Parabolic Trough Technology Development

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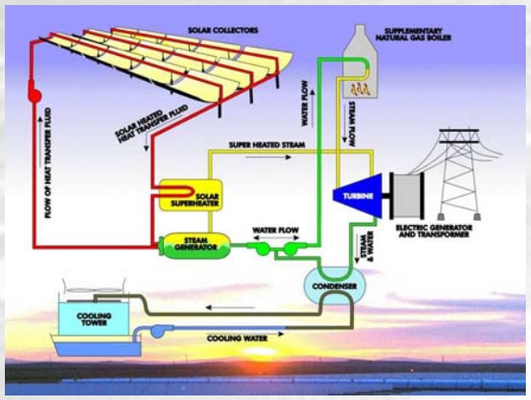
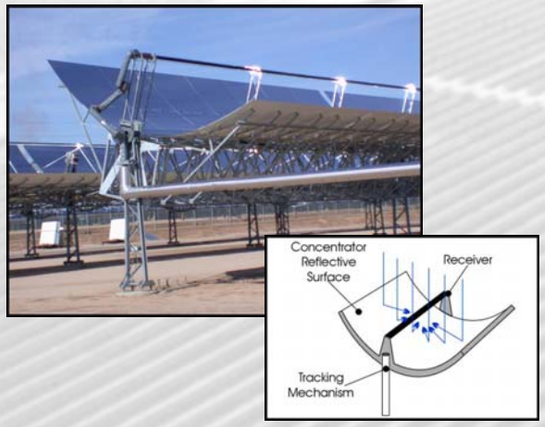
Parabolic Troughs Solar Power Plants



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).

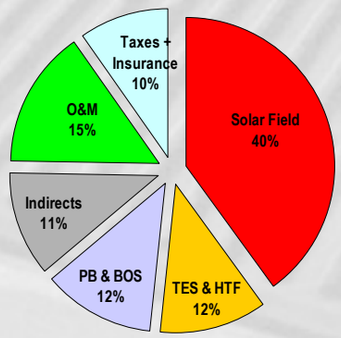
Technology Areas:

- **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

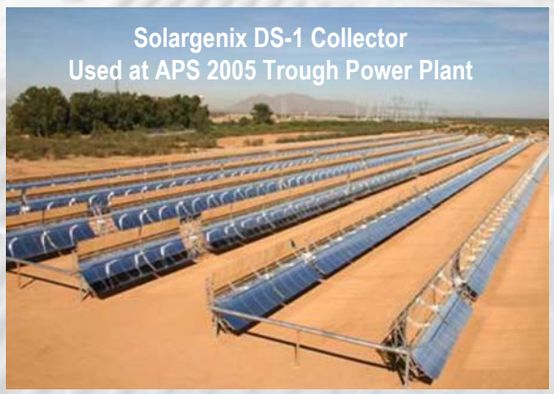
Breakdown of LEC

for 100 MWe System In Barstow, CA



Recent Parabolic Trough Concentrator Development

New Solargenix SGX-1 collector developed during 2005

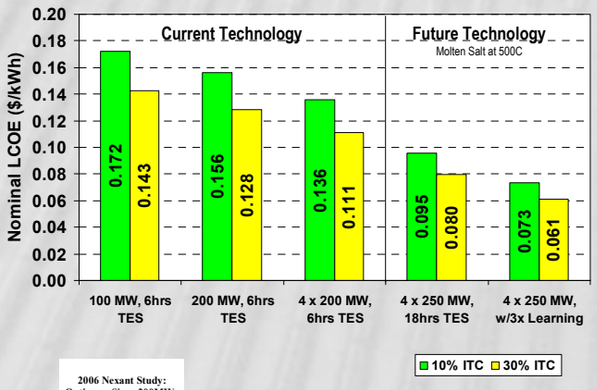


New Gossamer Organic Hub System

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



2006 Nexant Study:
Optimum Size ~200MWe
For Current Technology