Mass production and economies of scale are driving the prices of inverters down. For this reason, inverter manufacturers are seeing a decline in profits, even though sales figures are rising. This is the conclusion reached by experts at the solar market research firm GlobalData. “By 2020, the price of inverters could fall by a further 20 to 25 % to just US$-ct 0.13 per watt,” said Prasad Tanikella, an analyst at GlobalData. “The average price of inverters in 2010 was US$-ct 0.48 per watt. During the following four years, the price plummeted by approximately 60 %,” Tanikella said.

This had consequences. The global market volume for photovoltaic inverters will shrink from an estimated US$ 5.7 billion in 2014 to around US$ 5.2 billion in 2020. “Manufacturing the devices is also becoming cheaper through economies of scale. The expansion plans of major manufacturers such as SMA Solar Technology, ABB, KACO new energy and Refusol will increase the supply and saturate the market.” Ten of the fifteen largest inverter manufacturers are based in Europe, and the others are based in North America and the Asia-Pacific region. According to the market research firm IHS, SMA Solar Technology from Germany is still the largest photovoltaic inverter manufacturer in the world.

The second-largest is ABB. The company, which had acquired the US inverter manufacturer Power-One in 2013, was able to stay in second place ahead of the Japanese competition, despite a decline of 0.8 %. IHS ranks the Japanese competitors Omron, TMEIC and Tabuchi at positions three to five.

The global demand for photovoltaics continues to be high. Inverter manufacturers are also benefiting from this. Nevertheless, their profits are declining. Despite the increasing expansion of PV, prices for inverters are falling steadily, and this is impacting manufacturers’ profit margins. At the same time, competition for market share is in full swing.
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ABB is adding a production site in Brazil and intends to produce central inverters there. Photo: ABB

The dust is settling

Despite its undisputed market leadership position, this development meant hard times for SMA. In February, the company had to admit at its annual press conference in Frankfurt that it had sustained heavy losses in the financial year 2014. But the dust seems to be settling. SMA’s board of directors recently raised its sales and earnings forecast for 2015. The new forecast sees turnover at € 850 to 900 million (previously: € 800 to 850 million) and an operating result (EBIT) of € 0 to € 10 million (previously: between € -25 million and € 0). “This positive development is mainly being driven by foreign markets, in particular North America,” SMA Board Spokesman and CFO Pierre-Pascal Urbon said. The strong US market is the primary reason why SMA’s board of directors issued a new forecast. According to the market research firm GTM Research, SMA is currently the top supplier of photovoltaic inverters in the United States with a market share of 24 %. ABB, however, has also been able to gain ground in the United States. After SMA, the company is the second largest player in the USA with a market share of 19 %.

Internationalisation

But neither SMA nor ABB are only active in North America. Internationalisation is key. ABB is active as a project developer in India, for example, and this boosts its sales of inverters. ABB was awarded contracts for automation and substation solutions for photovoltaic power plants in India as well as for their connections. According to Pekka Tiitinen, President of ABB’s Discrete Automation and Motion Division, the contracts amount to US$ 18 million. The photovoltaic systems, which have a total output of over 850 MW, are located in the Indian states of Karnataka, Tamil Nadu and Andhra Pradesh. The contract for the most significant photovoltaic project was signed with the Adani Group. It is a 648 MW solar park in Tamil Nadu. ABB will supply turnkey solutions for this project. “We have sold inverters with a total capacity of over 2 GW in India to date,” Tiitinen said. His company is benefiting from the production facility in Bangalore that has been manufacturing inverters since the end of 2012. The inverter manufacturer KACO new energy is also driving the globalisation of its activities forward. KACO is turning its attention towards the increasingly attractive MENA region. The German company based in Neckarsulm signed a cooperation agreement with the Saudi Advanced Electronics Company. The two companies have begun jointly manufacturing the ‘Shams’ inverter range, which means ‘sun’ in Arabic. According to KACO, technology is mainly being supplied by the German inverter manufacturer. The production line was built under the supervision of KACO’s Global Director of Operations Volker Heuser. It has a capacity of 1 GW per year or 2,000 units. The ‘Shams’ inverters cover a power range of 20 kW to 1 MW. According to KACO, the devices meet the Saudi Arabian requirements for local content.

Asian competition

The development predicted by the market research company GlobalData is particularly positive for Asian companies that can produce their inverters at a relatively low cost due to favourable production conditions. Their importance has already increased significantly during the past year. The Chinese manufacturer Sungrow is pushing into the market and has now announced that it will be increasing its production capacity to 5 GW because of its significant increase in unit sales. In the first half of this year alone, Sungrow sold inverters with an overall capacity of 1.98 GW. The Chinese company mainly has the strong demand on its domestic market to thank for this. The company recently supplied inverters with an output of 200 MW to SUMEC New Energy Development for a solar park in the Chinese province of Anhui, for example. It also supplied inverters with a capacity of 50 MW for a project in the Shanxi
The competition is not decided by a price war

The market research firm GlobalData estimates that the global market for photovoltaic inverters had a volume of US$ 5.7 billion in 2014. The global solar market is doing well. Nevertheless, it is changing, and the main reason for this is the shift in the geographical focus. SUN & WIND ENERGY spoke to Andreas Schlumberger, Head of Corporate Communications at KACO new energy GmbH.

S&WE: Mr Schlumberger, the trend in the industry is to enter new markets. What is your view of the Latin American market and what opportunities do you see there?
Andreas Schlumberger: It is widely known that Chile and Honduras developed well this year. Brazil also looks very promising, as does Mexico to an extent. For this reason, our branch office in San Antonio is sending our colleagues who speak Spanish and Portuguese to work in the Central and South American markets. We have already carried out several projects there. Via the Baden-Württemberg Solar Cluster, our headquarters in Germany is also in close contact with Brazilian states that are doing pioneering work in the area of PV.

S&WE: The Chinese inverter manufacturer Sungrow is now one of the largest manufacturers worldwide, right behind SMA. Do established manufacturers such as KACO need to fear Chinese competition?
Schlumberger: Everyone needs to fear Chinese competition, even the Chinese. It is no secret that a number of Chinese manufacturers have not been able to survive their domestic price structure. The differences in production costs between Europe and China are in fact much smaller than people may think. Incidentally, the idea that inverter prices will continue to fall indefinitely is absurd, particularly given the rising prices of resources. For this reason, the way to gain an advantage in this competition is not by engaging in a suicidal price war, but rather through system solutions, technological integration and a perfect understanding of customer requirements. This means listening to your customers when designing products as well as when putting service packages together.

S&WE: How did inverter manufacturers such as KACO master the shift of focus in the solar market away from Europe towards the Asia-Pacific region?
Schlumberger: Fortunately, we have had a subsidiary in South Korea since 2008, and the location is not only one of our R&D centres, it also takes care of sales in the Asia-Pacific region. In addition, we already have a distribution partnership with a competent system integrator in Thailand. It supplies our products to this strong PV market as well as the surrounding markets and provides a complete range of services.
World map of the inverter industry
119 production sites of inverter producers worldwide

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Caption
production site for inverters
50/50/50
production capacity in 2014/2015/2016 in MW

Example
At the end of 2014 the Fronius plant in Austria featured an inverter capacity of 2,200 MW. By the end of 2015 the production capacity will remain at 2,200 MW. The same is expected for 2016.

* The company runs several production factories. The sum of production capacity in all plants is listed at their main production site.
SMA is increasing its sales in the area of large solar parks, but also in solar power systems for industry. Photo: SMA

Huawei also has a strong presence on the inverter market. According to information published recently by the analysts at IHS, Huawei became the second largest supplier of photovoltaic inverters in China after Sungrow in 2014. The two companies were responsible for 48 % of all photovoltaic inverters sold in China last year. “By 2016, we intend to expand our production in China to 20 GW,” Channel Sales Manager Webster Yan for Distribution Western Europe at Huawei said. Most of the goods produced are intended for the Chinese market. “However, we will also supply inverters to the global market.”

Sungrow is also supplying foreign markets. In June, the Thai energy supplier Superblock ordered inverters with an output of 75 MW. Sungrow now even intends to set up a subsidiary in the South Asian country. Superblock has projects with a capacity of 500 MW slated for completion in Thailand by the end of the year, and it has twice that number for the following year. Huawei has similar plans. Viessmann is taking on the role of general distributor for Huawei’s inverters in Germany. Huawei has had a distribution agreement with Wattrkraft since 2013 in Germany. According to a statement by Wattrkraft, the company will continue to serve resellers and project customers primarily. Huawei reaffirmed its cooperation with Wattrkraft with a solemn nomination at the Intersolar Europe.

**Strategic alliances**

In order to be able to compete against this new competition from Asia, established inverter manufacturers not only have to strongly internationalise their businesses, they also have to realign their strategies. SMA, for example, is forging strategic alliances to gain easier access to markets. The most recent cooperation with the electronics group Siemens, for example, is aimed at jointly providing systems for large solar power plants. This is a promising business because almost half of all inverters produced worldwide are installed in solar parks. “Our experience and technology complement each other perfectly,” Pierre-Pascal Urbon said. “Together with our cooperation partner Siemens, we can position ourselves better for large project tenders. SMA has the technical expertise to provide the largest and most technically advanced solar projects with innovative system technology worldwide. Siemens has an excellent track record connecting large power plants to the grid as well as the most modern medium and high voltage technology.”

Tabuchi Electric, the leading inverter manufacturer in Japan, is involved in similar activities. The company signed a cooperation agreement with the US company Ampt. The partners intend to jointly focus on the large-scale power plant market segment in the US and worldwide. Manufacturers are also trying to reduce their costs. The Austrian manufacturer Fronius International has a branch office in Canada, but the centre of its activities in North America is its 500-MW inverter manufacturing facility in Portage, USA.

Other companies are looking for low-cost production locations. ABB is expanding its production facilities in Brazil. “We will manufacture central inverters there,” spokeswoman Tiina Tukiainen said. “The central inverter production will have a capacity of 500 MW in 2016 and serve the growing market in Latin America.” Other companies such as Helios Systems, which now belongs to Wind & Sun Technologies, are focusing on diversity. “We are not only selling products for the solar market, but also for the wind and water power industries and other areas where inverters are used,” said Luis Herrera, Head of Global Sales and Business Development at Wind & Sun Technologies.
Intelligence and storage improve competitiveness

A further defensive measure against the Asian competition is to expand the product range to include systems engineering. Simple current transformers become intelligent energy manager combined with power storage systems. In countries such as Germany, Japan or the United States, an important factor driving the market is the desire of homeowners to be independent of rising electricity rates. This increases the importance of own consumption of solar power. “Our goal is to make solar power available 24 hours a day and reliably provide power using 100 percent renewable energy,” explained Andrea Schartner, spokeswoman for the Austrian inverter manufacturer Fronius. This is why Fronius offers a storage solution. The Fronius Energy Package consists of the Fronius Symo Hybrid inverter, the Fronius Smart Meter and the Fronius Solar Battery, which has a storage capacity of up to 12 kWh.

The German inverter specialist Kostal has also expanded its product range to include solar energy storage for single family homes and small businesses. The company’s newest system, Piko Ba System Li, combines the Piko Ba inverter with a lithium battery, which is available in six capacities between 6.3 and 6.9 kWh. Kostal equips its systems, which can consist of up to eight modules, with battery cells from Sony. Fronius also uses Sony cells. The system received the “ees Award” at the Intersolar Europe, and one reason for this was its safety concept. Kostal’s Switchbox provides threefold protection against overcharging the battery. Kostal’s product is a good example of systems technology that combines various electrical and electronic components into an integrated solution.

Competition is getting tougher for established inverter manufacturers. They are using strategic and technical measures to keep their market shares. We will see soon whether their Asian – mainly Chinese – competitors will try to implement a strategy similar to the one they used in the solar module market segment and try to conquer the market with inexpensive products.

Markus Grunwald