



## **TECHNOLOGY: New mirror is money saver for solar thermal electricity** (08/05/2009)

Annie Jia, E&E reporter

Scientists have developed a new mirror that they say will cut a sizable chunk out of the cost of electricity from solar thermal power plants.

The technology, developed jointly by the National Renewable Energy Laboratory and the solar thermal power company SkyFuel, uses a flexible mirror made of silver and plastic, rather than the glass mirrors that dominate the industry.

"Most companies, most people think only in terms of glass," said Gary Jorgensen, an NREL senior scientist and co-inventor of the mirror. But the new mirror makes more sense, he said. "It's quite an easy, low-labor, time-insensitive process, as compared to mounting large glass panels."

Randy Gee, chief technology officer with SkyFuel, said this is the first time a utility-scale solar thermal power facility is not using glass for mirrors.

The key to the new mirrors is that they are lightweight and flexible, and thus easy to manufacture and install, Jorgensen said. Gee claims that SkyFuel's technology, which combines the mirror with other advances, would cut the cost of electricity from solar thermal power plants by 15 to 20 percent, making the technology closer to being cost-competitive with fossil fuel power.

### **Lighter mirrors, lower cost**

Solar thermal power uses mirrors to concentrate sunlight onto a container, where fluid is heated up to high temperatures to make steam. The steam is sent through turbines to generate power, much in the same way that steam from water powers turbines in coal power plants.

The turbine technology is well-established, said Chris Huntington, SkyFuel's vice president of business development.

More than the half the total capital cost of solar thermal power facilities, however, is taken up with the solar field, where the collectors are located, Gee said.

The new mirror technology, which SkyFuel will be using in a parabolic trough design, cuts the biggest chunk out of the cost of the solar field, which the company expects will be 30 percent less expensive than competing solar field technologies that also use parabolic troughs, according to Huntington.

The savings come from easier manufacturing and installation processes, as well as from the lighter weight of the mirrors, which allows the troughs to track the sun more easily, Jorgensen said.

Gee said that capital costs make up more than 90 percent of the cost of a solar thermal plant. Cutting 15 to 20 percent from the capital cost results in comparable reductions in the cost of electricity, he said.

## **Making it into the market**

Mark Mehos, an expert in solar thermal power at NREL who was not involved with the technology directly, said there are only about 16 solar thermal power plants operating commercially in the world. Their total capacity is about 550 megawatts, he said, but contracts have already been drawn for 6,000 megawatts more of production.

While deployment of the technology is growing, the cost is still not as low as electricity produced using fossil fuels, Mehos said. He estimated that a "good bid" would be 14 cents per kilowatt-hour, with government incentives.

"The problem is, those incentives will eventually go away, so we need to get the cost down more than 2 cents," he said.

To begin with, solar thermal power's best bet would be to compete with peak power generation from natural gas plants, he said. Even then, natural gas still proves cheaper, at about 12 cents for kilowatt-hour.

"There are lots of other things that need to happen," Mehos said.

## **Pushing costs down**

He said that as a technology, solar thermal power is better suited for large-scale power generation than photovoltaic power. That's because electricity storage is easier to do. All that is needed is to store heat in the fluid, like taking a hot liquid and putting it in an insulated thermos, rather than having to build electricity storage systems like batteries.

Storage, he said, is important for solar energy, which is only available during the day and when there are no clouds blocking it.

Mehos said that equally important in cost-cutting, along with technological developments, will be economies of scale and competition.

A prototype and pilot project of the SkyFuel system are currently operating in Colorado. Gee said the company plans to open its first commercial plant in December in California.

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