



Concentrating Solar Power - Parabolic Reflector Technologies



Nevada Solar One is the 3rd largest parabolic solar power plant in the world.

Future Power Plants

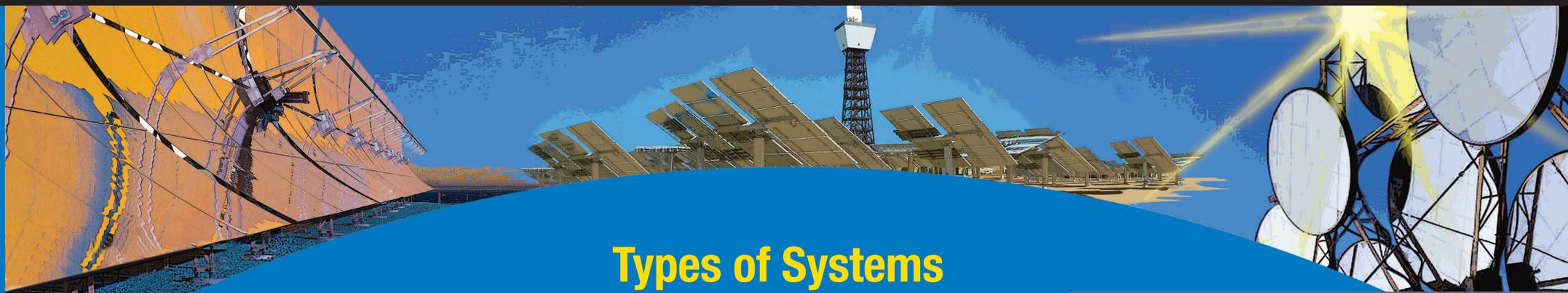
- Arizona**
- Abengoa Solar is constructing a 280-MW parabolic trough project with 6-hour molten salt storage.
- California**
- Solel is constructing a 553-MW complex of parabolic trough power plants in the Mojave Desert.
 - Beacon Solar Energy Project announced plans to build a 250-MW parabolic trough plant.
 - Victorville 2 Hybrid Power Project announced plans to build a 563-MW natural gas plant with a 50-MW parabolic trough addition.
 - Hybrid Gas-Solar Project – The city of Palmdale plans to build a 570-MW natural gas plant with a 50-MW parabolic trough addition.
 - Harper Lake Solar LLC announced plans to build a 250-MW parabolic trough power plant in San Bernadino County.
 - Ausra Inc. announced plans to build a 177-MW CSP power plant using compact linear Fresnel reflectors near San Luis Obispo.
- Spain**
- Solar Millennium, Flagsol, Cobra S.A., and Sener S.A., are building a 50-MW parabolic trough plant called Andasol 1 in Granada. An Andasol 2 and 3 are already being planned.
 - Iberdrola is constructing a 50-MW parabolic trough plant at Puertollano in southern Castile.

- Israel**
- Solel is constructing a 150-MW parabolic power plant in the Nevada desert.
- Egypt**
- Egypt announced plans to build a 40-MW steam input for a gas-powered plant with parabolic trough design.

- Algeria**
- Algeria announced plans to build an integrated solar combined cycle power station near the town of Hassi R'mel. The plant will combine a 25-MW parabolic trough array in conjunction with a 130-MW combined cycle gas turbine plant.

- Abu Dhabi**
- The Shams Project announced plans to build a 100-MW parabolic trough power plant near the town of Madinat Zayad.

- Morocco**
- The announced Beni Mathar Plant is an integrated power station with an installed capacity to generate 472-MW of electricity, including 20-MW from a parabolic trough solar power addition.



Parabolic Trough



Close-up of a parabolic trough showing collector tube containing oil at trough focal point.

Types of Systems

Linear Fresnel Reflectors

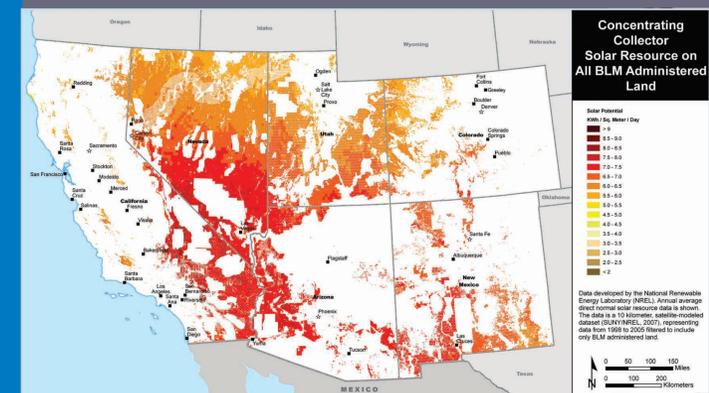


Close-up of compact linear Fresnel reflectors focusing sunlight onto a receiver.

Operational U.S. Parabolic Power Plants

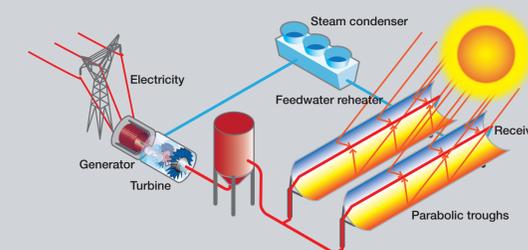
Plant Name	Location	First Year of Operation	MW	Solar Field Area (m ²)
Nevada Solar One	Boulder City, NV	2007	64	357,200
APS Saguaro	Tucson, AZ	2006	1	10,340
SEGS IX	Harper Lake, CA	1991	80	483,960
SEGS VIII	Harper Lake, CA	1990	80	464,340
SEGS VI	Kramer Junction, CA	1989	30	188,000
SEGS VII	Kramer Junction, CA	1989	30	194,280
SEGS V	Kramer Junction, CA	1988	30	250,500
SEGS III	Kramer Junction, CA	1987	30	230,300
SEGS IV	Kramer Junction, CA	1987	30	230,300
SEGS II	Daggett, CA	1986	30	190,338
SEGS I	Daggett, CA	1985	13.8	82,960

Solar Resource in 6 States

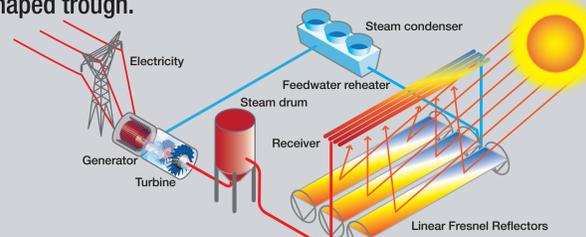


How They Work

Parabolic trough solar systems use long, parabolic-shaped mirrors or linear Fresnel reflectors to collect and focus sunlight onto a receiver tube that contains a fluid. The fluid inside the tube is heated to create superheated steam that powers a turbine generator to produce electricity.



Parabolic Trough Collector - The sun's energy is concentrated on an oil-filled, solar absorbing transparent glass tube running along the focal line of the parabolically shaped trough.



Linear Fresnel Reflectors - Differ from parabolic trough in that the absorber is fixed in space above the slightly curved or flat Fresnel reflectors. Sometimes a small parabolic mirror is added to the top of the receiver to further focus sunlight.