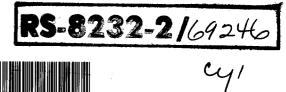
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A Bibliography of Reports from the Solar Thermal Distributed Receiver Systems Project at Sandia National Laboratories

J. A. Leonard, A. V. Poore, Editors

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A BIBLIOGRAPHY OF REPORTS

FROM THE SOLAR THERMAL DISTRIBUTED RECEIVER SYSTEMS PROJECT

AT SANDIA NATIONAL LABORATORIES

J. A. Leonard and A. V. Poore, Editors

Solar Energy Department Sandia National Laboratories Albuquerque, NM 87185

FOREWORD

The research and development described in this document were conducted within the U. S. Department of Energy's Solar Thermal Technology Program. The goal of the Solar Thermal Technology Program is to advance the engineering and scientific understanding of solar thermal technology and to establish the technology base from which private industry can develop solar thermal power production options for introduction into the competitive energy market.

Solar thermal technology concentrates solar radiation by means of tracking mirrors or lenses onto a receiver where the solar energy is absorbed as heat and converted into electricity or incorporated into products as process heat. The two primary solar thermal technologies, central receivers and distributed receivers, employ various point and line-focus optics to concentrate sunlight. Current central receiver systems use fields of heliostats (two-axis tracking mirrors) to focus the sun's radiant energy onto a single tower-mounted receiver. Parabolic dishes up to 17 meters in diameter track the sun in two axes and use mirrors to focus radiant energy onto a receiver. Troughs and bowls are line-focus tracking reflectors that concentrate sunlight onto receiver tubes along their focal lines. Concentrating collector modules can be used alone or in a multi-module system. The concentrated radiant energy absorbed by the solar thermal receiver is transported to the conversion process by a circulating working fluid. Receiver temperatures range from 100°C in low-temperature troughs to over 1500°C in dish and central receiver systems.

The Solar Thermal Technology Program is directing efforts to advance and improve promising system concepts through the research and development of solar thermal materials, components, and subsystems, and the testing and performance evaluation of subsystems and systems. These efforts are carried out through the technical direction of the Department of Energy and its network of national laboratories, who work with private industry. Together they have established a comprehensive, goal-directed program to improve performance and provide technically proven options for eventual incorporation into the nation's energy supply.

To be successful in contributing to an adequate national energy supply at reasonable cost, solar thermal energy must eventually be economically competitive with a variety of other energy sources.

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Components and system-level performance targets have been developed as quantitative program goals. The performance targets are used in planning research and development activities, measuring progress, assessing alternative technology options, and making optimal component developments. These targets will be pursued vigorously to ensure a successful program.

This bibliography cites, with a few additions, all the documents that were published by, or sponsored by, Sandia National Laboratories in support of the Department of Energy's Solar Thermal Technology Program and its Distributed Receiver Project. The timing of this updated bibliography is important because it marks the end of an era in which distributed receiver and central receiver research and development were pursued separately. At the beginning of fiscal year 1989, the Department of Energy initiated a restructured solar thermal research and development strategy. The new program is mission oriented, with core technology development activities supporting the missions. For instance, the advanced electric technology mission has an objective to organize industry, user, and government consortia that will field competitive nextgeneration solar thermal electric system experiments within five years--regardless of whether the systems are distributed or central receivers; and the concentrator development core activity will develop optical materials and concentrators regardless of application.

In addition to combining the application technologies, the restructured program also unifies institutional participation. Sandia and the Solar Energy Research Institute are represented as appropriate in all the missions and core technology activities. In the future, updates to the solar thermal bibliography will reflect this program organization.

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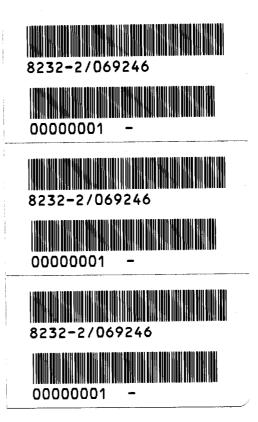
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