Peering through the fog

For the global photovoltaic industry, 2008 was the most successful in a string of record years since 2004. The seed for this explosive growth was planted in Germany, where in late 2003 a new law raised the feed-in-tariff (FiT) to above 50 euro cents, guaranteed for 20 years. For the first time there was a solid legal and economic foundation for attractive investment in PV systems, without any restrictions on energy volumes.

What followed was one of the most impressive growth spurts of all time. The German market for PV systems more than tripled in 2004 and triggered an enormous global investment boom. Billions of euros were invested in capacity increases throughout the supply chain, from new polysilicon plants to thin-film start-ups.

FiTs were soon introduced in countries as diverse as Spain, Italy, France, Korea, Greece, Belgium, the Czech Republic and even India.

The most successful of these programmes was the Spanish *Decreto Real*, a FiT with higher rates than in Germany, indexed to inflation and for 25 years. This triggered a flood of project developers. In 2008, nearly all PV markets worldwide felt a strong demand from Spain, which caused PV module scarcity and accelerated price increases throughout the supply chain.

Total system volumes of 3500 megawatt peak (MW) were installed in Spain in 2008. This was more than half of the total 5000 MWp installed worldwide that year. The result was fabulous profitability for the manufacturers of PV products and especially the silicon producers.

However, some companies that had been in the solar business for years were caught off guard and did not survive the sudden and fierce competition.

Disappointing stocks

Surprisingly, shares of PV companies on the stock market were *down* by almost 70% by the end of 2008. Despite the solar boom, the sector seriously underperformed. Why?

First of all, the Spanish government imposed a 500 MWp nationwide cap on solar energy projects for 2009. This created a big hole in the sales plans of the global industry. The German government substantially decreased the rates of the FiT for 2009 and beyond.

Second, the financial crisis has led to much scarcer credit availability for PV projects, and at higher prices. By March 2009, a number of long-term contracts had been either suspended or amended with postponed volumes or reduced prices.

The solar industry is now faced with the urgent question of which markets can replace Spain.

Italy, France and Greece should in principle be able to support PV module prices similar to those in Spain. These countries share high insolation, high FiTs, and a soft or zero cap. However, bureaucratic hurdles to getting contracts and permits have so far slowed down growth.

Then there is Germany, where growth had been limited during the lucrative Spanish bonanza, simply because there were insufficient modules available. The solar market there is still uncapped. Nearly every manufacturer has Germany in its calculations as a backstop market.

In the US, the solar incentive scheme was much improved by the Bush administration's October bailout package. The investment tax credit (ITC) for solar PV was extended for eight years, and President Obama even turned the ITC into a grant. With high insolation, high electricity prices and still strong economic power, the US is likely to become the world's largest solar market.

Before the rise of Germany, Japan used to be the world's largest solar market. But when markets abroad became much more attractive to Japanese manufacturers, Japan's solar market started to decline. With the recent strength of the yen and a reintroduced incentive scheme this trend may well reverse.

Finally, emerging markets such as India and China may soon grow to a meaningful scale. A couple of high-profile projects are already underway in China, and remarks by Zhengrong Shi, head of Suntech, suggest that things are moving quickly.

Bearing the costs of incentives

One thing cannot be stressed enough: all incentive programmes cost money. The more volume is installed, the higher the total cost. Big-figure calculations show that, for the electricity production of 1 GW solar capacity, the FiT paid for 20 years is €7.2 billion. Opponents sum up their criticism of the FiT programmes with the term 'solar debt'.

There are, however, key flaws in this calculation. It does not take into account the cost of the electricity that has to be generated anyway, or the environmental benefits of solar, which clearly have their own price tag.

In the long term solar energy must become competitive without government incentives. It will have to approach the cost point of a natural gas plant, currently around €0.9 per kWh. With FiTs today still above €0.30, PV still has a long way to go.

System prices have to come down to below €2 per watt peak. With silicon costs possibly approaching US$40/kg in the long term, this seems ambitious but plausible. The solar market volume can then become gigantic. ■

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