



# Germany's green revolution

Dozens of innovative small and medium-sized companies have made the German renewable energy sector the world leader in green expertise. They have turned barren landscapes in eastern Germany into high-technology hubs, creating tens of thousands of jobs. In renewables, “Made in Germany” means quality. The challenge now is to stay ahead in the face of growing competition.

| by *Stefan Nicola*

A bouquet of state-of-the-art production halls springs from wide grass fields, their roofs decked with deep-blue solar cells, the currency that drives growth here in Thalheim near Leipzig, in the heart of eastern Germany. The industry park in Thalheim is called Germany's “Solar

Valley” – several photovoltaic (PV) firms manufacture here, including industry giant Q-Cells. Subcontractors have followed and solar technology research institutes were created at the nearby universities in Halle and Leipzig, making Solar Valley one of the biggest PV centres in Europe.

It seems to be no coincidence that the sun rises in the East. Of the roughly 75 companies working in the German PV industry, nearly all have their wafer, cell or module production sites in the eastern states. Firms can draw from a skilled workforce as well as national and EU



Solar field in the Solar Valley in the German province Saxony-Anhalt. Photo: Kai Senf

funding plans. The Solar Valley's biggest star, Q-Cells, was founded in 1999 and started producing cells with 18 employees. The company today has a workforce of 1,800, is the world's number two after Sharp, and reported net profits of €150 million for 2007.

### Germany's sunny boom |

'We are one of three candidates for the DAX, a first for eastern Germany,' Q-Cells spokesman Stefan Dietrich says proudly. In 2008, the company wants a repeat of last year's investments, which towered at €400 million. Q-Cells' success is only one example. Nearly one fifth of the world's solar cells are produced in eastern Germany. In Freiberg, Saxony, SolarWorld has revived the local economy; in east Berlin, a range of PV start-ups emerged from a GDR-era science park. A group of engineers started Sulfurcell, a firm that manufactures thin-film solar cell modules and solar roof tiles. Around Erfurt, the state government of Thuringia is making efforts to enlarge a PV park consisting of eleven companies, among them Ersol Solar, a company with 800 employees and sales of some €160 million per year. Over the next five years, the firm plans to more than double its cell production to 500MW. 'We are planning further investments here

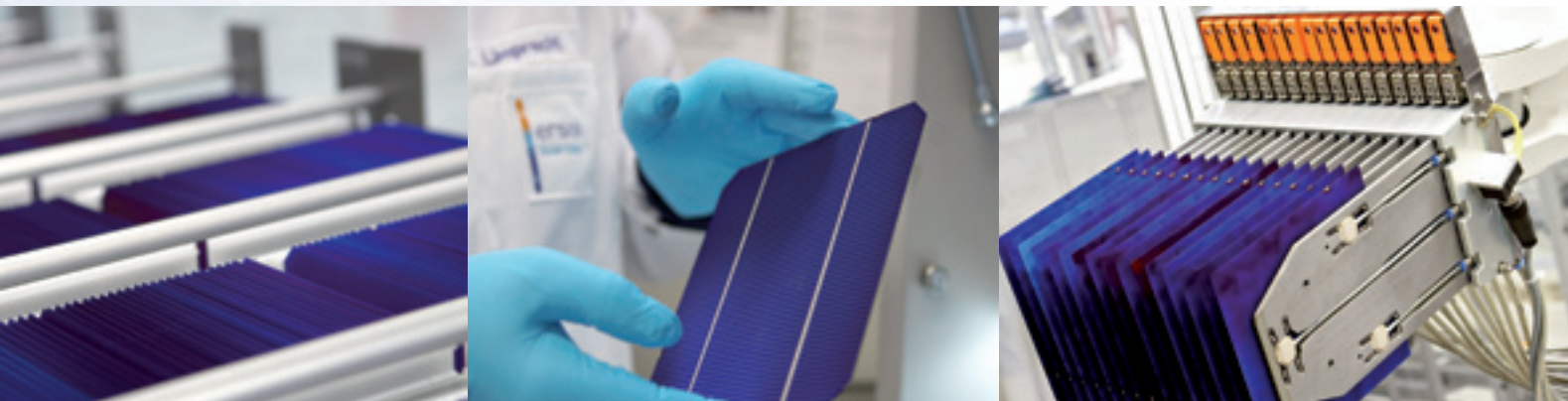
in Germany,' says Claus Beneking, Ersol Solar's chief executive.

Germany's PV boom has attracted many foreign players. US-based First Solar opened a \$170 million solar module plant in Frankfurt/Oder near Poland in 2007. Californian firm Signet Solar plans to launch a fully-integrated thin film solar production line near Dresden by mid-2008. For many in eastern Germany, the PV boom represents a second chance after the old "communist" conglomerates were downsized in the nineties. Thomas Limprecht of Arnstadt was a cook before sliding into unemployment. Today, the 45-year-old works in Ersol Solar's cell production. He was hired after a 9-month internship. 'It's totally different from what I did before, but I enjoy it very much, the work is really multi-faceted,' he says. 'And it's a job that has a future.'

Indeed it does. Sales of German PV firms since 2003 have increased more than ten-fold to roughly €5.5 billion in 2007. 'We are now at the stage where the automobile industry was in the 1920s,' says Anton Milner, the chief executive of Q-Cells. 'So there is great room for further growth.'

### Top consumer |

Driving from Leipzig to Erfurt – from one PV centre to the other – you can spot not only vast solar energy plants, but also a host of wind power units marching into the horizon, the steel ambassadors of yet another renewable sector that Germany dominates. Germany is the world's biggest user of wind power, generating 7.2% of its electricity with a capacity of 22,247MW. With €4 billion worth of sales and 70,000 employees, the wind energy sector is a major economic force. Thanks to a range of on- and offshore projects and strong exports, growth over the past few years has been high. Enercon, based near the North Sea, employs 8,000 people at production sites in northern and eastern Germany. The Aurich-based company is topped only by Denmark's Vestas in the global market for generators. The Danes produce many key components in Germany. Siemens unit Winergy says its parts are included in half of the world's windmills. The massive investments planned by the big players Eon and RWE are expected to hand a further push to the sector, with Hamburg-based Repower already in talks with RWE over the delivery of a staggering 1,900MW of wind units. The entire German renewables sector, including hydro, biomass and geothermal firms, employs 250,000 people



Quality control of the solar cells. Photos: Kai Senf

## *‘The large utilities have finally understood that they have to change’*

and delivers 14.2% of the electricity. German Environment Minister Sigmar Gabriel has said that he expects the renewable energy industry to one day be of similar importance to Germany as the automobile sector.

What has driven this success? Next to the traditional German strengths of efficiency, technology and innovation (Enercon, for example, owns roughly 40% of all wind energy technology patents), the country’s industry was boosted mainly by legislation. Experts give praise to the EEG, the German law that introduced a feed-in tariff for power from renewable energy sources. It guarantees operators of wind and solar plants an above-market price for up to two decades. This spurred investments in renewable. ‘The success of the industry is based on the EEG,’ Milner says. ‘Thanks to the EEG, PV is not merely a hobby but a profitable industry.’ But it’s more than just the EEG. ‘Germany, more than any other country, has a green milieu,’ Dietrich says.

### Green biographies |

When Sönke Siegfriedsen was a young student at the University of Applied Sciences in Lübeck in 1979, he built his first wind energy system from spare automobile parts and placed it on the roof of the school. Siegfriedsen later founded Aerodyn, a wind technology engineering company. He developed an anti-corrosion

system now included in the units of Multibrid, a German firm owned 51% by French nuclear giant Areva, that will equip Germany’s first offshore wind park, to be built this summer in the North Sea. The project, dubbed Alpha Ventus, includes 12 units of 5MW as tall as the Cologne Cathedral.

Enercon ceo Aloys Wobben, nicknamed the ‘Bill Gates of East Friesland’, started his company in his garage in Aurich. Despite record sales of €1.9 billion in 2006, Wobben will not list his company on the stock exchange. ‘I want to put my money into the development of a sustainable energy storage system, even if scientists say it doesn’t work,’ he told Greenpeace Magazine.

Then there is the German Green Party, founded in 1980, which governed Germany from 1998 until 2005 in a coalition with the Social Democrats. One of the Greens’ founding members, Frank Asbeck, is the chief executive of SolarWorld. ‘These are typically German biographies, this is the spirit that gave birth to this industry,’ Dietrich says.

Beneking still remembers the pioneering spirit among the firms that jumpstarted the PV industry in the 1990s, before the EEG existed. He says the main drive was not yet the money, but the passion for an exciting industry. ‘The businessmen who started solar firms in the mid-1990s took great risks,’ he says. ‘The technology was new, there was no market and no real feed-in tariff.’ When talking about those times, a smile lights up Beneking’s face. ‘Sometimes, customers simply weren’t able to pay for what they had ordered. I remember when we had to send trucks to haul back our

cells from what today are large, successful companies listed on the stock exchange.’

### Staying ahead |

The challenge is now to stay ahead. The competition from Spain, North America and Asia is getting stronger. Observers fear that as sales shift, so might production. Moreover, the current German government has announced plans to lower the support for renewable energy because of the massive profits that are being made. Industry officials say that this could hurt the economy. If Berlin lowers the feed-in tariffs for solar power as planned, ‘it might propel the move to a foreign country,’ Milner says.

While renewable energy exports amounted to €8.5 billion in 2007, the expensive euro is making export more difficult. Some companies are setting up shop abroad. Q-Cells has invested in the US and is planning to go to Malaysia. ‘This is a decision to stand on a more global footing, and not one against Germany,’ Milner promises. ‘We will soon open a research centre in Germany that aims to introduce new cell generations into the industrial production process. The expertise and the jobs stay here.’

And despite the growing competition, German producers don’t fear losing their head start. ‘Over the next decade, the biggest growth for wind energy will still be in Europe,’ says Per Hornung Pedersen, the chief executive of Repower. ‘Particularly from offshore wind, where German companies are in a leading position.’ Beneking feels the same. ‘The PV industry is about quality and long-life products,’ he says. ‘I don’t doubt German industry will keep its leadership.’ ■