



Photo: Thinkstock

# Wind in power

## 2010 European statistics

February 2011

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## Data sources

Platts PowerVision, January 2010

EWEA, Wind Energy Data

EPIA, Solar PV Data

ESTELA, CSP Data

EU-OEA, Ocean Energy Data

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## Executive summary

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### 2010 annual installations

- 9,295 MW of wind power capacity (worth some €12.7 billion) was installed in the EU during 2010, down 10% compared to the previous year;
- Wind power accounted for 16.8% of total 2010 power capacity installations;
- More renewable power capacity was installed during 2010 than any other year, an increase of 31% compared to 2009;
- Renewable power installations accounted for 41% of new installations during 2010, 22,645 MW of total of 55,363 MW of new power capacity;
- More power capacity was installed in 2010 than ever before, an increase of 102%, due to increasing renewable power installations and gas power installations;

### Trends & cumulative installations

- Wind power installations accounted for 16.8% of new capacity installations in 2010, the first year since 2007 that wind power did not install more than any other generating technology;
- For only the second time since 1998<sup>2</sup> the EU power sector installed more coal than it decommissioned<sup>1</sup>, highlighting the urgency of moving to a 30% greenhouse gas reduction target for 2020 and introducing an Emissions Performance Standard;
- The EU power sector continues its move away from fuel oil and nuclear, each technology continuing to decommission more than it installs;
- The EU's total installed power capacity increased by 52,855 MW (net) to 876,023 MW, with wind power increasing its share of installed capacity to 84,278 MW (9.6%).

### Data for wind power installations

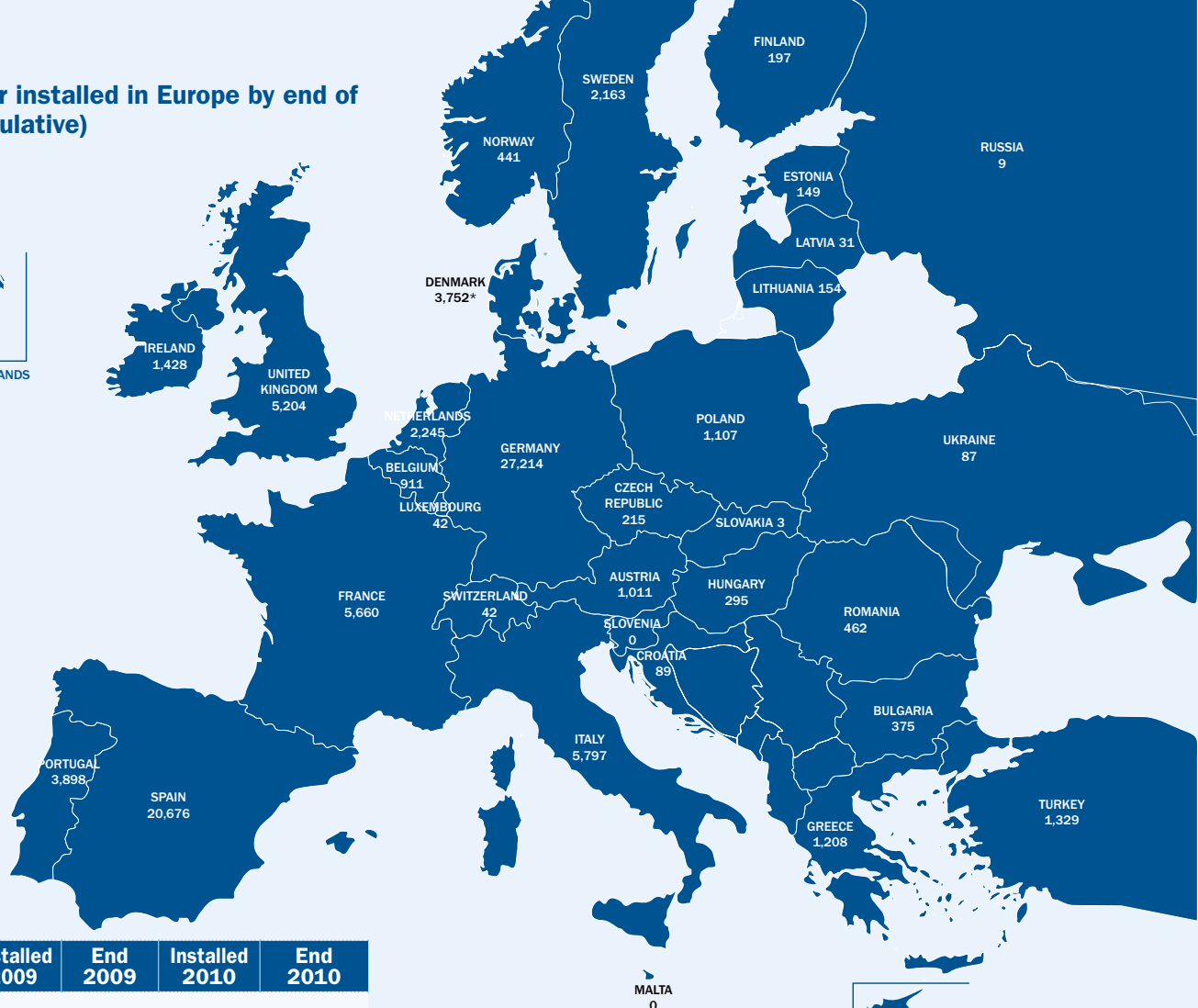
- Annual installations of wind power have increased steadily over the last 15 years from 814 MW in 1995 to 9,295 MW in 2010, an annual average market growth of 17.6%;
- A total of 84,278 MW is now installed in the European Union, an increase in installed cumulative capacity of 12.2%.
- Germany remains the EU country with the largest installed capacity, followed by Spain, Italy, France and the UK;
- Increasing installations in emerging EU markets – offshore in Northern Europe, and onshore in South East Europe (Romania, Poland and Bulgaria) – offset the fall in installations in the mature onshore markets of Germany, UK, and Spain;
- The wind capacity installed by the end of 2010 would in a normal year produce 181 TWh of electricity, representing 5.3%<sup>3</sup> of electricity consumption;

<sup>(1)</sup> According to Platts PIE (January 2011) almost 23 GW of coal projects have been cancelled or suspended in recent years

<sup>(2)</sup> In 2008 the net addition was only 16 MW.

<sup>(3)</sup> According to the latest figures from Eurostat, gross electricity consumption in the EU-27 was 3,390.7 TWh in 2008.

## Wind power installed in Europe by end of 2010 (cumulative)



|                                  | Installed 2009 | End 2009      | Installed 2010 | End 2010      |
|----------------------------------|----------------|---------------|----------------|---------------|
| <b>EU Capacity (MW)</b>          |                |               |                |               |
| Austria                          | 0              | 995           | 16             | 1,011         |
| Belgium                          | 149            | 563           | 350            | 911           |
| Bulgaria                         | 57             | 177           | 198            | 375           |
| Cyprus                           | 0              | 0             | 82             | 82            |
| Czech Republic                   | 44             | 192           | 23             | 215           |
| Denmark*                         | 334            | 3,465         | 327            | 3,752         |
| Estonia                          | 64             | 142           | 7              | 149           |
| Finland                          | 4              | 147           | 52             | 197           |
| France                           | 1,088          | 4,574         | 1,086          | 5,660         |
| Germany                          | 1,917          | 25,777        | 1,493          | 27,214        |
| Greece                           | 102            | 1,087         | 123            | 1,208         |
| Hungary                          | 74             | 201           | 94             | 295           |
| Ireland                          | 233            | 1,310         | 118            | 1,428         |
| Italy                            | 1,114          | 4,849         | 948            | 5,797         |
| Latvia                           | 2              | 28            | 2              | 31            |
| Lithuania                        | 37             | 91            | 63             | 154           |
| Luxembourg                       | 0              | 35            | 7              | 42            |
| Malta                            | 0              | 0             | 0              | 0             |
| Netherlands                      | 39             | 2,215         | 32             | 2,237         |
| Poland                           | 180            | 725           | 382            | 1,107         |
| Portugal                         | 673            | 3,535         | 363            | 3,898         |
| Romania                          | 3              | 14            | 448            | 462           |
| Slovakia                         | 0              | 3             | 0              | 3             |
| Slovenia                         | 0.02           | 0.03          | 0              | 0.03          |
| Spain                            | 2,459          | 19,160        | 1,516          | 20,676        |
| Sweden                           | 512            | 1,560         | 604            | 2,163         |
| United Kingdom                   | 1,077          | 4,245         | 962            | 5,204         |
| <b>Total EU-27</b>               | <b>10,486</b>  | <b>75,090</b> | <b>9,295</b>   | <b>84,278</b> |
| <b>Total EU-15</b>               | <b>10,025</b>  | <b>73,516</b> | <b>7,997</b>   | <b>81,406</b> |
| <b>Total EU-12</b>               | <b>461</b>     | <b>1,574</b>  | <b>1,298</b>   | <b>2,872</b>  |
| Of which offshore and near shore | 582            | 2,064         | 883            | 2,946         |

European Union: 84,278 MW  
Candidate Countries: 1,418 MW  
EFTA: 483 MW  
Total Europe: 86,279 MW

|                                 | Installed 2009 | End 2009      | Installed 2010 | End 2010      |
|---------------------------------|----------------|---------------|----------------|---------------|
| <b>Candidate Countries (MW)</b> |                |               |                |               |
| Croatia                         | 10             | 28            | 61             | 89            |
| FYROM**                         | 0              | 0             | 0              | 0             |
| Turkey                          | 343            | 801           | 528            | 1,329         |
| <b>Total</b>                    | <b>353</b>     | <b>829</b>    | <b>461</b>     | <b>1,290</b>  |
| <b>EFTA (MW)</b>                |                |               |                |               |
| Iceland                         | 0              | 0             | 0              | 0             |
| Liechtenstein                   | 0              | 0             | 0              | 0             |
| Norway                          | 2              | 431           | 9              | 441           |
| Switzerland                     | 4              | 18            | 25             | 42            |
| <b>Total</b>                    | <b>6</b>       | <b>449</b>    | <b>34</b>      | <b>483</b>    |
| <b>Other (MW)</b>               |                |               |                |               |
| Faroe Islands                   | 0              | 4             | 0              | 4             |
| Ukraine                         | 4              | 90            | 1              | 87            |
| Russia                          | 0              | 9             | 0              | 9             |
| <b>Total</b>                    | <b>4</b>       | <b>99</b>     | <b>1</b>       | <b>101</b>    |
| <b>Total Europe</b>             | <b>10,845</b>  | <b>76,471</b> | <b>9,918</b>   | <b>86,279</b> |

\*\*FYROM = Former Yugoslav Republic of Macedonia

Note: Due to previous-year adjustments, 106.7 MW of project de-commissioning, re-powering and rounding of figures, the total 2010 end-of-year cumulative capacity is not exactly equivalent to the sum of the 2009 end-of-year total plus the 2010 additions.

Note: Due to a difference in methodology, some figures in this table may differ from figures communicated by national wind energy associations

\*2010 figures are provisional

## 2010 annual installations

### Wind power capacity installations

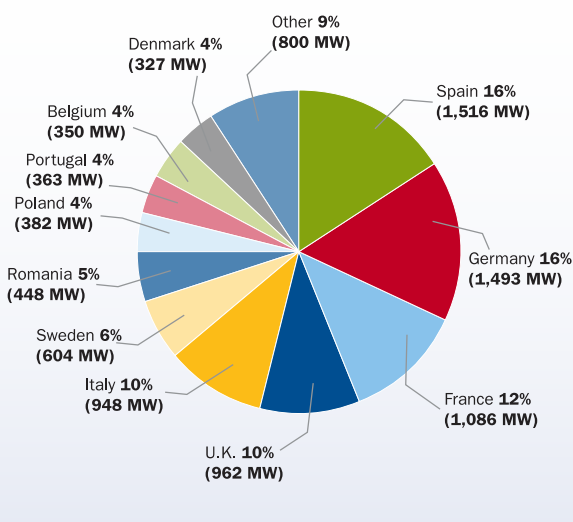
During 2010, 9,918 MW of wind power was installed across Europe, with European Union countries accounting for 9,295 MW of the total. This represents a decrease in the EU's annual wind power installations of 10% compared to 2009. Of the 9,295 MW installed in the EU, 8,412 MW were installed onshore and 883 offshore. In 2010, the annual onshore market contracted by 15% compared to the previous year, whilst the offshore market grew by 51% compared to the previous year.

Investment in EU wind farms in 2010 was €12.7 billion. The onshore wind power sector attracted €10.1 billion during 2010, whilst the offshore wind power sector accounted for around €2.6 billion.

In terms of annual installations, Spain was the largest market in 2010, installing 1,516 MW, compared to Germany's 1,493 MW. France was the only other country to install over 1 GW (1,086 MW), followed by the UK (962 MW) and Italy (948 MW). Sweden (604 MW), Romania (437 MW), Poland (382 MW), Portugal (363 MW) and Belgium (350 MW) also all performed strongly and for the first time ever, two new Member

EU MEMBER STATE MARKET SHARES FOR NEW CAPACITY  
INSTALLED DURING 2010. TOTAL 9,295 MW

FIGURE 1.1



States are among the top ten largest annual markets. Offshore installations accounted for 9.5% of total EU installations in 2010.



Photo: Vestas

## Power capacity installations

Wind power installations accounted for 16.8% of new installations in 2010, the first year since 2007 that wind power did not install more than any other generating technology. Following two consecutive years of installing less power capacity than the wind industry, gas installed more capacity than any other generating technology in 2010 with 28 GW, representing 51% of total new installed capacity<sup>4</sup>.

Solar PV installed 12 GW (21.7% of total capacity), followed by wind with 9.3 GW (16.7%). In addition, 4,056 MW (7.3%) of coal, 573 MW (1%) of biomass, 405 MW (0.7%) of CSP, 208 (0.4%) of large hydro, 200 MW (0.4%) of peat, 149 MW (0.3%) of waste, 145 MW (0.3%) of nuclear, 25 MW of small hydro, 25 MW of geothermal, and zero MW of tidal and wave capacity were installed. Significantly, no fuel oil capacity was added in the EU during 2010.

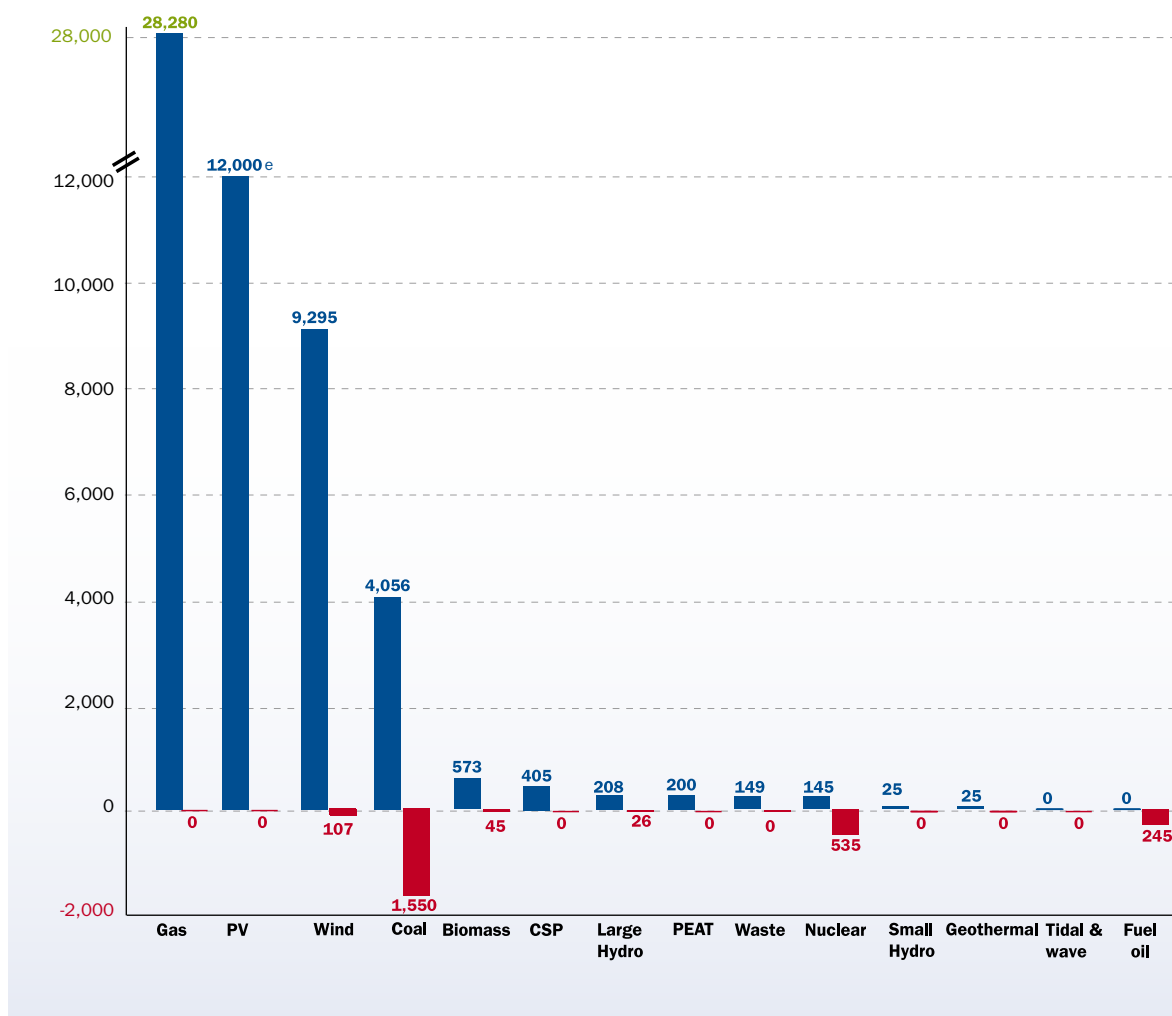
Overall, 2010 was a record year in the EU with 55.4 GW of new electricity generating capacity installed, more than double 2009 installations (a 102% increase).

During 2010, the fuel oil and nuclear power sectors decommissioned more MW than they installed: the fuel oil sector decommissioned 245 MW and the nuclear sector 535 MW.

For only the second time since 1998<sup>5</sup>, the coal power sector installed more new capacity (4,056 MW) than it decommissioned (1,550 MW). The hike in new coal power capacity highlights the urgency for the EU to move to a 30% greenhouse gas reduction target for 2020, and the need to introduce an Emissions Performance Standard.

NEW INSTALLED CAPACITY AND DECOMMISSIONED CAPACITY IN MW. TOTAL 52,820 MW

FIGURE 1.2



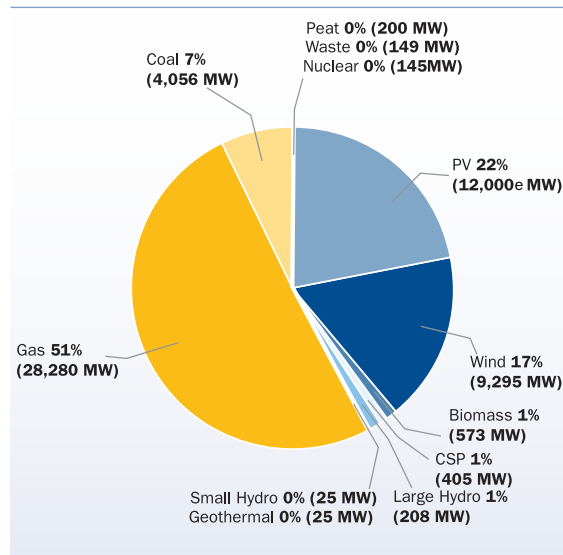
<sup>(4)</sup> According to Platts PIE (January 2011) almost 30 GW of gas projects have been cancelled or suspended in recent years

<sup>(5)</sup> In 2008 the net addition was only 16 MW

## Renewable power capacity installations

In 2010, more renewable generating capacity was installed in the EU than ever before. With 22,682 MW of new generating capacity, renewables represented 41% of total new installed capacity. Although renewables' share of newly installed capacity decreased in 2010 due to the exceptional year for gas, it is the fifth year running that renewables have represented more than 40% of total new electricity generating installations.

SHARE OF NEW POWER INSTALLATIONS IN EU FIGURE 1.3



## Trends & cumulative installations

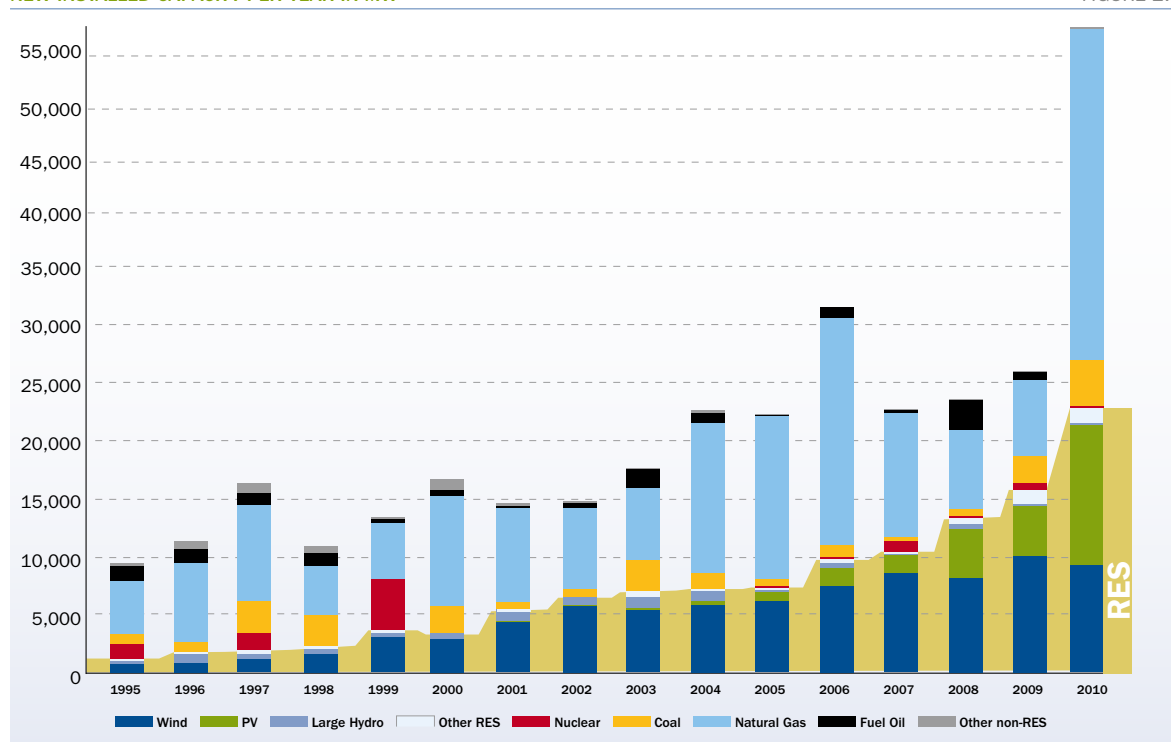
### Renewable power installations continue to increase

In 1995, new renewable power installations totalled just 1.3 GW (representing 14% of total EU power installations that year). Since 1995 they have gradually increased to 13.3 GW in 2008 (57% of total EU power installations that year), and 17.3 GW in 2009

(63% of total EU power installations that year). During 2010, a record 22.7 GW was installed. However, due to an exceptional year in new gas installations, the renewable share of new capacity was 41%.

NEW INSTALLED CAPACITY PER YEAR IN MW

FIGURE 2.1



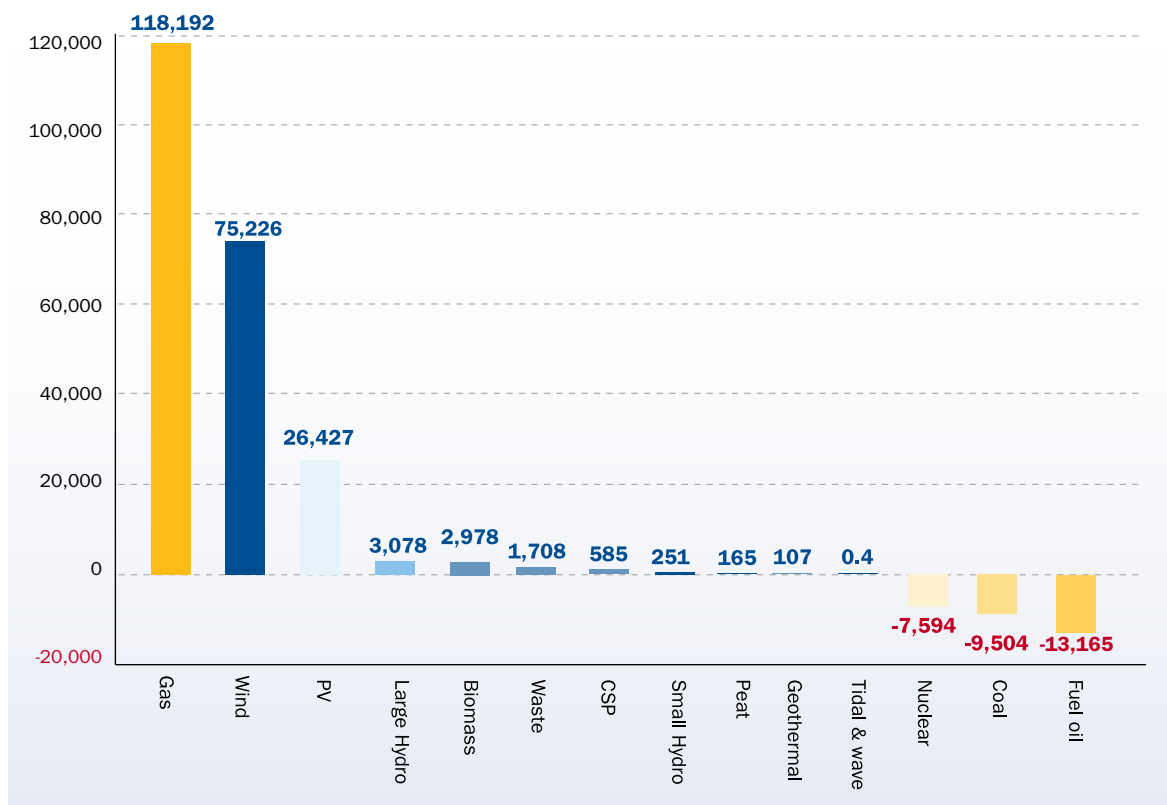
### Net changes in EU installed capacity 2000-2010

The net growth in the last 11 years of natural gas power (118.2 GW), wind power (74.3 GW) and solar PV (26.4 GW) was at the expense of fuel oil (down 13.2 GW), coal (down 9.5 GW) and nuclear (down 7.6

GW). The EU power sector, therefore, continues its move away from fuel oil, coal and nuclear, whilst at the same time increasing its total installed capacity to meet increasing demand.

NET ELECTRICITY GENERATING INSTALLATIONS IN EU 2000 – 2010 IN MW

FIGURE 2.2

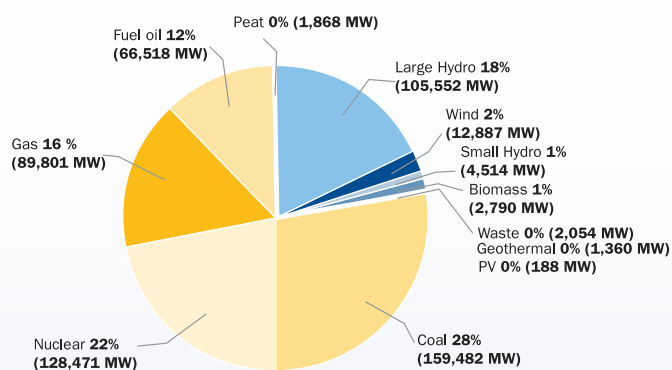


### Total installed power capacity

Wind power's share of total installed power capacity has increased fivefold from 2% in 2000 to 9.6% in 2010.

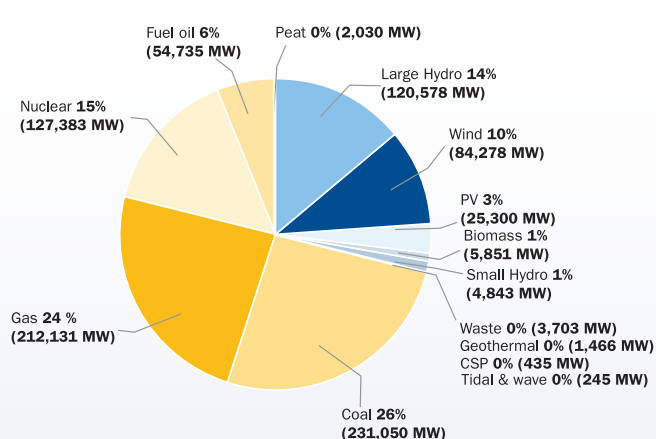
EU POWER CAPACITY MIX 2000

FIGURE 2.3



EU POWER CAPACITY MIX 2010

FIGURE 2.4

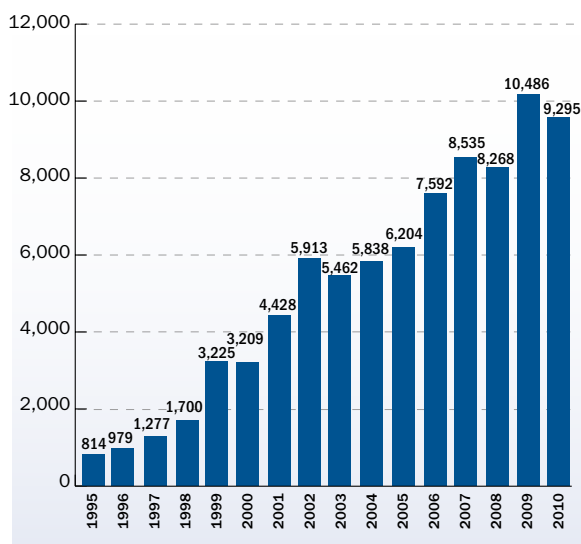


## A closer look at wind power installations

### Annual wind power installations

Annual installations in the EU have increased steadily over the past 15 years from 814 MW in 1995 to 9,259 in 2010, an average annual growth rate of 17.6%.

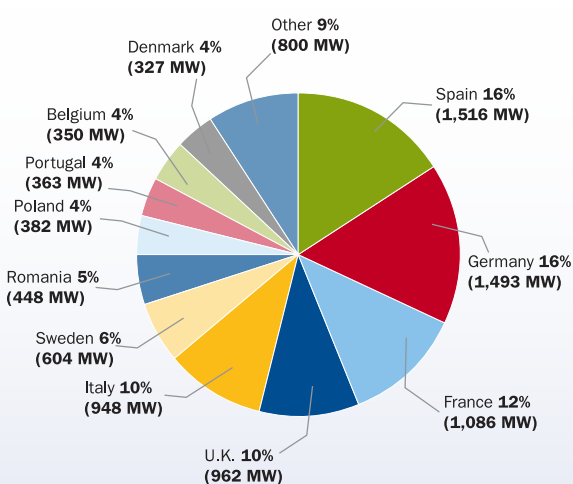
ANNUAL WIND POWER INSTALLATIONS IN EU IN MW FIGURE 3.1



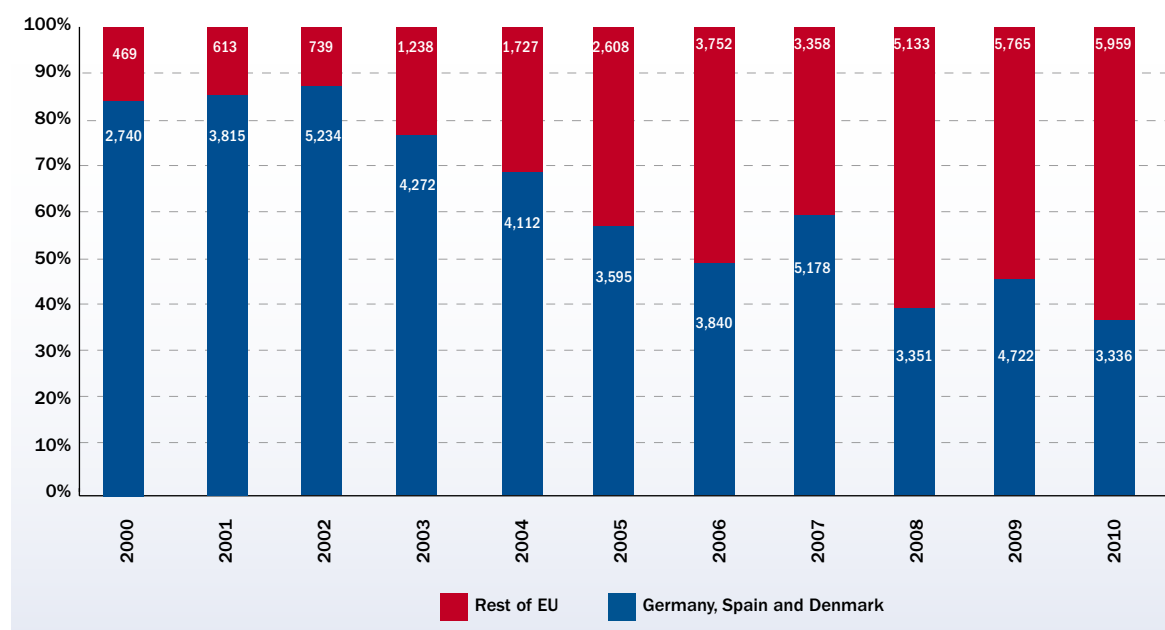
### National breakdown of wind power installations

In 2000, the annual wind power installations of the three pioneering countries – Denmark, Germany and Spain – represented 85% of all EU wind capacity annual installations. Ten years later, this share has decreased to 36%, showing that wind power is increasingly established across Europe.

EU MEMBER STATE MARKET SHARES FOR NEW CAPACITY AT END 2010. TOTAL 9,295 MW FIGURE 3.2



GERMANY, SPAIN AND DENMARK'S SHARE OF EU MARKET (MW) FIGURE 3.3



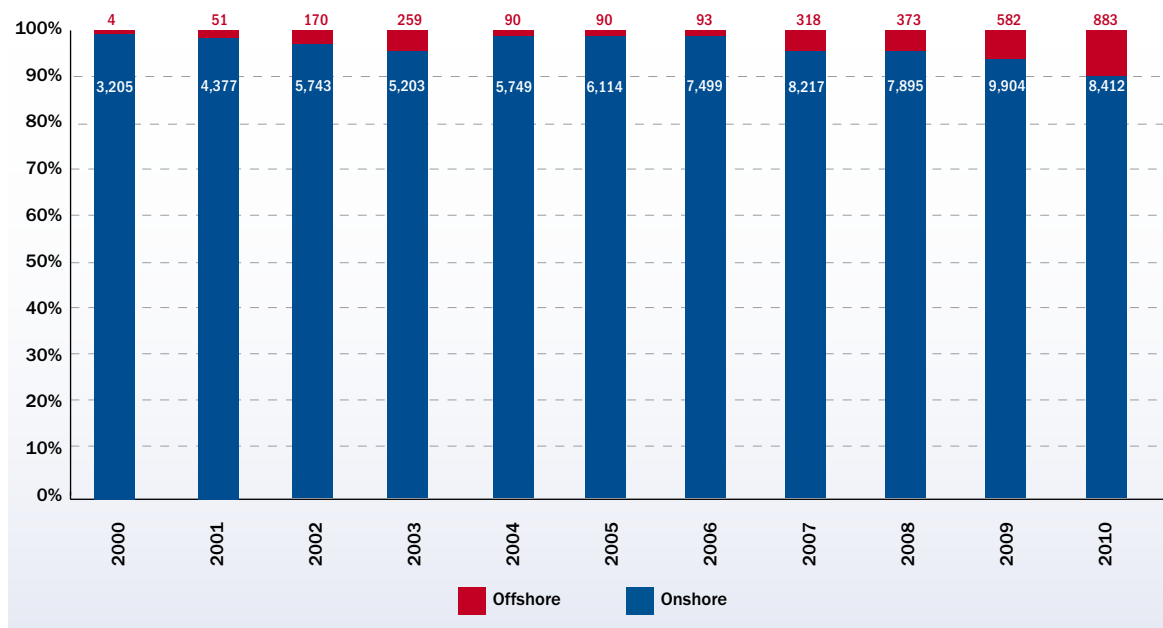
### Onshore and offshore annual markets

With 883 MW of new installed capacity, 2010 was a record-breaking year for offshore wind power. Annual offshore capacity has been gradually increasing since

2000 and in 2010 it represented 9.5% of all new wind power installations (in MW).

OFFSHORE'S SHARE OF ANNUAL EU WIND POWER MARKET (MW)

FIGURE 3.4



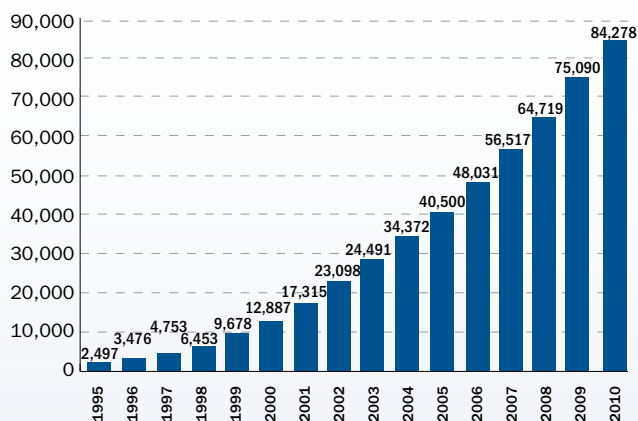
### Cumulative wind power installations

A total of 84,074 MW is now installed in the European Union, a growth of 12.2% on the previous year. Germany remains the EU country with the largest installed capacity, followed by Spain, France, the UK

and Italy. Eight other countries have over 1 GW of installed capacity: Portugal, Denmark, the Netherlands, Sweden, Ireland, Greece, Poland and Austria.

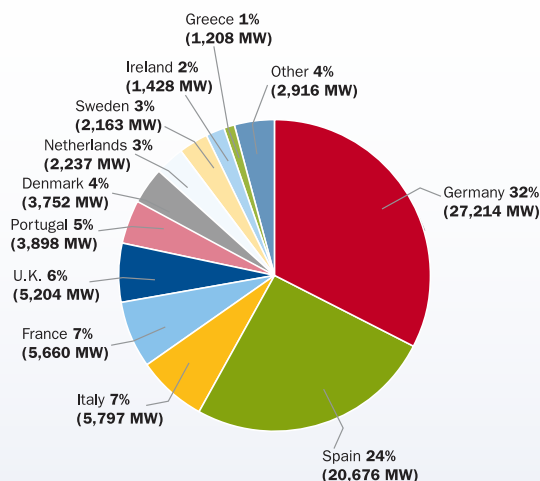
CUMULATIVE WIND POWER INSTALLATIONS IN THE EU IN MW

FIGURE 3.5



EU MEMBER STATE MARKET SHARES FOR TOTAL INSTALLED CAPACITY AT END 2010. TOTAL 84,074 MW

FIGURE 3.6



## Estimated wind energy production

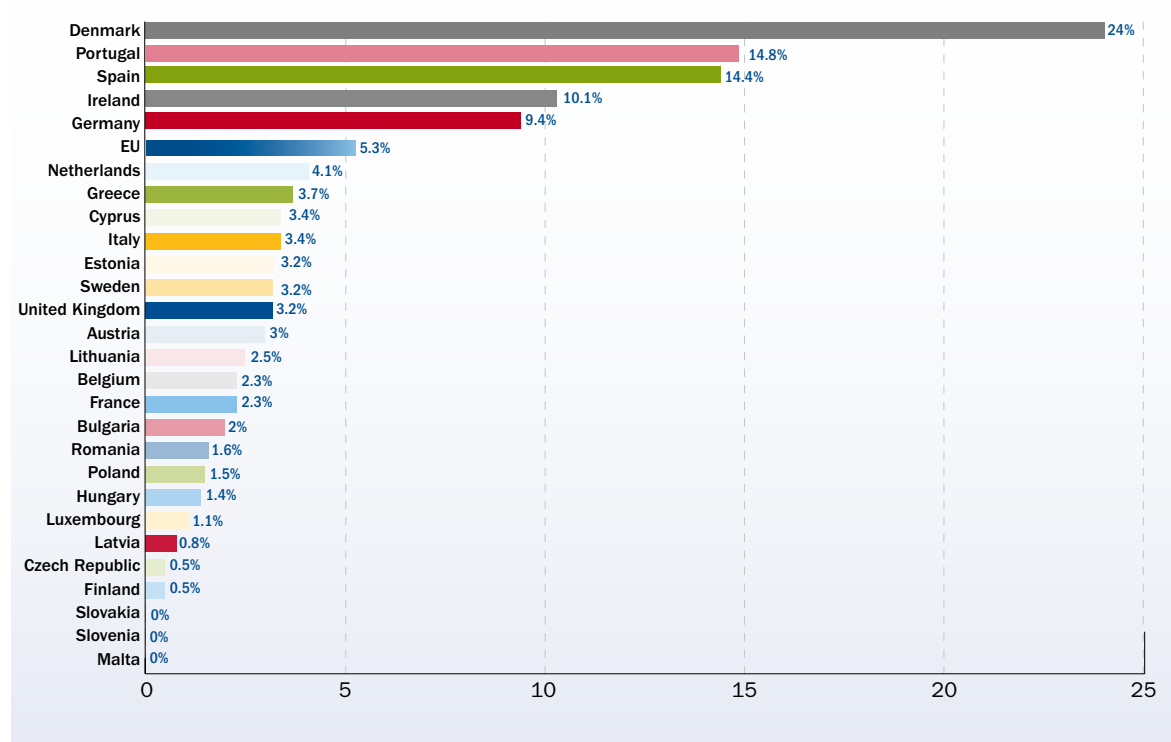
The wind capacity installed at end 2010 will, in a normal wind year, produce 181 TWh of electricity, representing 5.3% of the EU's gross final consumption<sup>6</sup>.

and Germany (9.3%). Overall, in a normal wind year, installed wind capacity at end 2010 will meet 5.3% of the EU's electricity needs.

Denmark is the country with the highest penetration of wind power in electricity consumption (24%), followed by Portugal (14.8%), Spain (14.4%), Ireland (10.1%)

### WIND SHARE OF TOTAL ELECTRICITY CONSUMPTION<sup>7</sup>

FIGURE 3.7



<sup>(6)</sup> According to the latest figures from Eurostat "Energy yearly statistics" 2008, gross electricity consumption in the EU-27 was 3,390.7 TWh in 2008.

<sup>(7)</sup> Normal wind production is calculated on the basis of typical capacity factors for onshore and offshore wind capacity. Each Member States' final electricity consumption is taken from Eurostat "Energy yearly statistics" 2008: total gross generation, total imports and total exports. [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-PC-10-001/EN/KS-PC-10-001-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-PC-10-001/EN/KS-PC-10-001-EN.PDF)