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'I do not see a big future for solar manufacturing in India unless appropriate policy initiatives are taken'

What are the current trends in solar PV industry on a global scale?

The current global trends include "over-capacity" in the market where the demand is not keeping pace with the increasing supply, focus and efforts are being put to move towards higher efficiency and an expected period of consolidation in the global markets.

The demand across the globe has slowed down but the supply is constant or increasing with new companies looking at capacity addition. This has led to decrease in module prices globally.

The industry is looking at means to increase cell and module efficiency. The higher efficiency focus is expected to bring in results soon but we do not expect this to bring any price increase. The market will look at higher efficiency at stable prices thanks to innovation and new technologies.

Meanwhile, Feed-in-Tariffs (FITs) are continuing their downward trend putting pressure on suppliers and industry margins. FITs are linked to the module prices. Over the last couple of years, we have seen a decrease in module prices leading to a cut in FITs across the world.

Where do you see the trend going in the race between Thin Film and Crystalline Modules?

I will not look at this as a question of choosing a module but more as a question of "cost" and "power generation" when there are no limitations. The module which gives better & reliable power generation at lower

Centrotherm Photovoltaics AG is the world's leading technology and equipment provider for the photovoltaics sector with more than 30 years of experience. In a chat with Bharat Vasandani, Energetica India, Dr.Haase analyses the solar industry trends and talks about new technology initiatives from Centrotherm.

cost should be the choice of a solar developer. By limitations, I mean government policies or on-ground situation. For example under India's JNNSM scheme, thin film modules can be imported but crystalline Si cell and modules need to be from India itself.

From a financial angle, an investor is looking at reliable (bankable) power generation and minimum cost and not necessary at the technology- lowest cost/kWh on reliable technology is the driving factor. Crystalline modules offer bankable power generation at minimum cost. With the price gap between crystalline and thin film narrowing further, an investor is sure of bankable power supply at minimum cost from crystalline modules.

Solar modules prices are dropping globally? Where do you see the price stability coming in? How is Centrotherm reacting to this in terms of technology and price?

The industry is experiencing over-capacity and a dip in module prices. If we assume worldwide installations of solar power plants in 2012 similar to 2011, the module prices will not see an upsurge; unless demand is created from unexpected quarters. So we expect prices to remain at the same level. As I just told we are in a challenging period of consolidation. Few companies may find it difficult to survive and this may lead to dumping of modules at much lower prices; leading to price war and pressure on margins. The financial and technological well-equipped companies will survive and win the race.

Centrotherm as an equipment supplier is aware of the trend in the global PV. The last few years have seen a reduction of ~ 50% in capital equipment cost /per watt leaving the industry at much lower costs today.

One also needs to be aware that though module prices have decreased, the major focus is still on efficient processes and equipment because labour, power and accessory costs have, infact, increased.

There are a lot of innovative ideas being worked on equipment, and the processes. We are on the way to 20 percent cell efficiencies in industrial production. We have already reached this magic threshold in the laboratory. This peak value was achieved on the basis of centaurus rear side technology developed by Centrotherm Photovoltaics. We will be working flat out on transferring these excellent figures to mass production. We deliver upgrade packages to install selec-

tive emitter and centaurus rear side upgrade technologies improving costs and boosting efficiency.

Another example: A 0.5 GW manufacturing plant produces 18000 wafers every hour; will need very robust processes and equipment to achieve a balance between yield and efficiency where the end result looked at is “lower cost per watt” and “return on investment” and not only yield or efficiency.

How do you see the progress of solar policies and on-ground implementation of solar power plants in India?

India comes with a lot of ambition but uncertainty also. There seems to be a lack of clear perspective—with not clear answers on domestic content, quality of domestic content w.r.t global content, Feed-in-Tariffs, benefit for investors, etc. This uncertainty scenario may lead to lesser number of solar power plants, and not many module & cell manufacturing companies.

To develop a solar industry, one needs to have local content and generate jobs. India seems to be on the right path. If this path is not taken, India will see huge import where the industry is more mature with GW sizes, economy of scale and more favourable government initiatives.

Another challenge in India is that the industry is not thinking big. Indian companies need to look at bigger projects in India. Bigger projects enable economies of scale, and investments in the industry. India's SMEs are also looking at smaller module production lines; thereby increasing production costs.

An example: average module lines globally are of 70-75MW. In today's solar business environment, this gives the manufacturer a chance to be competitive, enable economies of scale (to an extent), and plan capacity expansion for future without incurring same costs again. This also gives the manufacturer bargaining power to purchase raw materials which form the highest % in production costs. But in India we see module lines starting with 10-20MW lines. The Indian manufacturer is then looking at adding more lines; and adding more costs; resulting in higher price/watt in the market.

What are Centrotherm's market expectations from India in terms of growth?

India has huge potential and we are very interested to do outstanding work in India. But the slow progress is not encouraging. We have been speaking to several Indian companies since the last 2-3 years and we can say that the decision making could be faster. It takes 2-3 years for a company to make a decision to enter the market. The slow decision making could be a result of the environment created in India due to the policies. But in these 2-3 years, leading China and Taiwan manufacturer have added 20-30 GW additional capacity.

Meanwhile the Indian manufacturing space is also facing quality challenges. Some manufacturers are not functioning as expected because their products do not have the efficiency to compete in the global market. We would like to assist Indian companies in choosing the right technology which can help them compete on global scale and not only in India.

India 's reverse bidding saw Feed-in-Tariff (FIT) reach an average of \$ 0.25 in Batch I Phase of National Solar Mission; when everyone at that time was speaking about FIT in the range of \$0.35-\$0.40. How did the industry react to this?

Most of the reaction we saw was from India. Many Indian companies that we were looking to build power plants or manufacturing businesses slowed their efforts. The government needs to take measures and assure solar developers, bankers and investors of their intent and give a clear picture of the FIT for the next 20 or 25 years. Unless that clarity comes, investments may slow down or global investors may avoid India's solar program. This can certainly slow the progress of solar in India by 2-3 years. During this time, Taiwan and China will reach far ahead of India in installations and manufacturing business; thereby making it cheaper and easier for Indian solar developers to import rather than manufacture internally. This could kill the Indian manufacturing industry completely – and that would be a horrible and not desirable picture and outlook.

This can lead to disastrous effects for the Indian solar industry. Already a few cell & module manufacturers in India are running with less than 50% capacity output. This is due to uncertainty in the market. An Indian company may take a year to think

and work on a module line expansion plans compared to China where the module line will be expanded by 1GW in one year. So India may find the global industry moving faster than India, making it more difficult for Indian companies to compete. The Indian companies do not have much dearth of talent but the conditions do not seem favourable. Lower FITs have led to some uncertainty which has also made it difficult to achieve financial closure because banks do not see certain viability.

With this scenario, I do not see a big future for manufacturing unless appropriate policy initiatives are taken though there will be a better outlook for installations because India needs all the power it can produce.

Most of the Indian solar module manufacturers are under pressure due to decrease in market size of their biggest market-Europe and the very slow progress in India. How do you see this situation progressing from here?

Well if the uncertain policies continue, then no investor will put in money for module manufacturing.

Indian solar manufacturers are focusing more on exports and this may not work in the mid-term. The reason being Europe, the biggest solar market, is going through a current weakness and then companies across the world are trying to sell modules there, so the market is very competitive. In the mid-term, we do not see any huge growth in Europe.

The local market for Indian manufacturers is slow and not moving as quickly as expected. They also have competition from Chinese manufacturers who can supply at a better price and in quick time.

The slow Indian market is killing the module manufacturers in India. At the same time, Chinese companies are pushing hard to be the solar hub of the world. Chinese are thinking long term and do not mind losing some money initially but are building a base for solar manufacturing that India will find difficult to compete with. For example one Chinese customer alone is adding another 500MW to be operational early next year. For this quantity to be added to India, it will take another one year or more in this uncertain scenario.

So Indian policies need to be clear and quick; otherwise each month of delay adds to the task to take on the global module sup-



plier. The opportunity for solar Indian manufacturers were great 3 years ago, now its good but further delay can as well kill the industry because competition is growing faster than India.

How do you see the growth of cell manufacturing in India? We have a couple of big players such as IndoSolar, and Moser Baer with the Yash Birla Group joining in recently. But overall the main focus in India seems to be solar power plant installation and EPC.

I think it is a question of what India wants to do. Cell manufacturing in India is quite difficult because of lack of infrastructure. It may not be that easy to obtain quality raw materials such as chemicals, gas and other parts. In India, most of the manufacturing plants are located away from the main cities in a rural setting to avail of subsidies and low cost labour. I think for solar manufacturing, one needs to look at cluster development which can help bring down operational expenses otherwise the Indian companies may again face challenges of supply & service in addition to higher operating expenses. For example in China, you will find the raw materials easily available within a short distance thus encouraging more development.

The cell manufacturing is also now competing on cost per watt compared to the earlier years where there was some premium. So Indian companies, joining the party late, will need to compete with global companies on cost. This will put pressure on margins. In-

dia should also look at integrated approach in solar manufacturing to balance margins. Many European companies are involved in cell & module manufacturing and also EPC in addition to solar farm investment. In other words, if you are only a cell or module manufacturer, then you need to play on lower margins and high volume.

How many installations has Centrotherm achieved in India?

Some of our Indian clients include Websol Energy systems, Tata BP, Jupiter Solar and BHEL for cell manufacturing and Shan solar for module manufacturing. We are talking to other companies also and have been in talks with a few of them for more than 2 years. Our customers are not certain about the solar market and then the investors are not being encouraged by the government policies. What is needed is a certain outlook encouraged by favourable policies to push investment in this industry.

We believe in solar business for long term and we anticipate that the solar market will continue to report sustainable growth despite its current weakness. But in the current scenario not many are sure as to what trend the industry will take for the next 6-12 months.

Centrotherm has recently announced expected drop in cost by ~20% in Centrotherm's PV systems by 2013. What are the steps being taken by Centrotherm to achieve this?

The 20% reduction in equipment prices is

the minimum that Centrotherm is looking to do but we are looking to achieve more. This will be a slow and steady progress. The ways of achieving this are by working on capacity, processes and technology. The industry should note that it is not easy to cut costs beyond a certain point because quality also needs to be looked at. We are not looking at dropping 30% straight away by using low cost equipment that does not give long term quality output.

What are the expected technology progress/changes the industry can expect from Centrotherm in the near future?

Centrotherm is working on a roadmap to achieve higher efficiency of 0.5% more every year. Our efforts with focus on innovative solutions include selective emitter, centaurus rear side, new metallization, and interface optimization.

We have been progressing well. For example the guarantee on modules in 2005 was around 13% and now it has reached around 17.5% and we are working to increase this by 0.5% every year for the next 3-4 years. And as I just said, we are on the way to 20% cell efficiency. It may be slightly difficult to obtain more efficiency on the product and material side but we are working on the interface area to optimize processes and technology and reach higher efficiency. Not many companies are working in this direction but we think we will be able to achieve our goals to make a difference in the industry. In the end, the result looked at in solar is always "Cost/kWh generated".