BY THE COMPTROLLER GENERAL

113374

Report To The Chairman And Ranking Minority Member Of The Senate Committee On Governmental Affairs OF THE UNITED STATES

RELEASED

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Solar Energy Research Institute And Regional Solar Energy Centers: Impediments To Their Effective Use

The Solar Energy Research Institute and the Regional Solar Energy Centers have been designated by the Department of Energy as lead institutions for solar energy development and commercialization. However, these entities have not been effectively integrated into the Federal solar program and have not achieved their intended roles. DOE has reorganized its solar program structure to improve, among other things, its management and use of the Institute and the Regional Centers, but it needs to take further actions. Such actions, as a minimum, should include

--using the Institute and Regional Centers as its lead institutions for solar energy development and commercialization, as intended;

--improving the planning process for developing the Institute's and Regional Centers' programs and activities; and

--monitoring the effectiveness of the Department's reorganization of its solar program with regard to integrating the Institute and the Regional Centers into the Federal solar program and using them as lead institutions.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-198431

The Honorable Abraham Ribicoff, Chairman
The Honorable Charles H. Percy, Ranking
Minority Member
Committee on Governmental Affairs
United States Senate

As requested in your letter of February 7, 1980, and in subsequent discussions with your offices, this report discusses the problems preventing the Solar Energy Research Institute and the Regional Solar Energy Centers from becoming the intended lead institutions for solar energy development and commercialization. It contains recommendations to the Department of Energy for making more effective use of these entities.

As requested by your offices, we did not obtain official comments from the Department of Energy on this report. Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT
TO THE CHAIRMAN AND THE
RANKING MINORITY MEMBER
OF THE SENATE COMMITTEE
ON GOVERNMENTAL AFFAIRS

SOLAR ENERGY RESEARCH INSTITUTE AND REGIONAL SOLAR ENERGY CENTERS: IMPEDIMENTS TO THEIR EFFECTIVE USE

D I G E S T

The Department of Energy (DOE) has designated its Solar Energy Research Institute and Regional Solar Energy Centers as lead institutions for solar development and commercialization. Although it has been almost 6 years since the Congress authorized the creation of the Institute, and over 3 years since DOE announced the creation of the Regional Centers, these entities have not been effectively integrated into the Federal solar program.

Confusion and conflicts have existed over the roles of the Institute and the Regional Centers in the solar program. This is largely attributable to DOE's failure to assign to the Institute and the Regional Centers the responsibilities necessary to achieve their lead roles. In addition, there have been conflicts between the Institute and the Regional Centers over responsibilities for solar commercialization efforts. Action is needed to bring these entities into their lead roles and resolve the conflicts over commercialization efforts. (See p. 7.)

The process for planning and approving activities for the Institute and the Regional Centers has been ineffective. They do not have multi-year operating plans; instead, they have had to plan their activities through an annual operating plan process. DOE's direction and guidance for developing these operating plans has been unclear and conflicting. The Institute and the Regional Centers both experienced considerable difficulties in getting their plans approved. The Institute's plan for fiscal year 1980 was not approved until 1 month after the start of the year and the approved activities were later changed by DOE to such an extent that the plan had to be substantially

revised 4 months later, thereby delaying and diluting the Institute's efforts. (See p. 15.)

The Regional Centers' plans encountered even greater problems. Many of the activities they had planned for their regions in fiscal year 1980 were eliminated by DOE, resulting in an 8-month delay in obtaining approval for their plans. The Regional Centers are therefore not carrying out those activities which--in their judgment--are necessary to commercialize solar energy in their respective regions, and as a result, they are being viewed as ineffective by some parties within their regions. DOE is now attempting to have the Institute and the Regional Centers develop multi-year plans. However, there are indications that problems are occurring in this effort. (See p. 19.)

DOE has reorganized its solar program structure to improve, among other things, its management of these entities. Previously it had the Institute and the Regional Centers report to different Assistant Secretaries; however, it recognized that planning and coordination problems existed under this structure. Consequently, in February 1980 the Institute and the Regional Centers were organizationally placed under a single deputy assistant secretary responsible for their management--the Deputy Assistant Secretary for Field Operations and International Programs. However, they must obtain funding and programmatic guidance from a separate deputy assistant secretary--the Deputy Assistant Secretary for Solar Energy. Although this organization may improve the relationships between the Institute and the Regional Centers, it is questionable whether it will promote more effective management by DOE. The Institute and the Regional Centers must now report to management under both deputy assistant secretaries, and as a result many planning and coordination problems still exist. Further, the role and planning problems may be difficult to resolve under the new organization since responsibilities for the entities are divided within DOE. (See p. 24.)

CONCLUSIONS AND RECOMMENDATIONS

Almost 6 years after the passage of legislation to create the Institute, and 3 years after DOE announced its creation of the Regional Centers, these organizations are still not effectively integrated into the Federal solar program. In GAO's opinion, DOE, the Institute, and the Regional Centers have not taken advantage of the opportunity to become a potentially effective team for developing and promoting widespread use of solar energy technologies. DOE needs to improve its management of the Institute and the Regional Centers to ensure that these organizations achieve their intended roles. (See p. 31.)

The Secretary of Energy should take actions to ensure that the Institute and the Regional Centers are effectively integrated into the Federal solar program. At a minimum, the Secretary should

--Use the Institute and Regional Centers as its lead institutions for solar energy development and commercialization, as intended. As part of this action, the Secretary should assign tasks and responsibilities to these entities that are consistent with their lead institution roles. Particular attention should be given to the leadership role in solar commercialization in view of the confusion which now exists.

--Improve the planning process for developing the Institute's and the Regional Centers' activities. Improving the process should entail the development of more timely and clear guidance for these organizations which would permit the development of plans by the Institute and Regional Centers which meet established schedules and the needs of DOE. Some flexibility should be incorporated into the planning process to permit the Regional Centers to undertake activities to address specific regional solar commercialization needs. The Secretary should also ensure that

multi-year plans are satisfactorily developed this year to provide needed stability to the Institute and the Regional Centers.

--Monitor the effectiveness of the Department's reorganization of its solar program with regard to integrating the Institute and the Regional Centers into the Federal solar program and using them as lead institutions. (See p. 33.)

AGENCY COMMENTS

As requestd by the Committee, GAO did not obtain official comments from DOE on this report.

Contents

ABBREVIATIONS

DOE	Department of Energy
ERDA	Energy Research and Development Administration
MASEC	Mid-American Solar Energy Center
NESEC	Northeast Solar Energy Center
RD&D	Research, Development, and Demonstration
RSECs	Regional Solar Energy Centers
SERI	Solar Energy Research Institute
SSEC	Southern Solar Energy Center
WSUN	Western Solar Utilization Network

CHAPTER 1

INTRODUCTION

Solar energy represents one of the most important alternatives to the use of oil, offering the potential for meeting a significant portion of the future energy needs of this country. The development and implementation of solar energy technologies, however, is a complicated task. Substantial problems must be resolved in order to make solar a viable energy source. Such problems include the technical and economic uncertainties of many solar technologies, the varying regional needs and potential for solar, and the complexities of commercializing and integrating solar energy into the current energy structure.

The Department of Energy (DOE) is the lead Federal agency for solar energy research, development, and commercialization. DOE's solar energy program, which for fiscal year 1980 is funded at approximately $600 million, is attempting to solve the problems associated with solar energy. DOE's efforts in addressing solar energy related problems involve the Solar Energy Research Institute (SERI) and the Regional Solar Energy Centers (RSECs).

SERI has been designated by DOE as the lead organization for solar research, development, and demonstration (RD&D), and the RSECs as the lead organizations for solar commercialization. These designations place SERI and the RSECs in the central focus for rapid development and deployment of solar technologies. The coordinated efforts of DOE, SERI, and the RSECs, working in conjunction with one another, can constitute an effective team for developing and commercializing solar energy technologies.

The Federal solar program, and the responsibilities and activities of SERI and the RSECs, have taken on increased importance with the recent establishment of the 20-percent solar goal. In June 1979 the President established the national goal of meeting 20 percent of the Nation's energy needs with solar by the year 2000. This goal represents an ambitious attempt to accelerate the historically long period needed to implement new energy technology on a significant scale. Because of this goal, the functions of SERI and the RSECs are now more crucial since they are to help lead the way to solar development and implementation, and consequently the achievement of the solar goal.

BACKGROUND

SERI's creation was authorized almost 6 years ago by the Solar Energy Research, Development, and Demonstration Act of 1974 (P.L. 93-473, Oct. 26, 1974). The purpose of the act was, in part, to establish a vigorous Federal program of solar RD&D to ensure the use of solar energy as a viable source for meeting the Nation's energy needs. The act emphasized the urgency for such a program and the need for better coordination and management of the various solar energy RD&D activities. In this regard, Section 10(a) of the act authorized the establishment of SERI, and provided that SERI shall perform research, development, and other functions necessary to achieve the purposes and objectives of the act. The legislative history of the act shows that the Congress intended that SERI provide a needed focal point and an organizational framework for solar energy research, development, and demonstration.

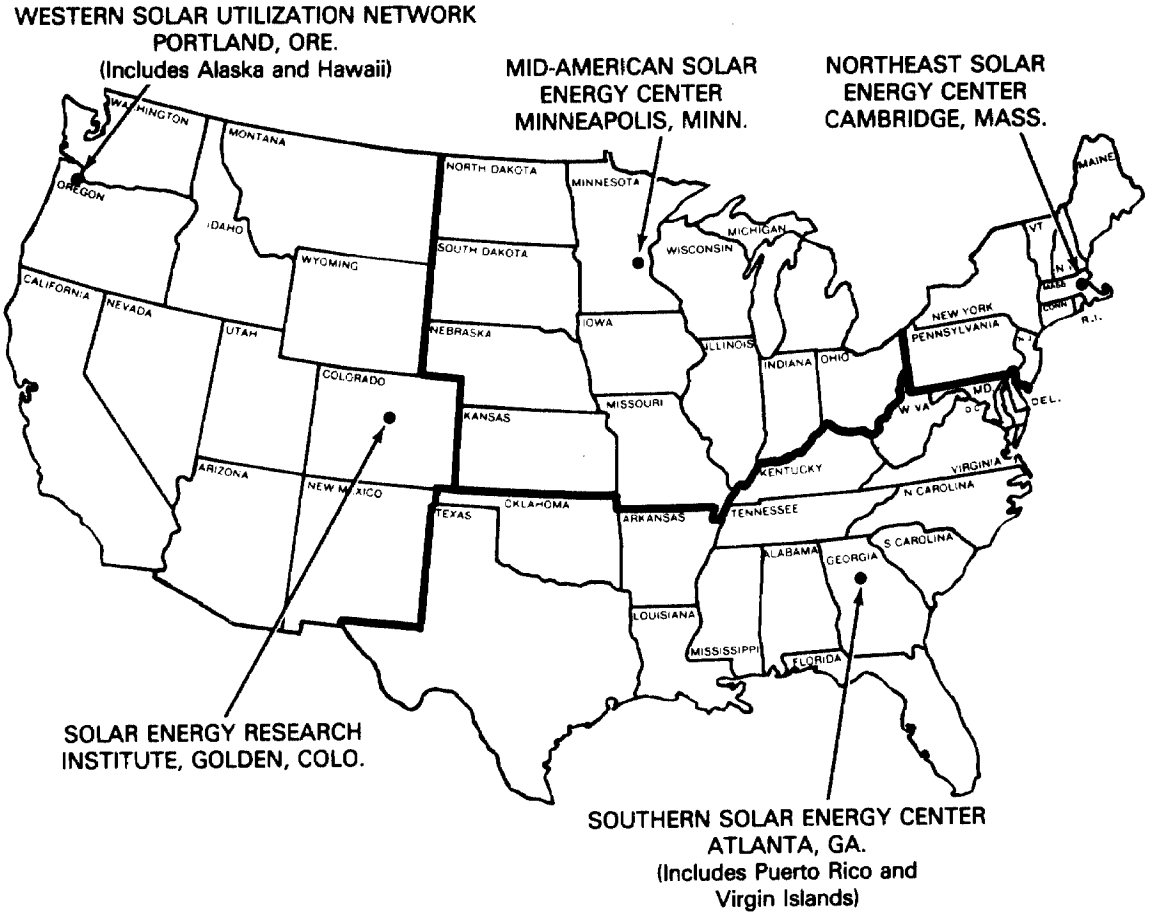
With the creation of the Energy Research and Development Administration (ERDA) in January 1975, pursuant to the Energy Reorganization Act of 1974 (P.L. 93-438, Oct. 11, 1974), the responsibility for bringing SERI into being was assigned to ERDA. After considerable study of roles and characteristics for SERI, ERDA decided that SERI should be a single, contractor-operated, medium-sized research and development laboratory. ERDA ruled out the use of any existing Federal Government laboratory for SERI. Accordingly, in March 1976, ERDA issued a Request for Proposal (RFP) from organizations interested in entering into a contract to operate SERI.

Following an evaluation of 20 proposals submitted by organizations responding to the RFP, the ERDA Acting Administrator announced in March 1977 the selection of the Midwest Research Institute--a not-for-profit research organization--as the managing/operating contractor for SERI. The announcement stated that SERI would be located in Golden, Colorado.

At the same time, ERDA also announced its plans to establish a network of regional solar energy centers. The regional centers, as conceived in ERDA's announcement, would constitute an expanded network of regionally-based centers for solar research efforts.

After the announcement of its intent to establish regional solar centers, ERDA awarded four planning grants to study regional needs for promoting widespread use of solar energy. Consequently, regional plans were developed, and the RSECs were established. Each RSEC is operated by a contractor and reports directly to DOE. The RSECs are:

Northeast Solar Energy Center (NESEC), Cambridge, Massachusetts; Mid-American Solar Energy Center (MASEC), Minneapolis, Minnesota; Southern Solar Energy Center (SSEC), Atlanta, Georgia; and Western Solar Utilization Network (WSUN), Portland, Oregon. The following map illustrates the geographic location of SERI and the RSECs and the regions covered by each RSEC.



CURRENT STATUS

The Midwest Research Institute began operating SERI in July 1977, under a 5-year contract with DOE. SERI was initially staffed with 50 people and had a budget of approximately $7 million. Staff and funding levels have increased substantially since then, with a fiscal year 1980 staff of about 750 and a total budget of about $103 million. SERI's work involves all phases of solar energy research, development, and commercialization.

The RSECs have completed their planning and implementation phases and are under 5-year operating contracts with DOE. The RSECs are involved in market analysis, systems development support, market tests and applications, and market development and training, with their primary emphasis being on passive solar and solar water heating technologies. The current total funding for the four RSECs for fiscal year 1980 is $21.7 million, ranging from $5.1 to $5.7 million per RSEC.

Each RSEC has a Board of Directors appointed by the Governors of the States in its region. The RSECs have advisory groups which assist in program development and implementation and make use of State solar offices to conduct outreach activities for promoting the use of solar energy. Each RSEC, however, has a different internal organization. Additionally, the number of employees per RSEC vary greatly, from 90 employees at NESEC to 30 employees at WSUN. According to the various RSEC Directors, these differences are a result of the latitude DOE gave them in establishing their centers, and in the way the RSECs perceive the best method for commercializing solar energy in their respective regions.

PRIOR GAO REPORTS

GAO has issued three prior reports on the creation of SERI and the RSECs. These reports examined the need and roles of SERI and the RSECs, and raised questions about the effectiveness of integrating these organizations into the solar program.

The first report, issued in September 1977, 1/ examined the congressional mandate for SERI, and the relationship between SERI and the RSECs. The report raised concerns about the need for SERI at that time, considering the capabilities available at existing national laboratories, and whether the establishment of regional centers would dilute the role of SERI as the focal point for solar RD&D.

Our second report, issued in November 1977, 2/ expanded on the concerns we raised in the earlier report. We stressed

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1/Letter report to the Chairman, Subcommittee on Advanced Energy Technologies and Energy Conservation Research, Development, and Demonstration, House Committee on Science and Technology (EMD-77-67, Sept. 9, 1977).

2/Letter report to Senator Floyd K. Haskell, Senator Gary W. Hart, and Representative Timothy E. Wirth (EMD-78-20, Nov. 25, 1977).

the need for defining the management structure and interrelationships between SERI and the RSECs.

Our third report, issued in January 1978, 1/ examined the respective roles of SERI and the RSECs being developed by DOE. In that report, we stated that the establishment of separate and independently focused roles for SERI and the RSECs can lead to fragmentation, lack of coordination, and program ineffectiveness. We stated that, since RD&D and commercialization must be carried out in unison, delays in developing solar energy could occur if there is not a closely coordinated interrelationship between research and commercialization activities. We questioned whether an effective program could be carried out if there is not an established commercialization strategy and a mechanism in place for effective coordination of SERI and the RSECs.

SCOPE, OBJECTIVES, AND METHODOLOGY

The Chairman and the Ranking Minority Member, Senate Committee on Governmental Affairs, by letter dated February 7, 1980, asked us to review the progress and problems experienced by SERI and the RSECs as well as the effectiveness of DOE's organization for using these entities. In their request letter, they stated that the Committee was concerned with the apparent lack of leadership in solar energy development and commercialization provided by SERI and the RSECs.

Our review consisted of an examination of the areas directed by the requesters; specifically, the progress being made, the problems hindering SERI and RSEC leadership in developing and promoting solar energy, and the effectiveness of DOE's organization for managing these contractors. We examined documents on SERI's and the RSECs' programs, reviewed past congressional oversight hearings on SERI and RSEC operations, and held discussions with DOE, SERI, and RSEC officials to identify areas in which problems existed. In addition, we met with public and private interest groups to obtain their perceptions on SERI's and the RSECs' progress and problems.

We performed detailed review work at SERI and at each of the RSECs. This work consisted of interviews with upper and middle managment to obtain their insights on SERI's and the

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1/Letter report to Senator Floyd K. Haskell, Senator Gary W. Hart, and Representative Timothy E. Wirth (EMD-78-26, Jan. 24, 1978).

RSECs' progress and problems, and their perceptions of DOE's management effectiveness. More specifically, we obtained comments from these officials on their roles in solar energy development, DOE's direction and guidance to them, and DOE's current organizational structure. We also reviewed pertinent budgetary and planning documents as well as correspondence to verify the information obtained. Additionally, we discussed SERI and the RSECs' management and progress with representatives of DOE's Chicago Operations Office having responsibility for the administration of the SERI and RSEC contracts at both their Batavia, Illinois, office and at their SERI site office in Golden, Colorado.

We also conducted detailed review work at DOE headquarters in Washington, D.C. We interviewed DOE officials responsible for the management of SERI and the RSECs, as well as officials in the various solar program offices which are providing funds to SERI and the RSECs. We obtained their views on the working relationships with SERI and the RSECs, and the progress in integrating these organizations into DOE's solar program. In addition, we examined DOE's letters, memoranda, and other budgetary and planning documents relating to its management of these organizations. We also reviewed two recent reports prepared by the DOE Office of Inspector General which dealt with the internal management controls at SERI.

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This report discusses three problem areas we noted that are diminishing the effective use of SERI and the RSECs. Chapter 2 discusses confusion over the roles of SERI and the RSECs; chapter 3 discusses the ineffectiveness of the SERI and RSEC planning process; chapter 4 discusses DOE's organizational problems for managing SERI and the RSECs; and chapter 5 includes our overall conclusions and recommendations.

CHAPTER 2

SERI AND RSEC LEADERSHIP ROLES NOT YET ACHIEVED

Although almost 6 years have passed since the Congress authorized the creation of SERI and 3 years have elapsed since DOE 1/ announced the creation of the RSECs, confusion remains over the roles they are to play in DOE's solar program. DOE has established broad roles in its solar program for these organizations, however, DOE's actions are not entirely consistent with these roles. SERI and the RSECs have not become focal points for solar RD&D and commercialization, and disputes over responsibilities for activities exist between DOE, SERI, and the RSECs. DOE has stated that the roles of SERI and the RSECs are still evolving; however, DOE has yet to take effective action to bring these organizations into their intended leadership roles. Thus, a potentially effective solar team has not yet been developed.

SERI QUESTIONABLE FOCAL POINT FOR SOLAR RD&D

Although the Congress intended SERI to serve as a focal point for solar RD&D, the authorizing legislation permited DOE to assign those functions to SERI that it determined were warranted. DOE consequently undertook a study to determine the proper role for SERI. Following the results of this study, the Secretary of Energy provided in a March 7, 1978, mission statement that SERI's role would be solar RD&D. This role was further clarified 1 week later in a DOE-prepared charter statement which stated SERI's role as follows:

> "As its primary mission, National SERI shall function as the DOE's lead institution with regard to solar research, development and demonstration * * *. SERI shall also maintain capability for market analysis and assessment of institutional barriers to the introduction of solar technology on a national and international basis." (Underscoring supplied.)

This role assigned to SERI by DOE follows the congressional intent for SERI activities. However, at this time, SERI does

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1/For ease of expression, DOE is used throughout the remainder of this report to refer to the Department of Energy as well as its predecessor agencies.

not yet appear to have become the lead institution, or focal point, for solar RD&D.

SERI does not yet have major responsibilities in many areas of the solar program. DOE's Solar Energy Program Document, dated January 1980, details SERI's lead and focal point responsibilities in the various program areas. Of the eight solar technology areas--photovoltaics, biomass, wind, solar thermal, ocean energy, active heating and cooling, passive solar technology, and industrial process heat--SERI has lead responsibility in only one technology (active solar heating and cooling RD&D) and in only selected portions of four other technologies (photovoltaics, wind, solar thermal, and ocean energy systems). For the most part, SERI appears to be supporting overall efforts performed by DOE or other national laboratories in the other areas. SERI has, however, been designated the focal point for international solar programs. There are major areas of individual technologies, however, such as system engineering in photovoltaics, and thermochemical conversion in biomass, in which SERI has virtually no responsibilities.

SERI officials stated that, in their opinion, they have partially become the lead center, or focal point, for solar energy, since SERI receives a significant portion of DOE's solar energy funding, is aware of solar energy RD&D in other Federal laboratories, and can provide an overview of solar energy activities to DOE. However, they said that SERI does not have total focal point responsibilities. The officials said that, due to expertise being established at other laboratories prior to the creation of SERI, it would have been very difficult for SERI to achieve a true focal point role in the 3 years that have transpired since it was established; however, they would like to assume more responsibilities than they are being given by DOE. For example, SERI officials pointed out that in its fiscal year 1980 operating plan they wanted to undertake a leadership role in biomass, but were not given any additional responsibilities in that area. Additionally, SERI officials stated that they could develop the necessary staff capabilities to handle all program areas should DOE make a commitment to making SERI a focal point for solar energy RD&D. However, SERI is reluctant to make commitments to improve its capabilities without being assured of additional programmatic responsibilities.

DOE officials have stated that SERI's lead center role is still evolving, and that they expect to see SERI assume more of a focal point role in the future. However, DOE was not able to provide us with any plans aimed at guiding SERI toward fully reaching its focal point role. Consequently, we were not able to determine how or when DOE will transfer

additional responsibilities to SERI in furtherance of this objective. Additionally, we noted that there seems to be little effort on DOE's part to fully make SERI a focal point for solar RD&D, and that program managers have discretion on deciding if SERI is to have responsibilities for certain program areas. For instance, one program manager stated that in his view SERI was just another contractor to be assigned responsibilities for whatever programs individual program managers decide to give it. Other DOE program officials stated that SERI does not necessarily have the management capability to serve as the focal point for all of the various solar program areas.

RSECs ROLE LIMITED IN REGIONAL SOLAR COMMERCIALIZATION

In the March 14, 1978, charter statement that assigned SERI lead responsibility for solar RD&D, DOE assigned the RSECs lead responsibility for regional solar commercialization as follows:

> "In carrying out their primary mission, the regional centers shall be responsible, within their respective regions, as DOE's lead institutions related to the regional commercialization of solar technologies and conservation integral to solar applications." (Underscoring supplied.)

However, there is considerable confusion between DOE and the RSECs over the implementation of this role, particularly in regards to achieving the 20-percent solar goal.

The RSECs have interpreted their role much more broadly than has DOE. The RSECs have interpreted the role to mean that they are to take the lead in DOE's solar commercialization efforts and become DOE's major vehicle for attaining the President's goal of meeting 20 percent of the Nation's energy needs from solar resources by the year 2000. 1/ In this light, the RSECs have developed as their goal the achievement of 20 percent solar energy in their respective regions. RSEC officials told us that they have undertaken the attainment of the 20-percent solar goal because DOE instructed them to use

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1/The President's June 20, 1979, message on solar energy outlined a national strategy for accelerating the use of solar energy resources which included a goal of meeting 20 percent of the Nation's energy needs from solar resources by the year 2000.

the President's message announcing the goal as direction, and, because DOE does not have a plan to achieve the goal, they therefore see themselves as fulfilling that function. 1/ The RSECs believe that the only way the goal can be reached is through a regionalized approach.

DOE officials, however, particularly at the program levels, have a different perception of the role of the RSECs in DOE's overall solar program. According to DOE officials, the RSECs are not the primary mechanisms to achieve the 20-percent solar goal. DOE officials stated that while the RSECs are useful entities in commercializing solar energy, they are but one part in DOE's overall effort in solar commercialization. Contrary to DOE's Charter Statement of March 14, 1978, most of these DOE officials stated that they view the RSECs as just another DOE contractor and that the RSECs have failed to view themselves in this capacity.

The interpretation of the RSECs' role in DOE's solar program has caused disagreements between the RSECs and DOE over the RSECs' fiscal year 1980 funding. DOE advised the RSECs that $18 million would be available to them for fiscal year 1980 activities. However, in developing their fiscal year 1980 activities, the RSECs structured plans which they believed would put them on a course to achieve the 20-percent goal. Consequently, the total funding requested by the RSECs was much higher than the DOE advisory levels, as follows:

1/In this connection, we issued a report entitled "20-Percent Solar Goal--Is There a Plan to Attain It?" (EMD-80-64, Mar. 31, 1980) which discusses DOE's lack of a plan for meeting this goal. Since the issuance of that report, DOE has informed us that they are now developing plans for achieving the 20-percent solar goal.

Funding Requested By RSECs
For Fiscal Year 1980

	DOE level (note a)	RSEC request
NESEC	$ 4.5	$15.3
SSEC	4.5	b/10.8
MASEC	4.5	17.3
WSUN	4.5	b/11.1
	$18.0	$54.5

a/DOE eventually raised the total RSEC funding for fiscal year 1980 to $21.7 million.

b/These centers submitted two budget requests, one at the DOE level, and one which these centers stated was the level required to meet the needs of their region. These figures represent the required level for their regions.

According to RSEC officials, they realized that they were exceeding the DOE budget advice when they submitted their funding requests. However, they felt that they had to submit budgets which were realistic with what they perceived to be the RSECs' role.

DOE officials believe that the RSECs are out of line in requesting such large sums for their activities. They felt that the RSECs, as DOE contractors, should be following DOE funding advice and not trying to obtain more money. They stated that it is not consistent with the RSECs' role to undertake the magnitude of activities which they desire, and that consequently the funding requested by the RSECs is unwarranted.

DOE officials, however, are not unsympathetic to the RSECs' funding requests. They stated that they would like to provide the RSECs more funds, but that constraints on DOE funds limit the amount DOE can award to the RSECs. DOE has taken steps to increase the RSECs funding and has advised the RSECs that a potential $36 million would be available for fiscal year 1981. While this is a $15 million increase over fiscal year 1980 funding, the RSECs feel that this is still insufficient for them to adequately carry out their role and that funding disagreements with DOE may persist.

The RSECs stated that they needed as least the same amount--$54 million--as they requested in fiscal year 1980.

CONFLICTS OVER ROLES IN SOLAR COMMERCIALIZATION

DOE allows both SERI and the RSECs to conduct activities in solar commercialization. While DOE's charter statement assigns a specific role in commercialization to the RSECs, SERI's role in commercialization is not clear. SERI and RSEC officials believe SERI has a role in commercialization, but agree the role needs to be better defined by DOE. Without a clear definition from DOE, SERI and RSEC officials are attempting to jointly define their responsibilities; however, there are still significant differences in their philosophies which could adversely impact on national efforts to develop and commercialize solar energy as a viable energy option.

SERI officials view their responsibilities to include national solar commercialization activities, and view the RSECs' responsibilities to relate to regional commercialization of specific solar technologies. According to the SERI Director, SERI is best suited for national commercialization because of its national perspective. He believes SERI can best serve as a national coordinator of solar commercialization activities. In this role, he said SERI could ensure that its RD&D work on solar technologies is carried through to commercialization and can assist DOE in coordinating the work of the RSECs.

The RSECs view SERI's activities as an infringement of their responsibilities. While RSEC officials acknowledge that SERI has some responsibility for commercialization, they believe many of SERI's commercialization activities fall into areas for which the RSECs are responsible. They cited the following as examples:

--SERI hosted regional meetings with trade unions to involve organized labor in solar energy commercialization.

--SERI recently initiated a national passive solar awareness campaign which RSEC officials believe is clearly a commercialization function which must be done on a regional basis if such a campaign is to have any impact.

Additionally, the RSECs feel that SERI's national commercialization and coordination efforts are often unjustified. RSEC officials stated that solar marketing activities are regionally and locally specific, and cannot always be

effectively carried out at the national level. They also stated that their staffs are more knowledgeable in marketing activities, and that consequently they have a better understanding than SERI of what activities need to be performed and how to do them.

SERI officials defended their activities in solar commercialization. They stated that many of the activities which the RSECs objected to were originally initiated prior to the time the RSECs were under contract with DOE or when the RSECs were still in the planning stages. Additionally, SERI believes that many of these disputes have been caused in part by differing views of "commercialization." SERI officials stated that many solar activities fall into a gray area that could qualify as either RD&D or commercialization. SERI's Director believes use of a strict definition for commercialization imposes arbitrary boundaries on what should be a smooth transition from basic and applied research to widespread use of solar energy by consumers and industry.

Just as the RSECs believe that SERI is too involved in regional solar activities, SERI officials believe that the RSECs have become too involved in work of a national rather than a regional nature. For example, they cited a case where DOE assigned one RSEC the responsibility to be the lead center and national coordinator of a project designed to analyze market penetrations of solar technologies throughout the Nation, a project SERI officials thought they should do.

Because of these disagreements over solar commercialization responsibilities, we noted instances where SERI and the RSECs would not work together on solar projects, to the possible detriment of the solar program. For example, we noted a case where SERI requested the participation of the RSECs in reviewing a document being developed by SERI on ways to achieve the 20-percent solar goal. The RSECs refused to provide the requested review services to SERI even though the document related to commercialization efforts. In addition, we also noted an instance where a RSEC official offered information to SERI on solar analysis techniques he had developed which he believed had a direct impact on SERI's work. This official told us that SERI declined his assistance without giving any reasons. During our review, we noted several other instances where SERI and the RSECs had refused to work together.

In spite of the disagreements noted above, SERI and the RSECs are working to improve their relationships. For instance, they are currently working on about 20 joint projects. In addition, SERI and the RSECs reached an agreement in June 1980 to work together to improve their planning and

operating procedures. However, they point out that these joint efforts and other relationships could be improved if the roles and responsibilities of SERI and the RSECs were clarified by DOE. DOE appears to be aware of the conflict over SERI's and the RSECs' roles on solar commercialization. A DOE Field Management Plan dealing with SERI's and the RSECs' responsibilities and roles, issued by its Office of Solar Applications in August 1979, noted that "SERI appears to have commercialization and information dissemination responsibilities that duplicate those of the RSECs." Additionally, the conflicts over solar commercialization responsibilities were thoroughly discussed at congressional oversight hearings in October 1979.

However, at this time, DOE has not resolved the problem with the role conflicts concerning commercialization responsibilities between SERI and the RSECs. A DOE official told us that they expect the commercialization roles of SERI and the RSECs will become better defined as DOE goes through the process of reviewing and approving SERI's and the RSECs' long-range plans.

We believe that the roles of SERI and the RSECs in solar commercialization need to be clarified as soon as possible. It appears that both SERI and the RSECs have legitimate roles in commercialization; however, the continuing conflicts and confusion over commercialization, if not resolved in a timely manner, could possibly cause overlap, delays, and disharmony in solar development efforts. These role problems have existed too long and should not be allowed to persist. Further delays in clarifying the roles may have an adverse impact on achieving successful solar development and the 20-percent solar goal.

CHAPTER 3

INEFFECTIVE SERI AND RSEC PLANNING PROCESS

The integration of SERI and the RSECs into DOE's solar program has been plagued by an ineffective planning process. Neither SERI nor the RSECs have multi-year operating plans which are needed for long-range stability. Consequently, both SERI and the RSECs have developed and implemented activities through annual operating plans. However, DOE's guidance for developing these plans has been at best unclear. As a result, there has been confusion in planning and implementing programs at SERI and the RSECs.

LACK OF SERI AND RSEC MULTI-YEAR OPERATING PLANS

DOE has a multi-year planning process in which DOE dedicated laboratories summarize their work in process, describe new thrusts the laboratories would like to undertake, and present an estimate of resources likely to be required over the ensuing 5-year period. This permits DOE to review the planned direction of these DOE contractor-operated laboratories, and later measure performance against plans.

While SERI and the RSECs are dedicated to DOE, they do not have multi-year plans to provide long-term stability to their operations. While the RSECs have not attempted to develop multi-year plans, DOE did attempt to have SERI prepare a multi-year plan during 1979, but this effort ended in failure because of a lack of agreement between DOE and SERI over the contents of the plan.

DOE has recognized the need to develop and implement a multi-year plan for SERI. The DOE Office of the Inspector General, in a report issued in April 1979, 1/ pointed out the need for a SERI multi-year plan to serve as a basis for planning for personnel, facilities, equipment and near-term technical work and provide stability in the SERI planning and budgetary process.

At about the same time as the Inspector General's report was issued, DOE requested SERI to prepare a draft plan for fiscal years 1980 to 1986. SERI submitted a draft multi-year

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1/"Report On The Inspection Of Management Controls At The Solar Energy Research Institute," INS-79-2, April 24, 1979.

plan to DOE in May 1979, but DOE disapproved the document because it was not in the prescribed format, the program and funding breakout was confusing, and DOE program managers did not like the plan's thrust or direction. Our review indicated that initially DOE did not provide SERI with formal guidance on how to prepare the plan. According to SERI officials, SERI had to prepare this plan based on informal discussions with various DOE program managers and other DOE headquarters staff. Because it was too late to revise the plan before the beginning of fiscal year 1980, DOE then directed SERI to prepare an annual operating plan for fiscal year 1980, and to delay its multi-year planning effort.

DOE, however, still believed the multi-year plan was necessary. In July 1979, the Assistant Secretary for Energy Technology confirmed the need for such a plan for SERI. He said that SERI is the only DOE laboratory entirely devoted to solar energy, and because of this, DOE is committed to developing SERI into a center of excellence. He stated that the multi-year planning process is needed to provide SERI with the stability necessary to meet this commitment.

Despite the importance of a multi-year plan in providing long-range stability, SERI, after being in operation for 3 years, still does not have one. The RSECs are also operating without a multi-year plan, and they, like SERI, are in need of long-range stability. DOE is attempting to rectify this situation for fiscal year 1981, and has asked both SERI and the RSECs to develop multi-year plans for the fiscal year 1981 planning cycle.

DOE GUIDANCE FOR ANNUAL OPERATING PLANS NOT EFFECTIVE

Since SERI and the RSECs do not have multi-year plans, DOE has used annual operating plans as the mechanisms for approving SERI's and the RSECs' work on a year-to-year basis. DOE's guidance for preparing the annual operating plans, however, has been unclear and conflicting. As a result, there has been considerable confusion in the development of both SERI's and the RSECs' annual plans. Constant changes in DOE's guidance caused repeated redirection of SERI's planning effort. The RSECs, on the other hand, received guidance from DOE which differed from DOE program manager needs, and resulted in conflicts over proposed RSEC activities. Consequently, both SERI and the RSECs experienced delays in beginning fiscal year 1980 activities. SERI's plan was initially approved 1 month after the start of the fiscal year, and required subsequent revisions. As a result, the final plan was not approved until 5 months into the fiscal year. The

RSECs' plans were approved about 8 months after the fiscal year started.

SERI's plans and activities hampered by DOE's changes

DOE's guidance to SERI for the development of its annual operating plan detailed the funds SERI would receive and the activity areas where the funds were to be applied. Based on DOE's guidance, and working with DOE program managers, SERI was to develop plans in each activity area.

DOE began providing guidance to SERI for its annual operating plan beginning in March 1979. This plan was to be done in conjunction with the multi-year plan activities discussed earlier. However, the guidance for this operating plan came piecemeal, much of it being received informally from DOE program managers. Changes to the guidance were received by SERI up to and beyond the start of the fiscal year. A cumulative analysis of DOE changes prepared by DOE's SERI site office, from March 1979 to January 1980, showed 12 different sets of funding levels. Total funding levels ranged from about $113 million in March 1979 to about $103 million in January 1980. Individual funding changes included:

--The Planning, Analysis, and Social Science program area at SERI originally was planned to be funded at $6.5 million. However, DOE changed its guidance on this program area five times, adjusting funding as much as $1.2 million. The final funding in this area ended up within $10,000 of the original funding guidance.

--SERI's Photovoltaics program area was originally allocated $41.2 million. It was subsequently reduced to $40.2 million, $34.9 million, and finally $32.8 million during the planning process.

--Various commercialization related activities were originally allocated $7.5 million. This changed to $8.4, $12.6, and finally $13.6 million during the planning process.

According to SERI officials, many of these changes did not even detail what tasks were to be added or deleted from SERI's operating plan.

As a result, SERI did not get its operating plan approved until October 26, 1979, almost 1 month after the start of the fiscal year. In this regard, SERI officials stated that they could not develop the detailed plans, establish milestones,

determine manpower needs, and implement its programs until after the operating plan was approved. Consequently, according to these officials, SERI was working on planning activities well into the fiscal year covered by the plan.

In addition, DOE required further changes to the approved operating plan. These changes ultimately became so extensive that SERI was required to prepare a revised plan, which was not approved by DOE until February 1980, 5 months into the fiscal year covered by the plan. According to a SERI official involved in the planning activities, the revisions required by DOE to the operating plan made a considerable part of the original effort "a worthless exercise."

SERI officials stated that the constant changes in guidance and funding resulted in excessive efforts on their part for planning, and less efforts on solar development. They stated that if DOE could have given more concrete guidance, they would have been able to devote considerably less time to planning activities, to develop their operating plan in a more timely manner, and to spend more effort on their solar work.

We also noted several areas where approved SERI work was being delayed due to DOE's changing direction. SERI's biomass program efforts received numerous informal changes from headquarters staff, but no official changes in the annual operating plan guidance and funding levels. These information changes resulted in considerable additions, deletions, and redirections of activities. Many of these changes were due to management staffing changes at headquarters, and to the proposed shift of management responsibilities for a substantial portion of SERI's biomass program to DOE's newly-created Office of Alcohol Fuels. An analysis prepared by DOE's SERI site office of SERI's annual operating plan stated that despite all of these changes, no one has officially changed the guidance and funding levels. Consequently, SERI officials have stated that they are reluctant to continue ongoing efforts, or start new work in biomass due to the uncertainty of the situation, and therefore, progress is being delayed in this important area.

SERI officials also stated that their work on DOE's schools and hospitals program and DOE's buildings energy standards program was similarly delayed due to confusion which arose over changes in DOE's guidance after the plan was approved.

RSECs' plans delayed due to inconsistencies in DOE guidance and approval

One of the RSECs' major missions is to provide a mechanism which can determine the commercialization needs of their respective regions and rapidly develop activities to address those needs. As stated by the former DOE Assistant Secretary for Conservation and Solar Applications, now the Secretary of Energy's Advisor for Conservation and Solar Energy Marketing, at SERI and RSEC oversight hearings before the Subcommittee on Energy Development and Applications of the House Committee on Science and Technology, on October 24, 1979:

> "One key aspect of the Regional Centers is the opportunity to pursue regional strategies for accelerating the demand for solar technologies. Solar will work best when married with local and regional needs and resources."
>
> "* * * the regional center[s] [have] the capacity and the mechanisms for determining the opportunities and best strategies for achieving the acceleration of those technologies within their own region. They are in the best position to do that, not DOE headquarters."

DOE provided guidance to the RSECs on June 29, 1979, for developing their fiscal year 1980 operating plans which was consistent with the above. It basically directed the RSECs to survey their respective regions and develop plans to address the commercialization activities determined to be needed. Consequently, the RSECs developed plans which they believed provided the best methods to market solar energy and represented the most pressing needs of their respective regions. These plans were submitted to DOE during September-October 1979.

The plans submitted by the RSECs were rejected by DOE. At a meeting between DOE and the RSECs on November 19-20, 1979, to discuss the plans, it became apparent that the activities proposed by the RSECs did not fit the needs of the responsible DOE program managers. DOE officials stated that, while the guidance provided flexibility to the RSECs in developing plans, they did not intend that the RSECs develop their own activities for commercializing solar energy but were to develop activities to carry out regional portions of DOE's national programs.

Consequently, DOE told the RSECs that they would have to revise the operating plans, and on December 21, 1979, DOE

submitted revised guidance for developing the plans. This guidance tied the RSECs' funds to various DOE programmatic activities, and assigned DOE program managers with whom the RSECs had to coordinate to ensure they planned the activities DOE desired.

DOE program managers informed us that the major reason for the changes in the RSECs' plans was that the funds for the RSECs came from existing DOE programs, which were approved in budgets submitted 2 years ago, and most of the activities proposed by the RSECs did not fit in with these programs. Some of the program managers described the RSECs' plans as a "shopping list" of projects.

According to RSEC officials, however, the changes to their annual operating plans have limited their effectiveness in meeting regional commercialization needs. The RSECs are not being permitted to undertake the majority of the activities they feel are the most necessary to commercialize solar energy and are required instead to undertake activities which ignore the regional differences between RSECs. For example:

--NESEC has determined that one of its region's most urgent needs is to retrofit existing homes with solar hot water heaters. The center conducted a program in fiscal year 1979 called "Operation Sunpower," which more than doubled the number of solar water heaters in the region to about 10,000. The center received an award for outstanding promotional publicity from a national public relations organization for this program. Consequently, the center proposed similar activities for fiscal year 1980 which would again double the number of solar water heaters installed in its region to nearly 20,000. DOE changed much of NESEC's proposed activities in this area to others, such as managing ongoing solar demonstration projects, which NESEC neither requested nor wanted. According to NESEC officials, they now expect to reach less than 40 percent of their goal because of DOE's redirection of their efforts.

--MASEC included in its plan an anemometer program which would enable people in the region to measure potential wind resources and determine if a small wind energy conversion system would be economically feasible. DOE directed that MASEC drop this activity, and instead use funds to monitor the Public Utilities Regulatory Policy Act to ensure fair treatment by utility companies for small wind energy conversion systems owners. MASEC neither requested nor wanted to perform this activity, and MASEC officials

stated that they do not view this activity as a regionally-oriented commercialization activity.

The RSECs' activities for fiscal year 1980 have also been significantly delayed due to the changes in RSECs' annual operating plans. The RSECs cannot undertake new activities until their operating plans are approved by DOE. However, because of DOE's redirection of the RSEC's plans and multiple reviews of the plans within DOE, the plans were not approved until May and June 1980, 8 months into the fiscal year covered by the plan. This delay in implementing fiscal year 1980 activities has hindered the RSECs' solar commercialization efforts. For example, MASEC had developed designs for 20 passive solar homes which they planned to reproduce and distribute to constituents in the region. However, because of the delays in approving the annual operating plans, MASEC could not contract to have the plans reproduced, and by May 1980 MASEC had a backlog of over 6,000 requests for copies of the home plans. A representative of MASEC stated that they had received many calls from angry residents in its region about the designs not being available. According to officials of all four RSECs, the delays in approving their annual operating plans have hurt their credibility in their respective regions. They stated that since regionally developed programs are not being fully undertaken and those that are undertaken are late, their efforts to get solar energy implemented have been set back significantly.

RSEC officials, in discussing the cause of the changes to their annual operating plans, stated that the RSECs are simply becoming extensions of DOE since they are merely carrying out tasks of existing DOE programs. They stated that they are not becoming the valued commercialization resources to DOE and to their respective States as was intended by DOE. Since most of the locally developed activities are not being undertaken, and those activities which are undertaken by the RSECs are delayed, the RSECs are viewed by some parties within their regions as unresponsive to the region's needs and therefore ineffective. Consequently, the RSECs' staffs are disillusioned, and the contractor operating one RSEC threatened at one point to vote itself out of existence if this situation continues.

PROBLEMS IN THE FISCAL YEAR 1981 PLANNING PROCESS

DOE recognized that problems existed in the fiscal year 1980 planning process for SERI and the RSECs which reduced the effectiveness of the planning efforts. DOE officials told us that, in retrospect, some mistakes were made in not providing more clear and timely guidance to SERI and the

RSECs which contributed to the delays and confusion in the activities to be performed by these organizations.

DOE is attempting to resolve the problems of the past. DOE has again requested SERI to develop a multi-year plan, and for the first time has requested the RSECs to do the same. DOE officials stated that the development of these long-term plans will provide stability to the SERI and RSEC planning processes. Additionally, with regard to the RSECs, these officials stated that DOE is providing planning guidance which will better detail what types of actions DOE desires, while providing flexibility for the development of regionally specific activities.

Our review of the fiscal year 1981 DOE planning direction and guidance indicates that problems with the fiscal year 1981 multi-year planning process exist. If not corrected, this planning effort could result in a repeat of the changes and delays which occurred in the fiscal year 1980 efforts. For example

--guidance was to be submitted in early March 1980; however, such guidance was not received by SERI until mid-April 1980 and by the RSECs until mid-May 1980;

--the guidance received was vague and incomplete. For example, SERI's guidance only provided funding by program area, and did not include direction on programmatic activities and an estimate of funding in four areas. Guidance provided to the RSECs similarly lacked program direction and objectives;

--informal guidance from DOE program managers has been provided to SERI and the RSECs which conflicts in some areas with the formal guidance provided by DOE. For example, SERI's guidance directed it to plan activities in one area at a $1.0 million level, while program managers at the same time instructed SERI to plan at a $6.5 million level for the same area.

Both SERI and the RSECs are concerned about the direction the fiscal year 1981 planning process is taking. SERI officials are concerned that the development of parts of the detailed work plans may become nothing more than a paperwork exercise since they expect numerous changes to the plan again this year. RSEC officials stated that based on the vague guidance and their subsequent meetings with solar program managers, they believe that they will be again required to perform only DOE-initiated activities in fiscal year 1981, and will not be provided any flexibility to initiate activities to address the specific needs of their respective

regions. Consequently, they are worried that they will remain entities for carrying out DOE's national programs. Officials of SERI, the RSECs, and even DOE expressed concern that the fiscal year 1981 planning activities could result in a repeat of the planning problems that occurred during fiscal year 1980.

CHAPTER 4

DOE'S ORGANIZATIONAL STRUCTURE HAS NOT FOSTERED INTEGRATED AND COORDINATED MANAGEMENT OF SERI AND THE RSECs

DOE has not provided an organizational structure for effectively integrating and coordinating the management and use of SERI and the RSECs. DOE last year reorganized its solar program structure to improve its efforts to develop and promote solar energy use. Included in this reorganization was a realignment of SERI and the RSECs to improve DOE's management of these entities. This new organizational structure, however, may only be a limited improvement in DOE's management and use of SERI and the RSECs.

PAST ORGANIZATION NOT CONDUCIVE TO COORDINATED MANAGEMENT OF SERI AND THE RSECs

To effectively develop and commercialize solar energy requires close coordination of RD&D activities on the one hand and market development or commercialization activities on the other. Generally, energy research must be performed with an eye towards commercialization, while commercialization must be carried out in unison with research. Additionally, close coordination of research and commercialization activities reduces time lags and delays in the eventual adoption of solar technologies.

In bringing SERI and the RSECs into being, DOE did not place SERI and the RSECs in a position which would promote close coordination with each other or with itself. On March 7, 1978, the Secretary of Energy placed SERI and the RSECs under separate divisons of DOE. SERI was placed under the Assistant Secretary for Energy Technology while the RSECs were assigned to the Assistant Secretary for Conservation and Solar Applications. This separation reflected DOE's belief that different kinds of managerial skills were required to resolve technical problems as opposed to managing commercialization activities.

The organizational structure that ensued, however, was not effective. There was no direct relationship between SERI and the RSECs and no formal coordination or communication links existed. While some informal communication and coordination took place, it was hindered by the lack of an

effective structure to promote a harmonious working relationship. Additionally, no one office within DOE was directly in charge of both SERI and the RSECs. As a result, no resolution of the role problems between SERI and the RSECs, as discussed in Chapter 2, could be achieved since no one office was in a position to make this determination.

DOE REORGANIZATION OF 1979

On October 1, 1979, DOE revised its solar organization and management structure as part of a major DOE-wide reorganization. In testimony before the Senate Commitee on Governmental Affairs in October 1979, the Secretary of Energy cited the importance of DOE's reorganization:

> "In reshaping the Department so that all of the functions related to a single technology are grouped together, we believe that we can achieve improved accomplishment of the various steps in the technology development process and speed the transition of technology we develop into the public domain."

In this regard, DOE reorganized its solar efforts under one Assistant Secretary for Conservation and Solar Energy. Subsequently, in February 1980, the Assistant Secretary consolidated solar energy technology and solar applications programs under one Deputy Assistant Secretary for Solar Energy, according to the market sectors using the solar technology (i.e., buildings, utilities, and industry). This Deputy Assistant Secretary was assigned responsiblity for solar project funding and management, including those projects undertaken by SERI and the RSECs.

The Assistant Secretary for Conservation and Solar Energy also established a Deputy Assistant Secretary for Field Operations and International Programs. The responsibility for management and coordination of both SERI and the RSECs was placed under this office, including responsibility for coordinating DOE's relationships with SERI and the RSECs, interfacing SERI's and the RSECs' activities with DOE's institutional planning and management process, ensuring that SERI and the RSECs receive proper institutional guidance, and coordinating their institutional activities with DOE's programs.

According to DOE officials, this reorganization will better facilitate solar development. Under the reorganization, program managers at DOE now have total responsibilities, from RD&D to commercialization for their respective solar technologies. SERI and the RSECs now have a common reporting relationship, which DOE believes will lead to a much more

coordinated effort between SERI and the RSECs, and a more productive relationship with DOE.

DOE'S PRESENT SOLAR ORGANIZATION MAY BE ONLY A LIMITED IMPROVEMENT

DOE's restructuring of its organization for managing SERI and the RSECs was an effort to improve its operating relationships for dealing with these entities. While the new organizational structure can improve the working relationships between SERI and the RSECs, it appears this organization may not solve all the problems related to DOE's management of these entities. Consequently, problems may remain in integrating SERI and the RSECs into the overall solar program.

Possible improvement in SERI and RSEC relationships

One of the objectives in DOE's reorganization of its solar programs was to improve the relationship and coordination between SERI and the RSECs. In this regard, the DOE reorganization appears to be an improvement, although it is still too early to fully evaluate its effectiveness.

The past DOE organization had placed SERI and the RSECs under separate Assistant Secretaries. This structure caused different reporting relationships with DOE for SERI and the RSECs, decentralized management of these entities, and inhibited coordinated efforts between SERI and the RSECs.

The new organization places SERI and the RSECs structurally under one Deputy Assistant Secretary for Field Operations and International Programs who is responsible for their institutional management. This organization appears to be an improvement since

- --it centralizes some of the functions for managing and coordinating SERI and the RSECs under one office,
- --it establishes a closer relationship between SERI and the RSECs, and
- --it establishes a single authority who can act to improve the coordination between SERI and the RSECs.

This reorganization should improve the relationship between SERI and the RSECs, and, while the reorganization is only now being fully implemented, indications are that SERI's and the RSECs' relationships are improving. Quarterly meetings between SERI and the RSECs are now held, and as

previously stated, SERI is involved in over 20 joint projects with one or more RSECs. Both SERI and RSEC officials stated that this organizational alignment is an improvement over the past in regard to their interrelationships. They stated that interaction and feedback between SERI and the RSECs is improving, and this should improve each organizations' efforts to get solar energy implemented into the Nation's energy structure.

The new organizational alignment can also provide the necessary structure for determining the appropriate roles in commercialization for SERI and the RSECs. As noted in Chapter 2, conflicts exist between SERI and the RSECs over commercialization activities. Evidence of where the new organizational structure can help resolve these commercialization problems occurred recently when the Office of Field Operations and International Programs brought SERI and the RSECs together for a meeting in June 1980 to discuss their differences. At this meeting, SERI and the RSECs agreed to review each other's operating plans to resolve differences over activities before they occurred. They also agreed to develop mechanisms to provide feedback on RD&D and commercialization needs to each other and to establish early involvement in joint projects. SERI and RSEC officials said that this agreement was a step in the right direction towards solving some of their existing problems.

Questionable improvement in DOE's management of SERI and the RSECs

While DOE's reorganization may improve the relationships between SERI and the RSECs, it is questionable whether it will effectively improve these entities' relationships with DOE. Under the reorganization, the problems that existed in the past have not been resolved, and new concerns have been raised.

In placing SERI and the RSECs under a single Assistant Secretary, DOE hoped to reduce the problems and confusion these organizations had in dealing with DOE. As stated by the then Under Secretary of DOE in the October 1979 oversight hearings of the Subcommittee on Energy Development and Applications of the House Committee on Science and Technology for SERI and the RSECs:

> "As of October 1, both SERI and the Regional Centers report to the Assistant Secretary for Conservation and Solar Energy. Previously, SERI reported to the Assistant Secretary for Energy Technology and the Regional Centers

reported to the Assistant Secretary for Conservation and Solar Applications. This new organization makes DOE management more effective and reduces confusion on the part of SERI and Regional Centers in dealing with DOE. The elimination of some dual management functions should enable us to devote more time to program development and to the encouragement of innovative R&D and creative marketing strategies."

The Under Secretary further stated:

"* * * I would believe that [the Assistant Secretary for Conservation and Solar Energy] would be likely to have a deputy assistant secretary exclusively responsible for the solar programs, and as exclusively responsible for the solar programs for that assistant secretary, he would have responsibility as the deputy assistant secretary for the institutional management of both the regional solar centers and the Solar Energy Research Institute * * *."

However, in establishing its new organization, DOE did not place SERI and the RSECs under the deputy assistant secretary responsible for the solar programs. Consequently, the office responsible for solar programs does not have responsibility for the institutional management of SERI and the RSECs, and as a result many dual management functions still appear to exist.

Under the new organization, SERI and the RSECs receive management guidance from the Deputy Assistant Secretary for Field Operations and International Programs. However, no funds for SERI's and the RSECs' operations are budgeted with this deputy assistant secretary. All SERI and RSEC funds come from the program managers under the Deputy Assistant Secretary for Solar Energy. To undertake activities, SERI and the RSECs must now report to management under both deputy assistant secretaries.

DOE officials explained that this alignment was made to enable SERI and the RSECs to work with groups outside of the solar program; for example, the Office of Conservation or the Office of State and Local Assistance Programs. The officials stated that they did not foresee any major problems for SERI and the RSECs working under this organizational structure.

However, SERI and RSEC officials expressed mixed feelings about their placement in DOE's organization. Generally, they believed that the creation of the Office of Field Operations and International Programs was an improvement since they now have a "champion" for SERI and the RSECs in the DOE hierarchy. However, they have concerns about receiving management guidance and direction from one deputy assistant secretary and funding from another deputy assistant secretary. Many were of the opinion that since funding came from the Office of Solar Energy, the Office of Field Operations and International Programs would have little influence over the operation of SERI and the RSECs. For the same reason, they were also concerned whether the Office of Field Operations and International Programs could eliminate the planning problems of the past. SERI and RSEC officials pointed out that some of the planning problems are recurring under the current organizational structure. For example:

--DOE guidance to the RSECs for the fiscal year 1981 annual operating plan and multi-year plan was 11 weeks behind schedule.

--DOE guidance to SERI for its multi-year plan was 6 weeks late and piecemeal and jeopardized the schedule for the development of this plan.

--Differing directions are being received from the DOE officials under the Deputy Assistant Secretary for Field Operations and International Programs and from DOE program managers under the Deputy Assistant Secretary for Solar Energy.

Additionally, some SERI and RSEC officials stated that they are still unsure of their roles in the overall solar program, and that the reorganization has done little to improve their position in the program. One RSEC official, in discussing the effectiveness of the organization, stated that the Deputy Assistant Secretary for Field Operations and International Programs has only become a "court of last resort" rather than a planning and coordinating mechanism for the RSECs.

Some DOE officials, particularly at the program level, also expressed concerns with the new organization. These officials pointed out that instead of consolidating DOE's solar energy efforts, this organization has again divided the solar program. The program officials stated that it is their management responsibility to adequately control the funds appropriated by the Congress, and this reorganization may make it difficult for program managers to control the efforts SERI and the RSECs undertake with their programmatic funds,

particularly if SERI and the RSECs view themselves as being autonomous from the solar energy program.

While it is too early to sufficiently evaluate the effectiveness of the organizational structure, we agree that the concerns expressed to us by DOE, SERI, and RSEC offices are significant and need to be expeditiously resolved by DOE to prevent the recurrence of the planning, reporting, and control problems that existed in prior years and to assure that such problems do not adversely impact on the development of a cohesive solar effort. Consequently, this situation needs to be closely monitored by DOE to ensure that this organization is made to work effectively, and that SERI and the RSECs become integral parts of the solar program.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

SERI and the RSECs were designated by DOE to become the Federal Government's lead institutions for developing and commercializing solar energy. However, 6 years after the Congress passed legislation authorizing the creation of SERI, and 3 years after the RSECs were created, it is clear that these organizations are not yet providing the leadership intended. It is also clear that the successful development and commercialization of solar energy, and the ultimate attainment of the 20-percent solar goal, will require the optimum use of these organizations.

The following problems are hindering the effective use of SERI and the RSECs and their successful integration into the solar program:

--The leadership roles of SERI and the RSECs have not been effectively implemented, resulting in confusion over their roles within the solar program and their activities in solar commercialization.

--The process for planning and approving SERI's and the RSECs' activities has been ineffective.

--DOE's past solar program structure did not provide cohesive management of SERI and the RSECs, and DOE's reorganization of its solar programs may be only a limited improvement.

These problems are preventing DOE, SERI, and the RSECs from becoming an effective team for developing and commercializing solar energy technologies. To be fully effective, each organization must have a good understanding of its role, a firm idea of what they are to do, and be able to work well with the other organizations involved in the solar effort. However, due to confusion and disputes in these areas, a cohesive solar team has not been developed. While DOE, SERI, and the RSECs are working towards the same objective--the implementation of solar energy into the Nation's energy structure--each organization has a different interpretation of what each is to do to get solar energy implemented. Consequently, this is adversely impacting on the solar program by causing delays and changes to planned or ongoing activities at SERI and the RSECs.

We believe DOE needs to improve its management of SERI and the RSECs and to more effectively integrate them into the solar program. First, DOE needs to effectively use SERI and

the RSECs as lead institutions for developing and commercializing solar energy as intended. DOE has assigned broad roles to each organization, but has not yet allowed either to fulfill its assigned role. While we recognize that DOE has overall responsibility for the solar program, DOE should allow these organizations to assume the responsibilities for which they were created.

Also in regard to roles, DOE needs to clarify the roles of SERI and the RSECs in solar commercialization. Historically, a role exists for both SERI and the RSECs in solar commercialization; however, DOE needs to make the distinctions between their roles clear so that the disputes and overlaps in this area are ended. Such disputes can only hinder the solar program by causing delays and ineffectively using commercialization resources. While SERI and the RSECs have been trying to resolve the commercialization disputes, we believe that it is the function of DOE to take firm action to satisfactorily end these disputes.

Secondly, DOE needs to take action to make the SERI and RSEC planning process more effective. Problems occurred in the development of SERI's and the RSECs' fiscal year 1980 operating plans, and the potential for similar problems with the fiscal year 1981 plans still exists; in fact, some initial problems have already surfaced. DOE needs to provide more timely and more specific guidance to better ensure that plans are developed in a timely fashion and the direction of activities to be undertaken is understood by all. DOE needs to make every effort to ensure that multi-year plans are satisfactorily developed by SERI and the RSECs, in order to provide more stability to these organizations, and to provide DOE and the Congress with a clear picture of what directions SERI and the RSECs are headed. Additionally, in regard to the RSECs, DOE needs to provide some flexibility in the planning process so that solar commercialization needs of the respective regions can be better addressed by the RSECs.

Third, DOE needs to closely monitor the effectiveness of its organization for managing SERI and the RSECs. SERI and the RSECs have been organizationally placed under a single deputy assistant secretary responsible for their management--the Deputy Assistant Secretary for Field Operations and International Programs. This new solar organization appears to be a more effective organizational alignment than in the past, since SERI and the RSECs are now placed under one office. However, this new solar organization may result in only a limited improvement. SERI and the RSECs must obtain funding and programmatic guidance from a separate deputy assistant secretary--the Deputy Assistant Secretary for Solar

Energy. SERI and the RSECs therefore may experience continual problems in be becoming effective parts of DOE's solar program.

RECOMMENDATIONS TO THE SECRETARY OF ENERGY

We recommend that the Secretary of Energy take actions to ensure that SERI and the RSECs are effectively integrated into the Federal solar program. As a minimum, the Secretary should:

--Use SERI and the RSECs as DOE's lead institutions for solar energy development and commercialization, as intended. As part of this action, the Secretary should assign tasks and responsibilities to these entities that are consistent with their lead institution roles. Particular attention should be given to the leadership role in solar commercialization in view of the confusion which now exists.

--Improve the planning process for developing SERI's and the RSECs' activities. Improving the process should entail the development of more timely and clear guidance to these organizations which would permit the development of plans by SERI and the RSECs which meet established schedules and the needs of DOE. Some flexibility should be incorporated into the planning process to permit the RSECs to undertake activities to address specific regional solar commercialization needs. The Secretary should also ensure that multi-year plans are satisfactorily developed this year to provide needed stability to SERI and the RSECs.

--Monitor the effectiveness of the DOE's reorganization of its solar program with regard to integrating SERI and the RSECs into the Federal solar program and using them as lead institutions.

APPENDIX I

United States Senate
COMMITTEE ON
GOVERNMENTAL AFFAIRS
WASHINGTON, D.C. 20510

February 7, 1980

The Honorable Elmer B. Staats
Comptroller General of the
United States
General Accounting Office
Washington, D. C. 20548

Dear Mr. Staats:

As you know, the Committee on Governmental Affairs is carrying out oversight of the Department of Energy. We have been following with some interest the progress of the Solar Energy Research Institute (SERI), originally authorized in October 1974. SERI, along with the four regional solar energy centers created by the Department, is to provide Federal leadership in solar energy development and commercialization. Our investigations have revealed a troubling lack of such leadership in this critical area.

We therefore request the General Accounting Office (GAO) to undertake a review of SERI and the regional solar energy centers. The Committee is particularly interested in the roles, relationships, progress, and problems of SERI and the regional centers. We request that GAO provide a report on the results of its review by June 1980, in order that it may be considered in the preparation of a Committee report scheduled for that time frame on DOE's organizational effectiveness and its impact on solving energy problems.

We request that the staff you assign to this inquiry be in touch with our staff at the Committee to identify specific problem areas requiring detailed consideration. Please have them contact Mr. Dana Peck (for Senator Percy) at 224-2174 and Mr. David Nichols (for Senator Ribicoff) at 224-4751.

Your cooperation is greatly appreciated.

Sincerely,

(307185) Abe Ribicoff
Chairman

Charles H. Percy
Ranking Minority Member

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