

# Slide in US market puts drag on global wind capacity

**N**EWLY INSTALLED wind power capacity decreased by nearly 20% in 2013, generating 35.4 GW compared to 45 GW in 2012. In fact, capacities generated in 2013 fell to levels not seen since 2009. REMIPEG research shows it was the first decline in the segment in past 15 years.

The growth rate of the world-wide wind capacities dropped from 19% in 2012 to 12% in 2013. By the end of 2013, an accumulated capacity of approximately 315.6 GW had been installed worldwide.

This reduction was mainly the result of developments in the US market, which crashed from 13 GW in 2012 to 1.1 GW in 2013. Industry observers say the slide was specifically triggered by the late extension of the tax credits.

Outside of the US market, the worldwide installed capacities were on a similar level as 2012 (see Table 3). The added capacities in Europe, South America, Oceania and Africa remained stable; Asia profited from an buoyant Chinese market. Germany, the largest European market, generated 2,998 MW onshore and 240 MW offshore capacities. This marked the

second-largest growth rate since 2002, when 3,247 MW in new wind capacities were realized.

Following is a breakout:

China regained first place as the largest national market in the world with 16.1 GW newly installed wind capacities. That's far ahead of Germany, which came in second place with 3.2 GW. The United Kingdom held the number three spot at 1.9 GW.

## Turbine manufacturers

2013 demonstrated that turbine manufacturers required a stronger diversification of their core markets in order to compensate for the changes in the market dynamics. While GE profited in 2012 from a strong domestic market, the company was negatively impacted by the late extension of tax credits. Hence GE dropped

from first place to fifth in terms of added capacity.

**Vestas** recaptured the leading position with a 13.1% share of market, while Goldwind profited from strong domestic activity and increased the newly installed shares from 6% in 2012 to 11% in 2013. This lifted **Goldwind** to the number two position, followed by **Enercon** (9.8%).

The market-share shifts didn't end there. After a four-year absence from the Top 10 list, **Nordex** captured tenth place on the strength of a new corporate strategy focused on targeted market segments and new, cost-optimised turbines [11].

The trend of shifting market shares from the big Top 10 players to smaller companies continued in 2013. The accumulated share of all manufacturers outside the Top 10 rose from 13% in 2008, to 19% in 2012 and 21% in 2013. The largest manufacturer is Vestas with a total accumulated share of 18.9 %, before GE (12.1%) and Enercon (10.1%).

## Technology trends for onshore wind farms

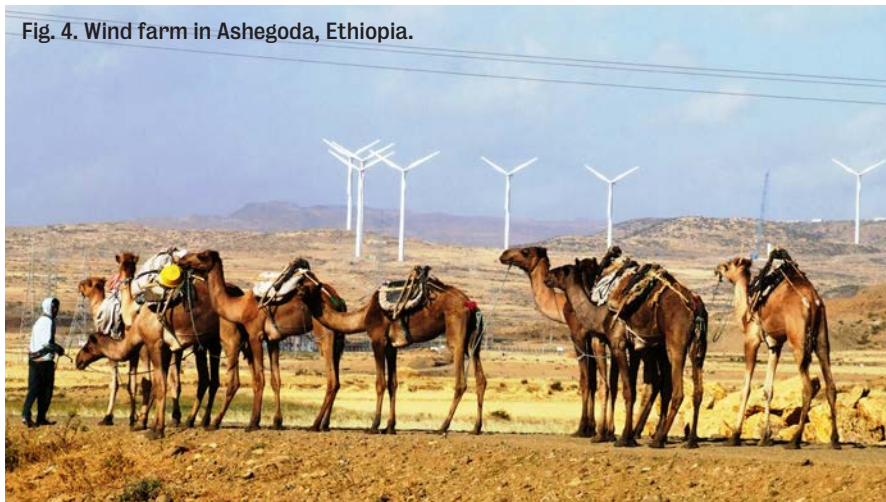
Several turbine manufacturers switched from a permanent magnet generator (PMG) format to asynchronous generators in 2013. After ten years GE, for example, decided to go back to double-fed inductive generators (DFIG) for the new GE 2.5X platform. GE claims DFIG's are more cost-effective, capable of meeting the latest grid codes and have less electrical conversion losses. In November 2013 the first commercial GE2.5-120 became operational in Schnaittenbach, Germany [12].

GE is not alone. Vestas, via its Gridstreamer platform, introduced several turbine models (V80, V90, V112) with a permanent magnet generator. In 2013 Vestas launched an upgrade of its 3 MW platform optionally available with an asynchronous generator.

Region	Installed capacity 2012	Installed capacity 2013	Accumulated installed capacity 2013	Estimated electricity generation 2013
	[GW]	[GW]	[GW]	[TWh/y]
North American	14.9	3.2	71.5	189.0
South American	1.2	1.2	4.3	8.5
Europe	12.7	12.0	121.0	250.3
Asia	15.7	18.2	113.6	223.0
Oceania	0.4	0.5	3.7	9.4
Africa	0.2	0.3	1.5	2.7
<b>World Total</b>	<b>45.0</b>	<b>35.4</b>	<b>315.7</b>	<b>683.0</b>
Largest national market		China 16.1	China 89.0	
Offshore (of above)		1.7	6.8	

Table 3. Summary of the global wind power market in 2013 compared to 2012.

Fig. 4. Wind farm in Ashegoda, Ethiopia.



### Large-scale onshore projects

In 2013 **Tri Global Energy** commenced construction of the first 240 MW phase of the Hale county wind farm in the US. After realisation of all five phases the wind farm will reach the total capacity of 1,100 MW — the world largest wind farm, according to Tri Global Energy. Commercial operation of the first phase is planned for late 2015 [13].

Although large wind farm projects are found mostly in established wind markets, such projects are springing up in emerging and upcoming markets as well. For example, in 2013 the Ethiopian 120 MW wind farm Ashegoda (see Figure 4) was inaugurated by the prime minister [14]. Africa's largest wind farm in Tarfaya, Morocco, is under construction and will be commissioned in 2014. The total wind farm capacity will be 301.3 MW, entailing 131 Siemens SWT-2.3-101 turbines.

### Offshore turbine update

The market concentration is in full swing. **Vestas** and **Mitsubishi Heavy Industries** founded the joint venture MHI Vestas Offshore Wind on 1 April [15]. The flagship product of the joint venture is the V164-8.0 MW, the world's largest offshore wind turbine. Beginning of 2014 the first prototype was installed at the Østerild test site in Denmark. Serial production is planned for 2015. In January 2014 **Gamesa** and **Areva** confirmed plans of a 50/50 joint venture. The main goal is the development of a joint 8 MW turbine on the basis of existing

Gamesa technologies [16]. After the successful acquisition of **Alstom** by GE in June 2014, Alstom's offshore wind business will be transferred in a 50/50 joint venture with GE [17].

### Offshore wind capacity

2013 was a good year for the offshore wind farm business. Approximately 1,700 MW were installed in Belgium, China, Denmark, Germany, Japan, Sweden and the UK. That's an increase of 50% compared to 2012. By end of 2013 the accumulated installed capacity was 6.8 GW; 6 GW of additional capacities are currently under construction.

The United Kingdom fortified its leading position in offshore wind energy. London Array, the world largest offshore wind farm, was officially inaugurated by the British Prime Minister, David Cameron, in July 2013 [18]. The wind farm consists of 175 Siemens SWT 3.6-120 wind turbines, with a total capacity of 630 MW.

Germany's first large-scale offshore wind farm in the North Sea Bard 1 (400 MW) has been suffering a series of breakdowns since commissioning last year. Due to several capacity overloads and a smouldering fire in the high-voltage DC converter in March 2014, the wind farm was out of operation for several months [19]. Notwithstanding these problems, the necessity of offshore wind energy as part of the German "Energiewende" has political support. Currently 8 offshore wind farms with total capacity of 2.3 GW are under construction.

Finally, China is the largest growing

## Industry buoyed by lower wind power costs

US wind industry developers, manufacturers and other key players have worked hard for years to make wind energy cheaper. As a result, today they express confidence they can deliver a reliable, affordable product — wind energy — to states and consumers to meet the US Environmental Protection Agency's proposed rule limiting carbon emissions from existing power plants.\*

Wind energy is 43% cheaper than it's been in four years, thanks partly to 560 factories making wind energy components across 44 states. Utilities and other power providers have increasingly been signing contracts for wind energy, because they can get long-term, fixed-price deals that help hedge their portfolio against the price volatility of fuel-based sources. The thousands of US companies that help manufacture, develop, build, and service wind turbines are capable of leveraging up to \$25 billion in private investment in a single year.

"With the release of these proposed rules, the Obama Administration and the EPA have taken an important step forward in America's effort to fight climate change," said Gabriel Alonso, CEO, EDP **Renewables North America**. "Wind energy has been a proven, cost-competitive and stable source of carbon-free electricity that has driven billions of dollars of investment nationwide, creating jobs and supporting rural economies while contributing to substantial reductions in US greenhouse gas emissions. This rule will help accelerate that trend."

\* "EPA Proposes New Rules for Plants," *Renewable Energy Focus* magazine, May/June edition, pps 10–13.

market for offshore wind energy. By the end of 2013, 350 MW were in operation, and an additional 2 GW are expected to follow in 2014 and 2015.