



A PV installation by Solaria. Photo: Solaria

Investors favour PV over CSP

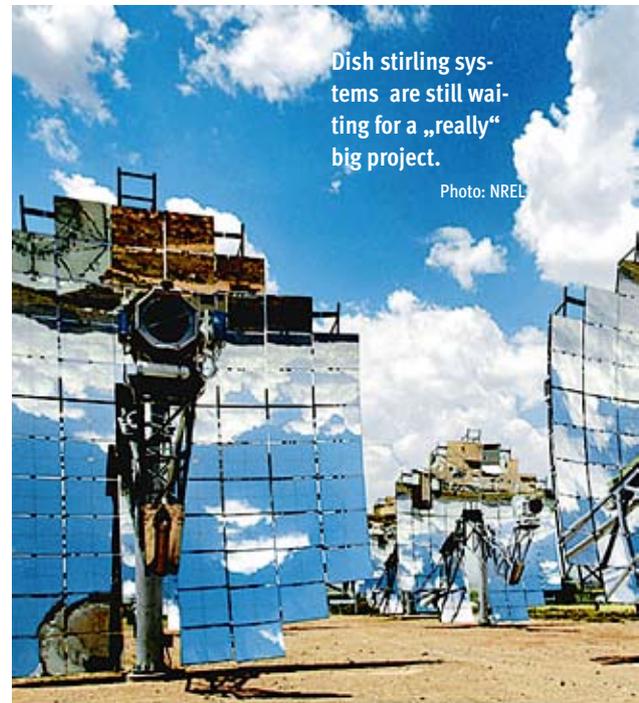
A couple of years ago, CSP seemed to be the utility-scale solar electricity of the future. Now costs for PV systems have declined so much quicker that some investors have changed their plans from CSP to PV.

The CSP industry in the US has had a big year: developers announced over 3 GW of federally supported CSP projects at the end of 2010. Some of them have found financing and are moving forward with development, others have not.

However, the long-term future for the industry is unclear. Despite projections that the global CSP market will grow from US\$ 3 billion in 2011 to over US\$ 10 billion by 2013, solar investors are starting to heavily favour PV installations, according to a report by Greentech Media (GTM), "Concentrating Solar Power 2011: Technology, Costs and Markets."

This is not the only hint that there is a shift taking place. A couple of years ago, the renewable energy investments of the Californian utility companies Sempra Energy and San Diego Gas & Electric had been 80 % CSP, says Jos van der Hyden, Vice President of Business Development EMEA (Europe, Middle East, and Africa) for First Solar, California. Now the mix is closer to 30 % CSP and 70 % PV.

Due to financing problems, even several planned and approved large CSP projects have switched to PV technology in the past several months. Tessera Solar, the development arm for Stirling Energy Systems (SES), which manufactures concentrated solar dish-engine plants, is having trouble getting its already



Dish-stirling systems are still waiting for a „really“ big project.

Photo: NREL

approved project financed. Tessera Solar signed two power purchase agreements with California utilities – for an 850 MW plant with Southern California Edison and for a 709 MW plant with San Diego Gas & Electric. Both were approved by the California Energy Commission and received federal loan guarantees. In December 2010, Tessera Solar sold the 850 MW project to an independent PV developer, K Road, which will convert 750 MW of Tessera's facility to the more accepted and proven PV technology. The final 100 MW will still come from Stirling's Sun-Catcher technology. Tessera's other CSP project was sold to AES Solar, another PV developer, in February 2011.

Tessera is not the only company that has been forced to give up its CSP project to a PV project. ESolar, a concentrating solar power tower company cancelled two projects – one in California and one in New Mexico – and converted them to PV projects as well.

CSP is losing ground

What has happened? Several years ago, CSP plants had a good price point compared to other types of utility-scale solar energy. They were offering large thermal projects that lowered overall costs per kWh. Today's situation is a sharp contrast to 2007 and 2008. Cumulative PV production has roughly quadrupled meanwhile. And every time cumulative production doubles, costs drop 18 to 20 %, says Dan Shugar, CEO of Solaria Corporation, a PV manufacturer in California. "Right now the PV industry is completely dwarfing the solar thermal industry." That's because solar thermal technology has not evolved as quickly and costs are not dropping at the same rate – a self enhancing effect.

And prices for PV are decreasing even more quickly now as a result of supply and demand issues. Prices will drop another 20 to 30 % this year because supply is increasing and demand is not increasing as much around the world, says Jay Mann, Principal at SunLight General Capital, a solar energy developer and financier in New Jersey. Spain has reduced feed-in-tariff rates drastically and Germany is about to follow, reducing the size of two big markets.

Big systems require big investments

But the price per kWh is not the only issue. The problem with the big CSP projects is that they require a large upfront investment. "It does not work to build a thermal plant less than 100 MW because the cost of the power block is too high," says Shugar. This was not as much of a hurdle several years ago, adds Jeffery Atkin, partner at Foley & Lardner LLP in Los Angeles. But it is now really hard for developers to get financing for such large projects: investors see CSP plants as expensive and risky operations. In a time when capital is hard to come by, smaller and more proven PV installations are more popular. A typical utility-scale PV plant is about 20 MW in size. "Many of these smaller plants really add up," says Atkin. "There are a lot of developers out there with five or ten 20 MW plants, and the number will grow in 2011."

However, some CSP developers were still able to get their projects through permitting and find investors. But all of the recently approved large CSP plants in the US needed federal loan guarantees from the US government in order to help finance them. These projects alone will make the US CSP industry grow 472 MW in 2011 and 1,200 MW in 2012, says GTM. "After the DOE loan projects end, it will be difficult for any big plants to find financing," says Shugar. "CSP projects were among the biggest victims of the credit crisis," says Atkin.

PV on the rise

GTM's report points to a sharp decline in newly installed CSP capacity after 2013, but a continued increase in PV project installations. "In the past 6 to



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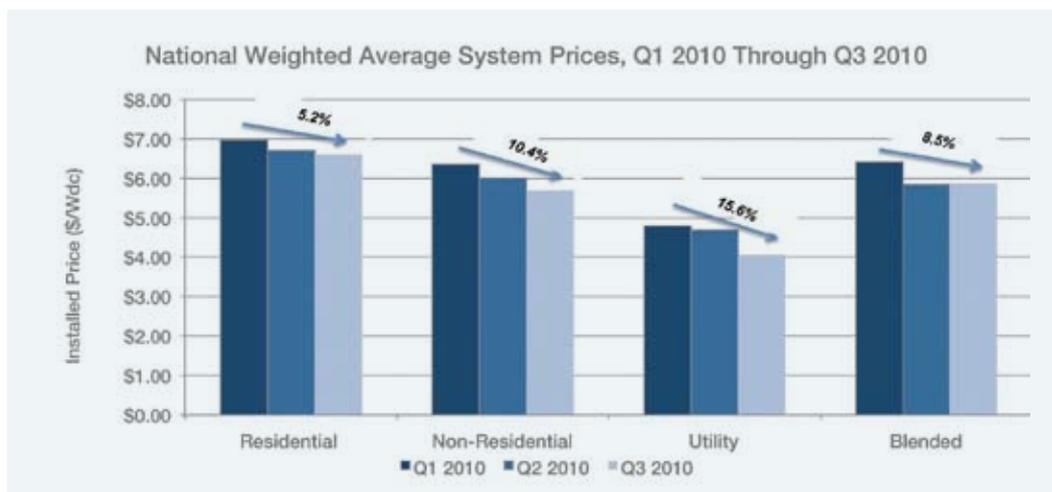


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Prices for PV have decreased drastically – in 2010 and in the years before. Source: SEIA



12 months and for the near-time future, PV has become a very hot technology for both venture-capital investments and for long-term financing,” says Atkin. “Our investor base thinks that PV is much more trustworthy than CSP,” says Mann. “PV investments are relatively conservative because they are essentially a series of fixed cash flows that are predictable.”

There are over 6 GW of contracted utility-scale PV projects at various stages of development and growing quickly, says the GTM report. There are currently 233 MW of installed utility-scale PV plants in the US, but that number is expected to double or triple in 2011 alone, says Atkin.

“PV plants have become in vogue because they are scalable, can be built and operating in three to nine months, and operate in most climates,” says Atkin. CSP projects as a contrast only work in high solar intensity locations with space for large installations. “In the US, this leaves the southwest as the only area that could support CSP systems. However, the southwest desert is extremely remote. Transmission infrastructure is minimal and solar developers would need major upgrades in order to deliver the large amounts of energy produced from CSP plants to end-users. It’s easier to get small PV projects online that are located close to metropolitan areas.”

Another problem for investors is that larger thermal projects have so many different components that need to come together and there aren’t guarantees and warranties on all of the parts, says Shugar. A PV system is simpler in design: the main cost factors – the panel and the inverter – are warranted. “It is hard to have investor confidence without warranties,” says Shugar.

The race is not run yet

In spite of its disadvantages, CSP technology offers benefits that PV technology cannot provide. CSP projects give utilities storage and dispatchable base-load generation, which may be worth the extra upfront cost in the future when storage and grid stability become bigger issues than they are today, says Shugar. Analyses from the National Renewable Energy Laboratory (NREL) in Colorado show that PV has limitations. Even with the low projected costs of

PV, it will eventually hit a plateau with utilities because the technology does not allow for energy storage. “PV energy is intermittent and can cause problems when there is too much of it on the grid,” says Mark Mehos, Principal Programme Manager at NREL.

The cost of CSP is also expected to decline in the next decade and in comparison to fossil energies it could become more appealing in the future. CSP development outside the US will also bring the costs down, says Mehos. But CSP project costs are expected to decline 3 to 7 % per year between 2010 and 2020, according to the GTM report. As PV will reduce prices probably a lot quicker over this time period, its price advantage over CSP will even increase.

The CSP industry will benefit from seeing new projects online over the next few years. This will allow their costs and benefits to be more accurately understood and quantified. “It is difficult to predict what will happen with CSP in the future because they are just beginning to build these big projects,” says Mann. If investors gain confidence in the new types of CSP technology, the technology might have a good future. But it becomes more difficult to find financing as time passes, says Atkin.

Not really PV vs. CSP

Although CSP project developers are losing investors to PV developers, Atkin still believes it is unlikely one technology will replace the other. That’s because the two technologies have been designed for different markets. On the other hand, the Tessler projects show that PV has found its way into projects that seemed to be predestined for CSP. This does not make Atkin worry about the future of CSP. “PV is not really taking away from CSP, just attracting new investors to the solar market, which is good for everyone in the solar industry”, says Atkin. The recent growth of the PV industry may even be a good thing for the CSP industry because it has drawn new banks, utilities, and contractors into the solar energy market.

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