

# Global Status of Wind Power in 2012

In 2012, the global wind power market increased by 10% compared to 2011, and the 45 GW of new wind power capacity represented USD 78 billion (EUR 60 billion) of investments.

The total cumulative capacity increased by 19% in 2012, reaching 282.5 GW. Slightly lower than the average capacity increase of 22% over the last 10 years.

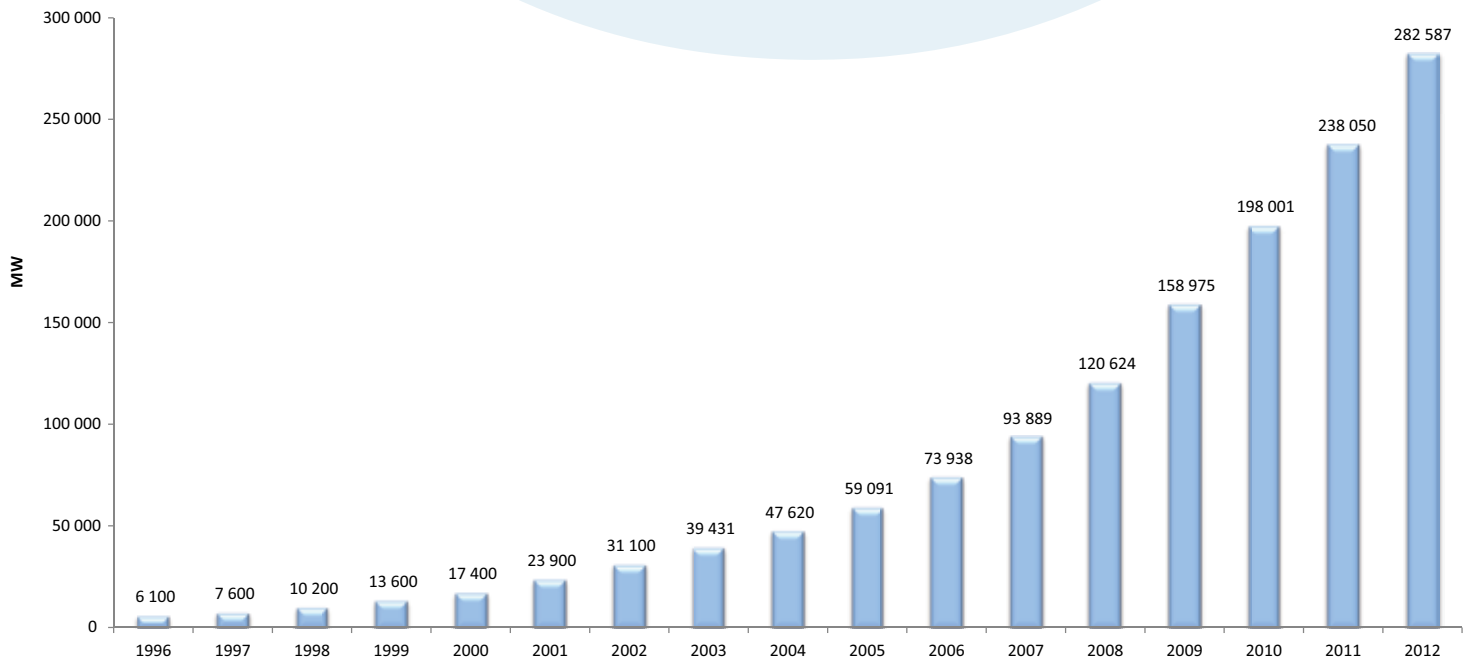


Figure 1: Global Cumulative Installed Wind Capacity (1996-2012) (GWEC, 2013)

At the end of 2011, the market growth projections for 2012 were mixed, due to the economic slowdown in Europe and uncertainty on the future of the US Production Tax Credit (PTC). On the contrary, North America and Europe saw a record year of installations in 2012. In the US, 8.4 GW were installed in the fourth quarter of 2012 in anticipation of the expiration of the PTC.

The annual installed capacity in the US reached 13 124 MW, surpassing that of China, which had its lowest level of installations since 2008 (at 12 960 MW). Combined with an exceptionally strong year in Europe, the market was more reasonably balanced between the three major regions (Asia, North America and Europe) than at any point in the last decade. While Asia was still the leading region, it did not enjoy the strong dominance that characterized the 2010 and 2011 markets.

The market is progressively diversifying. By the end of last year the number of countries with more than 1 000 megawatt (MW) installed capacity has risen to 24: including 16 in Europe (European Wind Energy Association, 2013); 4 in Asia-Pacific (China, India, Japan and Australia); 3 in North America (Canada, Mexico and US) and 1 in Latin America (Brazil).

Looking ahead, the picture is increasingly complex worldwide. From the industry point of view, although the US PTC has been renewed for almost two years in the US, the broader economic reforms may impact the level of support available to renewables in the short to medium term. The European legislation and 2020 targets ensure a degree of stability, but a recent wave of policy reforms creates uncertainty for 2013.

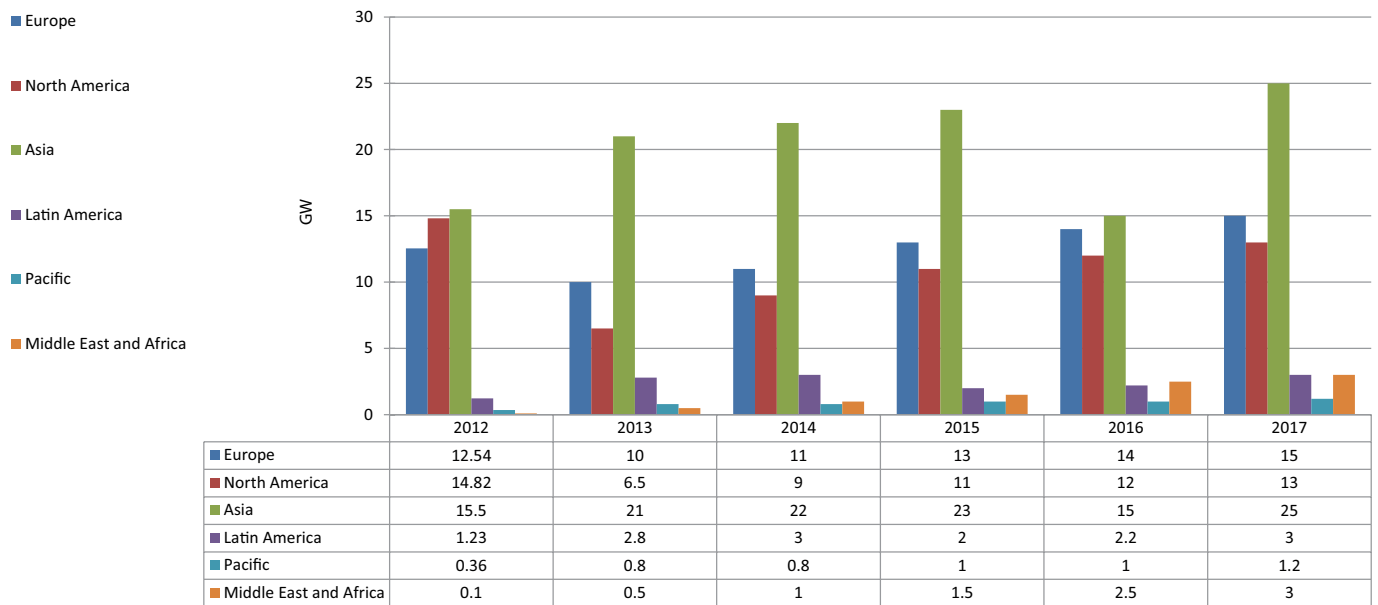


Figure 2: Annual Market Forecast by Region 2012-2017 (GWEC, 2013).

Market consolidation and rationalization in China, and a lapse in policy in India were the main reasons for the significant slowdown in Asia in 2012, but these conditions are expected to be short-term and Asian dominance of global wind markets is expected to continue. Canada, Brazil and Mexico are expected to have large growth in 2013, and new installations are expected in sub-Saharan Africa: South Africa, Ethiopia and possibly Kenya. Additionally new projects will be soon operating in Mongolia, Pakistan, the Philippines and Thailand

## Asia

For the fifth year in a row, Asia was the world's largest regional market for wind energy, with capacity additions totalling just over 15 GW.

In terms of annual installations China ceded its leadership position to the US in 2012, with less than 200 MW difference between them. China added 12.96 GW of new capacity in 2012, a significant decrease compared to the exceptional annual installation figures in the three years prior to 2012.

By the end of 2012, the cumulative installed capacity in China was over 75 GW, and generated 100.4 billion kilowatt-hour (kWh), accounting for 2% of the country's total electricity output, up from 1.5% in 2011 (People's Daily, 2013).

The astonishing growth of China's wind sector since 2006 has managed to surprise even many optimists in the industry, although it may now enter a more steady development phase. Curtailment of electricity generation became a new challenge for wind power projects. In 2011 alone, more than 10 billion kWh of wind power was lost because the grid had no capacity to absorb it. According to a recent announcement, China's National Energy Administration (NEA) expects installations of about 18 GW of new wind power capacity in 2013. In the meantime, however, the NEA and State Grid are working to solve the transmission bottlenecks and other grid issues. The NEA is also actively encouraging wind farm development in lower wind zones that are closer to load centres.

India today is also a key market for the wind industry, presenting substantial opportunities for both international and domestic players. Although in 2011, the Indian wind sector experienced its strongest annual growth ever, with over 3 GW of new installations, 2012 was a slower year due to a lapse in policy. Nonetheless, India saw new wind energy installations reach 2 336 MW by the end of 2012, providing overall a total of 18 421 MW in-country. This pace of growth kept the Indian wind power market firmly in the top five rankings globally. As of January 2013, total wind installations had risen to 18 552 MW bringing total renewable energy installations in the country to 26 920 MW (Ministry of New and Renewable Energy, 2013). By the end of 2012, renewable

energy accounted for over 12% of total installed capacity and about 6% of electricity generation, up from 2% in 1995. Wind power accounted for about 69% of total renewable energy capacity or about 8% of the total installed capacity (Central Electricity Authority, 2012)<sup>1</sup> in India. With the acute need for electrification and rising power consumption in the country, wind energy is going to provide an increasingly significant share of the renewables based capacity.

While the rest of Asia did not make much progress in 2012, there are some favourable signs on the horizon. The Japanese market saw new installations of 88 MW in 2012 to reach a cumulative capacity of 2 614 MW. This represents around 0.5% of the total power supply in Japan. After the Fukushima accident of March 2011, Japan is slowly moving towards a transformation of its energy system to allow for a more diverse energy mix including more wind power and other renewables. However, removing existing barriers will still take time. Offshore wind development, in particular floating turbines, is a promising prospect for the future.

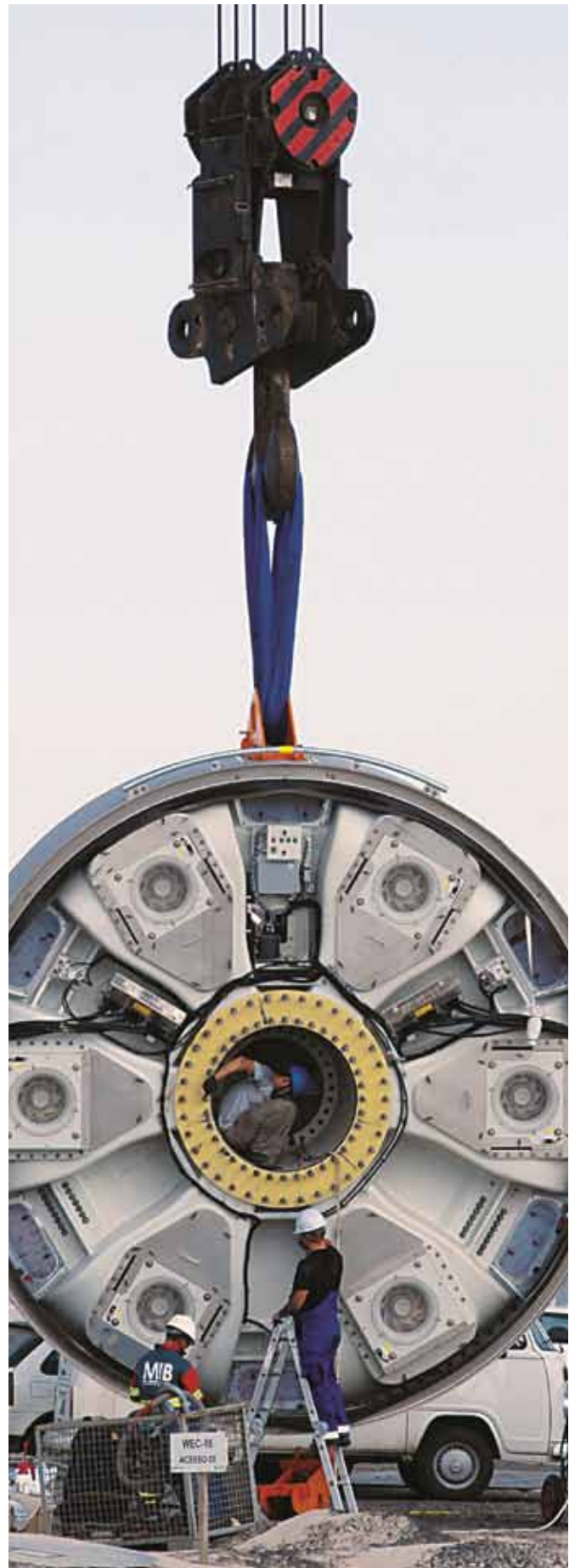
The Government of South Korea has made “green growth” one of its national development priorities. Although wind power is still a relatively young energy generation technology in South Korea, 2012 saw 76 MW of new onshore installations, which brought the total installed capacity to 483 MW. The introduction of a Renewable Portfolio Standard in 2012 is likely to expedite the development of new wind projects in the future. The Korean government had already put forward a strategy for offshore wind development with a target of 2.5 GW by 2019.

Finally, 2012 saw Pakistan commission its first large-scale commercial wind farm of 50 MW in the province of Sindh. The total installed capacity reached 56 MW by the end of 2012. Almost 150 MW of new capacity is currently under construction and projects totalling 700 MW are likely to achieve financial closure by the end of 2013.

The first commercial wind farm of 50 MW will get commissioned this summer in Mongolia. As for the rest of Asia, new projects are expected to begin operations in Thailand and the Philippines during 2013.

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<sup>1</sup> The month of January in 2013 saw total wind installations of 131 MW.



Brazil ©Carlos Pereira/GWEC

## North America

Uncertain federal policies in the US have caused a 'boom-bust' cycle in wind energy development for over a decade. Nonetheless the US wind energy industry had its strongest year ever in 2012, making it the market leader in terms of new wind installations globally. The US connected over 13.1 GW of new wind power capacity from 190 projects, which leveraged USD 25 billion (EUR 19 billion) in private investment. The country is now home to 60 GW of total wind power capacity, up from 46.9 GW in 2011.

In 2012, wind energy was the largest source of new US electricity generating capacity, providing some 42% of all new generating capacity. In fact, 2012 was a robust year for all renewables, as together they provided over 55% of all new generating capacity in the country. An unprecedented 8.3 GW of wind power was installed in the fourth quarter alone, making it the strongest quarter in the country's long wind power history. This was due in a large part to impending expiration of the federal Production Tax Credit (PTC). It was slated to end on 31st December 2012, but was extended by Congress on 1st January 2013 as part of the 'fiscal cliff package,' or the American Taxpayer Relief Act of 2012. The '13th hour' extension of the tax credit means that although the US market will slow substantially in 2013, it is unlikely to be as much of a slowdown as was expected and the nature of the extension bodes well for the 2014 market.

In terms of new capacity added in 2012, Texas again led the Top-five rankings (1 826 MW), followed by California (1 656 MW), Kansas (1 440 MW), Oklahoma (1 127 MW) and Illinois (823 MW). As of February 2013, 29 of the 50 states have firm RPSs, and 7 states have renewable energy goals. Additionally a total of 66 utilities in the US bought or owned wind power in 2012, a significant increase from 42 in 2011. New wind power purchasers last year included at least 18 industrial buyers, 11 schools and universities, and 8 towns or cities, showing a significant trend toward non-traditional power purchasers from the industrial sector.

Canada saw 935 MW of new wind capacity come online, making it the ninth largest market in 2012; but when compared to 1 267 MW new wind capacity in 2011, Canada's wind power market saw a slight slowdown in 2012, despite this it was still the second best year ever. Ontario leads in wind energy installed

capacity with more than 2 000 MW now supplying over 3% of the province's electricity demand. The Canadian industry expects to see a record year in 2013 for new installations with the addition of almost 1 500 MW of new capacity that will drive over USD 3 billion (EUR 2.3 billion) in new investments. Ontario and Quebec are expected to lead in new wind energy installations. New contracts were also awarded in 2012 for projects in Saskatchewan, Nova Scotia and Prince Edward Island.

Mexico has an outstanding wind resource, especially in the Oaxaca region. Mexico more than doubled its installed capacity, installing 801 MW for a total of 1 370 MW and joining the list of countries (now 24) with more than 1 000 MW of wind power capacity. At the end of 2010, Mexico had a total of 519 MW of installed wind capacity connected to the grid, with only 10 MW installed outside of the State of Oaxaca (in Baja California). The year 2012 was exceptional for Mexico and 2013 is expected to be another good year.

## Europe

During 2012, 12 744 MW of wind power was installed across Europe, with European Union countries accounting for 11 895 MW of the total. The 2012 figures reflect orders made before the wave of political uncertainty that has swept across Europe since 2011. Wind energy represented 26% of all new EU power capacity installed last year, and investments of between EUR 12.8 billion and EUR 17.2 billion (resp. USD 16.6 and 22.4 billion). Wind is now meeting 7% of Europe's electricity demand, up from 6.3% at end 2011 and 4.8% in 2009.

New wind energy installations in 2012 were led by Germany (21% of all new wind power capacity), the UK (16%), Italy (11%), Romania (8%) and Poland (8%). In terms of total installed capacity, Germany is leading again (30% of total wind power capacity), followed by Spain (22%), the UK (8%), Italy (8%) and France (7%).

Currently, the wind industry is being hit by the economic crisis and austerity measures being implemented across Europe.

Despite the current difficulties, the European wind industry is optimistic. The industry is advocating for the formalisation of 2030 Renewable Energy Targets. Overall, the EU is almost 2 GW (1.7%) under its National Renewable Energy Action Plan forecasts

for 2012. Eighteen Member States are falling behind, including Czech Republic, France, Hungary, Greece, Portugal and Slovakia.

The German wind energy market continued to provide stable growth in 2012. The German wind industry expects this to continue during 2013 as well. However, the latest plans for reforming the feed-in tariffs for renewable energy could negatively impact investor confidence in future wind projects in Germany (RECharge, 2013).

German offshore wind projects saw 16 new wind turbines with a capacity of 80 MW connect to the grid in 2012, bringing the total number of wind turbines in the German part of the North and Baltic Seas to 68, with a combined capacity of 280 MW. Last year, approximately 109 foundation structures were installed in the sea, while 6 offshore wind farms with a total capacity of 1 700 MW are currently under construction. In the coming months the industry would know whether the difficulties surrounding grid connection for offshore wind farms have been satisfactorily resolved.

Despite facing strong austerity measures, Spain continued to be the second largest market in the EU and the seventh largest global market for wind energy

in 2012. However, a dramatic drop in installations in 2013 is expected and the future is very uncertain. On 1 February 2013, the government introduced a new decree, which removes the option for renewables producers to sell energy at the market price plus a premium, and obliges them to choose between a fixed tariff and the prevailing market price. The majority of Spanish wind farms (over 80%) until last year were using the market price plus a premium option, one of the incentives under the Royal Decree 661/2007. Under the new decree, renewable energy producers are opting for a fixed tariff, since the current market price is not sufficient to support projects, according to the Spanish Wind Energy Association. Further, this decree would be retroactive, which would require project owners to undertake a complete overhaul of the original conditions under which long-term investments were made. (Spanish Wind Energy Association, 2013).

The United Kingdom is the windiest country in Europe and could power itself several times over using wind. The UK installed 1 897 MW in 2012 - 1 043 MW onshore and 854 MW offshore, which represents 16% of the new wind capacity in Europe. Overall wind power generated 5.5% of the UK's electricity needs in 2012, up from 4% in 2011 (Department of Energy & Climate Change, 2013).

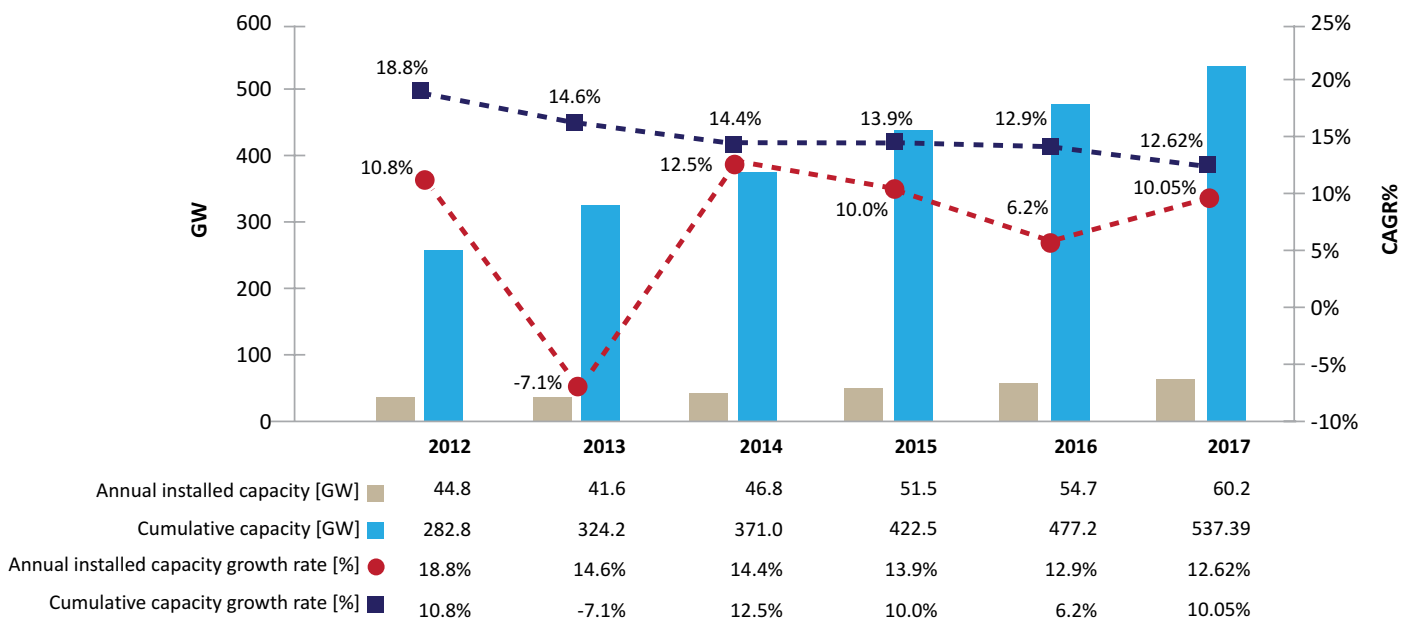


Figure 3: Expected growth trajectory 2012-2017



Recently, the UK government tabled an amendment to the Energy Bill, which would require the Government to set a decarbonisation target for the power sector in April 2014. If the amendment were to be introduced, it would limit the maximum amount of carbon emitted from 2030 onwards. The currently recommended limit is of 50 grams (g)/kWh or 90% lower than current levels<sup>2</sup>. Renewable UK, the UK's renewable energy trade association stated that this would secure more than 76 000 jobs in the wind industry by 2021, and have a transformative impact on the UK manufacturing sector.

Another regional development that will have long-term positive outcomes for the wind industry was the signing of the memorandum of understanding (MoU) between the Irish and UK government in January 2013. The MoU will initiate detailed analysis of how Irish renewable energy resources, onshore and offshore, might be developed to the mutual benefit of Ireland and the UK (Gov.UK, 2013). Based on this analysis, the parties will develop an inter-governmental agreement to be signed by 2014.

Early 2013, Italy had installed a total wind capacity of 8 144 MW, an increase from 6 737 MW in 2011. It is the seventh largest wind market globally. France's wind capacity is also growing steadily and has now reached 7 564 MW. The French government set a target of 25 GW by 2020, which would require a strong effort until the end of the period.

## Latin America

Wind power is reaching critical mass in a number of Latin American markets, and the region has begun developing a substantial wind power industry to complement its rich hydro and biomass (and potentially solar) resources. In the medium to long-term, the demand for energy security and diversity of supply is expected to foster the growth wind power in Latin America. For the first time Latin American markets installed over 1 GW of new capacity. During 2012 six markets in the region installed 1 225 MW of new wind capacity to reach a total installed capacity of just over 3.5 GW.

The cumulative wind capacity in Brazil is 1 077 MW. Brazil is one of the few wind energy markets with

annual installations of over 1 GW. Brazil has a strong pipeline of projects, with almost 7 GW to be completed by 2016. Subsequently it is a very promising onshore market for wind energy, for at least the next five years. The country's support framework and the sector's experience have been adapted to meet local conditions.

According to the industry, achieving sustained development requires a new regulatory framework, which would then provide certainty in terms of development volumes in the medium- and long-term; legal security in the processing of projects; and a support system, which would further enhance competitiveness. Current government projections foresee 16 000 MW of wind power installed in the country by the end of 2021.

Argentina added 54 MW of new capacity, bringing its total installed capacity up to 167 MW last year. Argentina is a promising market, which has massive wind resources. A number of wind power projects are under development, which could help alleviate chronic electricity shortages in the country. Some analysts claim that the winds in Argentina are sufficient to supply Latin America's entire electrical demand seven times over.

Venezuela commissioned its first commercial wind farm in 2012 (30 MW). Uruguay commissioned 9 MW of new capacity, bringing its total to 52 MW. In Central America, Nicaragua installed 40 MW, bringing its total to 102 MW and 15 MW was installed in Costa Rica, which brought its total installed capacity up to 147 MW.

## Pacific

The region's installed capacity exceeded 3 GW in 2012. Australia added 358 MW in 2012 (compared to 234 MW in 2011), bringing the total installed capacity to 2 584 MW. According to recent research conducted by the Clean Energy Council, wind farms have generated more than AUD 4 billion (USD 3.8 billion) in investment in Australia since their introduction (ABC Rural, 2013). The Australian Government's Renewable Energy Target Scheme is designed to deliver 20% of Australia's electricity supply from renewable sources by 2020. The Largescale Renewable Energy Target

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<sup>2</sup> The exact amount would be set based on advice from the independent body that is set up to advise the Government and Committee on Climate Change.



Ilocos Norte, Philippines ©Greenpeace / Rap Rios

and the Smallscale Renewable Energy Scheme provide incentives designed to bridge the gap between the price of electricity from conventional sources and renewable energy, and are expected to produce more than 45 000 gigawatt-hour (GWh) in 2020. As an additional measure, Australia last year started charging its biggest polluters a price of AUD 23 (USD 22) a metric tonne for their carbon emissions . In August 2012, the Australian government and the European Commission agreed to link their carbon trading platforms in a shared marketplace<sup>3</sup>.

Most importantly, wind electricity is now competitive with fossil fuels in Australia. According to a recent Bloomberg New Energy Finance report by (BNEF, 2013b), a new wind farm in Australia can supply electricity at a cost of AUD 80 (USD 77) per megawatt-hour (MWh), compared with AUD 143 (USD 110) a MWh from a new coal-fired power plant or AUD 116 (USD 111) from a new station powered by natural gas when the cost of carbon emissions are factored in.

## Africa and the Middle East

Africa and the Middle East seem to be waking up to the opportunity of their enormous wind power potential. Growth in 2012 was still small in absolute terms, with just over 1.1 GW installed across the region. However, several countries have announced long-term plans for installing commercial scale wind power; this includes South Africa, Ethiopia, Morocco, Kenya and Saudi Arabia, among others.

At the end of 2012, over 98% of the region's total wind installations of just over 1 135 MW were to be found across six countries; Egypt (550 MW), Morocco (291 MW), Tunisia (104 MW), Ethiopia (52 MW), Iran (91 MW) and Cape Verde (24 MW).

## EXPECTED GROWTH TRAJECTORY FOR WIND ENERGY (2013-2017)

According to the GWEC, the industry is expected to continue growing during the coming five years. The wind industry continued to diversify geographically, with significant new activity in Latin America, Africa

and Asia outside of China and India; but the major markets are still the key determinants of global market growth.

In an increasingly tight market, with tremendous downward pressure on prices through oversupply in the turbine market; fierce competition with 'cheap' gas; and a wave of downward revisions to support mechanisms in an austerity driven economic landscape; the industry continues to be challenged to compete on a price basis directly with fossil fuel and nuclear energy plants. The fundamental drivers for wind power development however remain, and there is a need around the world for new power generation, which is clean, affordable, indigenous, reliable and quick to install. The continued uncertainty over the short-term development of the global economy with all its regional and national variations, and its effect on electricity demand growth are other factors to consider when projecting the wind industry's development over the next five years.

GWEC forecasted that annual installations for 2013 would drop by more than 11% to just under 40 GW; and then recover sharply in 2014 to slightly exceed the 2012 market; and average just over 11% annual market growth from 2014 to 2017. The average annual market growth rate for the entire 2013-2017 period is forecast to be almost 7%, ending up with an annual market in 2017 of 61 GW. In cumulative terms, this means an average growth rate over the period of about 13.7%, well below the previous ten-year. GWEC projected that by the end of 2017; total cumulative installed capacity would pass 500 GW to reach approximately 536 GW.

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<sup>3</sup> Beginning 1 July 2015, Australia's carbon pricing scheme will be linked to the EU's Emissions Trading System (ETS) under an interim link that will synchronise carbon prices in the two markets and allow for global permit trading. A full linkage is scheduled to take place no later than January of 2018.



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