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Photovoltaics Program
Program Analysis and Integration Center

DOE/ET-20356-12
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Module Utilization Committee

Final Report

March 1984

Prepared for
U.S. Department of Energy
Through an Agreement with
National Aeronautics and Space Administration
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Jet Propulsion Laboratory
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Prepared by the Jet Propulsion Laboratory, California Institute of Technology, for the U.S. Department of Energy through an agreement with the National Aeronautics and Space Administration.

The JPL Flat-Plate Solar Array Project is sponsored by the U.S. Department of Energy and is part of the Photovoltaic Energy Systems Program to initiate a major effort toward the development of cost-competitive solar arrays.

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ABSTRACT

Photovoltaic collector modules were declared surplus to the needs of the U.S. Department of Energy. The Module Utilization Committee was formed to make appropriate disposition of the surplus modules. The final report of that committee accounts for that disposition. The membership and activities of the committee are set forth and the results of its activities are reported.

CONTENTS

SECTION I

INTRODUCTION

Between 1975 and 1982, the U.S. Department of Energy (DOE) acquired several megawatts of photovoltaic (PV) collector modules. These modules were procured through Jet Propulsion Laboratory Flat-Plate Solar Array Project block purchases, as well as by Sandia National Laboratories and the Massachusetts Institute of Technology-Lincoln Laboratory. These modules were used in a variety of tests, both as individual components and in continuing full-scale system experiments. Of the modules originally procured for component tests, a number completed all originally planned testing still in functioning condition. Of these, a small percentage (about 41 kilowatts) were considered to be unsuited for other planned test programs and were declared surplus to the needs of DOE.

At the same time, numerous organizations and individuals wished to have surplus modules. DOE had occasionally transferred ownership of surplus collectors in past years for emergency communications facilities, industrial and university research programs and various public-assistance programs. Requests of this type continued to be received by DOE.

Inasmuch as no formal mechanism existed to coordinate these requests with known supplies of surplus collectors, the Module Utilization Committee was formed in July of 1982 to construct an inventory of surplus PV modules on a nationwide basis and to act as a broker for requests for these modules originating outside of the National Photovoltaics Program.

SECTION II

MEMBERSHIP

The Committee consisted of two subcommittees. The core subcommittee included members who met regularly to perform routine Committee functions. The core committee representatives and the areas they presented are:

JPL Program Analysis and Integration Center:

G.A. Praver (Chairman)
J.W. Farrar
R.F. Greenwodd
R.H. Lee
D.H. Otth

In addition to the core committee, an advisory subcommittee provided information and opinions as required, mainly by telephone. The advisory subcommittee representatives and the organizations they represent are:

Sandia National Laboratories, Albuquerque (SNLA):

H. Baxter, H. Gerwin

Lewis Research Center (LeRC):

A. Ratajczak

Massachusetts Institute of Technology, Electronic Laboratory (MIT/EL):

E. Kern

Department of Energy Headquarters:

A. Krantz

Oak Ridge National Laboratories (ORNL):

S. Kaplan

Aerospace Corp.:

S. Leonard

These members became the focal point at their institutions for all matters relating to the work of the Committee, including collection of proposals from requesters and supplying information regarding availability, characteristics and locations of surplus modules.

SECTION III

ACTIVITIES

The Committee held 19 meetings between July 1982 and February 1984 at approximately one-month intervals. After each meeting, minutes were widely distributed within the National Photovoltaics Program so that all interested parties would remain aware of Committee activities.

The first and most difficult task to be addressed was the development of an inventory of surplus modules. It was determined that all modules surplus to the needs of DOE were at JPL, SNLA, LeRC or MIT/EL. Using a variety of sources, a preliminary inventory of surplus modules at each of these locations was constructed and in October 1982 each of these institutions received the draft inventory of modules at its location. By January 1983 each institution had returned its draft inventory with corrections, and the first complete working inventory was assembled and circulated throughout the program. This inventory was then used as a basis for module distribution with continuous updating reflecting actual distributions made and any discrepancies that were uncovered.

At the same time, property people were contacted at each of the institutions to establish the correct procedure for transferring modules from DOE to outside organizations. For each institution a procedure was agreed upon and copies of the transfer procedures were distributed throughout the program in December 1982.

By the beginning of 1983 the Committee was in a position to begin distribution of modules. In March 1983 the first five requests were considered and the first actual shipment of surplus modules was made on April 25, 1983, from SNLA. By June 1983 only 12 requests had been received by the Committee and it became apparent that a public announcement would be required. In the fall of 1983, announcements were placed in three periodicals whose readership was mostly college science teachers. Appendix A presents a copy of the news release and a list of publications in which it was carried. This publicity produced enough requests to deplete the inventory of surplus modules totally. The last meeting of the Committee was held on February 13, 1984, when the last of the remaining modules were committed.

SECTION IV

RESULTS

Some of the important statistics of the Committee's activities are shown in Table 1 (wattage figures represent nominal watts of generating capacity).

Table 1. Module Utilization Committee Statistics

Number of Requests Received		68
Number of Requests Approved		46
Number of Requests Not Approved		22
Number of Modules Distributed		2,653
Number of Modules per Recipient:	Average	58
	Minimum	1
	Maximum	325
Number of Watts Distributed		40,473
Number of Watts per Recipient:	Average	880
	Minimum	5
	Maximum	6,638

The 46 recipients of surplus modules are situated in 19 states, as shown in Figure 1. They were mostly colleges and universities (including community colleges), as shown in Table 2.

Appendix B contains a brief description of each of the 46 requests approved by the Committee, including the name and location of the requesting institution, the intended application for the modules, the number of modules donated and their nominal power.

Of the 68 requests received, 22 were rejected for a variety of reasons (see Table 3).

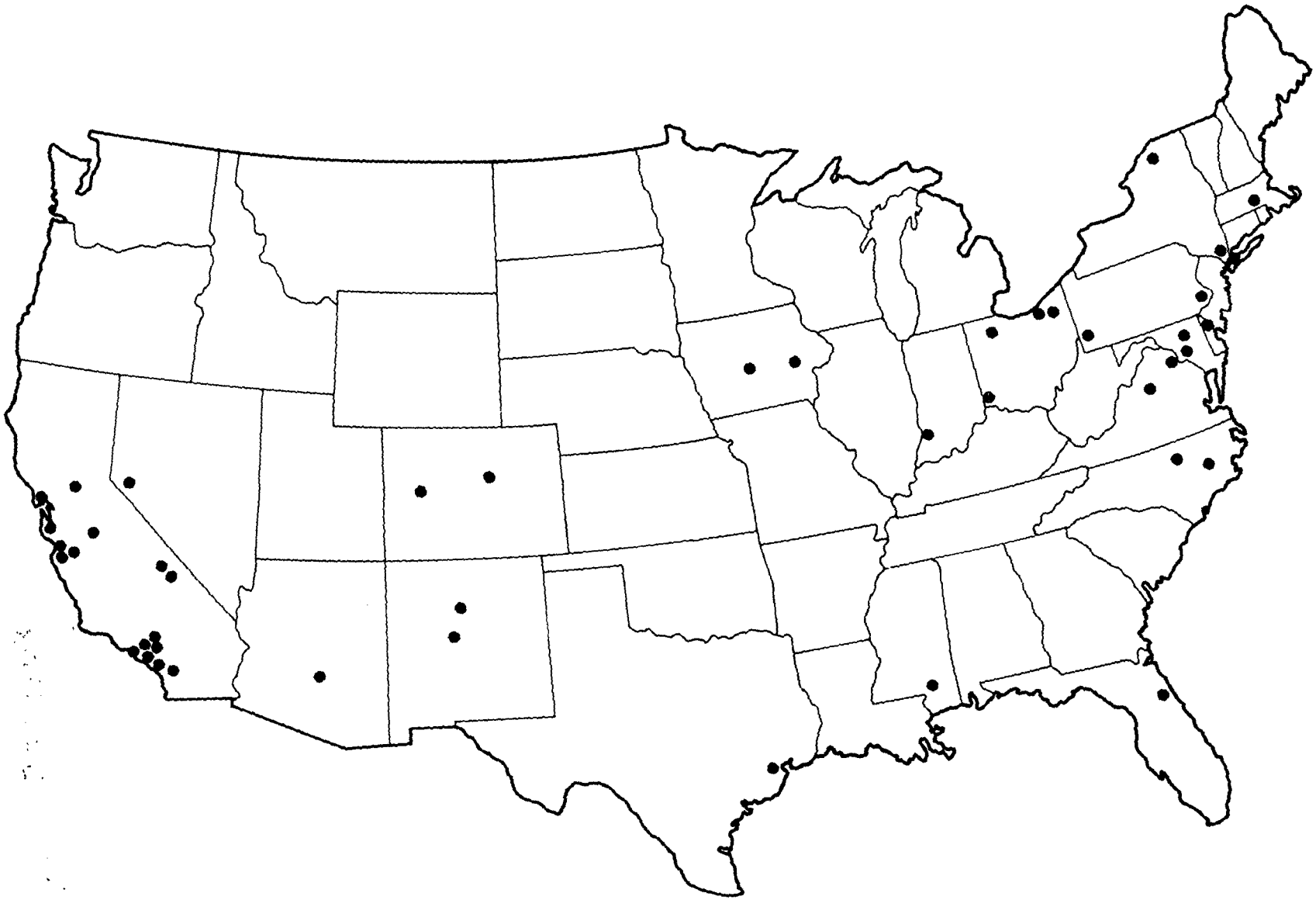

Figure 1. Locations of Recipients of Surplus Modules

Table 2. Breakdown of Surplus Module Recipients

Colleges and Universities	34
Government Agencies (other than DOE)	4
Elementary and Secondary School Education	4
Emergency Communication Facilities	2
Other	2
Total number of recipients	46

Table 3. Breakdown of Rejected Requests for Surplus Modules

Application Not Practical for Surplus Modules	2
Private Organization or Individual	7
Foreign Country	2
Not Enough Information Available	5
Received After Module Inventory Was Depleted	3
Other	3
Total Number of Rejected Requests	22

APPENDIX A

MODULE UTILIZATION COMMITTEE NEWS RELEASE

Public Information Office
Jet Propulsion Laboratory
California Institute of Technology
National Aeronautics and Space Administration
Pasadena, California, 91109. Telephone (818)354-5011

FOR IMMEDIATE RELEASE

Small quantities of solar photovoltaic modules are available at no charge to interested colleges and universities from the Department of Energy.

During the past several years DOE has acquired a number of flat-plate photovoltaic modules that have been used in tests and experiments. Although nearly all the modules are still installed in operating experimental systems, a limited number are considered surplus to DOE's needs and are available for educational use.

Interested colleges and universities may obtain the modules by paying only the cost of shipping. They should submit brief proposals describing the way they would use the modules, as well as the quantity desired. Proposals will be evaluated on a competitive basis by DOE's Module Utilization Committee. The committee will consider educational merit, publicity value and indication of the proposing organization's commitment to follow through on its plans.

Deadline for proposals is December 31. They should be submitted to Gerald Praver, Chairman, Module Utilization Committee, Jet Propulsion Laboratory, Mail Stop 506-328, 4800 Oak Grove Drive, Pasadena, CA, 91109.

Mailing List for Release

Chronicle of Higher Education
1333 New Hampshire Avenue, N.W.
Washington, D.C. 20036

Journal of College Science Teaching
1742 Connecticut Avenue, N.W.
Washington, D.C. 20009

Journal of Higher Education
Ohio State University Press
2070 Neil Avenue
Columbus, OH 43210

APPENDIX B

DESCRIPTIONS OF RECIPIENTS OF SURPLUS MODULES

Requester	Location	Application	Number of Modules	Total Watts
Iowa State University	Ames, Iowa	Construction of a demonstration grid-connected PV systems at the Land O' Lakes Dairy Co-operative Answer Farm near Webster City, Iowa. System will supplement existing wind turbine.	225	6638
Stanford University	Stanford, California	Student experiments in undergraduate energy laboratory.	12	222
Lyon County, Nevada (through Nevada DOE)	Yerrington, Nevada	Construction of PV system to power six TV repeaters located at Singatze Peak in Lyon County. Repeaters are operated by the County primarily for residents of Yerrington.	133	3924
*North Carolina Central University	Durham, North Carolina	Modules to be used in residential energy research program, which already includes some PV as well as coal, wood and solar heating. Will be installed on "clean energy van."	116	986
National Audubon Society	Tiburon, California	Demonstrate PV applications in course on "Alternative Energy Sources" for children.	4	74

*Historically black college or university.

Requester	Location	Application	Number of Modules	Total Watts
The Flying Samaritans	Bonsall, California	Power for remote communications equipment used in emergency rescue missions in Baja California, Mexico.	5	148
Cabrillo College	Aptos, California	Laboratory demonstration and student experiments in Solar Photovoltaics Laboratory.	32	1409
U.S. Forest Service	Inyo National Forest, California	Power for radio repeaters located throughout the Inyo National Forest.	325	1625
U.S. Forest Service	Inyo National Forest, California	Power for several water pumping applications at remote campsites throughout the Inyo National Forest.	122	3612
California State University	Long Beach, California	Laboratory experiments for undergraduate students in Power/ Energy Labortory.	45	1282
Phil Chapman	La Crescenta, California	Replacement modules for an existing array previously donated by DOE. Array powers W6HCS, an emergency radio station facility.	3	30
University of California	Santa Cruz, California	Student-built demonstration projects in Agroecology Dept. These include wastewater pumping, greenhouse ventilation and a mist propagation system.	33	610
University of Southern Mississippi	Hattiesburg, Mississippi	Lecture and demonstration aids.	4	74

Requester	Location	Application	Number of Modules	Total Watts
Northern Virginia Community College	Annandale, Virginia	Experiments for undergraduate students in Physics Laboratory.	16	371
University of Maryland	College Park, Maryland	Classroom demonstration and laboratory experiments in "Solar Energy Applictions in Buildings class.	9	166
Westchester Community College	Valhalla, New York	Power for blower motors on Solaron hot-air thermal heating system in solar house laboratory.	200	2000
George School	Newtown, Pennsylvania	Water pumping for solar greenhouse at a private boarding high school.	12	354
Orange Coast College	Costa Mesa, California	Experiments and demonstrations for undergraduate students in "Solar Electricity" and "Solar Projects" classes.	98	980
Friends Harvest Life Lab Science Program	Capitola, California	Demonstration and experiments for educating elementary level science teachers.	7	35
Community College of Allegheny	Pittsburgh, Pennsylvania	Demonstration and experiments for undergraduate students in "Solar Test Laboratory."	15	278
Stetson University	DeLand, Florida	Classroom demonstrations and research projects by undergraduate physics students.	3	56

Requester	Location	Application	Number of Modules	Total Watts
University of New Mexico	Los Alamos, New Mexico	Undergraduate laboratory experiments in "Solar Energy" segment of "Alternative Energy Systems" Program.	2	59
Vincennes University	Vincennes, Indiana	Laboratory demonstrations and experiments for students and faculty for "Energy and The Environment" class and three physics classes.	60	570
California State University	Long Beach California	Lecture demonstration aids for undergraduate students and for "Operation Outreach" mobile science exhibit, which tours nearby elementary schools.	10	185
Iona College	New Rochelle, New York	Instructor demonstrations and undergraduate student laboratory experiments in "Renewable Energy Resources" class.	20	100
Worcester State College	Worcester, Massachusetts	Undergraduate student laboratory experiments.	12	60
Coe College	Cedar Rapids, Iowa	Power for display and water pumping in a solar hot-water demonstration project presently under construction. (Undergraduate student project.)	40	380
Kent State University	Kent, Ohio	Undergraduate student laboratory experiments in "Energy/Power" class.	12	114

Requester	Location	Application	Number of Modules	Total Watts
*Prairie View A&M	Houston, Texas	Build experimental arrayfor use in fulfilling a contract with Johnson Space Center involving computer control of solar arrays.	16	152
California Energy Committee	Sacramento, California	Used in a variety of remote applications under the auspices of the California Photovoltaic Utilization Program.	71	1236
Towson State University	Towson, Maryland	Undergraduate student experiments.	1	71
Bowling Green State University	Bowling Green, Ohio	Installation on Solar Information Booth on campus by undergraduate students in two classes.	80	400
University of Delaware	Newark, Delaware	Three projects involving undergraduate and graduate students: water pumping, enhanced harvesting of sunlight and residential electric-load simulation.	194	1940
Miami University	Oxford, Ohio	Lecture demonstration aid.	1	5
Clarkson College	Potsdam, New York	Laboratory experiments and special research projects for undergraduate students.	8	304

*Historically black college or university.

Requester	Location	Application	Number of Modules	Total Watts
NASA/JPL and Los Angeles County Teacher Education and Computer Center	La Canada, California	Supply power for several computers in the Science and Mathematics Teaching Resource Center. This center provides training to elementary and high school science teachers.	9	504
University of New Mexico	Albuquerque, New Mexico	Power instrumentation to collect ecological data on the Sevilleta Reserve near Socorro, New Mexico.	140	1330
East Carolina University	Greenville, North Carolina	Experiments and demonstrations for undergraduate physics students.	20	370
James Madison University	Harrisonburg, Virginia	Experiments and demonstrations for undergraduate students in physics, geology and geography.	34	434
Toy Train Operating Society	Pasadena, California	Power three toy train exhibits at Omniplex in Oklahoma City, California State Railroad Museum in Sacramento, California, Children's Museum in La Habra, California.	9	266
Colorado Mountain	Glenwood Springs, Colorado	Power for PV cabin demonstration project being built on campus by students and staff.	12	354
Modesto Drive College	Modesto, California	Power ventilation for egg and meat production units (chicken coops) on campus, and lecture demonstration aids.	53	1558

Requester	Location	Application	Number of Modules	Total Watts
Edmonds Community Foundation	Lynnwood, Washington	Provide power for two demonstration projects: an irrigation pumping system and a greenhouse heat pump.	150	2775
Red Rocks Community College	Golden, Colorado	Undergraduate student experiments in "Introduction to Photovoltaics" class, to power a PV display area with an existing wind system, and to equip a mobile display going to nearby schools, shopping centers, fairs and expositions.	118	806
Cleveland State University	Cleveland, Ohio	Undergraduate student experiments and demonstrations.	34	546
Arizona State University	Phoenix, Arizona	Student experiments and demonstrations.	128	1080