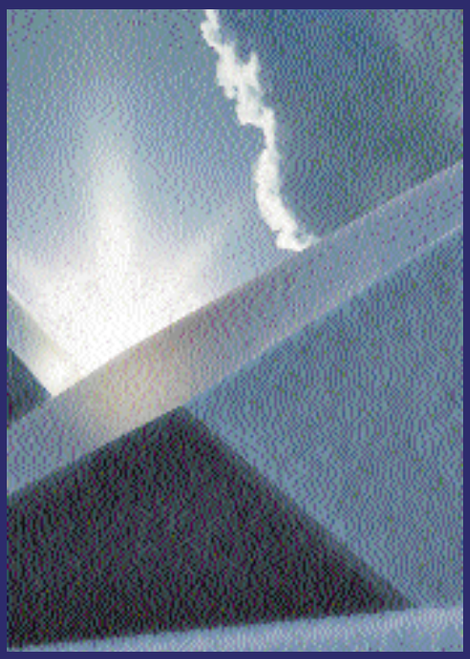

National

THE DAWN

Center

OF A

for

NEW ERA

Photovoltaics

This is a time of transition for the U.S. photovoltaics community. As the second millennium comes to a close, we are witnessing the dawn of a new era in the application of photovoltaic (PV) technology. With falling costs and large-scale commercial production making PV power systems rapidly more affordable, the demand for photovoltaics is growing at an unprecedented rate. As the world's leading manufacturer of PV modules, the United States is well-placed to take advantage of emerging global markets. But while we are facing tremendous opportunities, the competition for new markets — both at home and abroad — is likely to become ever fiercer in the years to come.

To help the U.S. photovoltaics industry maintain its competitive edge, the U.S. Department of Energy (DOE) has created the National Center for Photovoltaics (NCPV). Serving as a single focal point for all of the nation's capabilities in photovoltaic research, development, deployment and outreach, the NCPV unites geographically scattered initiatives into a single, coordinated effort.

Forging New Alliances to Strengthen U.S. Competitiveness

Based at DOE's National Renewable Energy Laboratory (NREL) in Golden, Colorado, the NCPV draws on the core expertise of NREL and Sandia National Laboratories to guide operations and coordinate support from other national PV resources. These resources include Brookhaven Naitonal Laboratory, DOE's Centers of Excellence in PV — at the Georgia Institute of Technology and the Institute of Energy Conversion at the University of Delaware — as well as dozens of university and industry research partners across the country. By facilitating greater communication and cooperation between staff at all of these facilities, the NCPV effectively enhances the capabilities of each — and links them together so that they function as a single entity.

The NCPV also serves as the initial point of contact for potential investors, customers, manufacturers and distributors interested in all aspects of PV technology and applications, connecting them to the information or resources they need, quickly and efficiently.

Providing Resources to Help the U.S. Photovoltaics Industry Maintain its Global Leadership

Implementing the National PV Program

The primary goal of the NCPV is to improve the implementation of DOE's National Photovoltaics Program by encouraging the most efficient use of the nation's PV resources. The Program exists to support the U.S. photovoltaics industry in its efforts to improve the cost-effectiveness, performance and reliability of its products.

Because most companies cannot afford large research facilities of their own, the National Photovoltaics Program conducts long-term, high-risk, high-payoff research, development and testing of photovoltaic components and systems in partnership with the PV industry — investing in the nation's future by helping U.S. companies bring clean, affordable electricity to the domestic and international marketplace.

Between 1996 and the year 2000, the Program aims to reduce the price of PV-generated electricity by 50%, extend the useful life of commercial PV systems to over 20 years, and more than double the cumulative sales of PV modules produced by U.S. manufacturers.

The United States is already a world leader in the development and application of PV technology, thanks to the ongoing support of the National Photovoltaics Program and the tenacity of U.S. companies. This historically close collaboration has been made even more effective through the creation of the NCPV. Its extensive, combined resources help U.S. industry to better meet the challenges of commercialization and maintain its lead.

As a single clearinghouse for development activities related to photovoltaics, the NCPV also provides improved guidance and coordination for the National Photovoltaics Program. Through the NCPV, industry researchers have a more direct input into the research priorities set by the Program as well as its long-term vision and direction. This helps industry to more rapidly achieve its two major goals: developing photovoltaic technology to the point where it can economically serve the mainstream electric power market, and improving the penetration of photovoltaics into energy markets in the United States and abroad.

Creating New Opportunities

By forging strategic alliances and partnerships within a growing network of domestic and international stakeholders, the NCPV gives the entire photovoltaics community better access to development resources and project financing. For example, close links between the various research facilities enable cross-laboratory teams to bring complementary capabilities to bear on complex problems — as do connections to related industries whose financial resources, technology or applications can augment the efforts of the PV industry. The NCPV also coordinates activities in the PV community with other federal programs — from basic research through DOE's Office of Energy Research to technology deployment through the Federal Energy Management Program.

Coordinating Information and Outreach

As a focal point for outreach activities and information about photovoltaics, the NCPV provides a single point of contact for questions from the media and potential end-users. The NCPV promotes the overall visibility of photovoltaic technology — particularly in the popular media — and makes it easier for potential overseas buyers to get access to the information they need. And the NCPV's use of electronic communications and interlinked databases ensures all stakeholders in the PV community fast, easy access to the growing body of knowledge about photovoltaic systems and their applications — including information about developments in Europe, Japan and other countries.

R E S O U R C E S A N D

The National Center for Photovoltaics coordinates world-class resources located at three DOE national laboratories, two university centers of excellence and research partners in several states.

The NCPV is based at the Solar Energy Research Facility (SERF) in Golden, Colorado. Part of NREL's high-tech research complex, the SERF houses more than 40 laboratories used for basic materials research, the development of thin-film and crystalline silicon technologies, and the measurement and characterization of photovoltaic devices, components and systems. NREL also has an Outdoor Test Facility that is used to test the performance of PV cells, modules and systems under a variety of environmental conditions.

NCPV capabilities in the areas of crystalline silicon technology and systems also draw on the extensive resources of Sandia National Laboratories (SNL). Located in Albuquerque, New Mexico, SNL works with industry to accelerate the development of cheaper, more efficient and reliable silicon solar cells and balance-of-systems components. SNL's Photovoltaic Systems Assistance Center is a national resource for technical information about photovoltaics, providing assistance with the design of photovoltaic power systems for many different applications.

Scientists at Brookhaven Nation
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Together with their university r
national facilities constitute a fo
the U.S. photovoltaics industry
at the forefront of global advanc
technology.

MATERIAL AND DEVICE DEVELOPMENT

NCPV research capabilities span the growth and application of a wide range of innovative semiconductor materials, as well as the design and fabrication of PV devices. Core competencies include solid-state spectroscopic analysis, experimentation with photoelectrochemical processes, and the application of advanced theoretical and computational tools for predicting the behavior of new PV materials.

MODULE AND SYSTEM DEVELOPMENT

The NCPV has user-accessible laboratories for the fabrication and evaluation of thin-film technologies (amorphous silicon, cadmium telluride and copper indium gallium diselenide), crystalline silicon cells and modules, concentrator cells and PV arrays, and for developing and testing balance-of-systems components such as charge controllers and inverters.

MEASUREMENT AND CHARACTERIZATION

NCPV staff can analyze and characterize everything from single atoms to PV arrays. Core competencies include analytical microscopy, electro-optical characterization, surface and interface analysis of materials, analysis of cell and device operation, computer modeling of system and component performance, and the development of special measurement techniques and instruments for U.S. firms.

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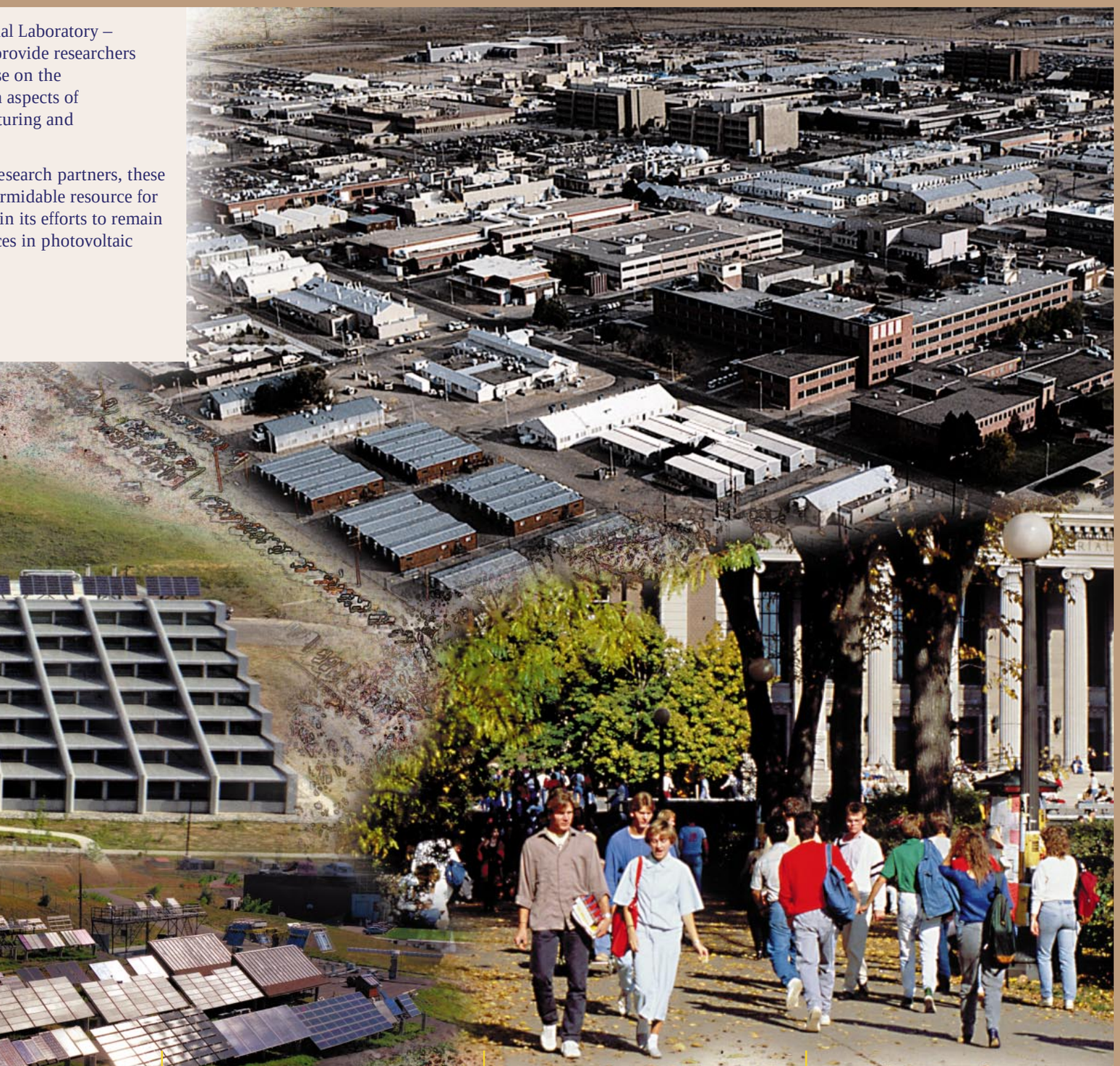

CE AND ESTING

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MANUFACTURING AND DEPLOYMENT

Through a variety of cost-shared development programs, the NCPV works with individual manufacturers to evaluate and resolve technical issues with the production of PV components and systems. Cost reductions from the optimization of manufacturing processes are opening up new markets. The NCPV also works with large user groups, such as utilities, to assist in deploying PV technologies in new applications.

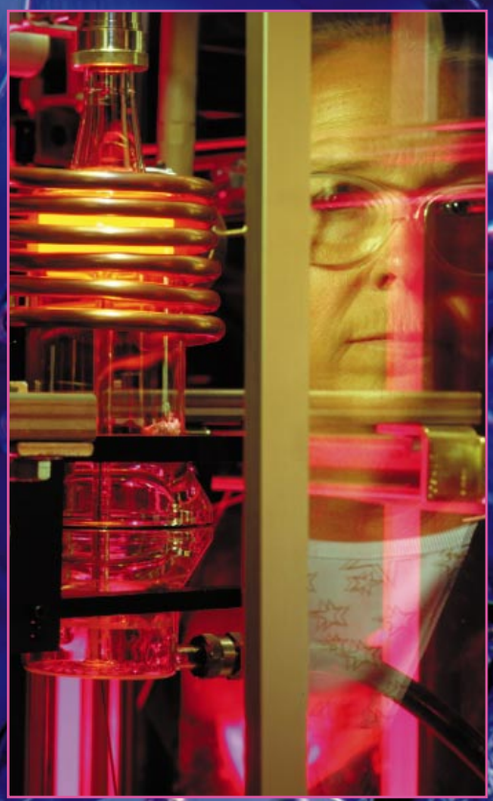
MARKET DEVELOPMENT AND OUTREACH

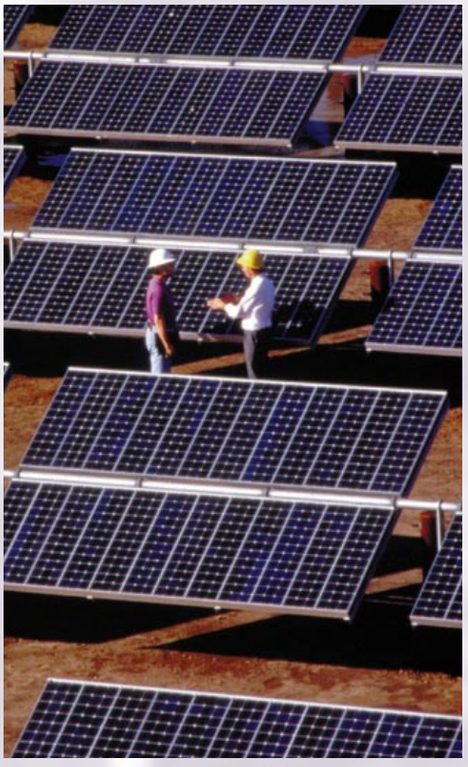
The NCPV is the focal point for PV information and outreach activities, including end-user assistance. Staff also conduct technological, economic and environmental impact analyses for specific applications; work with U.S. firms to develop the utility and federal facility markets for PV; and assist utilities, federal agencies and international customers to obtain alternative financing for PV installations.

SOLAR RESOURCE CHARACTERIZATION

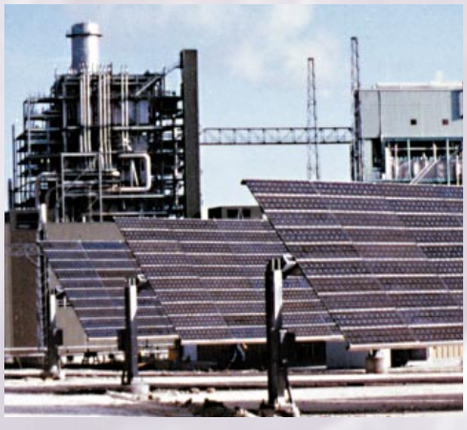
The NCPV characterizes solar resources using state-of-the-art measurement systems traceable to world standards. Electronic data sets and maps depict the global distribution of solar radiation and the quantity and variability of the resource at specific locations. For regions with limited sampling data, researchers can use satellite imagery, meteorological data and models to estimate solar radiation.

World-Class Research and Development Facilities for the 21st Century





PHOTOVOLTAICS: CONTRIBUTING TO THE SUSTAINABILITY OF GLOBAL CIVILIZATION BY PROVIDING CLEAN, ABUNDANT ENERGY EVERY PLACE THE SUN SHINES



The background image on this page shows highly magnified semiconductor crystals growing out of a polycrystalline film.

For More Information...

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