N.W.
Suite 632
Washington, D.C. 20036
Telephone: (202) 293-1000

Southern Solar Energy Center Planning Project:

Exchange Place
Suite 1250
2300 Peachford Road
Atlanta, Georgia 30338
Telephone: (404) 457-4407

Library of Congress, Science and Technology Division:

10 First Street, S.E.
Washington, D.C. 20540
Telephone: (202) 426-5580

Technology Applications Center (TAC):

University of New Mexico
Albuquerque, New Mexico 87131
Telephone: (505) 277-3622

Ecotope Group:

747 16th Avenue East
Seattle, Washington 98112
Telephone: (206) 322-3753

Alternative Energy Resources Organization:

435 Stapleton Building
Billings, Montana 59101
Telephone: (406) 259-1958

Florida Solar Energy Center:

300 State Road 401
Cape Canaveral, Florida 32930
Telephone: (305) 783-0300

Solar Energy Applications Laboratory:

Fort Collins, Colorado 80523
Telephone: (303) 491-8618

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Alternative Sources of Energy, Inc.:

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Power Information Center:

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University City Science Center
Philadelphia, Pennsylvania 19104
Telephone: (215) 382-8683

Solar Energy Institute of America:

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Washington, D.C. 20001
Telephone: (202) 667-6611

Energy Information Services:

University of Delaware
1 Pike Creek Center
Wilmington, Delaware 19711
Telephone: (302) 994-0915 or 994-0916

State Energy Offices:

Addresses of state energy offices can be obtained by contacting state governments.

GLOSSARY OF TERMS

ABSORPTION COOLING - A type of air-conditioning system that can be run on the relatively low temperatures available from solar collectors.

ACTIVE SYSTEM - A solar heating or cooling system that requires external mechanical power to move the collected heat.

AUXILIARY HEAT - The extra heat provided by a conventional heating system for periods of cloudiness or intense cold when a solar heating system cannot provide enough.

BIOCONVERSION - Conversion by bacteria of agricultural or municipal wastes to fuel.

BRITISH THERMAL UNIT (Btu) - The quantity of heat needed to raise the temperature of one pound of water one degree Fahrenheit.

COLLECTOR - A device that collects solar radiation and converts it to heat.

DESIGN HEATING LOAD - The total heat loss from a house under the most severe winter conditions likely to occur; a concept used in the design of buildings and their heating systems.

EUTECTIC SALTS - Salts which melt at constant temperatures and store large amounts of heat in the process.

GRAVITY CONVECTION - The natural movement of heat that occurs when a warm fluid rises and a cool fluid sinks under the influence of gravity.

HEAT EXCHANGER - A device, such as a coiled copper tube immersed in a tank of water, that is used to transfer heat from one fluid to another through a separating wall.

HEAT PUMP - A mechanical device that transfers heat from one medium at lower temperature (called the heat source) to another medium at higher temperature (the heat sink), thereby cooling the first and warming the second.

HEAT STORAGE - A device or medium that absorbs collected solar heat and stores it for use during periods of inclement or cold weather. Solar systems could store heat in a tank containing water, rocks or Eutectic Salts.

INSULATION - A material with high resistance (R-value) to heat flow.

NOCTURNAL COOLING - The cooling of a building or heat storage device by the radiation of heat to the night sky.

PASSIVE SYSTEM - An assembly of natural and architectural components which converts solar energy into usable or storable thermal energy (heat) without mechanical power.

PHOTOVOLTAIC CELLS - Semi-conductor (solid-state) devices that convert solar energy directly into electricity without any moving parts.

RETROFITTING - The addition of a solar heating or cooling system to an existing building.

SOLAR RIGHTS - (Sun Rights or Solar Access) - A legal issue concerning the right of access to sunlight.

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