The Wind Power Report

Ed 3 2006

Spanish wind farm

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Published by

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Introduction

- ABS believes that this is the most important Wind Report that we have yet produced
- The global installed capacity of wind turbines reached 59 GW by the end of 2005
- It is forecast that installed capacity of wind power will reach 136 GW by 2010
- 55% (75 GW) of which will be installed in Europe, 23% (31 GW) in North America and 22% (30 GW) in the rest of the world
- The last year has seen marked changes in the national rankings in terms of wind power, both among the market leaders and among the up and coming countries.
- Sudden activity has pushed some markets forward, others have slowed down as their wind market matures
- The other feature of development has been the widening of the market to new countries, with many taking their first steps into the market
- The five big markets remain the leaders, Germany, Spain, the USA, India and Denmark, with India overtaking Denmark
- Significant industry issues are emerging as operational data becomes available from the major wind power operators such as E.ON Netz, Eltra and ESB
- In 2003 the Irish government declared a moratorium on further wind power development. This opens many questions about the assumptions and claims made for wind power

Key Findings

- The wind power industry is reaching a highly controversial phase in its development as solid operational data becomes available about its performance, limitations and effects on the grid
- The ABS report concludes that governments, developers and operators should seriously consider their options regarding wind power
- Wind power reports have now been published by energy agencies and the network operators in USA, Germany, Spain, Denmark and Ireland, delineating critical problems. Deutsche Energie-Agentur (dena) has published a comprehensive report on German wind power on behalf of the Federal Government, together with the utility and wind and industries
- The dena report assessed the capacity credit of wind power in Germany in 2003 as 890-1,230 MW, i.e. 6% of installed wind capacity of 14,603 MW, rising to 1,820-2,300 MW for 36,000 MW installed in 2015, with a reserve capacity requirement of 7,000 MW
- The claimed savings in GHG emissions has been questioned
- Denmark exported over 80% of wind generated electricity to Norway in 2004, which has 98.5% carbon-free hydro generation, because wind delivered a surplus of 84%, according to the CEO of Eltra, almost nullifying any emissions savings
- Wind's intermittency places a large strain on system balance
- A new understanding is emerging about the relative efficiencies and emissions of base load operation of fossil fuel plant versus plant used in back up of a variable source
- Wind power has been promoted for politico/environmental reasons and wind developers have benefited from substantial subsidies, leading to exaggerated claims. A reality check is needed.

Reasons to buy

- With the first real evidence of performance from some of the most authoritative sources in the power industry, the claims for wind power are being called into question
- Anyone involved in this industry should have this information and be aware of these results
- Be wary when the wind industry describes a criticism of wind power as a "myth"
- Industry figures like the CEOs of E.ON Netz and Eltra do not deal in myths and solutions, they have real experience and more data than anyone else. They record what has actually happened.

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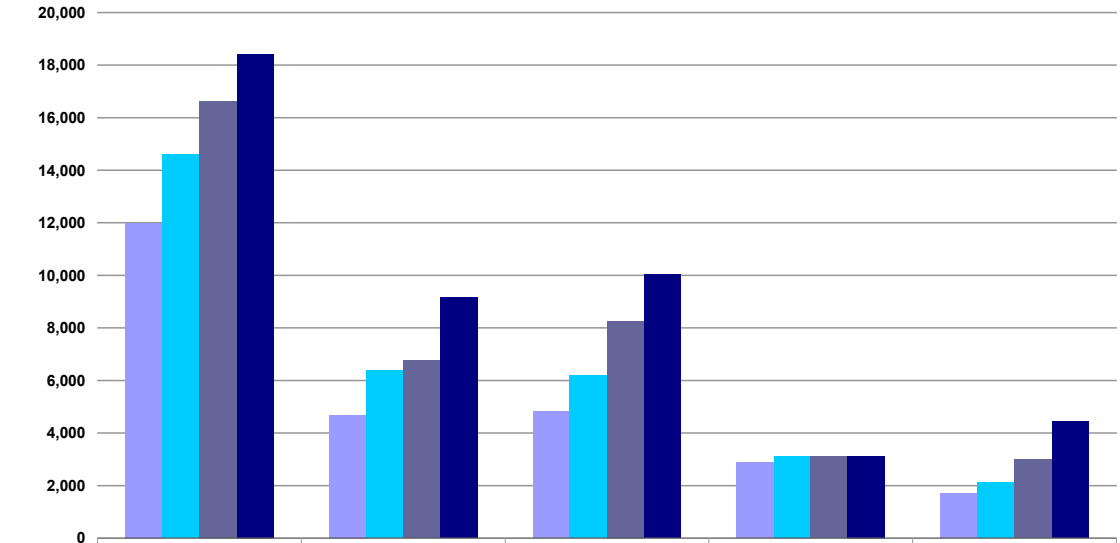
Figure II.2 Installed wind power capacity of the five leading countries MW December 2002 to 2005



	Germany	USA	Spain	Denmark	India
Dec 2002	11,994	4,685	4,825	2,880	1,702
Dec 2003	14,609	6,374	6,202	3,123	2,110
Dec 2004	16,629	6,750	8,263	3,117	3,000
Dec 2005	18,428	9,149	10,027	3,122	4,430

Source: Global Wind Energy Council EWEA, AWEA

The rest of the world's wind generating capacity is split in small amounts among an increasing number of countries. A feature of the global wind power market in the last two years is the number of countries which are taking off with large wind farms. In eh early days of the technology, many countries installed wind turbine measured in a few kilowatts. Today several countries are entering the market with 30-50 MW wind parks.

Europe

Europe has historically been the strongest market for wind energy development and continued to lead the world with over 40,500 MW of installed capacity at the end of 2005, representing 69 % of the global total. In 2005, the European wind capacity grew by 18% to 40,504 MW at the end of 2005, up from 34,372 MW at the end of 2004. 6,183 MW of wind power capacity were installed in 2005, representing a wind turbine manufacturing turnover of some € 6 billion.

The top five European wind energy markets in 2005 were Germany (1,808 MW), Spain (1,764 MW), Portugal (500 MW), Italy (452 MW) and the UK (446 MW). In cumulative installed capacity, two countries have more than 10 GW (Germany 18,428 MW and Spain 10,027 MW) and seven countries have more than 1GW (Denmark 3,122 MW, Italy 1,717 MW, UK 1,353 MW, Netherlands 1,219 MW and Portugal 1,022 MW, as well as Germany and Spain). T

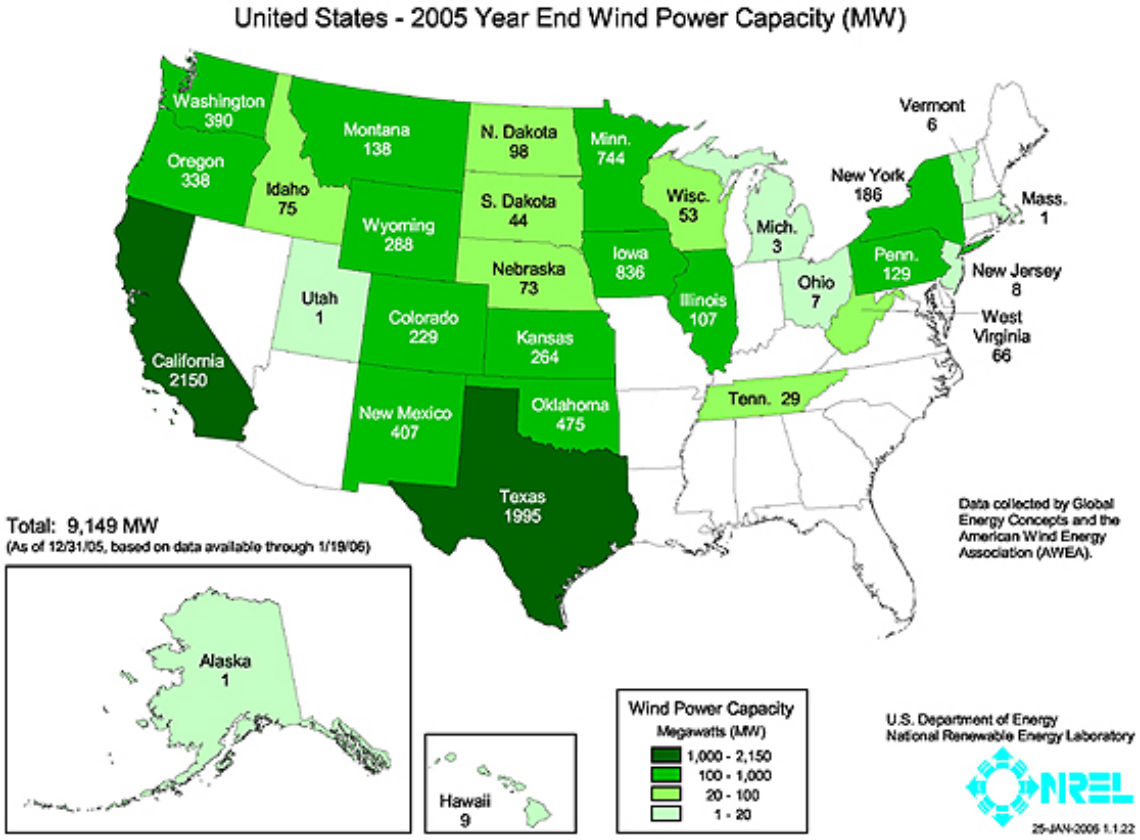
The EU market has already reached the 2010 target set by the European Commission of 40,000 MW, five years ahead of time and a greater number of countries are embracing wind power, including new markets such as Portugal and France.

Not only is the EU gradually becoming less reliant on a few key markets but other regions of the world are starting to catch up with Europe. The growth in the EU market in 2005 only accounted for about half of the total global new capacity, down from nearly three quarters in 2004.

The rest of Europe is much slower, although movement is now taking place. In the EFTA countries (mainly in Norway), 110 MW were installed during the year 2005, taking the total up to 279 MW. The EU accession countries now have 28 MW of installed capacity, 20 MW of which in Turkey.

production incentive program to April 2010. As a result, like the US, the Canadian wind power market will see steady growth ahead.

Figure II.4 Installed wind generating capacity in the USA, 2005 by state MW



Source: NREL

Latin America

There has been little activity in Latin America, but various governments are in the process of implementing renewable energy laws or programmes, and wind energy is expected to develop at a strong rate in the coming years.

In Brazil, the government passed a programme called PROINFA to stimulate the development of biomass generation, wind and small hydro generators. In a .first stage (up to 2007), the programme aims to implement 3,300 MW of projects using these technologies. The Brazilian government is planning to increase the installed wind capacity to 1,451 MW by 2007, up from the current 29 MW.

Mexico has an excellent potential for wind energy. Although currently, Mexico only has a total installed capacity of 3.2 MW in two small wind farms, the Mexican Wind Energy Association (AMDEE) currently estimates the development of at least 3,000 MW in the 2006-

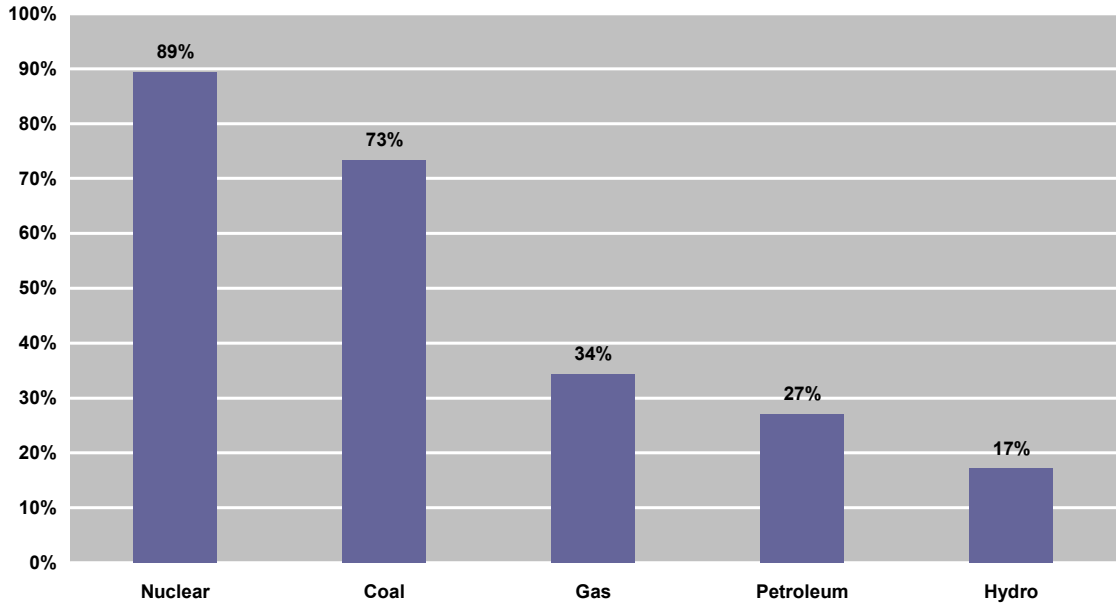
2014 period, as 2005 was characterized by some positive initiatives for renewable energy development in Mexico.

Asia

The Asian continent is developing into one of the main drivers for wind energy development and accounted for 19 % of new installations in 2005. Asia experienced a growth of over 46 % of installed capacity, bringing the continent up to a total of nearly 7,000 MW. The strongest Asian market remains India with over 1,430 MW of new installed capacity, which takes its total up to 4,430 MW. The Indian government envisages a capacity addition of around 5,000 MW by 2012, although the Indian Wind Turbine Manufacturers Association (IWTMA) is expecting a higher figure.

power stations have a capacity factor of only 17%. In other countries hydro has higher capacity factors, of up to 30% in some countries.

Figure XII.2 US average capacity factors by energy source, 2001



Wind power has an average capacity factor between 20-30%. The EWEA used a factor of 24% in 2002, rising to 25% in 2010 and 28% in 2020. Wind conditions are obviously variable from country to country and between on-shore and offshore wind towers. While capacity factors are currently low for wind power compared with the most efficient generators, they will increase and will come well into line with other renewables and non base-load generators.

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