



**EWEA**

THE EUROPEAN WIND ENERGY ASSOCIATION



# Wind in power

2013 European statistics

February 2014

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## Executive summary

### 2013 annual installations

- 11,159 MW of wind power capacity (worth between €13 bn and €18 bn) was installed in the EU-28 during 2013, a decrease of 8% compared to 2012 installations.
- EU wind power installations for 2013 show the negative impact of market, regulatory and political uncertainty sweeping across Europe. Destabilised legislative frameworks for wind energy are undermining investments.
- Wind power is the technology which installed the most in 2013: 32% of total 2013 power capacity installations - five percentage points higher than during the previous year.
- Renewable power installations accounted for 72% of new installations during 2013: 25 GW of a total 35 GW of new power capacity, up from 70% the previous year.

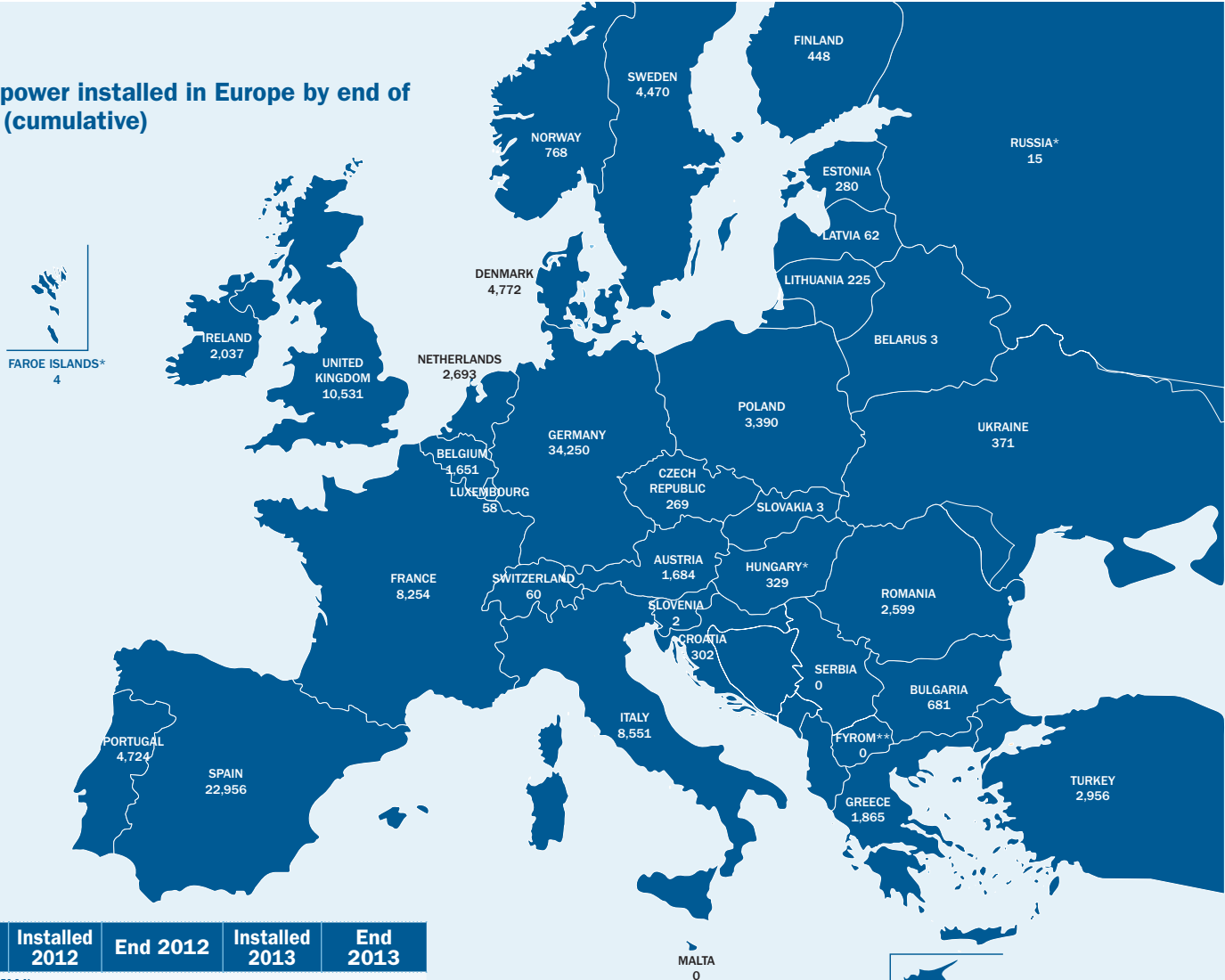
### Trends and cumulative installations

- There are now 117.3 GW of installed wind energy capacity in the EU: 110.7 GW onshore and 6.6 GW offshore.
- The EU's total installed power capacity increased by 13 GW net to 900 GW, with wind power increasing by 11.2 GW and reaching a share of total installed generation capacity of 13%, up one percentage point compared to the previous year.
- Since 2000, over 28% of new capacity installed has been wind power, 55% renewables and 92% renewables and gas combined.
- The EU power sector continues its move away from fuel oil and coal with each technology continuing to decommission more than it installs.

### Wind power installations

- Annual installations of wind power have increased over the last 13 years, from 3.2 GW in 2000 to 11.2 GW in 2013, a compound annual growth rate of 10%.
- A total of 117.3 GW is now installed in the European Union, an increase in installed cumulative capacity of 10% compared to the previous year.
- Germany remains the EU country with the largest installed capacity followed by Spain, the UK and Italy. Fifteen EU countries have more than 1 GW of installed capacity, including two newer EU countries (Poland and Romania), and eight EU countries have more than 4 GW of installed capacity.
- The volatility across Europe has contributed to 46% of all new installations in 2013 being in just two countries (Germany and the UK), a significant concentration compared to the trend of previous years whereby installations were increasingly spread across healthy European Markets. This is a level of concentration that has not been seen in the EU's wind power market since 2007 when the three wind energy pioneering countries (Denmark, Germany and Spain) together represented 58% of all new installations that year.
- A number of previously healthy markets such as Spain, Italy and France have seen their rate of wind energy installations decrease significantly in 2013, by 84%, 65% and 24% respectively.
- Offshore saw a record growth in 2013 (+1.6 GW); the outlook for 2014 and 2015 is stable, but not growing.
- The wind power capacity installed by the end of 2013 would, in a normal wind year, produce 257 TWh of electricity, enough to cover 8% of the EU's electricity consumption – up from 7% the year before.

## Wind power installed in Europe by end of 2013 (cumulative)



European Union: 117,289 MW  
 Candidate Countries: 2,956 MW  
 EFTA: 830 MW  
 Total Europe: 121,474 MW

	Installed 2012	End 2012	Installed 2013	End 2013
<b>EU Capacity (MW)</b>				
Austria	296	1,377	308	1,684
Belgium	297	1,375	276	1,651
Bulgaria	158	674	7.1	681
Croatia	48	180	122	302
Cyprus	13	147	0	147
Czech Republic	44	260	9	269
Denmark	220	4,162	657	4,772
Estonia	86	269	11	280
Finland	89	288	162	448
France	814	7,623	631	8,254
Germany	2,297	30,989	3,238	33,730
Greece	117	1,749	116	1,865
Hungary*	0	329	0	329
Ireland	121	1,749	288	2,037
Italy	1,239	8,118	444	8,551
Latvia	12	60	2	62
Lithuania	60	263	16	279
Luxembourg	14	58	0	58
Malta	0	0	0	0
Netherlands	119	2,391	303	2,693
Poland	880	2,496	894	3,390
Portugal	155	4,529	196	4,724
Romania	923	1,905	695	2,599
Slovakia	0	3	0	3
Slovenia	0	0	2	2
Spain	1,110	22,784	175	22,959
Sweden	846	3,582	724	4,470
United Kingdom	2,064	8,649	1,883	10,531
<b>Total EU-28</b>	<b>12,102</b>	<b>106,454</b>	<b>11,159</b>	<b>117,289</b>
<b>Total EU-15</b>	<b>9,879</b>	<b>99,868</b>	<b>9,402</b>	<b>108,946</b>
<b>Total EU-13</b>	<b>2,224</b>	<b>6,586</b>	<b>1,757</b>	<b>8,343</b>

	Installed 2012	End 2012	Installed 2013	End 2013
<b>Candidate Countries (MW)</b>				
FYROM**	0	0	0	0
Serbia	0	0	0	0
Turkey	506	2,312	646	2,956
<b>Total</b>	<b>506</b>	<b>2,312</b>	<b>646</b>	<b>2,956</b>
<b>EFTA (MW)</b>				
Iceland	0	0	1,8	1,8
Liechtenstein	0	0	0	0
Norway	166	703	110	768
Switzerland	4	50	13	60
<b>Total</b>	<b>170</b>	<b>753</b>	<b>125</b>	<b>830</b>
<b>Other (MW)</b>				
Belarus	0	3	0	3
Faroe Islands	2	2	5	7
Ukraine	125	276	95	371
Russia*	0	15	0	15
<b>Total</b>	<b>127</b>	<b>297</b>	<b>100</b>	<b>397</b>
<b>Total Europe</b>	<b>12,906</b>	<b>109,816</b>	<b>120,030</b>	<b>121,474</b>

\* Provisional data or estimate.

\*\* Former Yugoslav Republic of Macedonia

Note: due to previous year adjustments, 372 MW of project de-commissioning, re-powering and rounding of figures, the total 2013 end-of-year cumulative capacity is not exactly equivalent to the sum of the 2012 end-of-year total plus the 2013 additions.

## 2013 annual installations

### Wind power capacity installations

During 2013, 12,030 MW of wind power was installed across Europe, of which 11,159 MW was in the European Union, 8% less than the previous year.

Of the 11,159 MW installed in the EU, 9,592 MW was onshore and 1,567 MW offshore. In 2013, the onshore market decreased in the EU by 12%, whilst offshore installations grew by 34%. Overall, the wind energy market decreased by 8% compared to 2012 installations.

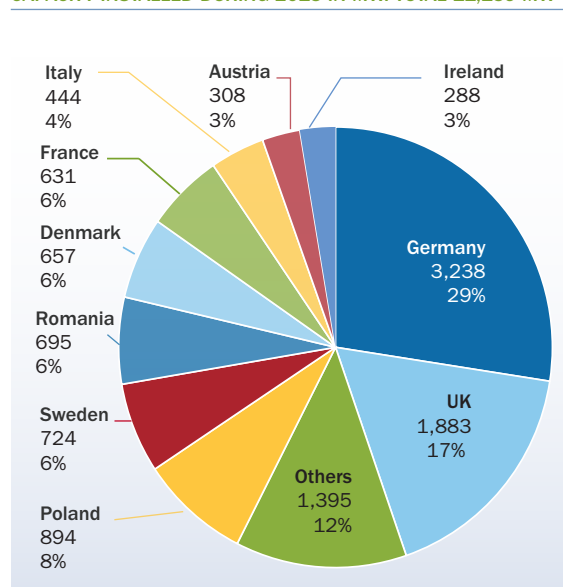
Investment in EU wind farms was between €13 billion (bn) and €18 bn. Onshore wind farms attracted around €8 bn to €12 bn, while offshore wind farms accounted for €4.6 bn to €6.4 bn.

In terms of annual installations, Germany was the largest market in 2013, installing 3,238 MW of new capacity, 240 MW of which (7%) offshore. The UK came in second with 1,883 MW, 733 MW of which (39%) offshore, followed by Poland with 894 MW, Sweden (724 MW), Romania (695 MW), Denmark (657 MW), France (631 MW) and Italy (444 MW).

The emerging markets of central and eastern Europe, including Croatia, installed 1,755 MW, 16% of total installations. In 2013, these countries represent a slightly smaller share of the total EU market than in 2012 (18%).

Moreover, 46% of all new EU installations in 2013 were in just two countries (Germany and the UK), a significant concentration compared to the trend of previous years when installations were increasingly spread across Europe. This is a level of concentration that has not been seen in the EU's wind power market

FIGURE 1.1: EU MEMBER STATE MARKET SHARES FOR NEW CAPACITY INSTALLED DURING 2013 IN MW. TOTAL 11,159 MW



since 2007 when the three wind energy pioneering countries (Denmark, Germany and Spain) together represented 58% of all new installations that year.

A number of previously large markets such as Spain, Italy and France have seen their rate of wind energy installations decrease significantly in 2013, by 84%, 65%, 24% respectively.

Offshore accounted for almost 14% of total EU wind power installations in 2013, four percentage points more than in 2012, further confirming the high level of concentration in annual installations during 2013.

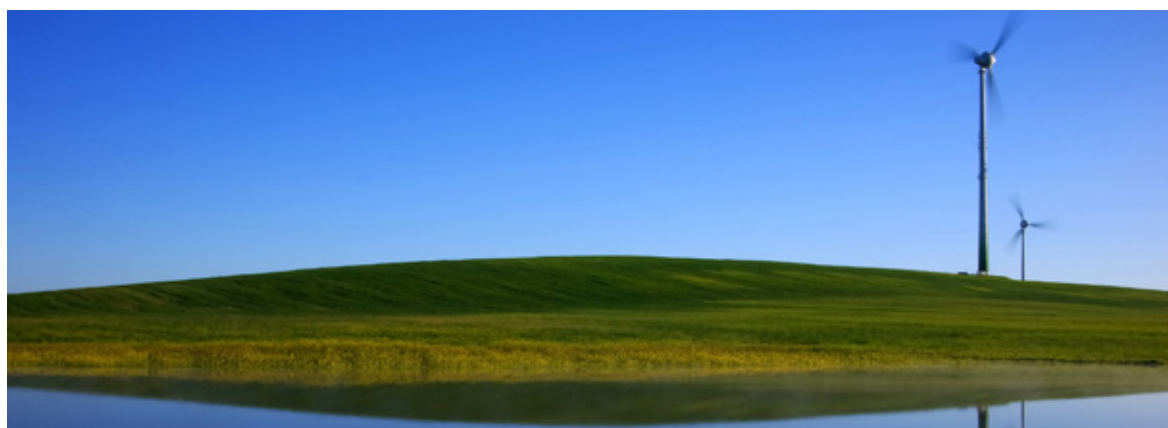


Photo: Kay Ludwig

### Power capacity installations

Overall, during 2013, 35 GW of new power generating capacity was installed in the EU, 10 GW less than in 2012.

Wind power accounted for 32% (11.2 GW) of new installations in 2013. Followed by solar PV (31%, 11 GW) and gas (21%, 7.5 GW).

No other technologies compare to wind, PV and gas in terms of new installations. Coal installed 1.9 GW (5% of total installations), biomass 1.4 GW (4%), hydro 1.2 GW (4%), CSP 419 MW (1%), fuel oil 220 MW, waste 180 MW, nuclear 120 MW, geothermal 10 MW and ocean 1 MW.

During 2013, 10 GW of gas capacity was decommissioned, as were 7.7 GW of coal, 2.7 GW of fuel oil and 750 MW of biomass capacity.

FIGURE 1.2: SHARE OF NEW POWER CAPACITY INSTALLATIONS IN EU, TOTAL 35,181 MW

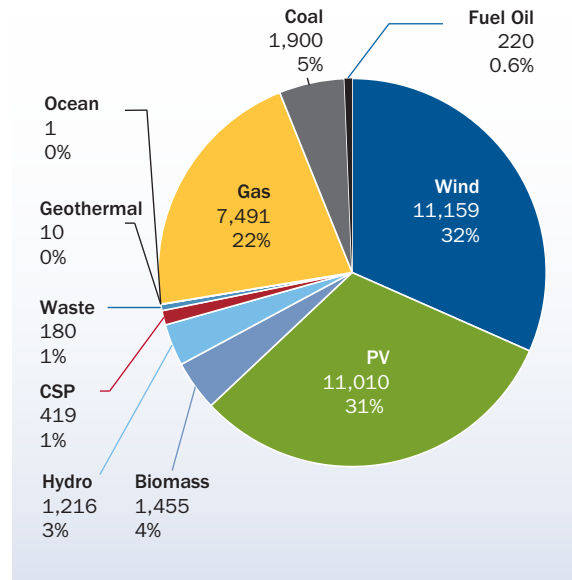


FIGURE 1.3: NEW INSTALLED POWER CAPACITY AND DECOMMISSIONED POWER CAPACITY IN MW

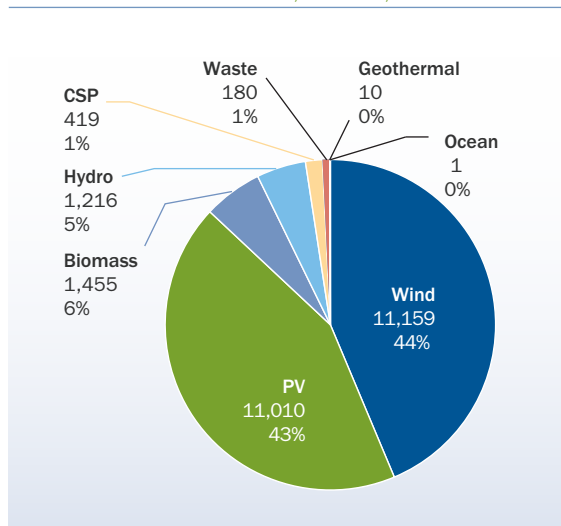


(1) Provisional data.

## Renewable power capacity installations

In 2013, a total of 25.4 GW of renewable power capacity installations were installed. Over 72% of all new installed capacity in the EU was renewable. It was, furthermore, the sixth year running that over 55% of all new power capacity in the EU was renewable.

FIGURE 1.4: 2013 SHARE OF NEW RENEWABLE POWER CAPACITY INSTALLATIONS IN MW, TOTAL 25,450 MW



## Trends & cumulative installations

### Renewable power capacity installations

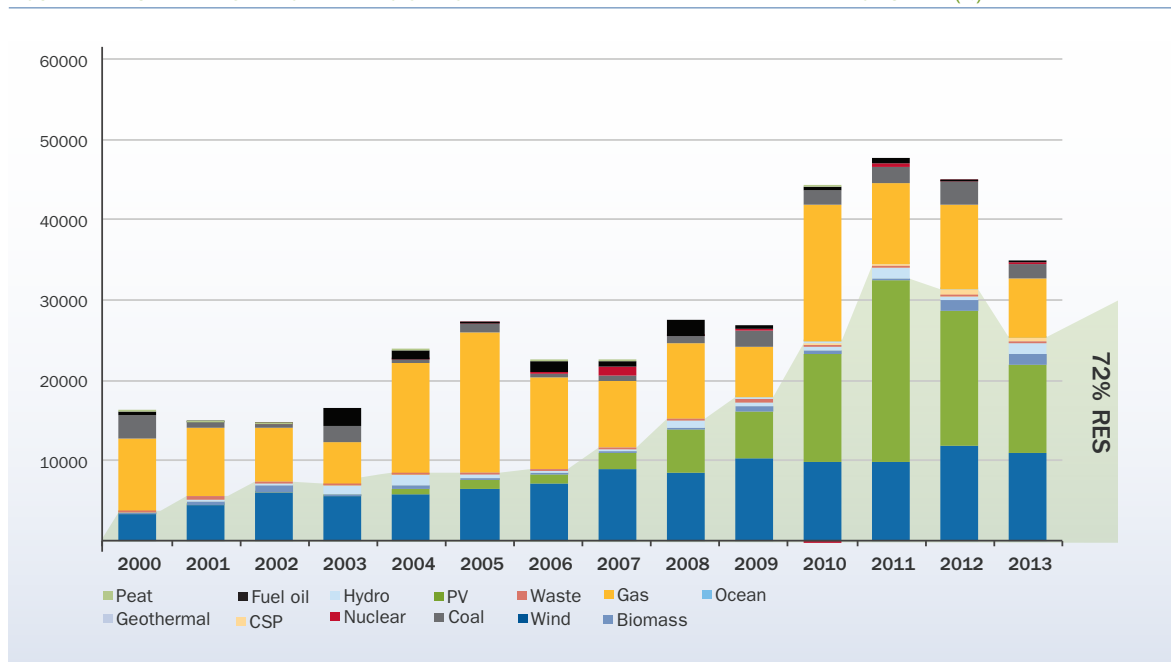
In 2000, new renewable power capacity installations totalled a mere 3.6 GW. Since 2010, annual renewable capacity additions have been between 24.7 GW and 35.2 GW, eight to ten times higher than in 2000.

The share of renewables in total new power capacity additions has also grown. In 2000, the 3.6 GW

represented 22.4% of new power capacity installations, increasing to 25 GW representing 72% in 2013.

385 GW of new power capacity has been installed in the EU since 2000. Of this, over 28% has been wind power, 55% renewables and 92% renewables and gas combined.

FIGURE 2.1: INSTALLED POWER GENERATING CAPACITY PER YEAR IN MW AND RENEWABLE ENERGY SHARE (%)

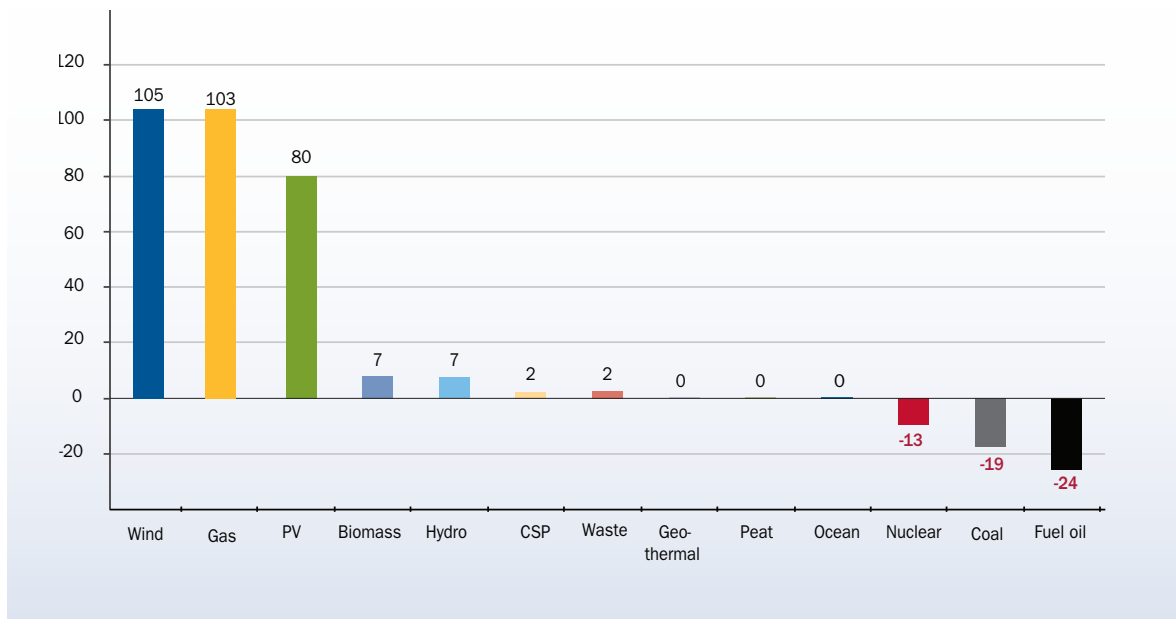


### Net changes in EU installed power capacity 2000-2013

The net growth since 2000 of gas power (131.7 GW), wind (115.4 GW) and solar PV (80 GW) was at the expense of fuel oil (down 28.7 GW), coal (down 19 GW) and nuclear (down 9.5 GW). The other renewable technologies (hydro, biomass, waste, CSP, geothermal and ocean energies) have also been increasing their installed capacity over the past 13 years, albeit more slowly than wind and solar PV.

The EU's power sector continues to move away from fuel oil, coal and nuclear while increasing its total installed generating capacity with gas, wind, solar PV and other renewables.

FIGURE 2.2: NET ELECTRICITY GENERATING INSTALLATIONS IN THE EU 2000-2013 (GW)



### Total installed power capacity

Wind power's share of total installed power capacity has increased five-fold since 2000; from 2.4% in 2000 to 13% in 2013. Over the same period, renewable

capacity increased by 61% from 24.5% of total power capacity in 2000 to 39.6% in 2013.

FIGURE 2.3: EU POWER MIX 2000

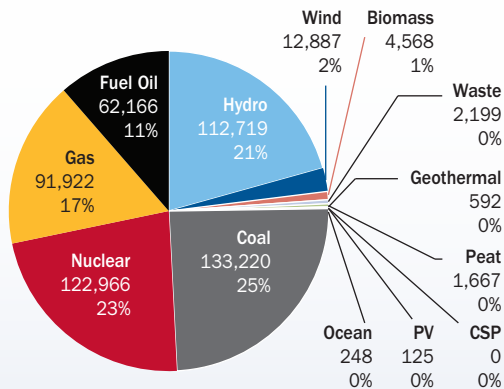
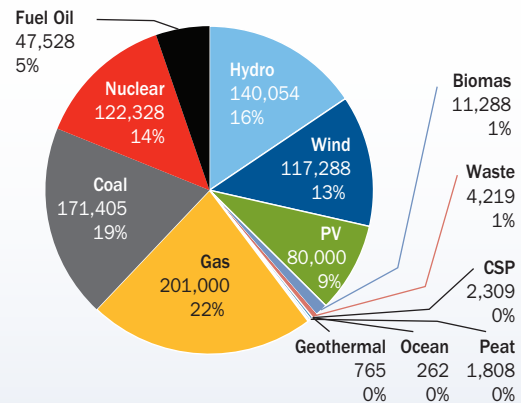


FIGURE 2.4: EU POWER MIX 2013





## A closer look at wind power installations

### Total installed power capacity

Annual wind power installations in the EU have increased steadily over the past 13 years from 3.2 GW in 2000 to 11 GW in 2013, a compound annual growth rate of over 10%.

FIGURE 3.1: ANNUAL WIND POWER INSTALLATIONS IN EU (GW)

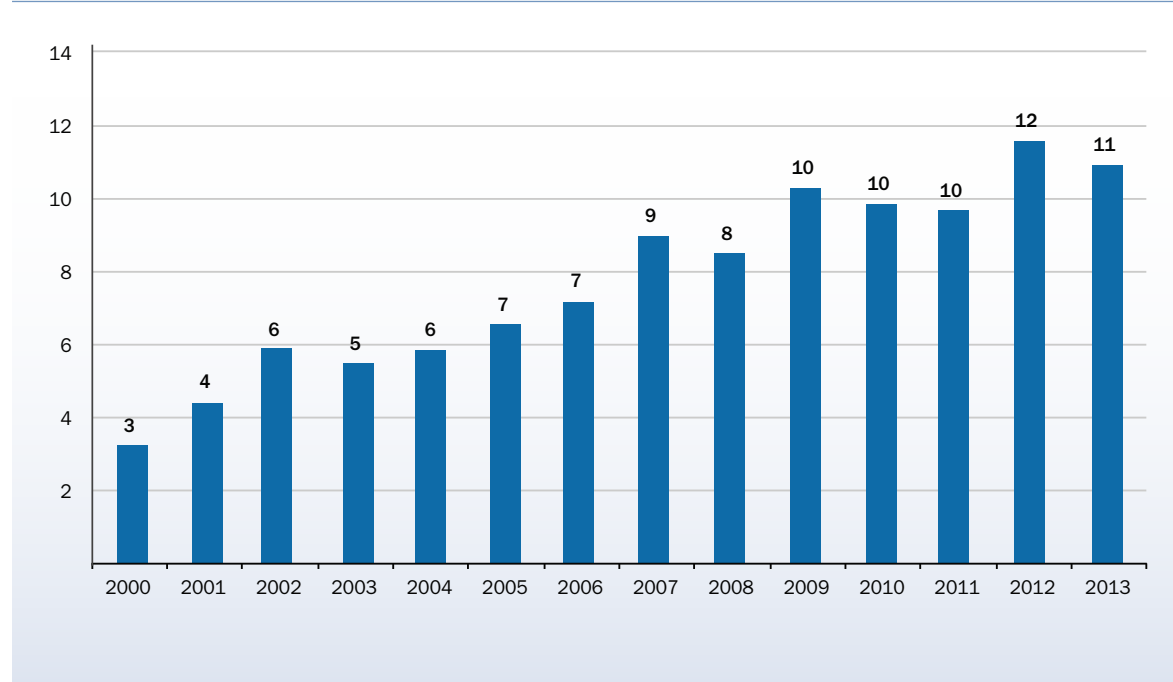


Photo: Joan Sullivan

### 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 additions. By 2012, they represented only 29% of total installations. In 2013, although the Spanish market contracted significantly compared to the previous year (-84%), the German market grew by 36% and installations in the three pioneering countries together represented 36% of the EU market.

Moreover, in 2000, the countries that make up, today, the 13<sup>1</sup> newer EU Member States, had no wind energy, in 2013, they reached 16% of the EU's total market. However, 90% of those installations were in just two countries, Poland and Romania.

This indicates that the renewables policy instability that has affected numerous countries in the EU is leading to increased concentration of wind energy installation in a handful of countries.

FIGURE 3.2 SHARE OF EU WIND POWER MARKET, PIONEERING COUNTRIES, NEWER MEMBER STATES, AND REST OF EU (GW)

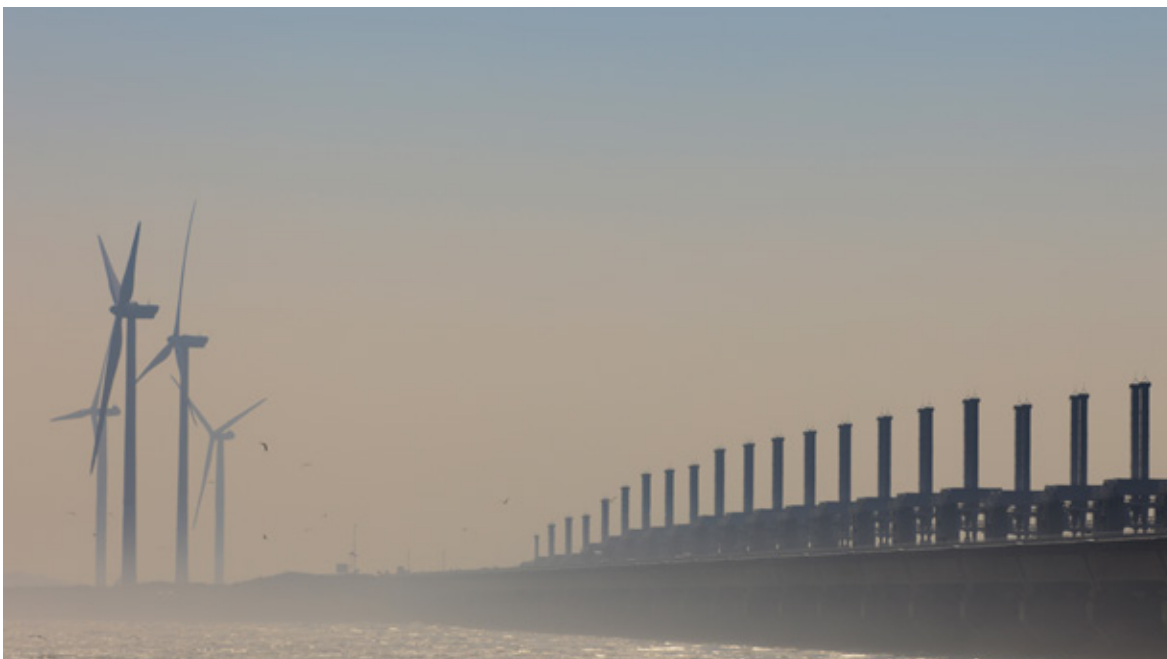
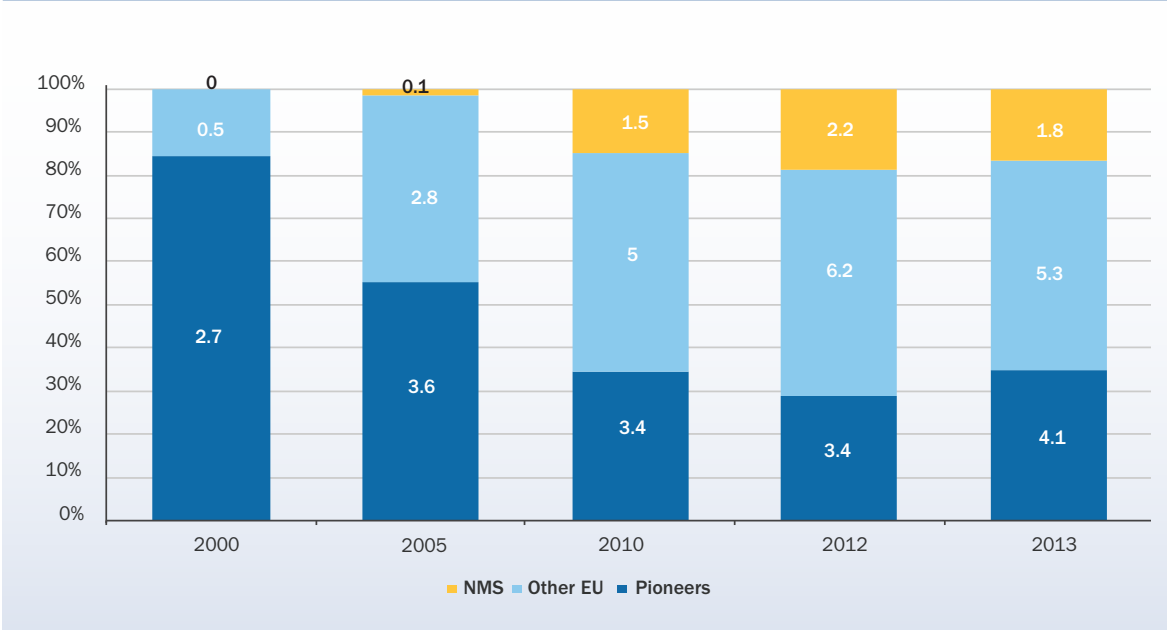


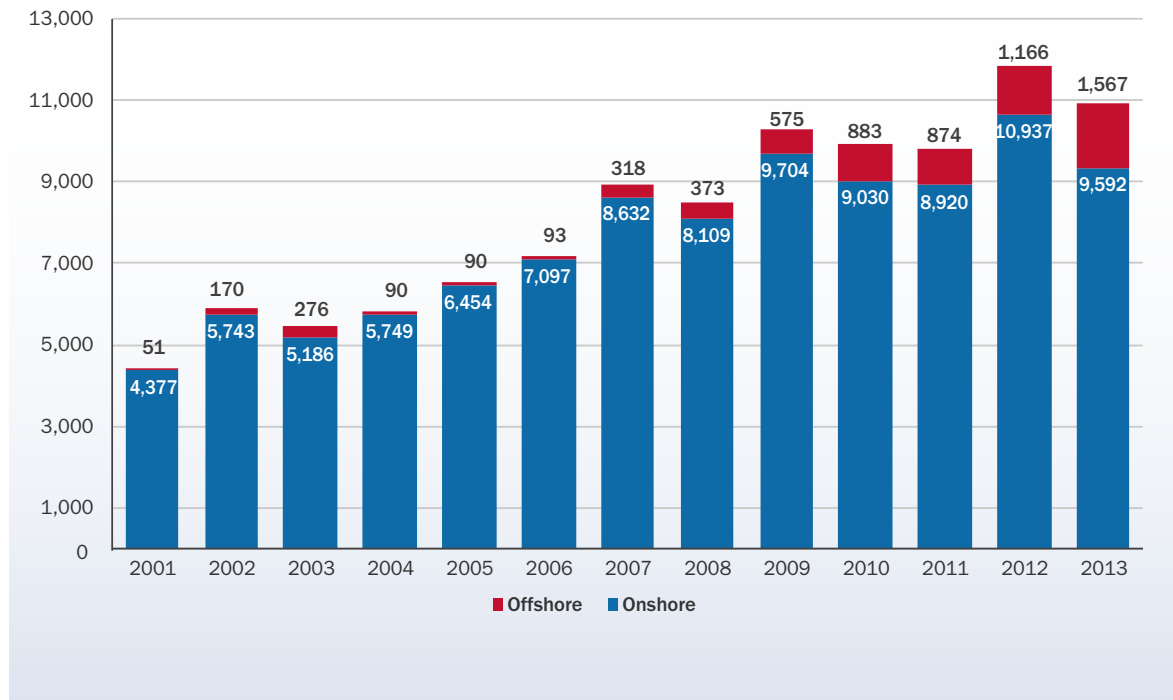
Photo: Arjan de Jager

<sup>1</sup> Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.

### Onshore and offshore annual markets

2013 was a record year for offshore installations, with 1,567 MW of new capacity grid connected. Offshore wind power installations represent over 14% of the annual EU wind energy market, up from 10% in 2012.

FIGURE 3.3: ANNUAL ONSHORE AND OFFSHORE INSTALLATIONS (MW)



### Cumulative wind power installations

A total of 117 GW is now installed in the European Union, a growth of 10% on the previous year and lower to the growth recorded in 2012 (+12% compared to 2011). Germany remains the EU country with the largest installed capacity, followed by Spain, the UK, Italy and France. Eleven other EU countries have over 1 GW of installed capacity: Austria, Belgium, Denmark, France, Greece, Ireland, The Netherlands, Poland, Portugal, Romania and Sweden.

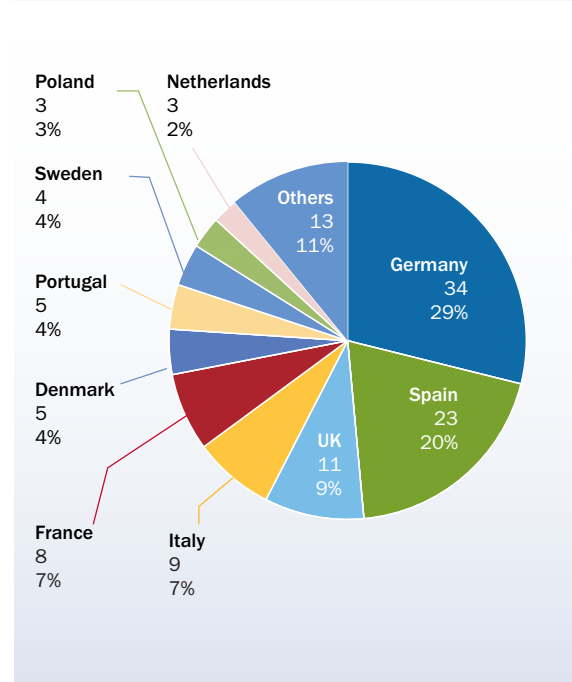
Eight of the latter (Denmark, France, Germany, Italy, Portugal, Spain, Sweden, United Kingdom), have more than 4 GW of installed wind energy capacity.

FIGURE 3.4: CUMULATIVE WIND POWER INSTALLATIONS IN THE EU (GW)



Germany (34.3 GW) and Spain (23 GW) have the largest cumulative installed wind energy capacity in Europe. Together they represent 49% of total EU capacity. The UK, Italy and France follow with, respectively, 10.5 GW (9% of total EU capacity), 8.6 GW (7%) and 8.3 GW (7%). Amongst the newer Member States, Poland, with 3.4 GW (2.9%) of cumulative capacity, is now in the top 10, in front of the Netherlands (2.7 GW, 2%), and Romania is 11<sup>th</sup> with 2.6 GW (2%).

FIGURE 3.5: EU MEMBER STATE MARKET SHARES FOR TOTAL INSTALLED CAPACITY (TOTAL 118 GW)



### Estimated wind energy production

The wind energy capacity currently installed in the EU would produce in an average wind year 257 TWh of

electricity, enough to cover the 8% of the EU's total electricity consumption.

TABLE 1: WIND ENERGY SHARE OF EU ELECTRICITY CONSUMPTION<sup>2</sup>

Total EU electricity consumption	Onshore wind energy production	Offshore wind energy production	Share of EU consumption met by onshore wind	Share of EU consumption met by offshore wind	Share of EU consumption met by wind
3,280 TWh	233 TWh	24 TWh	7.1%	0.7%	7.8%

<sup>2</sup> Wind energy penetration levels are calculated using average capacity factors onshore and offshore and Eurostat electricity consumption figures (2011). Consequently, table 1 indicates approximate share of consumption met by the installed wind energy capacity at end 2013. The figure does not represent real wind energy production over a calendar year.