Sun♦Lab SnapShot

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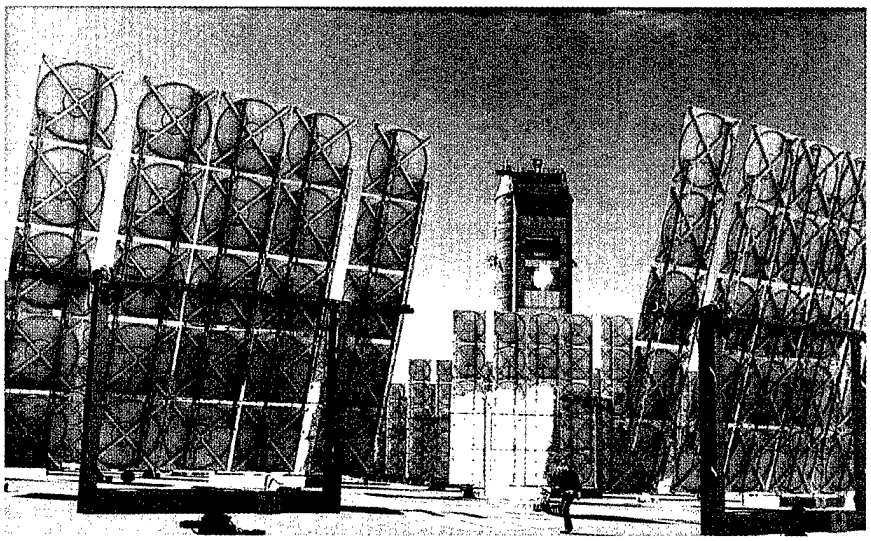
Sun♦Lab Test Facilities

Sun♦Lab's two major facilities are used to test and evaluate concentrating solar components and systems and to solve engineering problems.

Sandia National Laboratories/PIX03212



Sandia's National Solar Thermal Test Facility is an important resource for users and manufacturers of concentrating solar power systems. Manufacturers can use the NSTTF to test new designs, ideas, and products in an outdoor environment much like the environment the equipment will be in when it is used in the field.

This country's efforts to successfully develop and commercialize concentrating solar power (CSP) technologies depend on specialized research and testing capabilities. To support this effort, the U.S. Department of Energy's Concentrating Solar Power Program maintains two major test facilities: the National Solar Thermal Test Facility at Sandia National Laboratories in Albuquerque, New Mexico, and the High-Flux Solar Furnace at the National Renewable Energy Laboratory in Golden, Colorado. These test facilities combine to be instrumental in the development of parabolic dishes, troughs, and solar power towers.

National Solar Thermal Test Facility

Established in 1976, the National Solar Thermal Test Facility covers 110 acres of land and includes five distinct test areas: the Central Receiver Test Facility with a central tower and 222 heliostats; the 16-kilowatt Solar Furnace; the Modular Solar Industrial Retrofit Trough Facility; the Engine Test Facility; and the Distributed Receiver Test Facility with two 75-kilowatt parabolic dishes.

The database and technology that made it possible to commercialize parabolic troughs were developed at the Modular Solar Industrial Retrofit Facility. Six different solar receivers tested at the Central Receiver Test Facility were used to test and validate power tower technology. Major technological development of molten salt systems—the basis for the conversion of Solar One, a water/steam-based system, to Solar Two, a molten-salt-based system—took place at this facility. Much of dish/engine technology was developed or tested at the Engine Test Facility and the Distributed Receiver Test Facility, including heat pipes, parabolic dishes, and the engines used in these systems.

The unique capabilities of the facility are often applied to tests unrelated to solar energy—tests requiring high temperature, high flux, or large reflective areas. For example, the Central Receiver Test Facility and Solar Furnace are used to simulate nuclear blasts to test goggles and other equipment and to simulate re-entry heating of missile nose cones. The central receiver and parabolic dish systems are

Concentrating Solar Power Program

used to track distant light sources at night and look for unique radiation particles falling to earth.

High-Flux Solar Furnace

The 10-kilowatt High-Flux Solar Furnace, which began operation late in 1989, uses a tracking heliostat and 25 hexagonal mirrors to concentrate solar radiation. The furnace can nominally provide flux at 2000 suns but, when required, can utilize specialized secondary optics to generate concentrations greater than 20,000 suns. This installation is used for applied research and development in advanced materials and processes and research on destruction of environmental contaminants.

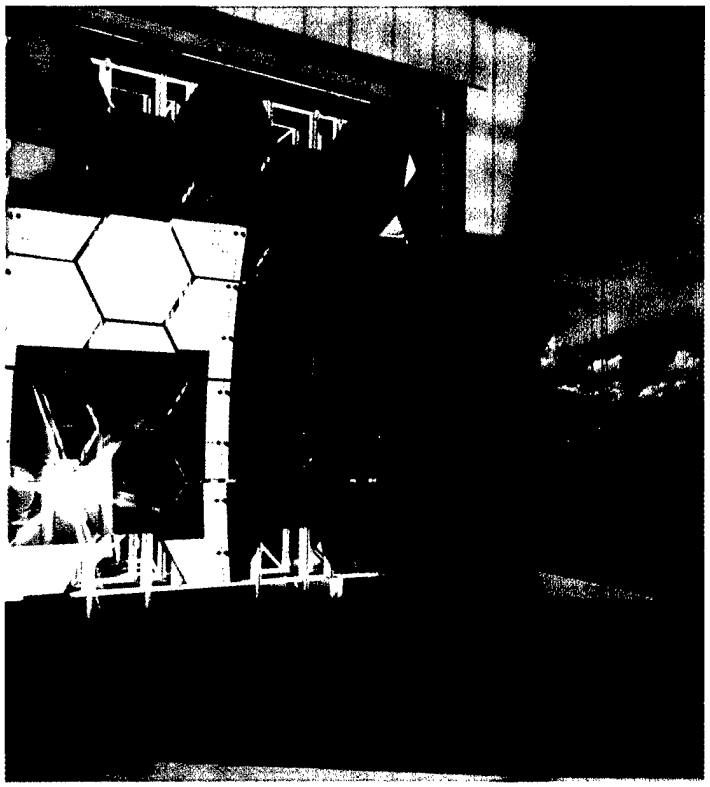
Accelerated testing of thin-glass reflector materials, like those used for heliostats and dish/engine units, is ongoing at the High-Flux Solar Furnace. The facility is also used to calibrate flux gauges, which measure levels of concentrated sunlight. Temperature and flux measurement systems developed and evaluated at the facility help advance the state-of-the-art in measurement techniques in the extreme solar environment. Planned exposure testing of high-temperature materials used in volumetric receivers may lead to new applications for these materials. The operational characteristics and size of the facility make it ideal for testing prototype hardware, including a prototype hybrid pool-boiler receiver.

Advancing Research Nationwide

The U.S. Department of Energy has designated the National Solar Thermal Test Facility and the High-Flux Solar Furnace as National User Facilities. Qualified researchers from industry, academia, and other laboratories can use these designated user facilities, making it possible for high-risk, high-payoff technologies to be developed and tested. The nation's investment in the test facilities is leveraged by a work-for-others program that allows the facilities to operate under contracts for non-Sun•Lab use and by conducting non-solar testing under contract to others.

Both facilities maintain an extensive environmental, safety, and health program and comply with all federal requirements. In fact, DOE recognized the National Solar Thermal Test Facility as a model facility in maintaining documentation, staff training, and limiting occurrences.

For information about the National Solar Thermal Test Facility, contact Jim Chavez, 505-844-4485 (jmchave@sandia.gov) or Bill Kolb, 505-844-1935 (wjkolb@sandia.gov). For information about the High-Flux Solar Furnace, contact Allan Lewandowski, 303-384-7470 (allan_lewandowski@nrel.gov).



Warren Gretz, NREL/PIX00865

At NREL's High-Flux Solar Furnace, a large flat mirror tracks the sun and reflects solar energy onto 25 individual curved mirrors, collectively known as the primary concentrator.

For on-line information about the U.S. Department of Energy's Concentrating Solar Power Program, please visit its web site: **http://www.eren.doe.gov/sunlab**

For more information on renewable energy or for additional copies of this brochure, contact the Energy Efficiency and Renewable Energy Clearinghouse (EREC): **1-800-DOE-EREC (363-3732)**

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