

Figure 8.9 Concentrating Solar Thermal Technologies

Linear Fresnel Reflectors	Large mirrors reflect and focus sunlight onto a linear receiver tube containing a fluid that is converted into superheated steam to spin a turbine producing electricity through a typical Rankine steam cycle.	In contrast to the direct conversion of the sun’s energy to electricity, the CST process often requires as much water as conventional fossil fuel generating plants.
Parabolic Troughs	Parabolic mirrors focus sunlight onto pipes containing water, salt, or other heat exchange mediums.	The superheated fluids run through a heat exchanger to be stored or to generate steam for the Rankine steam cycle. This process also requires water.
Power tower	Liquid in a “power tower” reaches very high temperatures because of the concentrating effect of heliostats (flat, sun-tracking mirrors) surrounding it that simultaneously beam the sun’s energy toward the tower.	The higher temperatures achievable from the concentration of the sun increase the efficiency of the steam cycle used to produce electricity. This process also requires significant amounts of water.
Dish/engine	Dish/ engine (also sometime called “Dish Stirling” because of the type of engine used) is one of the newest and most efficient methods of converting the sun’s energy to electricity. Concave mirrors in a dish direct the sun’s rays to a focal point holding the engine, which runs from the heat generated.	Dish/ engine is more efficient than either parabolic trough or power tower technologies. Although it has no storage capacity and it still requires large land areas, dish / engine does not use any water. Some complaints have arisen, however, about the noise from the Stirling engines.

(CSP stands for Concentrating Solar Power and can apply to both CST and Concentrating PV described in Figure 2.2 and above)