

Technology Assessment of Central Station Solar PV, Linear Fresnel, and Dish-Engine Technologies

A recent EPRI Technology Innovation (TI) project provided a technology assessment of solar photovoltaic (PV), linear Fresnel, and dish-engine technologies for a 50-MW or larger solar power plant in New Mexico to be developed by mid-2010. The assessment focused on how much operating experience these technologies have achieved and their current level of deployment.

The results have been published in an EPRI report entitled *Program on Technology Innovation: Central Station Solar Photovoltaic, Linear Fresnel, and Dish-Engine Technology Assessment*, 1016347.

The TI project was performed in conjunction with an EPRI feasibility study for a 50 to 500 MW central station solar power (CSSP) plant to be developed in New Mexico by mid-2010.

How to Apply the Results

Utilities today may be seeking to develop renewable energy projects in order to meet state Renewable Portfolio Standards, demonstrate corporate leadership in mitigating climate change, meet the need for more generation capacity, and develop a diversified generation portfolio. The results of this project will be beneficial to any energy company or project developer considering a central solar plant project, and will aid them in more effectively evaluating central solar technologies.

Technology Assessment

The project team distributed a request for information to all known PV, linear Fresnel, and dish-engine technology providers to gather data on current product offerings as well as information on project developer experience and ability to deliver a commercial plant by mid-2010. The assessment found the following:

- **PV.** Over ten gigawatts of PV solar power capacity are deployed worldwide, with annual growth averaging 41 percent for the past five years. Although PV has traditionally been considered a distributed technology, several new large-scale plants have been built in the United States in the past five years, and several new central plants are currently being developed. Europe has the largest installations, with two plants of over 20 MW in Spain. This trend towards PV as a central generation option is expected to continue as energy companies broaden their generation mix to include solar and prepare to meet state Renewable Portfolio Standards.
- **Flat-plate PV.** Flat-plate PV is technically and commercially ready for deployment at 50 MW or larger scale in the 2010 timeframe in New Mexico. There are two principal paths that are being taken by flat-plate project developers: low cost, low efficiency using thin film technology; and higher cost, higher efficiency using crystalline silicon cell technology. Flat-plate PV can use fixed orientation, one-axis tracking, and two-axis tracking approaches.

- **Concentrating PV.** Concentrating PV (CPV) appears to be nearing technical and commercial readiness for utility-scale deployment. However, demonstration of CPV using high-efficiency multi-junction cells is likely necessary for CPV to become competitive with flat-plate PV.
- **Linear Fresnel and Dish-Engine.** Linear Fresnel and dish-engine technologies are also advancing along the development curve. Both of the leading technology providers have agreements to develop central solar plants producing hundreds of megawatts in the next two to five years.

For more information contact Cara Libby, 650-855-2382, clibby@epri.com.

View or download *Program on Technology Innovation: Central Station Solar Photovoltaic, Linear Fresnel, and Dish-Engine Technology Assessment*, 1016347.