IEA SOLAR HEATING AND COOLING PROGRAM

TASK VI - PERFORMANCE OF SOLAR HEATING, COOLING AND HOT WATER SYSTEMS USING EVACUATED COLLECTORS

Operating Agent - U.S. Department of Energy

Task Status - September 1980

William S. Duff, Task VI Chairman
Solar Energy Applications Laboratory
Colorado State University
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I. Overview of the Task

The objective of Task VI is to further the understanding of the performance of evacuated collectors in solar heating, cooling and hot water systems, and to study, document and compare the performance characteristics of such collectors in different systems and climates.

Task VI was officially initiated at the October 1979 Executive Committee meeting in Copenhagen. Initial planning had been conducted for the task at experts meetings in June 1978 in Madrid and in October 1979 in Fort Collins, Colorado.

Task VI participant installations are:

- Federal Republic of Germany - Solarhaus Freiburg, a twelve unit apartment building with solar heating and hot water
- Japan - Sanyo Osaka House, a single family residence with solar heating, cooling and hot water
- U.S.A. - Colorado State University Solar House I, a single family residence with solar heating, cooling and hot water
- United Kingdom - a solar hot water system with a simulated load located at Bracknell
- Canada - Solar supplied industrial process heat for an Edmonton bottling plant
- Sweden - Solar district heating system experiment
- Switzerland - Solar district heating system experiment near Geneva

Each participants' interests are enhanced by the international cooperative structures of Task VI. Required commonalities in data collection, measurement and reporting; differences in installation end uses, collectors and other components; similarities in installation end uses and collectors; and interactions with other IEA tasks serve to significantly expand each participants' program. Thus each participant has easy access to and benefits from each of the projects in Task VI without having to fund them.
II. Task Status

Six installations have been approved for participation in the task. These include those of Canada, the United Kingdom, Sweden, the U.S.A., the Federal Republic of Germany and Japan. It is expected that Switzerland's installation will be approved at the Fall Task VI meeting.

The first formal performance reports utilizing the IEA reporting format generated by Task I are now being prepared by the three participants having operating installations - Japan, the U.S.A. and the FRG. The remaining participants are preparing reports on their progress toward installation operation. The reports will be mailed to the participants in advance of the Fall meeting and discussed at that meeting.

A working group meeting of the three participants preparing performance reports based on the IEA format is to be held September 28-October 2 in Colorado, U.S.A. The agenda of this meeting is appended as Annex A. The purpose of the meeting is to agree on more extensive standardization of reporting than is called for in the IEA reporting format document and to resolve nomenclature problems arising from the diversity of the Task VI projects. The meeting objectives are to provide greater reporting commonality and promote the ease of communication of performance results. The output of the meeting will be an internal task report which will be presented to the entire group at the Fall meeting for their finalization and approval. The possibility of publishing this report as a formal IEA report will be presented to the Executive Committee. The possibility of integrating some of the material generated at the meeting into the IEA reporting document has also been discussed with several Task I, Subtask C participants.
Data from the daily radiation comparison of the four Eppley precision pyranometers at the Solar Energy Applications Laboratory of CSU were sent to the Task VI operating agent for inclusion in the June meeting discussion of pyranometer error.

The sign format requested by the Executive Committee Chairman for erection at each of the Task VI installations has been designed and is appended as Annex B. It will be sent to the Task VI participants for approval at the Fall meeting.

Several Industrial Process Heat installations in the U.S.A. were examined for possible inclusion in Task VI. These will be presented at the Fall meeting for participants recommendations.

The Task III tests on evacuated tubular collectors will be discussed at the Task VI semiannual meetings as the results become available.

Task VI installations will provide data for the SALED work of Task I if requested. Task I SALED researchers have been provided information on Task VI installations by individual participants.

A responsible researcher list was compiled and distributed. It is appended as Annex C.

The Commission of the European Communities has been sent information by the Solarhaus Freiburg installation as part of a general solar information request. Otherwise, no evacuated tubular collector systems work, per se, is presently being sponsored by the EC.

Denmark has indicated that they will not be participating in Task VI.
The semiannual Fall meeting will be held in Osaka, Japan, December 2-5, 1980.

Switzerland is mounting eight Sanyo collectors and expects to begin tests with the district heating system in September 1980. Sweden has received their GE and Owens-Illinois collectors and started to install them in August 1980.

The U.K. has estimated a start up date of January 1981 and Canada, April 1981.

III. Significant Accomplishments During the Last Six Months

Much effort has been expended by the participants on converting to a common reporting format. This effort is a key step in expanding the program scope of each installation via its participation with the other Task VI installations.

IV. Working Plan for Next Six Months

Prepare an internal Task report on the more extensive standardization of Task VI reporting.

Prepare formal performance and progress reports for each installation.

Prepare the Task VI annual report.

Continue participant data collection and analysis for the USA, FRG and Japanese installations.

Complete or continue progress toward completion of the Swiss, Swedish, Canadian and U.K. installations.

A milestone chart is appended as Annex D.
V. General Level of Activities and Task Effectiveness

The level of effort by the U.S.A., the FRG and Japan on communication of performance results and toward achieving a common reporting basis has been very high. The United Kingdom has also assisted in the latter effort.

The activity level for bringing the other participants' installations to completion with project target dates is being met.

VI. Matters to be Considered by the Executive Committee

The duration of this task is a scheduled three years ending in September of 1982. Four of the installations will not begin operating until sometime after January of 1981. Experience has shown that new data collection systems often take two years to debug before substantive useful results are obtained. In view of the fact that a two to three year evaluation is projected in each case, it is requested that the Executive Committee consider extending the task at least one more year.

It is also requested that the Executive Committee discuss the possibility of making the Task VI September 28-October 2 1980 Working Group report a formal IEA report.
# Annex A Task VI Working Group Meeting Agenda

**IEA Task VI Working Group Meeting - September 28 to October 2, 1980**

## SCHEDULE

<table>
<thead>
<tr>
<th>Day</th>
<th>Morning</th>
<th>Afternoon</th>
<th>Evening</th>
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<tbody>
<tr>
<td><strong>SUNDAY</strong></td>
<td>Drive to Pingree Park Campus</td>
<td>Discuss Objectives</td>
<td>Discuss Objectives</td>
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<tr>
<td><strong>MONDAY</strong></td>
<td>Fix Objectives</td>
<td>Discuss thermal performance factors and indicators</td>
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<td></td>
<td></td>
<td>Free time</td>
<td>Discuss thermal performance factors and indicators and discuss notation</td>
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<tr>
<td><strong>TUESDAY</strong></td>
<td>Discuss notation</td>
<td>Fix notation</td>
<td>Write up notation that was determined</td>
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<td></td>
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<td>Free time</td>
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<td></td>
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<td>Write up presentations that were determined</td>
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<tr>
<td><strong>WEDNESDAY</strong></td>
<td>Discuss graphics tables and other presentations</td>
<td>Fix graphics tables and other presentations</td>
<td>Write up presentations that were determined</td>
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<td>Free time</td>
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<td><strong>THURSDAY</strong></td>
<td>Tie up any loose ends</td>
<td>Return to Fort Collins</td>
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COLORADO STATE UNIVERSITY
SOLAR HOUSE I

IS PARTICIPATING IN A COOPERATIVE PROJECT OF THE

INTERNATIONAL ENERGY AGENCY

PROGRAM TO DEVELOP AND TEST SOLAR HEATING, AND COOLING SYSTEMS

COUNTRIES PARTICIPATING IN THE COOPERATIVE PROJECT TO DEVELOP AND TEST THE PERFORMANCE OF SOLAR HEATING, COOLING, AND HOT WATER SYSTEMS USING EVACUATED COLLECTORS ARE: CANADA, FEDERAL REPUBLIC OF GERMANY, JAPAN, SWEDEN, SWITZERLAND, UNITED KINGDOM AND UNITED STATES.
Annex C - List of National Contact Persons/Responsible Persons for Task VI

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Annex D - Milestone Chart

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<tr>
<th>Year</th>
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<tr>
<td>Month</td>
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<tr>
<td>Participants reports sent to other participants</td>
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<tr>
<td>Working group meeting and draft report</td>
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<td>Semiannual meetings</td>
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<td>Annual Report</td>
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Additional milestones may be added at the Fall meeting