

**WIND**

# China's great unconnected wind reserve

Wind turbines in China  
Photo: Shutterstock, Wang Song



**Wind energy capacity in China has been growing at a rapid rate over the last seven years – perhaps too rapid. Feng Zhao highlights the vast number of wind turbines in China that are not, so far, connected to the grid, and how the network can catch up.**

China has over 120 GW of connected and unconnected wind power capacity, but power transmission bottlenecks have jeopardised wind power development in the country since 2008 – a year when wind power installations started taking off.

To break through these bottlenecks, China has invested heavily on building High Voltage Direct Current (HVDC) and High Voltage Alternating Current (HVAC) lines across the country over the past three years to reach areas of built, but not grid connected, turbines. Following these investments, the connection situation is getting better and the amount of wind power connected to the power grid during 2014 reached 19.8 GW, 40% more than 2013 and the highest rate China has ever had.

Although the percentage of unconnected wind power in China went down from 31% in 2008 to 16% in 2015, the actual total amount of unconnected wind power capacity has, in fact, grown more than five times (see Figure 1).

In addition, the explosive growth of wind power installations in the first half of 2015 triggered

by the reduction of feed-in tariffs in the top three onshore wind speed regions has put the already stressed Chinese grid further under strain. The 10 GW worth of new added wind power capacity during the first half of the year has brought the total unconnected

amount of wind power capacity in China today up to 20 GW.

**Linking regions**

Building transmission lines that can transfer wind electricity generated in the north, north-west and north-east of China to the

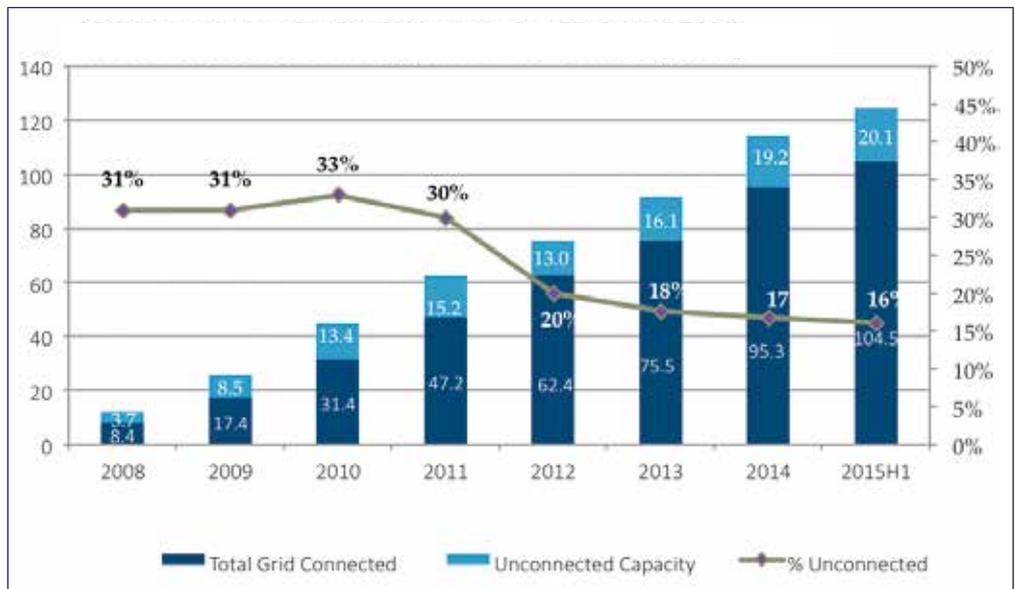


Figure 1. Unconnected wind power in China (GW)

Source: FTI Intelligence, CWEA, NEA, September 2015

load centres along the east coast and in the centre of the country plays a crucial role to secure the sustainable development of clean power in China.

Not only can it bring hope for those building unconnected turbines in the northern regions, but it can also reduce the high wind power curtailment rate (the amount of wind power not reaching the grid due to prioritisation of other sources) that reached 15% in the first six months of 2015 – equal to 17.5 TWh. This explains why China State Grid has invested more than RMB629bn (US\$101bn) in building new transmission lines in the past two years and expects to invest another RMB420bn (\$68bn) in 2015.

For the same reason, the Chinese National Energy

Administration released its *Notice for the Construction of 12 Power Transmission Lines for Speeding up the Work Plan for Prevention of Air Pollution* in June 2014. According to the plan, five of the 12 transmission lines are scheduled to be completed in 2016 and the rest will be ready for operation in 2017.

#### Nowhere to go?

However, a less reported theme is that the slower than expected growth in electricity consumption in China is creating a new challenge for the wind industry. According to first half of 2015 statistics released by the China Electricity Council in July 2015, the growth rate of electricity consumption on the national level was just 1.3% – slightly lower than 2014 and the lowest level

since 2010. For the central China and north-east China regions, the figures even turned negative.

Slow economic growth not only reduced the local electricity demand in north-east China and western China, where wind project owner-operators have already faced the challenge of electricity oversupply, but also reduces expected demand for green electricity from the load centres in central and eastern China.

Assuming new wind power installations and new grid connected wind power in 2015 will reach 25 GW and 22 GW respectively; total unconnected wind power capacity will increase to 22.2 GW by the end of this year. Considering the weak growth rate of electricity demand and the reduction of electricity transfer among provinces in 2015, the wind power curtailment rate in China this year is likely to jump to a level of around 12%.

From 2016 onward, it is likely that the pressure on the grid operators will be gradually eased as some of the planned long distance HVDC and HVAC transmission lines included in the *Work Plan for Prevention of Air Pollution* will be put into service in 2016.

However, whether the problems of grid transmission and high curtailment rate for wind power can be solved during China's 13th Five-Year Period relies on:

- the construction of the 12 power transmission lines included in the *Work Plan for Prevention of Air Pollution*, and the portion of the new built transmission capacity that will be allocated to wind power;
- the level of control over new capacity to be installed in over-supplied regions where the wind power curtailment rate is greater than 20%;
- coordination between wind power generation and other energy sources and the coordination of wind power transfer between different regions and provinces;
- the upcoming wind power installation target included in the 13th Five-Year Plan; and
- strategies adopted by the Chinese central government in order to boost the further economic growth and in turn increase electricity demand. ●

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## Vestas leads wind turbine order flow as industry heads for record in 2015

The global wind market is heading for a second consecutive record year in terms of new installations, according to figures from FTI Intelligence in its *Global Wind Market Update – H2 2015 Briefing*.

New installations globally in 2015 are expected to reach 59 GW, says the briefing, compared to the 52 GW installed in 2014. The briefing has also upped its estimate of the total installations for 2015–2019, which it says are now expected to reach 264 GW – an increase of 5.6% from FTI Intelligence's first quarter 2015 forecast. Total installations for the 2015–2024 period are forecast to reach 592 GW – corresponding to a 3.3% compound annual growth rate between 2014 and 2024.

The new installation forecasts in 2015–2019 were increased by 12% for North America. The key drivers behind this are expected strong growth in Canada in 2016 and the optimism created by the political debate about the revised US federal Clean Power Plan. The installations forecast for the Asia Pacific region by 2019 has increased by 5.6% due to strong continued growth in China with a clear visibility of project pipelines in 2016.

Firm order intake for the top 10 wind turbine manufacturers

in the first half of 2015 was approximately 20 GW, says the briefing. Danish-owned manufacturer Vestas lead the intake, driven by near-record orders of 3 GW in the second quarter of 2015. Chinese companies Goldwind and United Power take second and third place respectively, by taking the advantage of strong market growth in their home market. Germany's Siemens, the second-largest wind turbine manufacturer in 2014, saw a relatively low order intake due to a lull in offshore orders in both the first and second quarters of 2015.

Confirmed offshore orders for the first half of 2015 totalled 1.2 GW, led by Senvion (443 MW) followed by MHI-Vestas (423 MW) and Siemens (337 MW), says the report.

'In 2015, the global wind market will reach a new record of activity, driven by the extraordinary strength of China's market,' said Feng Zhao. 'However, we can still expect some volatility over the next five years, before annual installations build to the next peak around 2021.'

The *Global Wind Market Update – H2 2015 Briefing* is available through the FTI Intelligence website, [www.fti-intelligence.com](http://www.fti-intelligence.com)