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Executive Viewpoint

20-20 Vision: Solar Trust of America is seeing it all clearly

1 March 2010

'Project vision 2020' is not a catch phrase; it is a strategy - and it appears to be working. With the introduction of new solar trough collector technology that is currently in its final testing stages at a commercially operating solar thermal power plant in California, and with nine 250 MWe projects on the Bureau of Land Management's fast track list, Solar Trust of America is shaping up to be a pack leader. CSP Today talks to Solar Trust of America's Chairman and CEO, Uwe T. Schmidt, to learn what it takes to break away.

By Rikki Stancich in Paris



Solar Trust of America, the joint venture between Solar Millennium and Ferrostaal, plans to take the US market by storm.

Using a strategy it calls 'Project Vision 2020', Solar Trust of America has set stringent goals - to shear 20 percent from its overall construction costs, boost output and cost efficiencies by 20 percent and displace the competition by amassing a hefty 20 percent share of the U.S. market, by 2020.

The prognosis looks promising. With the recent addition of Solar Millennium's proposed Nevada site to the Bureau of Land Management's (BLM) fast track list, Solar Trust of America could realize up to nine plants throughout California and Nevada, beating its own internal and external targets.

If approved prior to December 31st 2010, these projects will qualify for Department of Treasury's ITC cash grants and the Department of Energy's Federal Loan Guarantees program, all of which form part of the government's American Recovery and Reinvestment Act (ARRA) stimulus fund.

In addition, the company recently launched its new HeliOTrough collector which the company says is more than 10 percent more efficient in thermal output and 10

percent more cost-efficient than its predecessor, the SKAL-ET. According to Solar Trust of America's CEO, Uwe Schmidt, HeliOTrough delivers on the Project Vision 2020 targets insofar as the larger components have driven down logistics and labor costs, while the more efficient collector boosts output.

Replacing synthetic oil with molten salts as a heat transfer fluid could further augment this efficiency. Solar Trust of America and Solar Millennium are testing molten salt as the heat transfer fluid in a next step at the test bed. At this stage, the company expects implementation of this novel heat transfer fluid in the second phase of its U.S. project portfolio.

While molten salt storage will not be integrated into its California projects at initial start-up construction in late 2010, the company says that a thermal storage solution will likely be integrated during the second phase of build-out as well as into its Nevada projects.

If and when it does, Solar Trust of America would be first to the U.S. market with parabolic trough technology using molten salts - based on Solar Millennium's experience in thermal storage experience at its three Andasol plants located in Spain, all of which are equipped with 7.5 full-load hours per day.

CSP Today's Rikki Stancich talks to Uwe Schmidt, Chairman and CEO of Solar Trust of America, to learn more about the latest HeliOTrough technology and the key to a successful strategy.

Solar Trust of America is a vertically integrated joint venture between Solar Millennium (70%) and Ferrostaal (30%).

CSP Today: Solar Trust of America's wholly-owned subsidiary, Solar Millennium, LLC and its technology sister company, Flagsol, LLC, have begun testing their latest technology, the HeliOTrough. According to Solar Millennium, the HeliOTrough is the most efficient trough technology on the market. What is the level of efficiency and how has Solar Millennium achieved this?

Uwe Schmidt: The new collectors are now 192 metres in length (compared to the 148 metre length of their predecessors) and 6.7 metres wide, compared to 5.7 in the previous generation.

The collectors have a non-interrupted mirror surface with a significantly increased aperture, and the concentration ratio has been reduced from 82-times concentration to 76-times concentration as optical efficiency of the collector is so much improved.

The diameter of the heat-collecting element is also larger (89mm), allowing an increased flow of the heat transfer fluid and thus reducing pumping power parasitic.

We also aim to achieve plant efficiency gains by using molten salt as the heat transfer fluid, switching from synthetic oil to a molten salt mixture.

We have been testing the latter for quite some time. In these tests, we've managed to achieve operating temperatures at 500°Celsius, which would offer significantly higher cycle efficiencies when the process is fully proven and ready for day-by-day operation.

The HeliOTrough collector design also reduces the labor requirement due to standardized components that allows for shorter construction times.

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CSP Today: What has performance been like so far and when will the testing phase and performance measurements be completed?

Uwe Schmidt: The results we have achieved to date have exceeded our expectations – we are already delighted with the results. We will continue testing for a another 6-8 months.

CSP Today: Both the mirrors and the absorber pipes of the HeliOTrough collectors are larger than current systems. What are the benefits and drawbacks of using larger components?

Uwe Schmidt: While some say bigger is not always better, from our current vantage point, it is.

Compared to the SKAL ET collectors at the Andasol 1 site, the HeliOTrough achieves more than 10 percent greater efficiency with the bigger collector. This is due to an increased thermal output of the collector. The bigger collector size (appr. 1,300 sqm of aperture per collector, compared to appr. 850 sqm with the SKAL ET), there are cost savings for drives, gears, hydraulic pumps and flow measurement equipment.

But there is an optimal point of efficiency, beyond which diseconomies of scale set in, where for example, mirror maintenance would become an issue.

CSP Today: Solar Trust of America places an emphasis on supply chain management. Can you comment on this strategy?

Uwe Schmidt: When you are building plants with a US \$1bn capital expenditure, there needs to be an emphasis on supply chain management.

Our strategy is to reduce the cost through good supply chain management, increase the output of the collector and lower the assembly cost.

Every decision we make is based on performance statistics – we take a logistics-based approach with profit-centered thinking, to reduce overall plant costs. The aim is to be more competitive than the market and still make money.

We have achieved this through the HeliOTrough; we have achieved economies of scale by producing larger, standardized components, which in turn, streamlines our logistics path.

We have been very focused on promoting economies of scale. At our Mojave Desert sites, we are developing up to four plants that use one assembly facility, one supply chain route, and one transmission line access route.

With Solar Millennium and Ferrostaal, we are approaching a new sector, but following old economy philosophy and guidelines. We are focusing on the 'less sexy' supply chain management approach, using best-in-class partners –this sector definitely requires a consortium approach.

We have an opportunity to be shareholders in an efficient model going forward. Solar Trust of America was set up to build projects - to handle the supply chain required to build those projects and then to stay involved in the facility post-construction, as an independent owner operator with a 20-25 percent equity stake.

CSP Today: Can you provide comment on Solar Trust of America's 'Project Vision 2020' strategy?

Uwe Schmidt: Project Vision 2020 forms the backbone of STA's internal and external strategy. Through this we aim to reduce investment costs by 20 percent; reduce assembly costs by 20 percent via sequencing used by our partner, Ferrostaal in the automotive assembly lines industry; we aim to improve the thermal performance of the collector and heat transfer fluid by a combined 20 percent; and ultimately, we have a very aggressive and ambitious goal of capturing 20 percent market share by 2020.

Currently we are at the permitting stage with our projects and are in discussions with the Department of Energy. If these projects are approved, we will be closer to having 40 percent of the solar thermal power plant market share in California, which is our primary focus, and 25 percent of the market share in Nevada.

Over the long-term, we'll have roughly 20 percent of the overall US market.

CSP today: In the future, what role do you envisage CSP playing in the larger energy picture?

Uwe Schmidt: There will be a mix of energy sources, but where CSP is concerned, for certain states like California with its 33 percent renewable energy target, there will need to be more plants in production than are currently earmarked for BLM's fast track programme

Wind and solar are complimentary, at least in California, in that wind supplies peaks in the morning and evening, while solar thermal power generates energy almost evenly throughout the day and can cover night peaks, too, in a cost efficient way that no other renewable source offers.

Coal and gas will most likely be the base power sources, with peak loads coming today from gas turbines and, increasingly, solar thermal power plants – here's our target market segment!

So far, renewable energy sources such as wind and photovoltaic could only supplement the power demand as available. Concentrated solar thermal power plants with thermal storage, however, are matching Southwestern US peak demand perfectly, thus contributing the most valuable energy for the power system. With thermal storage, those peaking power contributions can be made fully dispatchable and are thus highly reliable for the utility companies.

We have no ambition to replace all energy sources with solar, but rather to play a complimentary role in the peaking and mid-load power market segment. Demand for these segments will grow much faster than fossil fuel energy supplies. When considering that global energy demand will triple in size by 2050, we believe we are well positioned in the energy marketplace.



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