

# **The Wind Power Report**

**Ed 3 2006**



**Spanish wind farm**

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**ABS Energy Research**

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# The Wind Power Report

## Ed 3 2006

### 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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# Contents

I.	Executive Summary .....	11
	Wind power development.....	11
	Industry issues .....	11
	Capacity factors .....	12
	Intermittency or variability of wind.....	12
	Mis-match of supply and demand .....	12
	Inadequacy of weather forecasting .....	12
	The difficulty of balancing the grid because of the variability of wind .....	12
	Demands on the grid.....	12
	Credit capacity.....	12
	Wind a part of a portfolio of generating sources .....	13
	Size of wind carpets.....	13
	Doubts about the true contribution of wind power to emissions reduction.....	13
II.	The development of wind energy and the market in 2006 .....	16
	The global market in 2005 .....	16
	The leading wind power countries in 2006.....	17
	Europe .....	18
	North America.....	19
	Latin America.....	20
	Asia .....	20
	Pacific.....	21
	Africa and Middle East.....	21
III.	The future market for wind power .....	24
IV.	An assessment of factors affecting wind power.....	27
	Topics of contention and their terminology .....	27
	Base load.....	27
	Intermittency.....	27
	Capacity factor .....	27
	Capacity credit.....	28
	Spinning reserve .....	28
	The operational experiences of wind power .....	29
	E.ON Netz Wind Report, 2004.....	29
	E.ON Netz Wind Report, 2005.....	31
	Western Denmark 2005.....	32
	USA experience .....	33
	Spain.....	33
	Wind a part of a portfolio.....	34
	Reduction in carbon emissions.....	34
	Contribution and target of renewables in reducing carbon emissions .....	34
	UCTE position paper on wind power .....	34
	Main characteristics of wind power .....	35
	Availability of supply .....	35
V.	National policies.....	36
	Europe – the EU Renewable Energy Directive .....	36
	EU Environmental Directives .....	36
	Security of supply .....	37
VI.	Policy landscape for renewable energy.....	38
	Policy targets for renewable energy .....	38
	Support systems in the EU.....	38
	Feed-in tariffs.....	38
	Green certificates .....	38
	Pure tendering .....	39
	Tax incentives.....	39
	Mixed systems.....	39
VII.	National wind power markets and support plans Denmark.....	43
	Market size and forecast.....	43
	Future targets in Denmark.....	44
	Wind power ownership .....	44

The energy policy role of power companies .....	44
Power companies' ownership of wind power .....	44
Pricing for wind power.....	44
Special rules for private (individual or co-operative) owners .....	45
Grid connection, grid reinforcement.....	45
Wind resources .....	45
Wind generation structure.....	45
Offshore wind power.....	45
Wind turbine size.....	46
R&D technology development .....	46
The role of Risoe National Laboratory and others .....	46
The role of power companies in R&D .....	46
New concepts .....	47
Offshore projects .....	47
Government support.....	47
Funding Levels .....	47
Ministry of Environment and Energy's Energy Research Programme (EFP). .....	48
Ministry of Environment and Energy's Programme for Development, Demonstration and Information on Renewable Energy (UVE).....	48
Priorities .....	48
Legislation.....	48
Windmill Law .....	48
Energy 21 .....	48
Danish Energy Agency .....	48
Electricity Reform.....	49
Export Assistance .....	49
Renewable Energy Island .....	49
Promotion of Local Initiatives .....	49
Danish manufacturing base .....	49
Turbine and component suppliers .....	51
The Danish Wind Industry Association list four "Core" members. ....	51
Germany .....	58
Market size and forecast.....	58
Market share Germany.....	58
Repowering trend.....	59
Offshore potential .....	59
Wind turbine size.....	60
Government support and R&D.....	63
Stromeinspeisungsgesetz - Electricity Feed Law (EFL) .....	63
Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz / EEG) .....	63
Renewable Energy Law .....	64
Investment Assistance .....	64
Planning Privileges .....	64
250 Megawatt Programme .....	64
REISI - A new and further-reaching Information System based on ISEE and WISY ...	64
Technology Area Wind Energy .....	64
Product Information .....	64
Development of wind energy use in Germany .....	64
Operational results.....	65
External Conditions of Operation .....	65
Download of measured data .....	65
El Dorado.....	65
Regional incentives.....	65
Research and Development (R&D).....	66
Manufacturing Base .....	66
Spain.....	66
Annual investment in wind power .....	69
Manufacturing industry .....	70
Wind developers.....	71

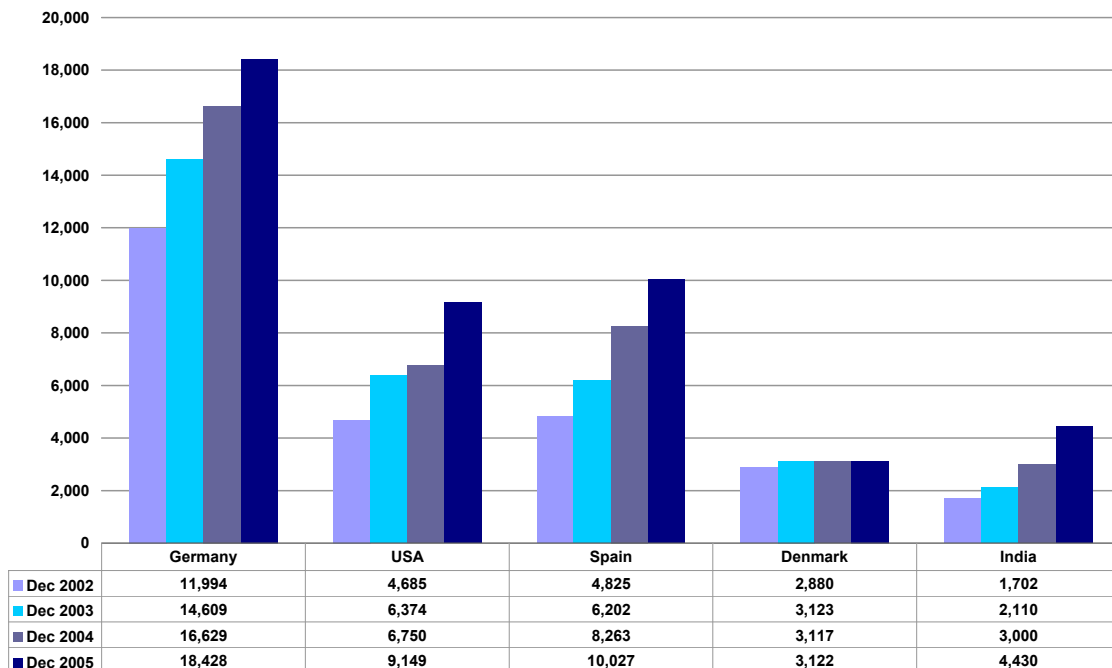
Wind turbine size.....	72
Future targets .....	72
R&D Technology development.....	72
Government support.....	72
Guaranteed market price.....	72
Fixed Tariff Option .....	73
Market Option .....	73
United Kingdom.....	73
Wind resources .....	73
Market size .....	74
Future development.....	78
Future targets .....	79
Development programmes .....	80
Offshore wind power.....	80
R1 .....	80
R2 .....	82
Government support.....	83
Manufacturing Base .....	83
United States .....	84
The start of wind power .....	84
Market size and forecast.....	85
Suppliers .....	86
Outlook.....	87
Future targets .....	87
Low speed wind technology .....	88
Cost of wind energy generation .....	89
Technology development in the USA.....	98
1. Making longer, stronger blades.....	99
2. Designing taller towers.....	99
3. Building multi-megawatt turbines .....	100
Understanding turbulent wind patterns.....	101
Research and Development .....	101
Offshore wind development.....	101
Government support.....	102
Investment Tax Credits.....	102
Production Tax Credits.....	102
Property Tax Reductions.....	102
Accelerated Depreciation .....	102
Direct Production Incentives.....	102
Direct Investment Incentives (Grants) .....	103
Government Subsidised Loans .....	103
"Standard Offer Contracts" for Small and Distributed Projects.....	103
Net Metering or Net Billing .....	103
Site Prospecting, Review and Permitting .....	103
Renewable Portfolio Standard (RPS) .....	103
Auctioned Contracts .....	103
Green Marketing/Pricing.....	103
State Mandates .....	104
Research and Development .....	104
Manufacturing Base .....	104
Major Manufacturers .....	104
Small wind turbine manufacturers .....	104
UWIG Members 2006.....	105
India .....	107
Market size and forecast.....	107
Future targets .....	108
Cost.....	108
R&D Technology development.....	109
The Centre for Wind Energy Technology (C-WET) .....	109
Government support.....	109

MNES - Ministry of Non-conventional Energy Sources .....	109
IREDA - Indian Renewable Energy Development Agency Ltd .....	109
Financial incentives have also been provided for investors .....	109
State incentives .....	110
Manufacturing Base .....	110
Wind Energy Producers Association (WINPRO).....	110
Indian Wind Turbine Manufacturers Association (IWTMA).....	110
Turbine and Component Suppliers .....	110
China.....	113
Installed wind capacity .....	113
Market size and forecast.....	114
Wind development support.....	116
Wind Power Concessions .....	116
Renewable energy law & regulations for renewable energy power.....	117
Future targets .....	117
Offshore wind power.....	117
Wind turbine size.....	117
Costs.....	118
Local manufacturing capability .....	118
Past constraints on development of wind power in China .....	118
High costs.....	118
Limited wind resource assessment data.....	118
Difficulty in securing project approval and negotiating power purchase agreements .....	118
Failure to account for the full environmental benefits of wind power.....	119
Subsidised financing for imported wind turbines .....	119
Government support.....	119
“Ride the Wind” (Chengfeng) programme.....	119
Wind concessions .....	119
National Debt Programme .....	119
863 Wind Programme.....	120
Foreign assistance .....	120
Foreign participation.....	120
Manufacturing Base .....	121
Medium and large wind turbines .....	121
Micro and small wind turbines.....	122
Italy .....	122
Renewable energy policy .....	123
Government policy.....	124
Strategy .....	124
Italian manufacturers .....	124
Netherlands.....	125
Government policies, financial incentives and market stimulation.....	126
Manufacturers.....	127
Austria .....	127
National renewable energy targets.....	128
Current situation .....	128
Argentina.....	129
Canada.....	129
R&D.....	130
Government production incentive.....	130
Wind Power Production Incentive (WPPI) .....	130
Programme operation .....	131
Terms of the incentive .....	131
Amount of financial incentive for the ten-year period by commissioning date .....	131
Future target .....	133
France.....	133
Greece .....	133
Future target .....	134



Ireland.....	134
Variability .....	136
Japan .....	136
Environmental and renewables policy.....	137
Future target for wind power.....	137
Government programmes .....	137
R&D.....	138
Sweden .....	138
Portugal.....	139
Government support.....	140
Renewables target.....	140
Australia .....	140
Government renewables policy and support .....	140
State initiatives .....	140
Manufacturing base .....	141
Corporate initiatives.....	141
VIII. Wind farm developers and owners.....	142
IX. Advantages and disadvantages of wind energy compared with other forms of energy	143
X. Manufacturing base .....	144
The top ten wind turbine companies.....	145
Vestas.....	145
GE Wind.....	145
Gamesa.....	146
Enercon .....	146
Siemens.....	146
Suzlon.....	147
REPower.....	147
Mitsubishi.....	147
Nordex .....	147
XI. Offshore wind power – The New Frontier .....	149
Operating offshore wind farms .....	149
The benefits .....	150
The challenges, offshore: costs .....	150
Projects in the pipeline.....	152
Forecasting a New Technology - Experience Curves and Progress Ratios (PR).....	153
XII. Development of wind turbine size and capacity factor .....	155
Capacity Factors .....	156
Directory of Manufacturers .....	157

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



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 the 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

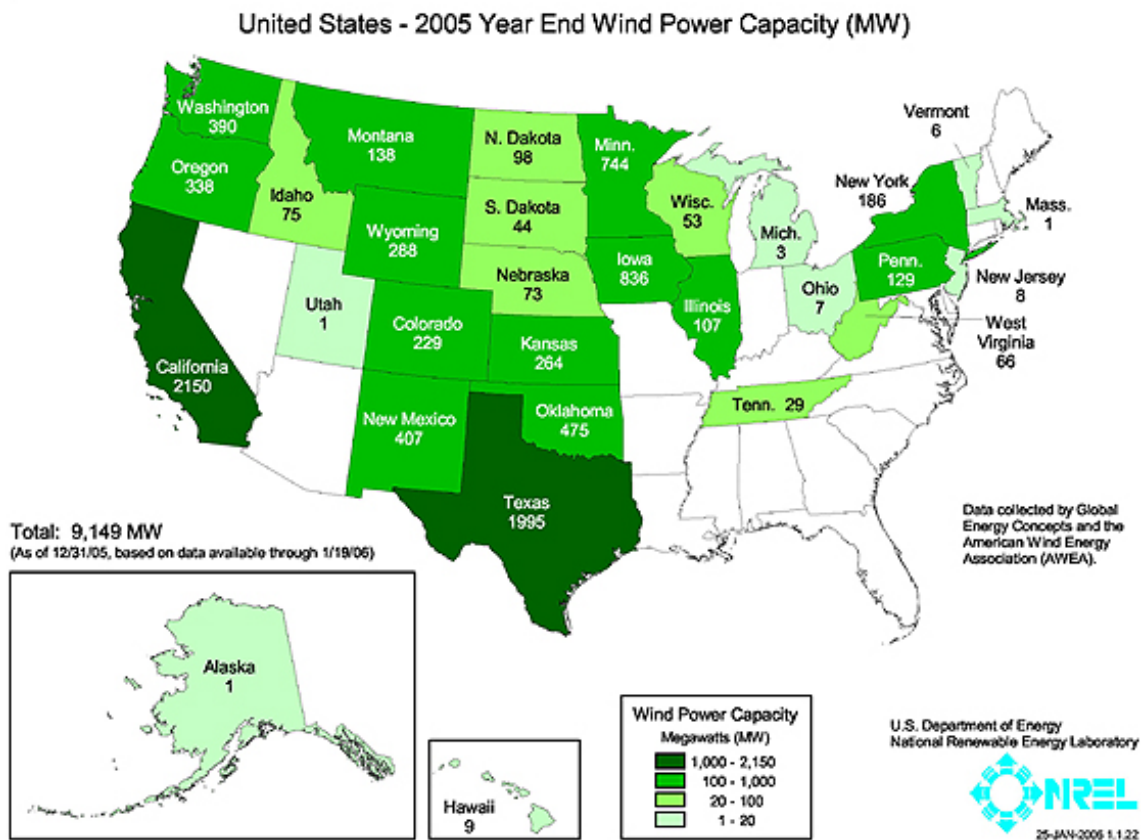
The EU market has already reached the 2010 target set by the European Commission of 40,000 MW, five years ahead of time and a greater number of countries are embracing wind power, including new markets such as Portugal and France.

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-

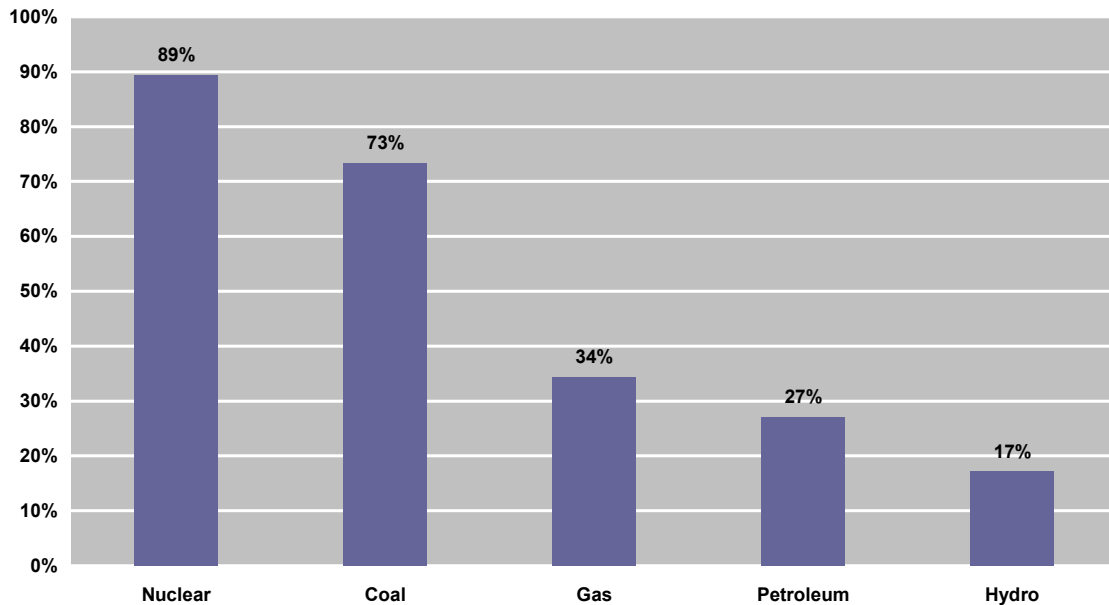
2014 period, as 2005 was characterized by some positive initiatives for renewable energy development in Mexico.

## 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.

### **Directory of Manufacturers**