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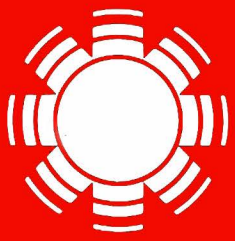
Proceedings: Photovoltaics User Review Panel

March 6 and 7, 1979

Stephen Carroll



SERI

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A Division of Midwest Research Institute

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PROCEEDINGS: PHOTOVOLTAICS USER REVIEW PANEL

MARCH 6 AND 7, 1979

STEPHEN CARROLL

AUGUST 1979

PREPARED UNDER TASK NO. 6930.51

Solar Energy Research Institute

1536 Cole Boulevard
Golden, Colorado 80401

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Prepared for the
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FOREWORD

This document was prepared under Task 6930.51 by the Communication Branch of the Solar Energy Research Institute (SERI) Technology Commercialization Division, Dr. Stephen Carroll, Photovoltaics Technical Information Dissemination (TID) Project Leader.

In December 1978, SERI's TID Program was approved by the U.S. Department of Energy (DOE), ETS/Solar Divisions. The purpose of this program is to conduct technical information dissemination activities to support the earliest appropriate commercialization of research and development results in five solar technologies: photovoltaics, solar thermal power, biomass, ocean thermal energy conversion, and wind energy conversion.

The TID program called for the establishment of advisory committees, entitled User Review Panels, as a primary task for each of the solar technologies.

The Photovoltaics User Review Panel first met on March 6 and 7, 1979 in Denver, Colo. This report describes the discussions, recommendations, and conclusions of the panel.

Keith Haggard, Chief
Communication Branch

Approved for:
SOLAR ENERGY RESEARCH INSTITUTE

Jon Veigel, Assistant Director
Technology Commercialization Division

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SECTION 1.0

INTRODUCTION

In the spring of 1978, the U.S. Department of Energy (DOE) ETS/Solar Divisions requested the Solar Energy Research Institute (SERI) to develop a program to conduct information dissemination activities to support the commercialization of solar energy. This responsibility was assigned to the Communication Branch of SERI's Technology Commercialization Division.

A Technical Information Dissemination (TID) Program was developed to respond to the DOE directive and was approved by DOE in December 1978. The purpose of the TID Program is to define, produce, and disseminate communication products to facilitate the earliest appropriate commercialization of solar energy research and development results. The program is divided into five technological areas—photovoltaics, solar thermal power, biomass, wind energy conversion, and ocean thermal energy conversion—each with specific communication activities to be completed.

Target audiences have been defined to serve as the foci for the activities that will be implemented within each technology area. These four target audiences are characterized as follows:

- Target audience 1 (TA_1) consists of DOE contractors—the laboratories and research organizations funded by the government and linked with one another through federal reporting regulations and DOE-monitored channels;

- Target audience 2 (TA_2) includes the private and academic research communities, as well as organizations involved in production and marketing functions, who are not directly involved in DOE-sponsored research and development;

- Target audience 3 (TA_3) is composed of advocates and influencers—environmentalists, lobbyists, and legislators—who influence the acceptance and adoption of the solar technologies; and

- Target audience 4 (TA_4) is the larger interested public—individuals who are or may become the end users of solar technologies. A more detailed description of these four target audiences can be found in Appendix A of this report.

An initial step in the implementation of the TID Program was to establish and convene User Review Panels for each of the five technologies. These panels included key representatives from each of the target audiences to provide input regarding specific TID products and insure a continuing mechanism of feedback and suggestions during the actual development of these products. The immediate purpose of the panel discussions was to determine the TID needs for the various audiences, to reach agreement on what informational products could fill these needs and who should produce the materials, and to establish priorities for the need for the TID products.

SECTION 2.0

PROCEDURE

A list of proposed Photovoltaics User Review Panel members was carefully compiled by SERI and DOE personnel to include key representatives of the four target audiences. Appropriate representation was critical because panel members would continue to play an important part in the evolution of the TID plan through semiannual meetings and a continuing association with SERI TID personnel between meetings. It was decided that TA_1 should include Lead Center photovoltaics contractors (Jet Propulsion Laboratory and SERI), TA_2 include key independent researchers, TA_3 include representatives from the solar advocacy, political, and environmental communities, and TA_4 include representatives from the individual and institutional user groups and from the public information dissemination area.

Each potential panel participant was sent a letter of introduction and a copy of the TID plan to clarify the purpose of the panel and the role of each member. Each person invited either participated in the panel or sent a representative in his place.

Two constraints on the meeting were time and place. The meeting was limited to two days, March 6 and 7, 1979, because of the panel members' other commitments. Although a conference room at an airport hotel offered a better working environment than SERI because of the newness of the SERI complex and related distractions, it was considered important that the panel members have the opportunity to see SERI and meet some of its personnel. Consequently, the panel met at SERI on the morning of the first day and then at Stouffer's Denver Inn for the remaining time. The final afternoon was left free so that participants could return to SERI if they chose.

In the first morning session, presentations were made to acquaint the panel with SERI and to provide information about the TID program. The rest of the meeting was divided into sequential working sessions in which the needs of each target audience were discussed. All members of the panel were involved in each workshop.

Members of the panel and the target audience represented by each were as follows:

TA_1: Tony Pearson, Program Administration Manager, Photovoltaics Technology Development and Applications
Jet Propulsion Laboratory, Pasadena, Calif.

Larry Kazmerski, Senior Scientist
SERI Photovoltaics Branch

Ed Witt, Senior Scientist and Task Manager
SERI Photovoltaics Program Office

TA_2: Bob Brown, Manager, Terrestrial Solar Power Programs
Optical Coating Laboratories, Inc., City of Industry, Calif.

Arnie Lesk, Manager, Solar Energy Research and Development
Motorola, Inc., Phoenix, Ariz.

Guy Roderick, President
Photon Power, Inc., El Paso, Tex.

TA_3: Lee Salmon, Board Member
Colorado Solar Energy Assoc., Loveland, Colo.

Joan Shorey
Solar Lobby, Washington, D.C.

Kathryn Lawrence, Staff Environmental Scientist
SERI Institutional & Environmental Assessment Branch

TA_4: Roger Dennett
Boulder Solar Energy Society, Boulder, Colo.

Rod Kuharich, Senior Resource Planner
Colorado Springs Department of Public Utilities, Colorado Springs, Colo.

Bill Stephenson, Senior Public Information Officer
SERI Public Information Office

See Appendix B for more information about the Photovoltaics User Review Panel members.

SECTION 3.0

DISCUSSION

SESSION 1 (March 6, 9-12 a.m.)

Joseph Carlson, Assistant Director of SERI's Technology Commercialization Division, welcomed the panel members and expressed SERI's appreciation for their attendance. He stressed the importance of the TID program and invited comments from the panel members.

General information about SERI was presented by Jerome Williams, head of the Public Information Office. During this presentation, general questions were raised by the panel members regarding the national photovoltaics program and SERI's role in it. Panelists wanted a clearer definition of the national program and SERI's involvement, including budgetary information.

Keith Haggard, Chief of Communication Branch, then introduced the branch, whose members were responsible for developing the TID program. He emphasized the need to accelerate commercialization of P/V and pointed out that the cooperation of the target audiences and popular acceptance of the technology are necessary before the goal of commercialization is reached. Mr. Haggard asked for the panel's help in assuring the quality and accuracy of technical information and in facilitating two-way communication between SERI and key members of the four target audiences.

The newness of SERI and the Technology Commercialization Division was emphasized by Mr. Haggard and Mr. Williams. They said it is important to remember that the TID effort was begun in December 1978 and is only now taking shape.

Next, Steve Rubin from the Information Systems Division talked about the Solar Energy Information Data Bank (SEIDB), a system being developed at SERI which will collect, review, process, and distribute information and data in all of the solar energy technologies.

Pete Mourning, TID program manager, then explained the TID plan, its establishment, purpose, and goals. At this point, panel member Bob Brown recommended that a major effort of the TID plan should be to avoid duplication of efforts by different agencies and organizations.

The development of a distribution list including the names of key people within each target audience was explained by Mr. Mourning.

Several panel members suggested that SERI evaluate the international market potential immediately rather than wait until the second year of the TID program. It was recommended that a representative of this market be invited to speak at the next User Review Panel meeting.

It was also emphasized that SERI should serve as a vehicle for communicating the recommendations and conclusions of the target audiences to appropriate officials in DOE and other agencies. Panel members agreed that there should be more coordination and centralization of government efforts to enhance the commercialization of P/V. A suggestion was made to have all five TID panels convene to consider a unified approach

to the problem. However, several panel members objected to this since it would be cumbersome and the productivity of such a meeting was questionable.

Stephen Carroll, photovoltaics TID project leader, explained the present scope and mission of the panel. This initiated a discussion on what is being done now to meet the TID needs of the target audiences, what more should be done, and who is best suited to accomplish these activities. The panel was given the responsibility of recommending specific projects to be accomplished, setting priorities for them, and suggesting how their effectiveness could be evaluated.

The panel members then introduced themselves and briefly talked about their interests and needs regarding P/V. Following this, the morning session adjourned. The panel moved from SERI to Stouffer's Denver Inn for the afternoon session.

SESSION II (March 6, 1:15-5 p.m.)

The session began with brief presentations from panelists representing target audience 1 (TA_1) and target audience 2 (TA_2). Ed Witt gave an overview of SERI's Photovoltaics Program Office activities and funding considerations, and fielded questions and comments. The point was made that many people, particularly those in TA_2, should have better access to information generated by TA_1. At present, many people remain uninformed regarding DOE-contracted research and development activities due to a lack of effective communication channels. The improvement of this situation will aid in the commercialization of P/V.

Next, Larry Kazmerski discussed P/V research and development activities at SERI, and Tony Pearson talked about the Technology Development and Applications program conducted by JPL. Questions and comments regarding this Lead Center program centered around the need for more specific information, especially in such areas as accountability, definition of the national program, organization of the budget and funding considerations, and planning and goal attainment. Many panel members would like to know more about the discretionary powers of the Lead Centers and DOE.

TA_2 representatives Bob Brown, Guy Roderick, and Arnie Lesk then spoke. This target audience wants P/V to become economically viable as soon as possible and sees increased cooperation with TA_1 as the best way to achieve this goal. Representatives discussed the need to research, manufacture, and market efficient products; to develop a manufacturing process for producing solar cells on a relatively large scale; and to learn what information is available for the small businessman who cannot afford the time and expense to attend meetings or search for valuable information generated by TA_1. TA_2 panelists mentioned that there is up to a year's lag time in getting technical information from DOE contractors unless a personal contact is involved. To help alleviate this problem, it was suggested that an in-house referral directory might be established—a list of contacts in appropriate organizations that an outsider could consult for particular kinds of information. SERI could take the lead in establishing the directory. Anyone who wanted to be included in the directory would be, and it would be available on request.

At this point the discussion turned to the specific needs of TA_1. There was general agreement that TA_1 is presently a rather small and close-knit group and that its TID needs are being met much better than are those of the other target audiences.

The possibility of a newsletter was introduced, but panelists representing TA_1 did not think that another publication of this type was necessary. Instead, TID effort would be

more valuable if it were used to provide support to existing newsletters and similar publications through more thorough and regular contact.

Regarding trade meetings, panelists agreed that there is no substitute for personal contact. There are plenty of P/V meetings to attend, but the panel felt that if information about the meetings were provided further in advance, prospective attendees could be more selective about which ones to attend. Specifically, the agenda should be available well in advance of a meeting, and in many cases, the proceedings of the meeting should be available sooner. There was a consensus, however, that the 4-month time span required to get Project Integration Meeting (PIM) proceedings published and distributed was fast enough.

Other discussion centered around the need for more complete budgetary and organizational information: what money is available, which programs are to be funded, who are the appropriate contacts. Planned announcements and their proper distribution are very important to TA_1. It was also pointed out that there should be a better way to keep abreast of international developments.

SESSION III (March 7, 9 a.m.-12:30 p.m.)

The session began with a brief summary of the discussion of the previous day. It was mentioned again that TA_2 needs better access to information generated by TA_1, including contract results, budgeting, and marketing data. The panel agreed that it would be very useful if the contents of Commerce Business Daily were categorized into an area for solar energy information. It was also reaffirmed that there are presently enough P/V conferences, and workshops, but that agendas and other information for the meetings should be more readily available in advance.

At this point, a question was raised about the definitions of the target audiences. Tony Pearson suggested that the panel look at various market applications and the supply of and demand for each application as a way to define the audiences. He mentioned that there are different actors depending upon which market segment one is in.

In the discussion that followed, it was suggested that major categories such as technical/nontechnical and manufacturer/user be used. It was concluded that redefinition of the target audiences for P/V possibly was in order, and that this question would be examined in the coming months with continuing input from the panel. The current definitions of the target audiences will be used until the panel agrees on better ones, however.

Rod Kuharich then remarked that institutional users, such as utility companies, need information synthesis rather than information dissemination. Linear extrapolation of available data is needed to predict, with some degree of accuracy, the impact in the future. Mr. Kuharich said that the information needs of institutional users are worlds apart from the needs of the manufacturer, who is concerned with type and source of cell material, cost, and manufacturing process.

Roger Dennett said that there is a distinction between the information needs of the manufacturer and the user: the manufacturer has a single information need, while the user has multiple needs. Joan Shorey suggested a third category of individuals who have technical information needs—the interpreters. She said this category includes a whole area of middlemen, the planning research community, technical advisors, etc.

Ms. Shorey then said that the results of government-funded programs should be made more available to the business community and public interest area. Mr. Kuharich agreed and added that access to government-funded programs is necessary because utilities deal with a time frame that is anywhere from 5 to 15 years. Mr. Kuharich said that if a planner realizes that a decision is going to have to be made in 5 years, he wants—from day one—to accumulate the information on the alternatives. If the decision is several years away, he wants to be able to anticipate what kind of impact developing technologies can have and what the impact will be when he has to make that decision. Mr. Kuharich said that the decision-making process is a long-range planning process and that if the developing technology is not perceived early, there is no incentive to make the necessary changes that will result in the use of the technology.

It was concluded that the kinds of information utilities would like to have but don't have access to now include historical information on development trends, cost trends, basic data for statistical analyses, hard data for analyses, linear extrapolation, forecasting, and information that deals with the subjective process—in short, information that helps anticipate a viable alternative to present conditions. Information along these lines could include DOE projected cost data, real numbers which show whether goals are being met, scientific results, historical data, assumptions, etc.

It was pointed out that it is difficult to get the above information because most people don't have time to read technical reports and look for information valuable to them. A research summary was suggested as the answer to this problem. The research summary, a compromise between an executive summary and the technical report itself, could be an overview paper of 20 to 50 pages that contains hard data and discusses the state of the art. It was recommended that TID program effort include an investigation of ways to develop and distribute this kind of document.

The discussion then turned to the information needs of the less technically oriented members of TA_3 and TA_4. Tony Pearson pointed out that most of the information now generated takes the form of technical reports, but that this is not the kind of information that TA_3 and TA_4 need. He said it is a tough conceptual problem to rewrite a technical report in a way that a lay person can understand it; it requires talent, money, and time.

It was pointed out that presently there is no communication among those involved in energy technology, applications, and information dissemination. The technical community often operates in a way that isolates it from the other target audiences, and this hampers the communication process from the start.

The panel agreed that the public knows very little about P/V and debated whether now is the time to begin mass indoctrination. Several panel members believed that it was time for P/V, as a promising solar technology, to be marketed, packaged, presented, and promoted so that it gets its fair share of attention and consideration. Other panelists believed that informational efforts initially should be more selective. They thought that an educational program for students and informational products for legislators and other special interest groups would be a good idea.

It was agreed that communication among the target audiences, especially technical and nontechnical, is essential. It was also emphasized that representatives of the public interest should be present at any public presentation where technical information would be discussed.

Discussion ensued regarding media penetration. Some panel members suggested that a film would be a very valuable tool—perhaps a film for use by public television. It was agreed that a film, or any product for a general audience, should not be a selling piece but should provide very specific information on what P/V is and some realistic assessment of what can be done with it. Short, 5-minute "fillers" for public television were also suggested.

Liz Moore of SERI's Intergovernmental and Regional Programs Office then gave a description of the Solar Technology Seminar for Public Constituents held at SERI in January. It was recommended that this type of meeting be held periodically. Several members indicated interest in obtaining the minutes of the P/V workshop held during the Solar Technology Seminar.

The discussion which followed concerned the definitions of the target audiences. The basic dichotomies of technical/nontechnical and manufacturer/user were mentioned again. Some panel members felt that there were two distinct types of P/V information: research, how it is being done, etc., and applications, economic data, and cost projections. A matrix approach to target audience definition was suggested as a method that might allow more specific information to be disseminated to individuals within the target audiences.

Steve Carroll then asked what specific tasks the TID Program should be concerned with during the 6 months before the next P/V User Review Panel. It was suggested that the panel and SERI TID personnel reach agreement on what P/V informational products are available, what products should be available, and the definition of the target audiences. It was agreed that representatives from the academic community and DOE should be added to the panel if possible.

Other suggestions included improved dissemination of R&D results in the form of more readable research summaries, periodic reports that discuss technical progress in a particular area, and an annual overview with information on what has occurred and what research trends are likely in the coming year.

A chairperson was not elected for the next meeting. It was decided that SERI would continue to assume the responsibility of maintaining contact and coordinating the exchange of information and suggestions, between TID personnel and the panel members.

Panel members suggested that SERI summarize the discussions of the P/V User Review Panel in a document that outlines proposed communication activities and the target audiences to be reached. The following sections of this report are intended to provide that information.

The meeting was adjourned at 12:30 p.m., March 7, 1979.

SECTION 4.0

SUMMARY AND CONCLUSIONS

TARGET AUDIENCES 1 AND 2

Regarding target audience 1 (TA_1), the panel agreed that the photovoltaics research community is presently a small and close-knit group whose basic informational needs are adequately met by existing channels. This situation will change, however, as this community continues to grow. Nevertheless, information would be more useful if it were organized, summarized, and reformatted.

The panel agreed that target audience 2 (TA_2) does not enjoy the same level of access to information regarding P/V research and development as TA_1.

Specific points regarding TA_1 and TA_2 included the following:

- Another P/V newsletter probably is not needed. Instead of developing a new publication, TID efforts could be used more effectively by working with existing newsletters, magazines, and journals covering the solar field.
- The need for a more efficient method to disseminate key information in technical reports was discussed. The Technical Information Center (TIC) system to distribute reports should work more smoothly and quickly. Accurate, readable research summaries (a compromise between brief executive summaries and technical reports) were recommended as an excellent means for disseminating information, especially for the small businessman.
- There is no substitute for the personal contact method of information dissemination. Meetings, review sessions, workshops, and seminars are valuable media. However, there are so many of these that one has to be selective in choosing which to attend. They would be more valuable if, when appropriate, more people would be made aware of them in a timely fashion, agendas were available further in advance, and the results of the meetings could be made available immediately.
- Commerce Business Daily is a very important source to TA_1 and TA_2 and would be more helpful if it were categorized by subject.
- A need was expressed for more marketing information to be generated and made available, especially for TA_2.
- Additional information about international activities and market potential would be useful.

TARGET AUDIENCES 3 AND 4

Some members of TA_3 and TA_4 fall into a technically oriented users group, and other members in each target audience fall into a general, nontechnical users group. The technically oriented members of TA_3 and TA_4 need specific P/V marketing and technical data. The nontechnical users present a particular informational problem. For them, photovoltaics often appears too complicated, technical, or obscure. This problem can be overcome if these users become acquainted with photovoltaics.

The panel felt that even though P/V potential is in the future, the time to begin telling the P/V story is now, if expectations are kept realistic. Audiovisual aids, specifically informational films, were recommended as a good way to communicate with TA_3 and TA_4.

Other specific suggestions included:

- Informed representatives of the public interest should be invited to attend technical and planning meetings.
- Special workshops and case studies, developed especially for legislators, their aides, and other special interest audiences, could be very effective.
- Potential business users need specific data (i.e., lists of equipment suppliers, technical summaries of reports, information on development and cost trends) so that extrapolations and timely decisions can be made.
- The Solar Technology Seminar for Public Constituents was very valuable. Minutes of this meeting should be available to appropriate target audiences. It was recommended that the Solar Technology Seminar for Public Constituents be held periodically.
- A P/V educational program for students should be developed.

GENERAL RECOMMENDATIONS

Other suggestions that resulted from the panel's discussions were:

- When implementing the TID plan, every attempt should be made to avoid duplication of effort.
- The possibility of defining the target audiences in another way should be studied. For example, should technical/nontechnical and manufacturer/user dichotomies be used? A grid approach to allow for more flexible definitions was proposed. It was concluded that the present target audience definitions will be used until a better alternative is agreed upon.
- The question of audiences not represented on the panel was discussed. It was suggested that representatives from DOE and the international and academic communities be invited to participate.
- It was recommended that both a technical authority and an end-user should review P/V material repackaged as part of the TID plan.

SECTION 5.0

SUGGESTED PHOTOVOLTAICS TID PROJECTS

TARGET AUDIENCES 1 AND 2

The following is a list of suggested P/V TID projects for TA_1 and TA_2:

- Establish a working relationship with Solar Age and other selected publications. Try to arrange for inclusion of P/V news in the publications whenever possible.
- Coordinate the production and dissemination of research summaries (a compromise between the brief executive summaries and the technical reports).
- Establish and coordinate a technical information collection and dissemination service. Participation on both ends (individuals with information to distribute and individuals wishing to receive information) would be voluntary.
- For selected P/V meetings and seminars, assist in sending information, agenda, and/or proceedings to appropriate people.
- Establish and coordinate an over-the-phone SERI referral service for those interested in obtaining information from P/V researchers, and manufacturers.
- Develop a guidebook of who is doing what in P/V and who to contact for specific information. This would be available on request and updated regularly.
- Publish a semiannual or annual review of photovoltaics. This publication could include a definition of photovoltaics, a discussion of its potential, the current state of the art, goals for the future, current activities, and trend analysis. This publication could be bound in a looseleaf notebook to allow regular additions to the current activities section and updates of other sections.
- Develop a brochure or handout which would be available at selected meetings and conventions such as the ISES Congress. This brochure could present a brief overview of the national photovoltaics program and SERI's role in it.

TARGET AUDIENCES 3 AND 4

Many projects suggested for TA_1 and TA_2 also would be appropriate for TA_3 and TA_4, with some projects requiring slight modifications. In addition, other suggestions for TA_3 and TA_4 include the following:

- Develop a 30-minute film about photovoltaics. This film would not be a selling piece but a realistic and informational one. Work within proper distribution channels to disseminate widely for use by public television, civic groups, etc.
- Develop two or three 5-minute photovoltaics "fillers" for use on noncommercial television.

- Rewrite and publish the minutes from P/V presentations made at the Solar Technology Seminar for Public Constituents as a handbook for those who attended the meeting and make copies available to others on request.

- Develop film strips and accompanying teachers' guides and students' materials for use in public schools on both grade school and high school levels.

- Prepare a series of case studies focusing on various applications of photovoltaics and stressing international applications.

APPENDIX A

IDENTIFICATION OF POTENTIAL USERS OF OF SOLAR R&D RESULTS

At the request of the ETS/Solar Divisions of DOE, the Communication Branch of SERI developed a Technical Information Dissemination (TID) Program. The program's purpose is to facilitate the earliest appropriate commercialization of solar research and development (R&D) results. One of the first objectives of the program is to define and characterize the potential target audiences or major actors who have a need to know solar R&D results for the five ETS technologies (i.e., wind energy conversion systems, biomass, solar thermal power, photovoltaics, and ocean thermal energy conversion). The characterization and classification of target audiences will provide the Communication Branch with a framework from which to select organizations and individuals to be included in a study to assess the information needs of the users of solar R&D results.

The TID plan established four primary target audiences for solar R&D results. The composition of each audience, some characteristics of that audience, and examples of organizations and groups therein are listed below and then summarized in Figure A-1.

TARGET AUDIENCE 1 (TA_1)

TA_1 is composed of organizations and individuals who are very interested in solar development and who are directly involved in DOE-sponsored solar R&D programs. TA_1 includes the personnel of DOE and those organizations who subcontract to DOE for technological and economic research. TA_1 members have the following general characteristics:

- Technically knowledgeable about specific solar technologies;
- Understand the technical jargon of research;
- Interested in research in progress;
- Interested in DOE program information, including RFP's, and contracts let;
- Include some segments of the solar industry;
- Require highest degree of timeliness in solar information; and
- Rely heavily on technical reports, conferences, and program reviews.

Target groups include: National Laboratories (JPL, Sandia), federally funded research and development centers, and other wholly federally supported organizations; research institutes; industrial/commercial organizations; and universities and colleges.

TARGET AUDIENCE 2 (TA_2)

TA_2 is composed of organizations and individuals who manufacture, install, service, and distribute solar technologies, but who are not directly involved in DOE-sponsored solar

R&D programs. These organizations translate the results of research into marketable products and services. TA_2 members have the following characteristics:

- Include largest segment of solar industry,
- Require more summary information and repackaging of R&D results than TA_1,
- May not understand solar R&D program structure,
- Interested in performance data, summary cost data on applications, specifications, etc.,
- More interested in research results than in interim programs in R&D, and
- Rely heavily on trade press, conferences, professional meetings for solar information.

Target groups in TA_2 include: construction trades and installers (i.e., contractors, plumbers, sheet metal workers); equipment manufacturers; professional and trade organizations; distributors and retailers; and engineers who design and maintain solar equipment.

TARGET AUDIENCE 3 (TA_3)

TA_3 is composed of organizations and individuals interested in fostering solar technology use via legislation, financing, citizen advocacy, and construction activities. These agencies and organizations are not directly involved in the commercialization of solar but exert influence, either positive or negative, upon commercialization decisions by providing the framework for incentives, quality control, and coordination. TA_3 members have the following characteristics:

- Necessary but not sufficient professionals (i.e., they influence consumption decisions and the pace of commercialization but do not make such decisions themselves),
- Less understanding of the technical jargon and solar R&D program structure,
- More reliance on conventional public media for solar information, and
- Require repackaging of technical solar reports.

Target groups in TA_3 include: public interest or citizen advocacy groups (i.e., conservation, environment, natural resources) and consumer organizations; associations of residential and commercial builders and of home and building owners; regulatory community; financial community; state and regional governments including state solar or energy conservation offices, regional commissions; and other federal agencies like DOD, USDA (Energy Extension Service) and FEA.

TARGET AUDIENCE 4 (TA_4)

TA_4 is composed of the larger solar interested public, including those individuals who are or who may become involved as users of solar technolgies as a result of R&D. TA_4 members have the following characteristics:

- Make final consumption decisions,
- Require greatest amount of repackaging of technical information,
- Least understanding of technical jargon and R&D program structure,
- Need most information about delivery systems, and
- Heavy reliance on conventional public media for solar information.

TA_4 groups include: utility companies; building owners, both residential and commercial; farmers, ranchers, foresters; industrial plants; businesses.

These four target audiences play differing roles in the commercialization of solar R&D results. Target audiences 1 and 2 are responsible for the production and marketing functions. Target audience 3 is primarily responsible for influencing commercialization by removing barriers and providing incentives. All four target audiences act as information disseminators. Finally, target audience 4 comprises the users of solar technology.

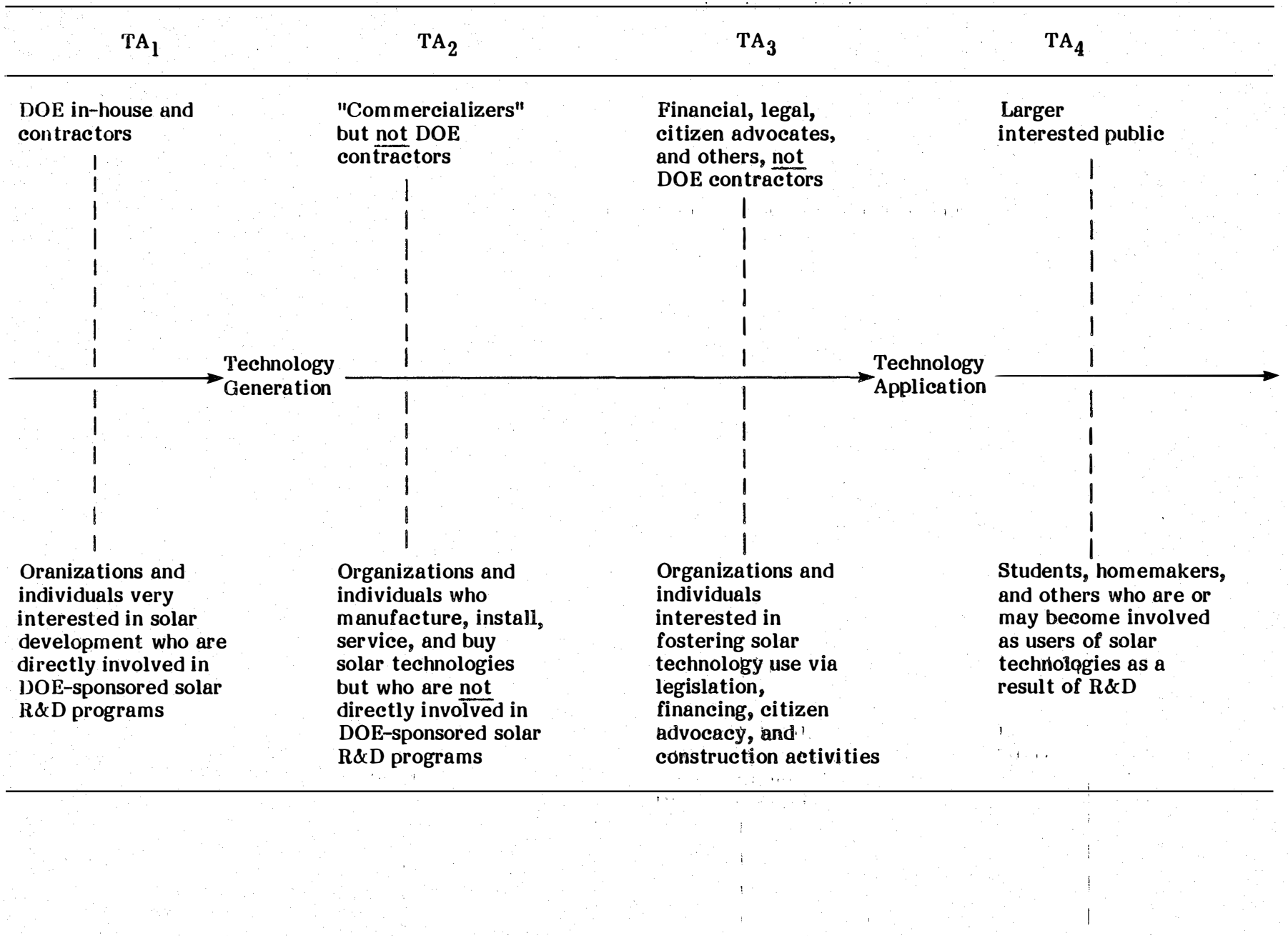

Figure A-1. FOUR TARGET AUDIENCES (TAs) FOR SOLAR R&D RESULTS

APPENDIX B

PHOTOVOLTAICS USER REVIEW PANEL

Bob Brown
Optical Coating Laboratories, Inc.
15251 E. Don Julian Rd.
City of Industry, CA 91745
(213) 968-6581

As Manager of the Terrestrial Solar Power Program for the Photoelectronics Division, Mr. Brown, M.B.A., is responsible for systems design, flat-plate modules, solar concentrators, and solar cell production programs.

Roger Dennett
NCAR
P.O. Box 3000
Boulder, CO 80307
(303) 494-5151 ext. 648

Stationed at the National Center for Atmospheric Research, Mr. Dennett is GAMETAG data coordinator for the National Air Chemistry Project, Georgia Institute of Technology. His interest in systems integration of solar devices was instigated by his education in mechanical engineering, in which he received B.S. and M.S. degrees. He is a member of the Boulder Solar Energy Society.

Rod Kuharich
City of Colorado Springs
Department of Public Utilities
P.O. Box 1103
Colorado Springs, CO 80947
(303) 636-5358

Mr. Kuharich is a Senior Resource Planner for the Colorado Springs Department of Public Utilities, where his duties involve utility resource planning and development. He has a B.A. in Political Science and Sociology and an M.S. in Planning.

Arnie Lesk
Solar Energy Department
Motorola Inc.
5005 East McDowell Rd.
Phoenix, AZ 85008
(602) 244-5479

As Manager of Solar Energy Research and Development, Dr. Lesk is responsible for the R&D efforts for several photovoltaic projects, including solar cell design, silicon ribbon growth, optical analysis and test techniques, and array support structures. He has a B.S. in Engineering Physics and an M.S. and Ph.D. in Electrical Engineering.

Tony Pearson
Jet Propulsion Laboratory
M.S. 506-418
4800 Oak Grove Drive
Pasadena, CA 91103
(213) 577-9415

Mr. Pearson is Program Administration Manager for the Photovoltaics Technology Development and Applications Lead Center at the Jet Propulsion Laboratory. He is responsible for overall P/V program administration, including technical information dissemination and commercialization activities. He has a B.S. in Psychology and Industrial Engineering, and an M.B.A.

Guy Roderick
Photon Power, Inc.
10767 Gateway West
El Paso, TX 79935
(915) 593-2861

Mr. Roderick, who received his degree in Chemical Engineering from Surrey University, Great Britain, is President of Photon Power, Inc. His company concentrates on developing manufacturing techniques for large scale photovoltaic panels.

Lee Salmon
Colorado Solar Energy Association
P.O. Box 238
Loveland, CO 80537
(303) 669-4811

A past president of the Colorado Solar Energy Association, Mr. Salmon now serves on its Board of Directors. He also is a solar energy consultant to the state government and to the University of Colorado at Denver. He is president of G. L. Salmon Associates, an alternate energy technologies consulting firm and holds B.S. and M.S. degrees in Physics.

Joan Shorey
1028 Connecticut Ave.
Solar Lobby, Room 1100
Washington, DC 20036
(202) 466-6350

Currently a member of the Solar Lobby, Washington, D.C., Ms. Shorey is a co founder and former director of Concern, Inc., an environmental organization, and has been a legislative aid to Congressman Richard L. Oettinger.

SERI PARTICIPANTS:

Larry Kazmerski
Photovoltaics Branch

A Senior Scientist in the Photovoltaics Branch, Dr. Kazmerski is responsible for the fabrication and characterization of photovoltaic thin-films, as well as the investigation of surface and interface properties of solar cell devices. He also is an editor of the journal, Solar Cells: Their Science, Technology, Applications and Economics. He received a B.S., M.S., and Ph.D. in Electrical Engineering.

Kathryn Lawrence, Institutional
and Environmental Assessment Branch

Ms. Lawrence is a Staff Environmental Scientist in the Institutional and Environmental Assessment Branch, where she is responsible for developing and applying methods to assess the ecological, environmental, and health impacts of solar energy. She also is involved in analyzing life cycle environmental trade-offs between solar and conventional energy technologies. Ms. Lawrence has a B.S. in Mathematics and an M.A. in Environmental Biology.

Bill Stephenson
Public Information Office

Dr. Stephenson, a Senior Public Information Officer, is responsible for overseeing the Institute's exhibit program, audiovisual support group, and special writing assignments. He also has represented SERI and presented overviews of the solar technologies to many groups through lectures and various presentations. Dr. Stephenson has a B.A., M.A., and Ph.D. in English Literature.

Ed Witt
Photovoltaics Program Office

A Senior Scientist and Task Manager in the SERI Photovoltaics Program Office, Dr. Witt is responsible for the planning and coordination of activities in the Advanced R&D portion of the National Photovoltaic Program. He also is responsible for the development and management of the Innovative Concepts Program which addresses new ideas in photovoltaic conversion. Dr. Witt has a B.S., M.S., and Ph.D. in Physics.

APPENDIX C

TECHNICAL INFORMATION DISSEMINATION PHOTOVOLTAICS USER REVIEW PANEL

AGENDA
(March 6 and 7, 1979)

Tuesday Morning at SERI

9:00-10:00	Orientation	Steve Carroll, panel coordinator
	Welcome to participants	Joe Carlson
	General information about SERI	Jerome Williams
	Communication Branch introduction	Keith Haggard
	Information Systems Division	Steve Rubin
10:00-11:40	Description of the TID Plan	Steve Carroll
	Four target audiences	Pete Mourning
	Goals—need for specificity and consensus	
	Methods to achieve goals	
	Panel's role	
	Evaluation of TID Program	Floyd Shoemaker
10:40-11:45	Introduction of panel members (8-10 minutes each)	Steve Carroll
	Member's organization, its work and objectives	
	Member's role in his organization	
	Member's current TID activities	

Tuesday Afternoon and Wednesday at Stouffer's

11:45-1:15	Return to Stouffer's and lunch	
12:30-1:15	Lunch	
1:15-2:00	Discussion: State of current P/V R&D programs and outlook for coming year	Steve Carroll Pete Mourning
2:00-2:45	Discussion: Members' TID goals in the next year or two	
	National and international goals	
	Members' specific TID needs to achieve these goals	
	Capabilities of members' own organizations to meet above needs	
2:45-2:55	Break	

2:55-4:15	Workshop I (Concerned with Target Audience 1) Definition of Target Audience 1: categories, associations, etc. Ways to reach Target Audience 1 Use of media—journals, etc. Handouts, displays, meetings Mailings Present efforts and deficiencies What specifically should be done and who should do it Examples—newsletter, case studies, audiovisual materials, research summary reports, workshops, support plans for test sites, other information materials Setting of priorities What should be done now What can wait Level of effort required [estimate of cost (time)]	Pete Mourning

Wednesday Morning

9:00-10:00	Workshop II (Concerned with Target Audience 2) The same general agenda would be followed in Workshops II, III, and IV as in Workshop I.	Pete Mourning
10:00-11:00	Workshop III (Concerned with Target Audience 3)	Steve Carroll
11:00-12:00	Workshop IV (Concerned with Target Audience 4)	Steve Carroll
12:00-1:00	Lunch	
1:00-1:15	Preparation for next meeting Tentative date Objective of next meeting Election of chairperson (?)	Steve Carroll

1:15-1:30	Summary of Results of P/V User Review Panel Review of specific needs (agreement on what these needs are and their priority) Recommendations (agreement on products to fill above needs and on the amount of effort that will be required) Definition of work (1) to be done before next meeting and (2) during this fiscal year (agreement on who will do what)	Pete Mourning