

Backed by the government



Solar thermal systems are nothing unusual on China's cityscapes. Today, the country offers the world's largest market for solar heating systems.

Photo: Shenzhen Prosunpro Solar Energy

China's commitment to clean energy is no flash in the pan. The country is driving the expansion of the domestic industry with attractive state loans. Foreign companies will still find that the People's Republic poses a lot of challenges.

As a consequence of the rapid growth of the domestic industry and the increasing levels of prosperity in many parts of the country, the energy consumption of the world's largest population has been exploding over the past years. With a standard coal equivalent of about 3 billion tons in the year 2009, the Middle Kingdom has become the biggest energy consumer globally. Fossil fuels cover 90 % of China's primary energy consumption. More than 70 % of the energy is produced from coal. China's energy demand increases at a rate of 15 % annually. According to the World Energy Outlook released by the International Energy Association, China's production capacities of the next 15 years will be equivalent to the total capacities installed in the United States today – i.e. in the dimension of about 1,000 GW. Renewable energies still contribute less than 10 %. However, that situation is something China wants to change. "China is meanwhile pouring more money into renewable energies than the United States and Europe together", says Kuang-Hua Lin, CEO of Asia-Pacific Management Consulting (APMC), Germany, a consultancy specialized on East Asia.

Many hopes for the social development of the giant country are now pinned on the renewable energy

sector. Renewables are not only expected to secure China's future energy supply but also to create jobs and bring prosperity to as many people as possible. With this goal in mind, China's central government has been supporting the renewable energy sector with generous loans through its state-owned banks. In the last year alone, the solar giants Suntech, Trina Solar and Yingli Green Energy were provided with multi-billion loans on a low-interest basis. Thanks to these capital flows and the low production costs, China's domestic industry was able to create a new benchmark in competitiveness. The prices for modules made in China are currently below the mark of € 1.50 per Watt. This gives the Chinese PV players a dominant role on the international PV market. According to the China Renewable Energy Society, the country's production capacity had ranged at between 7 and 8 GW in 2010. It is estimated that over 90 % of the production is shipped to the foreign markets. More than every second solar module that was installed in Germany in 2010 had carried the brand of a Chinese module manufacturer.

PV: 1 GW annual growth targeted

The need to find sales markets for the mega factories established by the Chinese industry could now develop into a problem. After all, the demand on the domestic market is not strong enough to fully exploit the production capacities. In 2009, the government reacted with the introduction of the "Golden Sun" programme that covers up to 50 % of the investment costs for a solar power system. The incentive is expected to lead to new installations in the range of at



In the scope of China's Golden Sun Programme, the grid connection of a 7 MW project was achieved in the Province of Shandong in January.

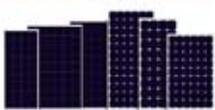
Photo: CNPV Solar Power

projects have gone to Chinese companies: Yingli will supply modules with a total capacity of 272 MW for the Golden Sun programme. This means that the company will supply an expected 70 % of the modules needed before the end of 2011. Besides this, the whole range of component parts, such as inverters, will be supplied by domestic players, among them Shenzhen Kstar Power and Delta GreenTech.

According to plans by the Finance Ministry, the newly installed capacities are expected to arrive at 1 GW by 2013. China's new Five-Year Plan even envisages a total installed capacity of 20 GW by the year 2020. In the opinion of Sebastian Trimpl, Managing Director of IBC Solar China, the target "is quite realistic even though the central government has not yet announced concrete support mechanisms for its realization." However, the introduction of a fixed

least 500 MW in China in the next three years. With the aim of giving a further stimulus, the Chinese provinces Zhejiang and Jiangsu have additionally launched regional incentives for PV. So far, the majority of

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Add: Linuo Hi-tech Park, No. 30766 East Jingshi Road, Jinan, Shandong, China
 PC: 250103
 Tel: +86-531-88729688
 Fax: +86-531-88729120/88729436
 Email: pv@linuo.com
 www.linuopower.com





Key figures for China:

Area	9,596,961 km ²
Capital	Beijing
Population	1,330,141,295 (2010e)
GDP per capita	US\$ 7,400 (2010e)
Global radiation	1,100 - 2,100 kWh/(m ² a)
Primary energy sources	coal: 68.4 % hydro power: 15.2 % nuclear: 1.9 % gas: 0.5 % renewables: 0.2 %
Installed capacities	
PV:	400 MW
Solar thermal:	145 million m ²
Wind:	42 GW

Source: CIA Factbook, International Energy Agency

feed-in tariff in the short or medium term is unlikely, says Trimpl. IBC Solar has been advising the Chinese Ministry for Construction on the training and certification of PV installers since March 2010, it says in a press release. The corporation has the aim of providing installers of construction firms that wish to become active in the area of PV with adequate technical expertise. "The development of PV projects gives foreign companies an opportunity to enter the market", says Trimpl. He believes that a company like IBC Solar can benefit from its knowledge lead in that respect. Non-Chinese module manufacturers, Trimpl says, essentially only find opportunities in market niches.

World's largest market for solar thermal

China is one of the pioneers when it comes to the utilization of solar for domestic hot water and heating. Since the 1990s, the demand has virtually been exploding. Between the years 2000 and 2009, the installed collector surface in China had skyrocketed from 26 million m² to 145 million m². Domestic companies such as Sunrain, Micoe or Sunda were able to enter the ranks of the global leaders in the manufacturing of evacuated tube collectors. China's federal incentive scheme for the promotion of private solar thermal solutions has been one of the driving forces behind the utilization of solar thermal in rural China. The central government has made grants worth 13 % of the investment costs available for solar thermal systems. "The incentives are not high, but they do help companies to develop and improve", says Jenny Shi, Sales Manager at Shenzhen Prosunpro Solar. In the past year, the company was able to sell a total flat plate collector surface of 900,000 m² in China.

Chinese manufacturers such as Sinovel were able to benefit the most from the development of the domestic wind market and are meanwhile among the largest turbine manufacturers worldwide.

Photo: Sinovel



The largest customer group for solar thermal solutions in China is the emerging middle class. This group accounts for about 80 % of the entire market volume. "The standard apartment building in China is built without a central hot water system, which means that the home owner has to install a solution himself", says Corinne Abele at Germany Trade and Invest (GTAI), the foreign trade and inward investment agency of the Federal Republic of Germany in China. Since the costs for an electrical continuous flow heater are comparable to solar thermal solutions, the decision to install a solar thermal system is not a difficult one. Power cuts are, after all, not unusual in many parts of the country.

Wind turbines reach record growth

China's wind energy sector has undergone a rapid development. In 2010, the newly installed wind capacity arrived at about 16 GW. This equals not only about 50 % of the newly installed capacities globally for the same period but makes China the world's leading wind energy producer with a total capacity of 42 GW. According to plans by the government, the installed wind capacity is even targeted to reach 90 GW by the year 2015. In July, the government introduced fixed feed-in tariffs that range between 0.51 and 0.61 Yuan per kWh (approx. €-ct 6 to 7) depending on the location. "The government has shown a strong commitment to the development of wind energy and has encouraged the industry to increase their investments in R&D", says Jens Tommerup, President of Vestas China.

Chinese manufacturers meanwhile dominate the market with more than 90 % of the newly installed capacities. Backed financially by the government, Sinovel, Goldwind and Dongfang have experienced continuous growth and entered among the world's principal manufacturers of wind turbines. The number of turbine manufacturers in China is today estimated to reach one hundred together arriving at a production capacity of about 30 GW. It does not surprise then that the share of foreign manufacturers active on the Chinese market has decreased dramatically.



“Historically, the market has mostly focused on the price of the turbines – the up-front investment. This is typical of developing markets that focus on initial investment costs”, says Vestas President Tommerup. “However, we feel very strongly that the cost of energy or the long-term energy production must be considered as a better way to evaluate a project. This ensures that the focus is on reliable and productive turbines that generate electricity over the lifespan of the turbine, which is designed to be at least 20 years.” Vestas is also among the ones who had to give up market shares in the past. In 2010, the manufacturer sold wind turbines with a capacity of 857 MW in China.

Grid development falling behind

This year, the growth course goes into the next round with further mega-projects. China’s National Energy Administration (NEA) currently has six 10 GW wind parks under planning for the regions of the Inner Mongolia, Gansu, Xinjiang, Hebei and Jiangsu where wind speeds are exceptional. The first offshore wind farms are now also being built. According to studies, the offshore wind potential along the Chinese coasts reaches about 11,580 TW. On the southern coasts between Zhejiang and Guangdong, the potential is estimated to be the highest. However, the frequent occurrence of typhoons poses great challenges for wind projects in this region. In the past year, the government launched the first offshore tenders for projects north of Shanghai. Not surprisingly, Sinovel and Goldwind, which will supply turbines for three of the four wind parks, came out as winners of the tender. Their price offers ranged between 0.64 and 0.74 Yuan per kWh (€-ct 7 to 8).

However, the expansion of wind projects in China is leading to massive problems when it comes to the distribution grid. Because of insufficient grid development, between one third and half of the electricity produced by wind turbines is estimated to remain unused. “It’s not unusual that wind turbines, for example in Inner Mongolia, sit waiting for an entire year or

even longer until they are connected to the grid”, says Corinne Abele of GTAI. Some regions simply have no access to connect new wind farms to the grid, which is due to the fact that the grid operators are unable to keep pace with the growth. China’s government is meanwhile reacting to the problem. According to the State Grid Corporation of China, a total of 293 billion Yuan (approx. € 33 billion) was invested into the expansion of the Chinese distribution grid in the last year.

Biogas for rural energy production

So far, the People’s Republic has been cautious with the promotion of bioenergy utilization in the country. Since fertile farm land is scarce in the giant country when compared to the population and an expansion of biofuels is feared to lead to higher food prices, the government in Beijing has so far remained reserved. However, China has meanwhile realized the potential of biomass for fighting bottlenecks in the rural energy supply and for providing farmers with an additional source of income. “Improving the living conditions of the rural population requires decentralized and cost-efficient ways of producing energy. This is why the government has already been promoting the production of biogas through farmers in the past. For such family-sized biogas systems, the China-based manufacturer Puxin has brought a fermenter with a volume of between 6 to 10 m³ to the market. Today, China is home to about 5,000 biogas systems that produce approximately 2,500 million m³ of biogas per year. The main material for these systems is liquid manure. Kuang-Hua Lin of APMC comments: “Biogas has almost no importance for China’s energy policy, but it does play a role for its development policy”.

Rouben Bathke

Bright prospects: in the last year, China became the world’s largest wind energy producer with a total installed capacity of 42 GW.

Photo: Sinovel

Further Information:

Asia-Pacific Management Consulting GmbH (APMC): www.apmc.de
 Chinese Renewable Energy Industries Association (CREIA): www.creia.net
 Goldwind Science & Technology: www.goldwind.cn
 IBC Solar: www.ibt-solar.com
 Shenzhen Prosunpro Solar Energy: www.prosunpro.com
 Shenzhen Puxin Science & Technology: <http://puxinbiogas.en.alibaba.com>
 Sinovel Wind Group: www.sinovel.com
 Suntech Power: www.suntech-power.com
 Trina Solar: www.trinasolar.com
 Vestas: www.vestas.com
 Yingli Solar: www.yinglisolar.com

