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Despite being relatively quiet compared to the Intersolar events in Munich and San Francisco, the Intersolar India was buzzing with interest and activity.

Road to the Solar Mission

India: India is considered one of the most promising solar markets in the world. However, there are quite a few hurdles to straddle before reaching the finish line set by the government's ambitious expansion plans for photovoltaics. One issue is combining lower costs and quality assurance, a problem on full display at the Intersolar India in Mumbai.

Compared with its sister events in Munich and San Francisco, the Intersolar India was a quiet event. The trade show, which was held for the first time in downtown Mumbai's exhibition center, attracted 143 exhibitors and brought in some 5,900 trade visitors. **The show floor was busy till the very end, especially at the booths of companies such as Centrotherm, Gehrlicher, Coveme, Bonfiglioli Riduttori, Schueco, IB Vogt, Emerson, Phocos, M+W, Oerlikon Leybold Vacuum and SMA.** Many a new product was also introduced for the first time from in-

dustry players such as Eltek Valere, Delta Energy Systems and the new joint venture MiniTec-Krisam.

Many newcomers

A good dozen Indian module manufacturers were exhibiting or walking the floors of the trade show in Mumbai, including Reliance, Waaree, Chemtrols, EMMVEE, Tata BP Solar, Sova Power, Icomm, JJ PV Solar and Ecosol Power. Many are just about to start production or are already in initial start phases, such as Chemtrols in Goa or JJ PV Solar in Gu-

jarat. Most of annual production capacity is between 15 and 35 megawatts. But some key companies were absent from the event, namely major international manufacturers like Suntech, Yingli, Trina, Sharp, SunPower, First Solar and SolarWorld. No doubt this is due largely to the domestic content quota regulations set forth by the Jawaharlal Nehru National Solar Mission, not to mention the still small significance of the Indian PV market. Supporting local economy, only projects that use 'Made in India' crystalline silicon modules are being considered. In

2012, the rule will also apply to solar cells. Till now, the regulation does not apply to thin film modules or components like invertors or mounting systems.

Wanted: mechanical engineers

European and U.S. mechanical engineering companies are especially able to profit from India's domestic content laws. Many Indian manufacturers are using foreign equipment because the country's own machinery construction sector is not very developed. Most popular is "Made in Germany" equipment. "For the moment, India is our most important market for turnkey systems for crystalline silicon solar modules," says Hartmut Gross, Marketing Director at Centrotherm. Right now many outside companies from completely different sectors such as textiles, mining, or telecommunications are getting into the solar market, and they are often complete beginners when it comes to photovoltaics.

Centrotherm has benefitted from the situation. Gross says they have already delivered three turnkey systems to Indian companies for the manufacture of crystalline modules: Jupiter, JSPL and Websol. Willi Huber, Director of Inter-

national Sales at Centrotherm subsidiary, GP Solar, has had similar experiences with Indian cell manufacturers. They usually want access to mostly standard quality equipment such as efficient inspection systems. The economic opportunities of India's growing photovoltaic market were enough to warrant a reception organized by the German Embassy in the rarefied atmosphere of the Kempinski Hotel. "The Indian solar market offers especially outstanding sales opportunities to German mechanical and plant engineering companies," says Bernd Forster, German Deputy Consul General, at an exhibitor's reception at the Intersolar India and Energy India, a parallel event.

Enormous potential

"India has enormous potential for photovoltaics," concurs Mikio Kimura, General Manager of PV-Global Division for Yukita Electric Wire in Osaka. The sun shines up to 300 days a year in many locations and the country has a massive appetite for energy. At the end of 2009, the government set an important milestone with the Jawaharlal Nehru National Solar Mission. It stipulates that solar plants with a capacity of 20 gigawatts must supply elec-

tricity by 2022. In the first construction phase, grid-connected systems with a capacity of 1.3 gigawatts will be installed by 2013, said Deepak Gupta, Secretary of the Department of New and Renewable Energy at the Intersolar in Mumbai.

Indeed, there are a lot of hurdles to jump before the photovoltaics market

HHV SOLAR

HHV Solar in Bangalore is a good example of a young Indian module manufacturer that has developed from a traditional engineering company. The parent company HHV (Hind High Vacuum Company) describes itself as the market leader in high vacuum technology in India. HHV Solar produces crystalline solar modules on two lines with an annual capacity of 30 megawatts and operates a ten MW pilot turnkey system for a-Si solar PV modules. According to Chairman Prasanth Sakhaamuri, they are also planning to go into thin film tandem cell technology. The company's PV business grew to 50 percent of its total revenues last year. 90 percent of the modules were exported. 80 employees work in three shifts to produce the crystalline modules in a semi-automated manufacturing system. Processes such as cell busing or attaching junction boxes are performed manually. Equipment is manufactured in-house or purchased from U.S. or European suppliers, giving HHV Solar close business ties with companies such as Spire. "With our current small production capacity and our low labour wages in an international context, it does'nt make sense to automate our entire crystalline line," says Prasanth. But, the company is still very focused on high quality of the production of components and materials in use. For example, solar glass is also pre-cleaned, every module is labelled with an RFID tag (radio-frequency identification), and gets its own quality checklist. Prasanth says that the company works closely with TÜV Rheinland India in Bangalore. HSV Solar buys its film from companies such as Krempel; the EVAs are supplied by Isovolta and other companies; glass is procured from St. Gobain; the junction boxes are made by Tyco and Huber+Suhner; the solar cells are from Arise, Suniva, Neopower and Solartec. Prasanth believes such quality materials means a competitive advantage over the Chinese. "We have about the same costs as in China, but are able to offer better module quality because we primarily use European and U.S. materials and components."



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between Tamil Nadu and Jammu and Kashmir really kicks into gear. Photovoltaic systems with a capacity of just barely 15 megawatts will be installed in India in 2010. "The Indian government must be careful not to stall the market from the outset and that quality isn't sacrificed," stresses Aparna Sodhi, Head of Astonfield Renewable Resources in Mumbai. The government in New Delhi would like to keep the cost of solar energy as low as possible and is using a multi-stage project tender process to reach its solar expansion goals. Under this approach, the state-owned energy company NTPC Vidyut Vyapar Nigam (NVVN) buys the electricity.

The plan originally included a rate of 17.91 Indian Rupees (INR) for solar power from photovoltaic systems of up to five megawatts (approximately 30.1 euro cents, rate from 30 December 2010). But the most recent request for bids for the first expansion phase stipulates a total capacity of 150 megawatts and a rate drop to 10.96 INR (18.4 euro cents, rate from 30 December 2010). "These low prices turn away serious providers from the market," says Doshi. The result is inter-

national companies like Beck Energy or Gehrlicher Solar no longer submitting bids. "Quality has its price and it can't be as cheap as a lot of people here imagine, which will require a strong education process," says company head Klaus Gehrlicher. "We cannot deliver the required quality under such conditions," says Yogesh Dabhade, Director of Belectric, a joint-venture with Beck Energy. With such low prices, the return on investment is under ten percent, and this is far too little for the business environment in India. India's bank interest rates are over 12 percent, much higher than in other countries, meaning that investors need to see profits of 16 to 20 percent.

Hesitant banks

And many banks are hesitant to finance photovoltaic projects because they do not have any experience with what is a new technology in India, says Dabhade. Moreover, many Indian manufacturers cannot get loans for lack of credit history. Dharmendra Nautiyal, Sales Manager for laser technology at Trumpf India, points to other challenges for the expansion of the solar industry and a PV market in

India: poor infrastructure of roads, rail or electricity networks. Moreover, frequent power outages mean solar component production facilities need expensive backup systems to operate.

Childhood illnesses

"What we are experiencing in the PV market in India right now are typical childhood illnesses," says Markus Elsässer, Managing Director at Solar Promotion, the event organizer of Intersolar. For example, it is typical for a young market not to prioritize quality but focus on expansion and costs.

Accordingly, only about 30 people attended a conference panel on quality in Mumbai, whereas 120 went to a forum on project planning. Still, Elsässer remains optimistic that quality will get a better reception at the next Intersolar India, to be held December 14 to 16 this year in Mumbai at the Bombay Exhibition Centre. Company head Klaus Gehrlicher states it in a more direct way: "We will definitely see a lot of bad systems in India until a learning process about quality has been initiated." ♦

Hans-Christoph Neidlein

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