

Executive summary

This summary highlights the main developments in the international wind power market during 2009 and this report's new forecast for the growth of the industry up to 2014. A medium term prediction is also made up to 2019. The report's special theme evaluates **the outcome of the COP-15 climate change meeting and its impact on wind power development.**

Highlights of wind power development in 2009

- **Record installation of 38 GW in spite of the financial/economic crisis.**
- **Strong presence of three Chinese wind turbine suppliers in the Top 10 list.**
- **China became the No. 1 market in the world, with 13.75 GW of new capacity.**
- **Offshore on track for increased contribution to wind power in Europe.**
- **Market value will grow from US\$75 billion in 2010 to US\$124 billion in 2014**
- **Technology: three turbines with a rating of 5 MW or more are commercialised**
- **Technology: direct drive turbines now account for 14% of the world's supply of wind power capacity.**
- **Wind power will deliver 1.6% of the world's electricity in 2010.**
- **This year's forecast and prediction up to 2019 indicate that wind power can meet 8.4% of the world's consumption of electricity by 2019, ten years away.**

Demand and market growth in 2009

With **38,103 MW** of new installations, the total installed capacity of wind power grew to around **160,000 MW**. This was an increase in cumulative installations of **31%**. In terms of annual installations there was an increase of 35%. This follows the previous year's growth of 42%. Annual installed capacity has grown by an annual average of 36.1% over the past five years. This outcome happened in a year when the financial/economic crisis struck the world, including some of the wind industry's most important markets in the US and Europe. The highlights on the demand side were:

- **38,103 MW** of newly installed wind power capacity.
- Cumulative installed capacity by the end of 2009 reached **160,084 MW**. Around 23,000 new wind turbines were erected across 51 different countries.
- **Europe** lost its previous position as the largest wind power continent. 28.2% of all new installation in 2009 took place in Europe, but the continent's share is decreasing. Three years ago the European share was 51%.
- The **Americas** had another record year thanks to the pace of development in the **US**, where **9,922 MW** of new capacity was added. That was 18.7% more than in 2008, and the highest ever for the United States. Altogether the **Americas** accounted for **30%** of the world's installations in 2009 and became the second region in terms of added capacity after South & East Asia.
- **Asia** experienced significant growth. Including the OECD Pacific, the region increased its cumulative capacity from 26,446 MW in 2008 to **42,037 MW** in 2009, a growth of 59%. China was by far and away the leading country, with 13,750 MW of new capacity in 2009. India saw a decrease, with a modest 1,172 MW of new installations. The region as a whole accounted for 41% of the year's global total. This was significantly higher than both the Americas and Europe.
- Among the Top 10 markets China emerged as the largest in 2009, followed by the US. **Germany**, the world's largest market for a decade, lost its No.2 position in cumulative installations to **China**. Germany installed 1,917 MW in 2009. **France and Italy** improved their position, with **1,104 MW** and **1,114 MW** respectively. The **UK** had a record installation of **1,077MW** and passed the milestone of 1 GW/year for the first time.
- Penetration of wind power in the world's electricity supply has reached **1.6%**, the proportion expected to be produced in 2010.
- In the offshore market three new projects were installed in the **UK**, which took the lead in offshore development for the second year. Two new offshore plants were installed in **Denmark** and **Germany** saw its first project, **Alpha Ventus** (60 MW). **China** entered the offshore arena with a start on its first offshore wind farm, **Donghai Bridge Offshore** on the coast off Shanghai. A total of

- 689 MW was installed in the sea, making a cumulative capacity of around 2.1 GW in operation.
- The 2009 market saw a stabilisation of wind turbine prices. The value of the 2009 market in terms of turnkey cost/turnover reached around **€51 billion**.

The supply side and Top 10 turbine manufacturers

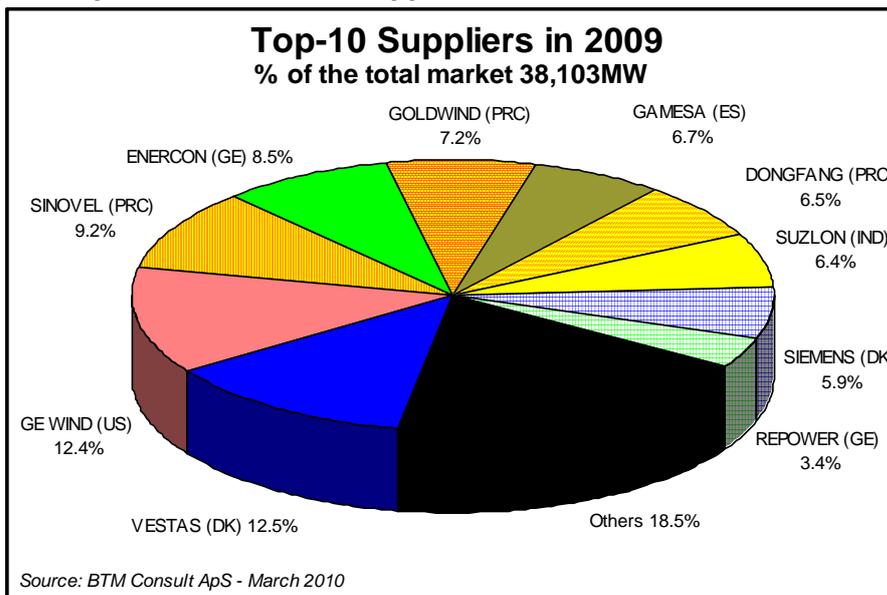
The most significant change in the supply market was the strong growth of Chinese wind turbine suppliers. Three Chinese companies are now among the Top 10 and with strong positions. These are Sinovel (No. 3), Goldwind (No.5) and Dongfang (No. 7). The result was that almost all the longer established companies in the Top 10 list lost significant market share. The Top 10 suppliers of wind turbines (out of a total of about 25) are responsible for 80.9% of the global market.

Vestas maintained its leading position, though with a significant drop in market share, down to 12.5%. GE Energy achieved virtually the same market share, just 25 MW behind Vestas. The top ranking companies in 2009 were Vestas, GE Energy, Sinovel, Enercon, Goldwind, Gamesa, Dongfang, Suzlon, Siemens and REpower. Suzlon and REpower both now belong to the Suzlon Group.

Suzlon of India dropped to eighth position, with a decrease in market share to 6.4%. But the company also acquired the majority of **REpower's** shareholding in 2009, adding a market share of 3.4%. The Suzlon Group as a whole therefore accounts for 9.8% of the world market, enough to achieve third position in the Top 10 if it was treated as one company. **Siemens Wind** registered 6.0% of the market, slightly below its 2008 share. One new name appeared in the Top 10 list, which was the Chinese supplier Dongfang.

The five companies below the Top 10 rankings are: **Nordex** (GE), **United Power** (CN), **Clipper** (US), **Mitsubishi** (JP) and **Mingyang** (CN).

The Top 10 list of turbine suppliers in 2009



Significant trends in the market

The most significant trend in the market was the booming Chinese wind industry. Other features of 2009 were:

- Along with a modest upscaling in turbine capacity from the supply of more multi-MW turbines for use on land, the demand for offshore wind turbines was higher than the previous year, with **689 MW** supplied in 2009. The **average turbine size** delivered to the market was **1,599 kW**, slightly higher than in 2008.
- The redefined "mainstream" segment of turbines, in the capacity range of **1,500-2,500 kW**, accounted for **81.8%** of the total capacity delivered in 2009.
- A significant trend was the **increasing supply of wind turbine concepts with a direct drive design**. This emerging technology accounted for around 14% of the world market in 2009, represented mainly by Enercon (GE) and Goldwind (CN).
- In the Asian markets smaller turbines are preferred. The average size delivered to India in 2009

was therefore **1,117 kW**, whereas the average delivered to the UK market reached **2,251 kW**. In China the average turbine supplied was **1,360 kW**

- **Utilities and IPPs** are the dominating customer group in today's market. The Top 15 wind farm operators in this customer segment controlled around **35%** of the aggregate installed capacity in the world at the end of 2009. They *build* and in many cases *own and operate* the largest new wind farms in the US, Spain, China and the UK.

Forecast for 2010- 2014 and Prediction for 2015 - 2019

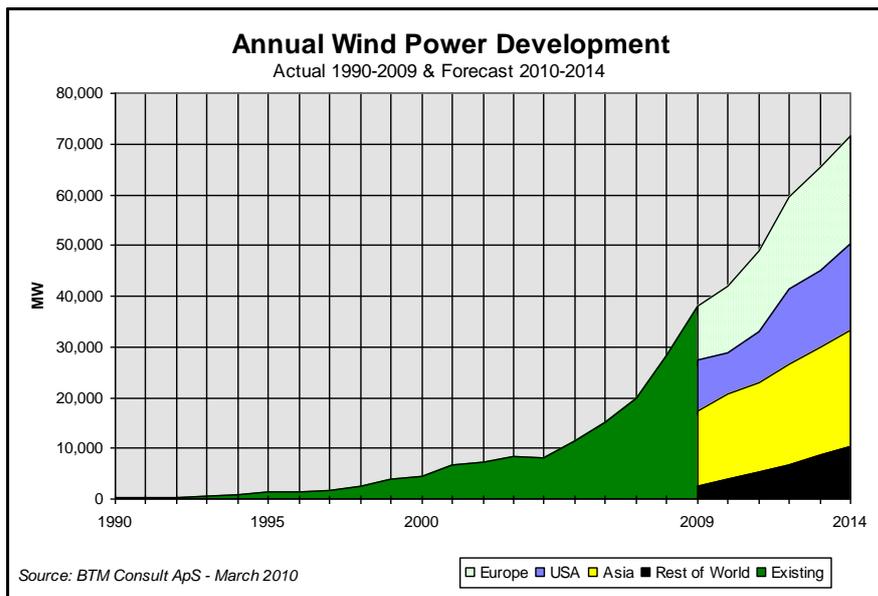
The global drivers for wind power have been stronger than ever, although their profile varies from region to region. In **Asia** (India and China) the drivers are **strong economic growth and the need for electricity**, in **Europe** the driver is determined political action to **combat global warming** and in the US a mix of **global warming** and **security of supply**.

This year's Forecast for the period up to 2014 remains strong but with uncertainty in the first year (2010) caused by a lower intake of new orders during 2009. An **average growth rate of 13.5% per year** for new installations is expected up to the end of 2014. By then the annual rate of new capacity is expected to surpass 71,000 MW per year. The cumulative level of installations expected over all five years is 287,000 MW, resulting in a close to tripling of the current total. This year a modest **growth of 10.3%** over 2009 is expected.

The slight upgrading in the forecast, compared to last year's, is justified by the strong global drivers, not least the pace of economic growth in Asia. In addition, there has been a more progressive policy towards wind power in the US, where support has come from the American Recovery and Reinvestment Act aimed at replacing employment lost in old industries. The more uncertain **Prediction for the period from 2015 to 2019** indicates an improved average **growth rate of 10.2%**, also justified by the likelihood of political action to implement new decisions on the climate change issue. Other key figures from the Forecast and Prediction are:

- **Europe** will lose its leading role by 2014 and account for **31%** of cumulative demand over the forecast period.
- The Americas, particularly the US and Canada, will increase their contribution by the end of the forecast period.
- South and East Asia will take the leading role and see a rapid increase, particularly in China and India. South & East Asia will account for 34.3% of all installations over the forecast period.
- OECD Pacific will see stable growth, led by Australia and Japan.
- By the end of the forecast period **in 2014**, cumulative installations in the world will have reached **447,600 MW**, of which **165,600 MW** will be in Europe, **135,700 MW** in South & East Asia and **122,300 MW** in the Americas.

Forecast for 2010-2014



- Offshore installation of wind power will increase steeply by the middle of the forecast period. By

2014 it will make up about 5.5% of total global demand. Europe will be the major market for offshore wind, and by 2014 it will account for 15.3% of total European supply. The contribution from offshore wind has been upgraded by some 30% in this year's forecast. The UK will be the major player in the sector up to 2014.

- By the end of the Prediction period in **2019**, cumulative global installations will come close to the milestone of 1,000 GW of installed capacity, and the worldwide penetration of wind generated electricity will by then be around **8.4%**. This figure assumes that the overall electricity market grows according to projections in the Reference Scenario presented by the IEA in its World Energy Outlook 2009.
- The **Special Topic** in WMU 2009 is an evaluation of the **outcome of the COP-15 meeting** and the resulting declaration, **the Copenhagen Accord**, and its impact on future wind power development. The conclusion is that it will not have a remarkable impact in the short to medium term. Despite this it is clear that the industry and its customers are already ahead of the politicians in terms of the need to change from a fossil fuel-based economy to a renewable one.