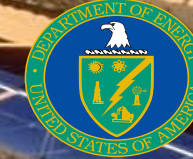


Parabolic Trough Technology Development

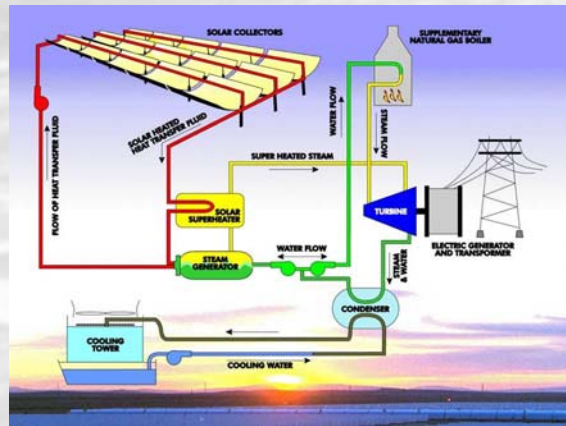
Hank Price, Mark Mehos, Chuck Kutscher

National Renewable Energy Laboratory
Golden, CO 80401

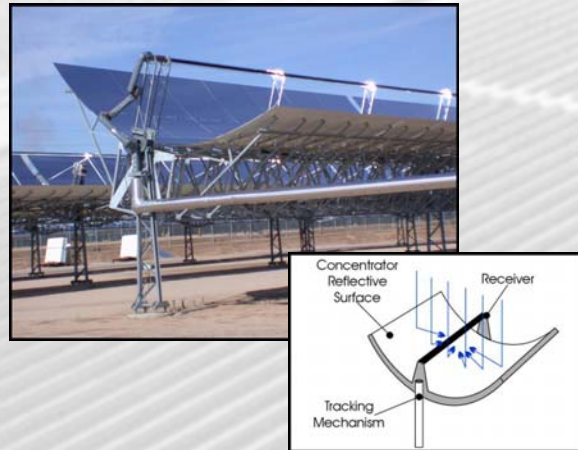


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Parabolic Troughs Solar Power Plants



How it works.



Parabolic Trough Solar Technology



Parabolic Trough Solar Power Plants

Parabolic troughs currently represent the most cost-effective solar technology for developing large utility-scale solar electric power systems. These systems are also one of the most mature solar technologies, with commercial utility-scale plants that have been operating for over 20 years. Parabolic-trough solar-concentrator electrical generation systems use curved (parabolic shaped), sun-tracking mirrors to focus sunlight on a vacuum insulated receiver at the focus of the parabolic mirrors. A heat-transfer fluid is heated as it passes through the receiver and then is sent to a heat exchanger to generate high-pressure superheated steam. The steam is used to power a conventional Rankine cycle steam turbine/generator, which produces electricity.

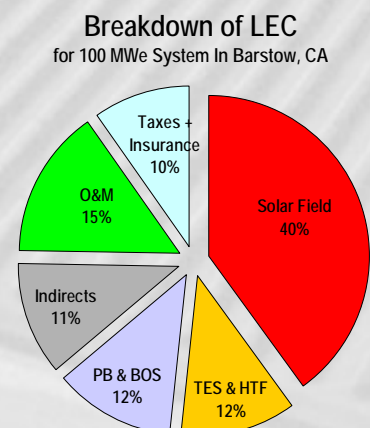
Program Goal:

Develop parabolic trough power plant technologies that will be able to compete cost competitively with conventional fossil power technologies as dispatchable intermediate load generation in the wholesale bulk-power market (COE 6 - 8 ¢/kWh).

Technology Areas:

- ▶ Solar Field
 - Receiver Technology
 - Concentrator Development
- ▶ Thermal Energy Storage
 - Advanced Heat Transfer Fluids
 - High Temperature Molten-Salts
- ▶ Power Plant Technology
 - Solar Optimized Power Cycles
 - Dry Cooling
 - O&M Cost Reduction
- ▶ Systems Integration & Testing
 - Model Development
 - Testing
 - Analysis

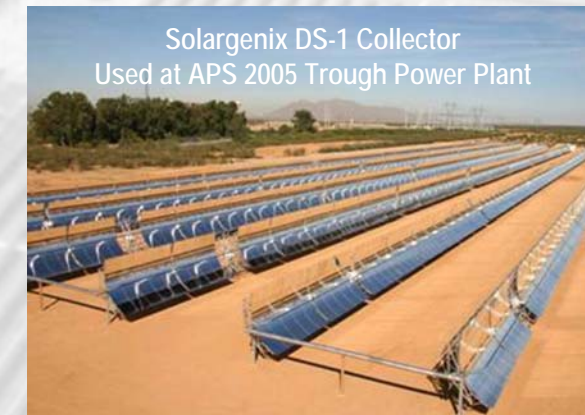
Parabolic Trough Rankine Cycle Power Plant



Recent Parabolic Trough Concentrator Development



New Solargenix SGX-1 collector developed during 2005



New Gossamer Organic Hub System



- SGX-1 Collector:**
- Gossamer organic hub
 - 50% fewer parts than DS-1
 - 30% lighter
 - 1/3 time required for field assembly
 - Uses low-cost extruded parts
 - No alignment of mirrors required
 - Simple drilling jigs provide high tolerances

SGX-1 is being used in Nevada Solar One Plant

The Cost of Solar Power

