U.S. Department of Energy
Energy Efficiency and Renewable Energy
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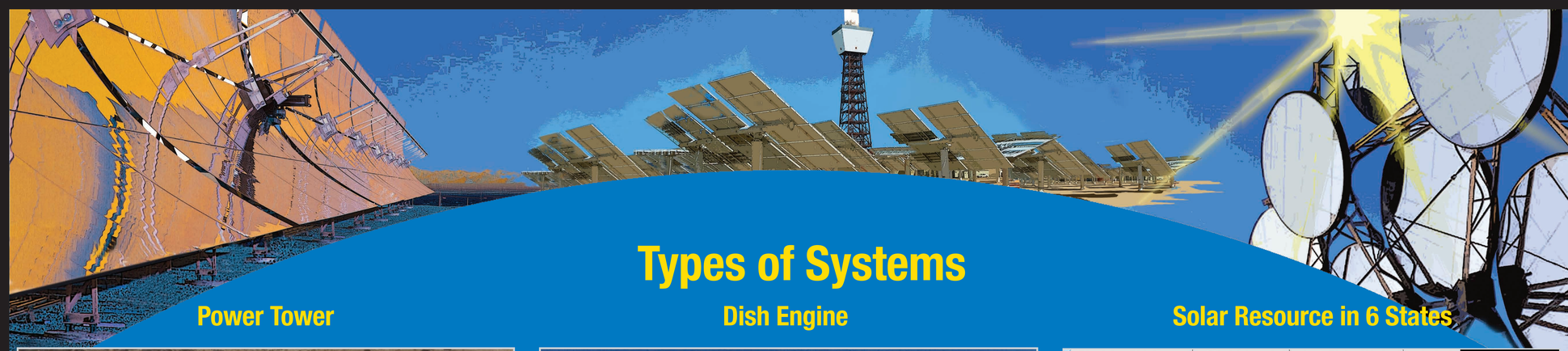
Concentrating Solar Power - Point Focus Reflector Technologies

Solar Energy Technologies Program

In January 2008, Stirling Energy Systems (SES) set a new solar-to-grid system conversion efficiency record at 31.25% on SES's "Serial#3" solar dish Stirling system at Sandia National Laboratories Solar Thermal Test Facility. It produces up to 150 kW of grid-ready electricity. Each dish unit consists of 82 mirrors.

Future Power Plants

- Spain – Solar Tres (Solar Three), a 15-MW power plant using Solar Two technology will be three times as large as Solar Two.
- California – BrightSource Energy is building 500 MWs of distributed towers.
- Spain – Abengoa is constructing a larger version of PS10 called PS20 near Seville.
- Australia – Announced plans to build a 10-MW plant with heat storage near the town of Cloncurry.
- California – Announced plans to build an 800 MW of dish engine systems in the Mojave Desert and Imperial Valley.



Types of Systems

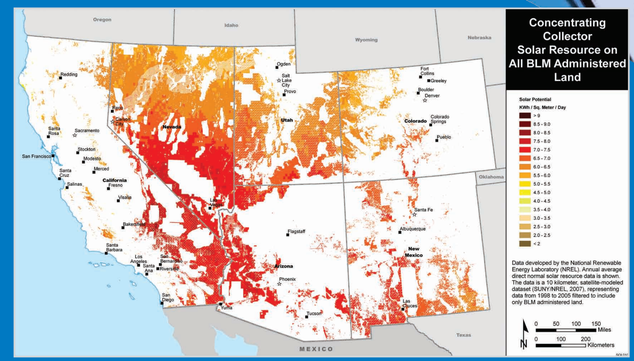
Power Tower

Solar Two, located in Daggett, California, generated 10-MW of solar electricity before it was decommissioned in 1999.

Dish Engine

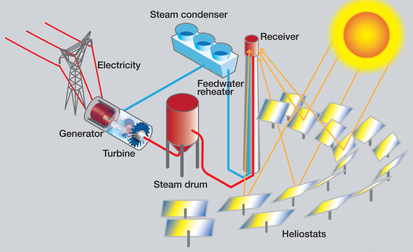
This solar dish-engine system collects the sun's energy and concentrates it on a small receiver. The thermal receiver absorbs the concentrated beam of solar energy, converts it to heat, and transfers the heat to the engine/generator.

Solar Resource in 6 States

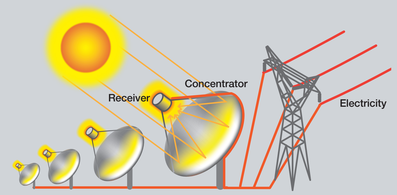


How They Work

Receiver technology focuses concentrated sunlight onto a receiver to power an engine that produces electricity.



Power Towers–use large sun-tracking mirrors, called heliostats, to focus the sun's energy on a receiver located atop a tall tower. In the receiver, molten nitrate salts absorb the heat, which is then used to boil water to steam, which is sent to a conventional steam turbine-generator to produce electricity.



Solar Dish-Engine System–an electric generator that uses sunlight to produce electricity. The dish, a concentrator, collects the sun's energy and concentrates it onto a receiver. A thermal receiver absorbs the concentrated beam of solar energy, converts it to heat, and transfers the heat to the engine/generator.

Operational Receiver Technology Power Plants

Plant Name	Location	First Year of Operation	MW	Solar Field Area (m^2)
Solar One	Barstow, CA, USA	1982	10	72,650
Solar Two	Barstow, CA, USA	1995	10	82,750
Planta Solar (PS10)	Seville, Spain	2007	11	624 120