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Product difference and virtual localization: E-ton general manager talks about Taiwan's PV industry

Editor, SEMI Taiwan; Rodney Chan, DIGITIMES [Monday 15 September 2008]

His eyes sparkle when Chin-Yao Tsai, general manager of E-ton Solar Tech, talks fervently about solar energy and in particular the photovoltaic (PV) industry in Taiwan. He has confidence in the sector and firmly believes that solar energy will be another star industry driving Taiwan's economy and propelling Taiwan to the top among its competitors in the worldwide PV sector. "Strength, confidence, and perseverance: with these we can achieve something unglauublich." That is the "DNA" that Tsai is trying to instill in all of E-ton's workforce. With a strong commitment to doing the right thing, Tsai has helped E-ton carve out a place in the PV industry. Now he hopes to enlist the resources available through SEMI to create a blue ocean for Taiwan's PV industry.

Tsai serves as the very first chairman of the SEMI Taiwan PV Committee, formed early this year by leading players in the Taiwan PV industry. The committee will regularly probe important issues and offer advice on Taiwan's PV industry, and will leverage SEMI's global PV expertise and resources to further advance the growth of the Taiwan PV industry. The following are excerpts from an interview with Tsai, who points out the challenges awaiting Taiwan's PV industry, plus the direction of its development.

Big players staying big; industry staying localized

According to statistics by Taiwan's Industrial Technology Research Institute (ITRI), the production value of the Taiwan PV industry stands at number four worldwide, which attests to Taiwan's strength in manufacturing and management. For the future development of Taiwan's PV industry, Tsai thinks the issue should be approached by going back to the basics, namely from the characteristics of the PV industry.

The history of the energy industry reveals two important trends: big players will stay big and the industry will stay localized. The PV industry, as part of the energy industry, will be no exception. The development of the energy industry needs the support of economies of scale, and therefore it is seemingly inevitable that in the energy industry the big players will remain big. Localization on the other hand affects the development of the industry and its international marketing. As energy has an important bearing on a country's economic development, every country will make a lot of laws and policies to protect its own energy industry, so as to avoid its economic development from being hijacked by other countries. That is why such world-class oil companies as BP and Shell still have been unable to penetrate deep into other countries' petroleum businesses. And each and every market has its own local leaders.

Because of such localization, the domestic markets and government incentives play crucial roles in the PV industry. Sharp in 2000 rose fast to become the global number-one solar cell maker due to the Japanese government's New Sunshine program. In a similar manner, the German government's electricity purchase program propelled Q-Cell to second place in the worldwide solar cell market in 2005, and Q-Cell even surpassed Sharp as top player in 2007. E-ton started just a year later than Q-Cell. But the German competitor enjoys government incentives and strong demand from the domestic market. Their domestic market has taken off, resulting in the big gap between Q-Cell and E-ton.

Government incentives and virtual localization: Taiwan's blue ocean

Having understood the characteristics of the PV industry, we can now move on to discuss the challenges and problems facing Taiwan's PV industry: demand from the domestic market is insufficient and a clear government policy is lacking. While localization is characteristic of the PV industry, we need to consider how strong the domestic market may be. Taiwan has a relatively small population, and therefore the domestic market is not very big. But we have excellent technologies we can use to reduce production costs. That's why the SEMI PV committee has been able to set up, because Taiwan has a large pool of experiences and talents from its semiconductor industry.

All Taiwan needs to do is leverage its technological and managerial advantages to continue offering high-added-value niche products at low production costs, creating product difference and marketing their products worldwide via virtual localization. Then Taiwan can unshackle itself from the limitations of the small domestic market.

For Taiwan's PV industry to create new markets, innovation coming from cross-sector technological integration and government incentives are essential. Take Denmark's wind power for example. Denmark has excellent technologies, equipment and talent, and the government has sound planning to turn the country into the world's biggest exporter of wind power technologies. Likewise, Taiwan may benefit from cross-sector technological integration and government incentives to create products unique to itself and for the niche market.

Take BIPV materials for example. Taiwan, by introducing new laws, may encourage real estate developers and construction material suppliers to jointly develop BIPV cells. When technologies mature, Taiwan can create product difference and become an exporter of BIPV technologies. Another example is the adoption of solar cells in notebooks, or in consumer electronics. Taiwan can make use of its position as the world's biggest notebook maker to achieve a breakthrough in the challenges coming from the weak domestic demand for PV energy.

Through the understanding of users' needs, and making use of Taiwan's creativity and its technological advantages from its semiconductor industry, Taiwan can create more high-added-value niche products. Together with government incentives, the Taiwan PV industry can first grow its domestic market. When technologies and cost structure reach world-class levels, these products and technologies can then be marketed through virtual localization by forming joint ventures with enterprises in other countries to develop their respective markets.

PV industry standards

SEMI has been contributing a lot to the introduction of PV industry standards, which are crucial to the development of technologies and the reduction of production costs. The PV committee's present work is to actively seek to set the standards. The industry needs worldwide standards. Although currently each country has its own validation institutions, there are no common standards that they can follow. For example, the PV industry uses watts as its measurement units. But if the measurement is imprecise, it may create disputes. Therefore the PV industry needs to set its own standards. SEMI is aiming to help introduce such standards for the worldwide PV industry to follow.

The priority of introducing the standards goes to cells, followed by modules and then systems. The difficulty in setting standards lies chiefly in the fact that the simulation of solar radiation is imprecise. For example, TUV Rheinland's validation allows a 2.5% margin of error, which attests to the fundamental difficulty in measuring. While measuring solar radiation is imprecise, the cells manufactured according to the standards cannot be guaranteed to stay the same during their product life. This is the bottleneck that needs to be solved through the setting of standards. For example, solar radiation needs measurement standards, or a standardized procedure must be introduced for measuring the radiation. The key thing is to have these standards internationalized, so that cells can be tuned frequently in line with the standards. As for production equipment, SEMI's existing standards for semiconductor can be invoked or revised to become standards for the PV industry. Standards can be worked out for each and every step during the entire manufacturing process. SEMI is more experienced and resource-richer than any individual country's research institutions working alone in setting standards. If Taiwan can have a set of standards with which it can communicate with the world, it would be a great contribution to both Taiwan and the worldwide PV industry.

Apart from setting the standards, the PV committee in the next two years is looking at holding more international forums to introduce advanced PV technologies and new ideas into Taiwan. It will also work to encourage Taiwan players to develop high-added-value PV applications to increase the Taiwan PV industry's global visibility, and help it achieve healthy growth.

Good intentions and perseverance

It is hoped that Taiwan's PV industry can take off, because PV energy not only is eco-friendly, but also will be the most important resource in the future. It is estimated that by 2030, 20% of the world's electricity will be generated by solar cells.

E-ton's growth also did not proceed smoothly. After starting in 2001, the company at one time was down to only three people left in the company. But in 2004 it managed to develop solar cells with a conversion efficiency of 17%. In 2006, its share prices were higher than any other stock issues in Taiwan. Such unbelievable achievements have been backed by a strong sense of commitment to the sustainable development of Taiwan's PV industry.



*Chin-Yao Tsai, general manager of E-ton Solar Tech
Photo: Nuying Huang, Digitimes, September 2008*

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