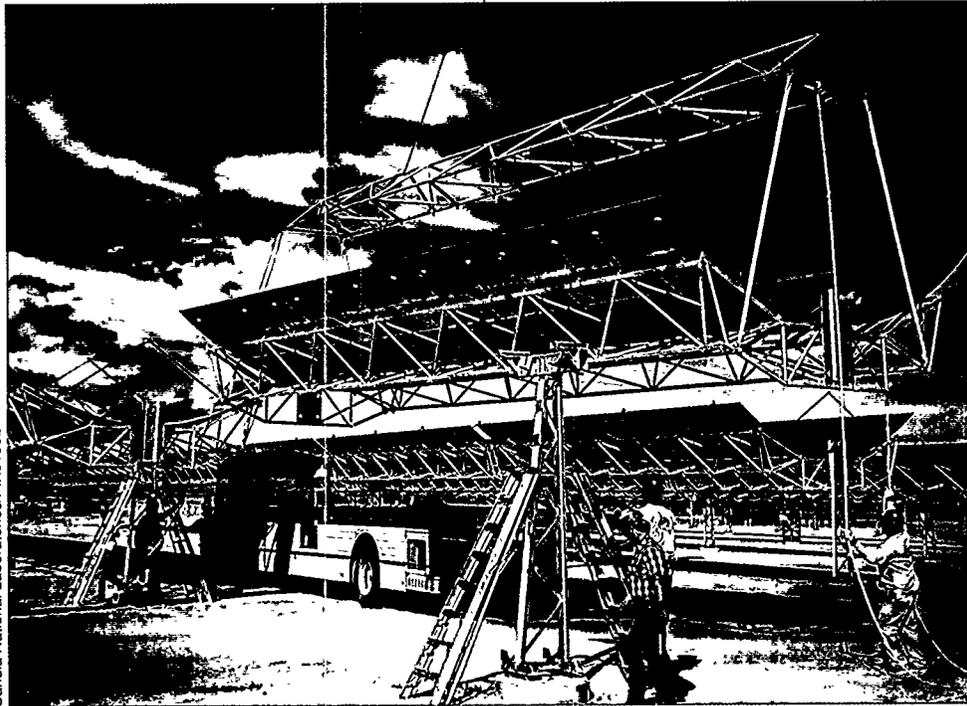


Solar Thermal Electricity: Power from the Sun's Heat



Sandia National Laboratories/PIX01332

The assembly system used by Luz International for its parabolic-trough generating plants.

Overview

Solar thermal electric systems provide utilities with a variety of modular power options, some of which can be constructed in a relatively short period of time. There is currently about 365 MW of utility-connected solar thermal generating capacity, all of it installed in California.

More than 250 people are directly employed in the operation and maintenance of 354 MW of solar thermal trough systems in California. A fossil-fuel-fired plant producing the same amount of electricity would employ only about 100 people. A 1994 study by the California Energy Commission also revealed that solar thermal power plants yield twice as much tax revenue as conventional, gas-fired plants producing the same amount of electricity.

Success Stories

The three types of solar thermal electric technologies — troughs, power towers and dish systems — are in different stages of development. Troughs have a proven track record, power towers are in the demonstration stage — which means that they are close to commercialization — and dish/engine systems are still under development.

Solar Troughs: Proven Success

Parabolic trough systems have already proven themselves in the field. Nine solar electric generating systems (SEGS) totaling 354 MW have been operating successfully in California, some for more than a decade. Their availability to produce power when the sun is shining is greater than 92%, a statistic that rivals utility-scale power plants of any type.

The SEGS systems were all built by a private company, Luz International, between 1984 and 1991. These systems

are still operating successfully, producing more than 90% of the world's solar thermal electricity and saving the energy equivalent of 2.3 million barrels of oil every year.

"The SEGS provide employment to over 250 skilled operators, craftspersons, and professionals, and millions of dollars in contracts to local vendors."

— KJC Operating Company, which manages five of the SEGS plants (Clean Power Day 1996 prospectus)

In 1991, Luz employed more than 700 people. According to Michael Lotker, formerly Luz's vice president of business development, each of its 80-MW SEGS plants required about 1 million job hours (500 job years) to construct. Because maintenance of the SEGS solar field is more labor-intensive than maintenance of a fossil-fuel power plant, the solar plant pays higher payroll taxes.

It has been estimated that, over their 30-year life, the operation and maintenance of each of the 80-MW plants will contribute \$11.6 million in taxes to the local government, \$65.8 million to the state, and \$228.9 million to the federal government.

The Solar Two Power Tower

Solar Two, in California's Mojave Desert, is a 10-MW, second-generation demonstration project to confirm the technical and economic viability of power towers. The plant uses a field of 1926 heliostats located around a 300-foot tower to focus solar radiation onto a central receiver. Molten salt is used as the heat exchange and storage medium, providing up to three hours of dispatchable power after the sun goes down.

The project has been financed by a consortium of electric utilities and high-tech companies (led by Southern