

The EU's Energy Transition at a Cross- road

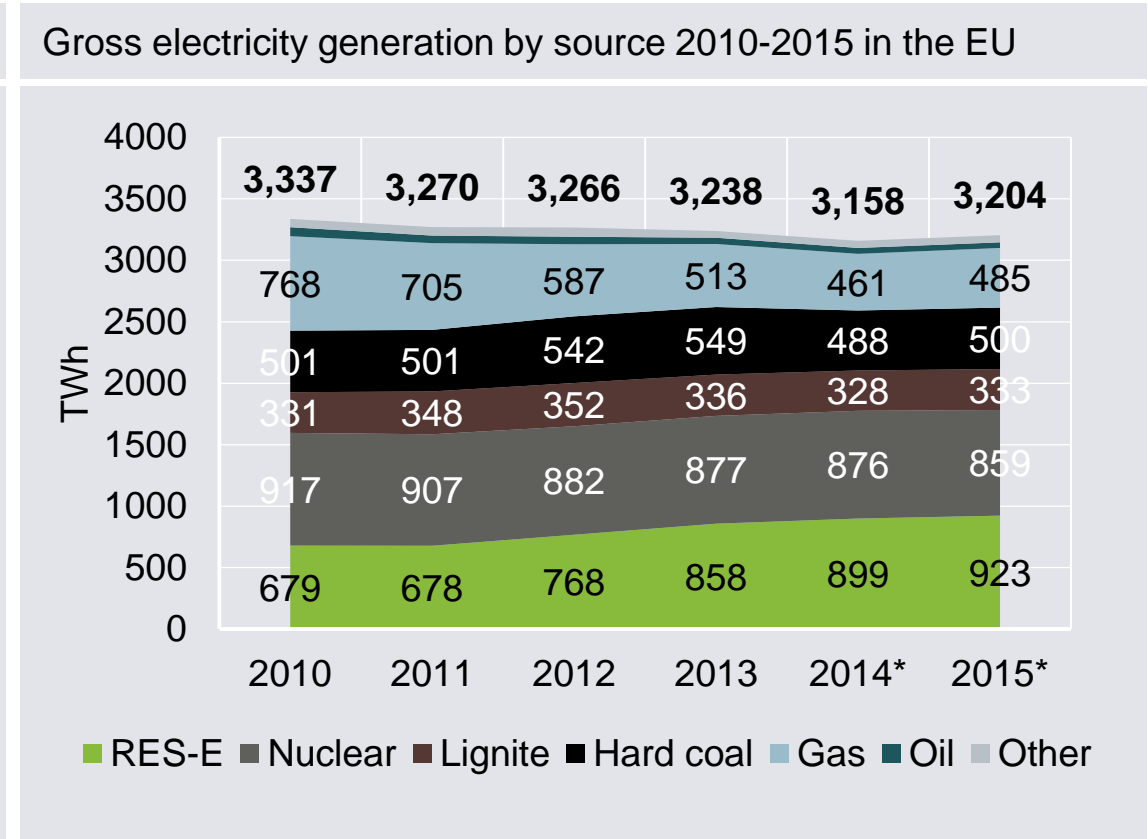
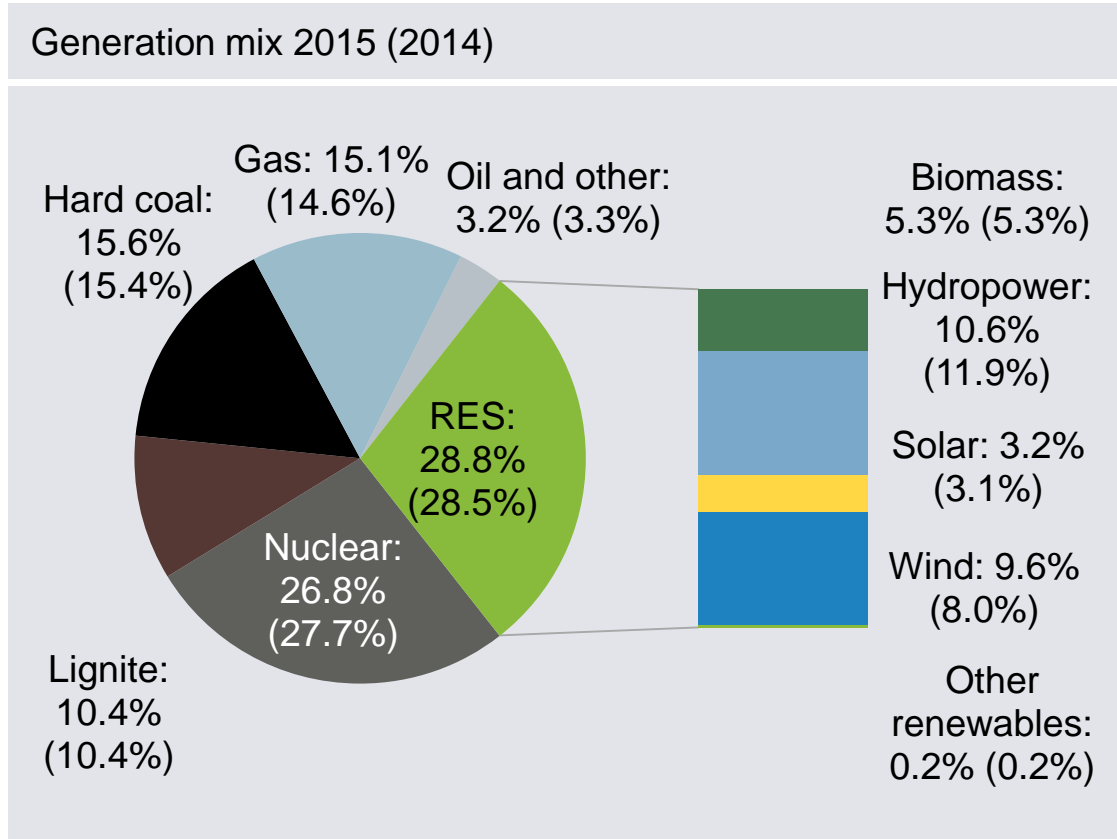
State of Affairs 2015

Matthias Buck, Mara Marthe Kleiner

28 APRIL 2016 | BERLIN



The power mix 2015: Renewables with growing shares of wind and solar Gas power has decreased significantly since 2010 Coal remains at 2010 level

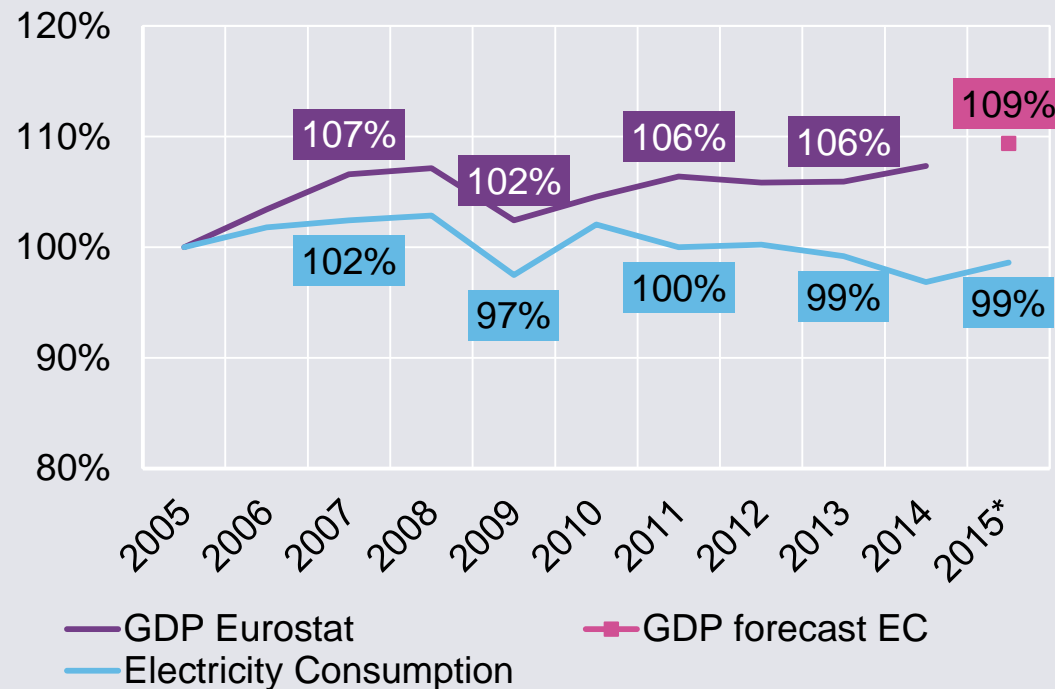


ENTSO-E 2016b, Eurostat 2016b, 2016c; Calculation Öko-Institut

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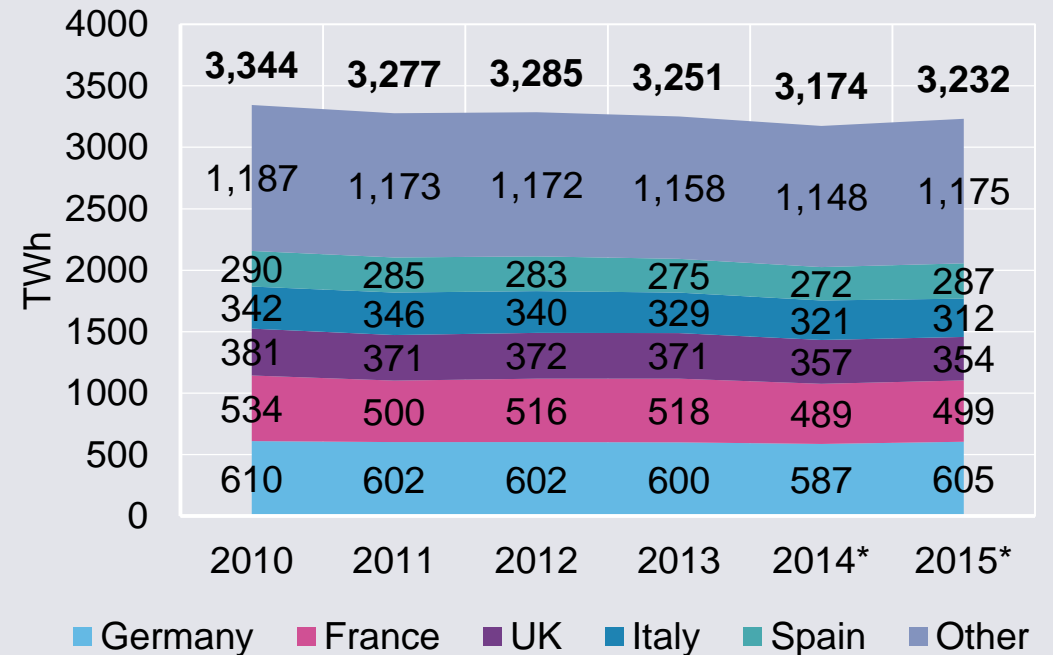
Energy efficiency 2015: Power consumption has declined slightly since 2005, GDP, however, in 2015 is 9 percent above 2005 level.

Power consumption and GDP of the EU



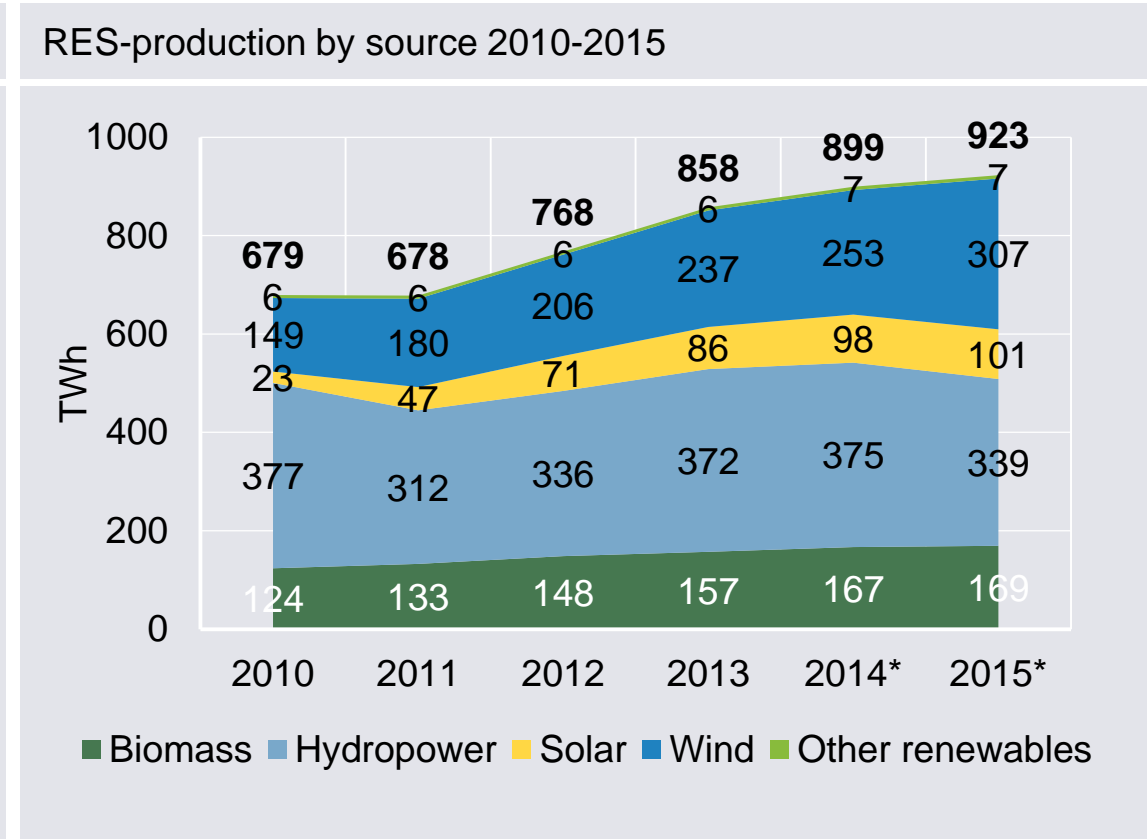
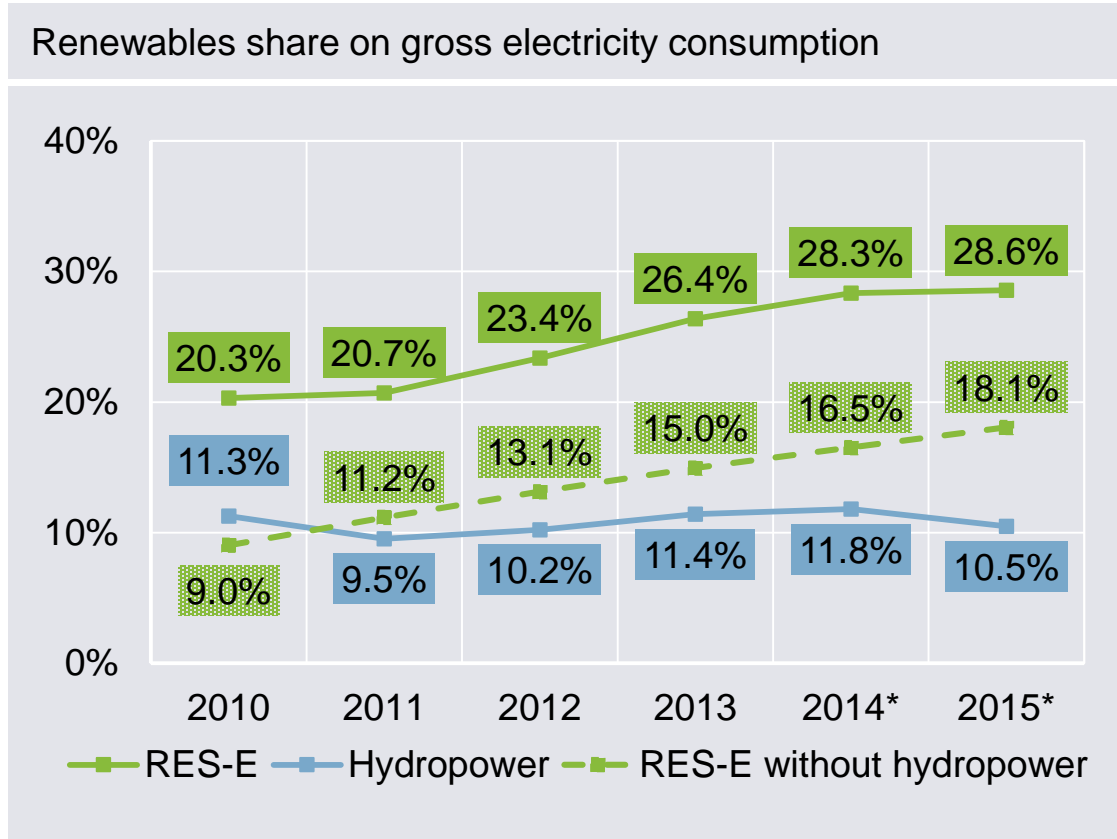
Data ENTSO-E 2016b; European Commission (EC) 2016, Eurostat 2016a, 2016b, 2016c; Calculation Öko-Institut

Gross power consumption 2010-2015 with top five countries



Data ENTSO-E 2016b, Eurostat 2016b, 2016c; Öko-Institut

Renewables 2015: RES cover 28.6 percent of demand; largest contributors are wind and hydropower, largest %-increase since 2010 in solar power



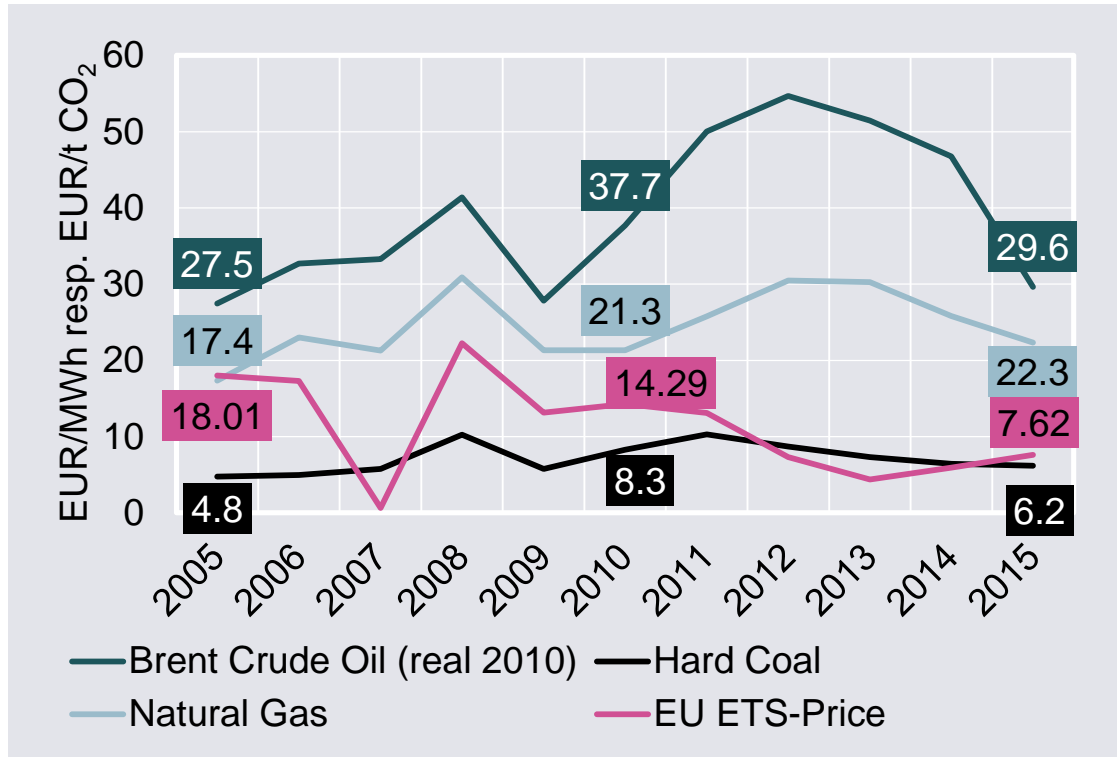
Data ENTSO-E 2016b, Eurostat 2016b, 2016c; Öko-Institut

Data ENTSO-E 2016b, Eurostat 2016b, 2016c; Öko-Institut

Fuel and Carbon prices 2015:

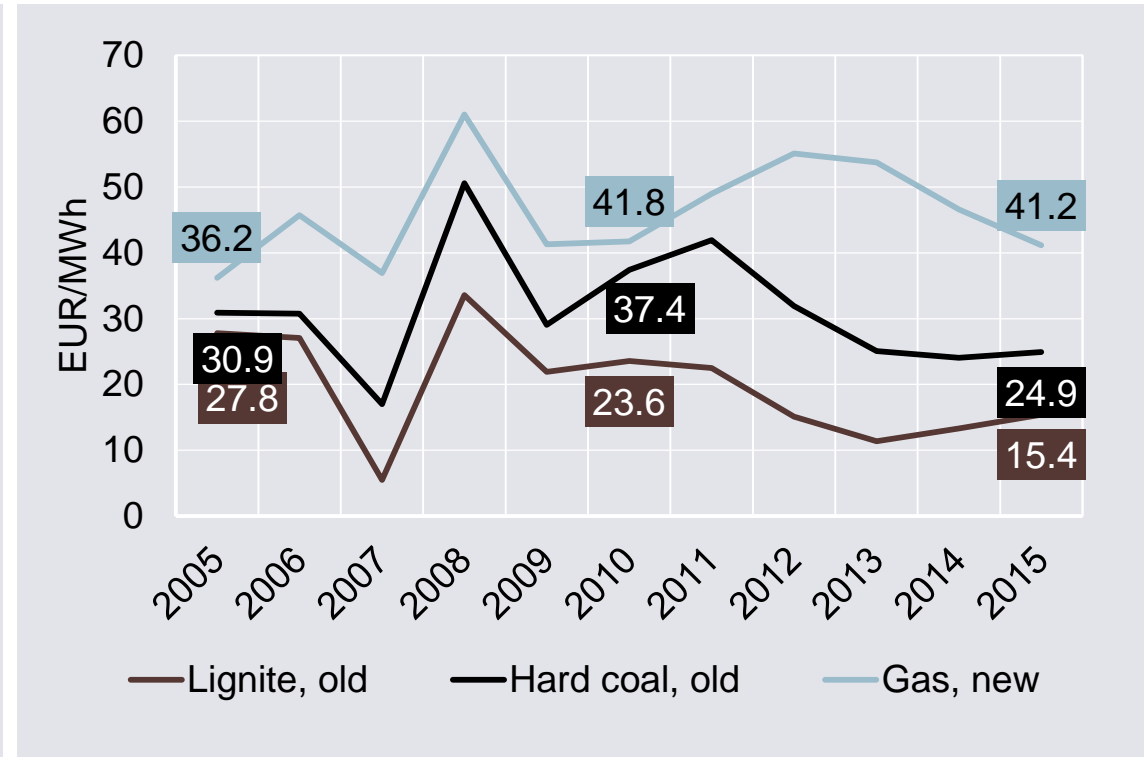
Fuel prices decreased in 2015 and are now back at 2005 level, Consistently low CO₂ prices increase the marginal cost gap

Nominal fuel prices in Europe 2000-2015



Worldbank 2016, BP 2016, Bundesbank 2016, DEhSt 2016

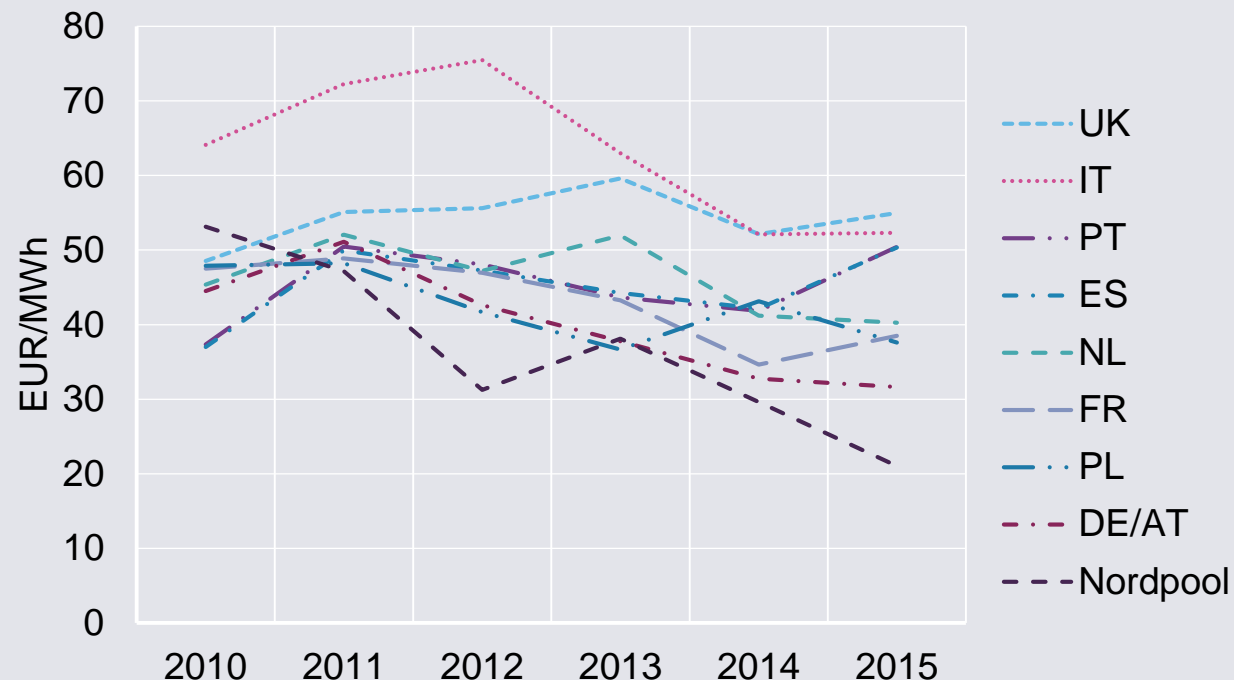
Marginal costs of common types of power plants 2000-2015



Worldbank 2016, BP 2016, Bundesbank 2016, UBA 2015, DEhSt 2016

Power Prices 2015: Wholesale markets show unclear pattern, lowest prices in Germany/Austria and Nordics, highest prices in UK and Italy

Day-ahead prices in selected European countries

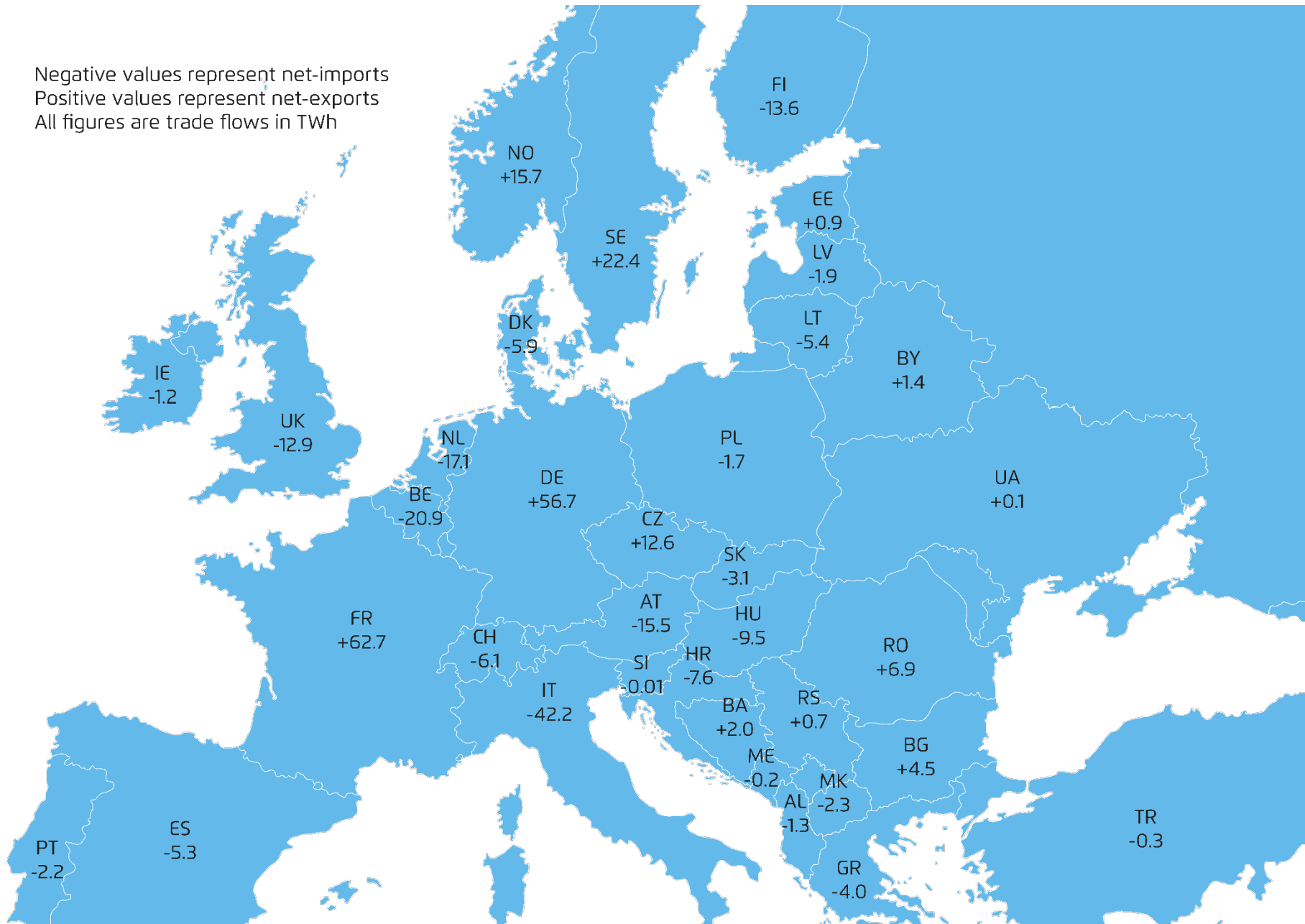


Prices in most countries declined significantly:

- within the **Nordpool** exchange from around 50 euros per MWh in 2011 to around 20 euros per MWh in 2015
- In **Germany/Austria** from approx. 50 euros per MWh in 2011 to slightly above 30 euros in 2015
- In **Italy** from over 70 euros per MWh in 2011/2012 to around 50 euros per MWh in 2015
- In the **UK, Spain, Portugal and France**, prices increased in 2015 compared to 2014
- Mean price of the sample is around 40 euros per MWh

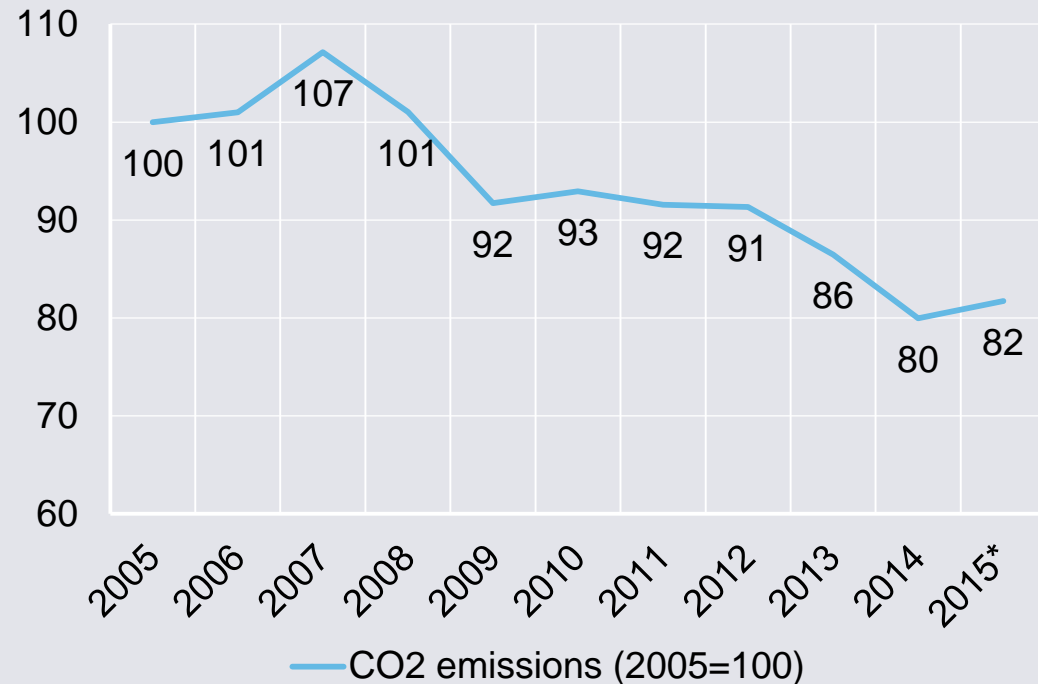
EEX 2016, EPEX 2016, APX 2016, OMEL 2016, GME 2016, PGE 2016, Nordpool 2016. Matthes 2016

Negative values represent net-imports
Positive values represent net-exports
All figures are trade flows in TWh

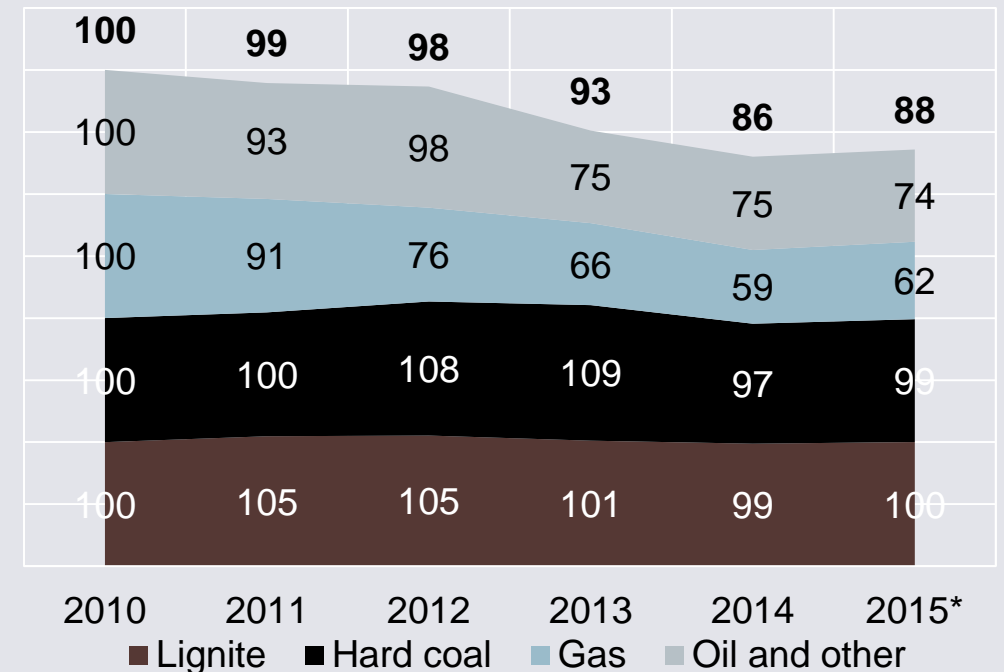


Greenhouse gas emissions 2015: Power Sector emissions up by 2% in particular due to increased coal; constant coal share hinders further reductions

Power Sector CO₂-Emissions since 2005



Power Sector CO₂-Emissions relative to 2010, by energy source



EC 2016; Öko-Institut

ENTSO-E 2016b, Eurostat 2016b, 2016c, UNFCCC 2015; Öko-Institut

Key Findings

1

As of 2015, renewable energies are Europe's dominant power source, with a 29 percent share of the power mix.

Nuclear power comes in second with 27 percent, coal (hard coal and lignite) amount to 26 percent. Among RES, wind power increased significantly by more than 50 terawatt hours to 307 terawatt hours in total. Hydropower produced much less due to less precipitation.

2

Three key trends in European power production have emerged in 2010-2015: gas and nuclear power are losing ground, renewables are on the rise while coal is in 2015 back on 2010 levels.

From 2010 to 2015, gas demand fell by more than a third, while renewables increased by 35.9%. Nuclear power production decreased slightly (-6.3%) and, following a slight decrease in 2014, coal (hard coal and lignite) returned to the 2010 level in 2015.

3

CO₂ emissions in the European power sector increased in 2015 by 2%. They could be lower by some 100 Mio. t if the decline in fossil power production since 2010 had been coal instead of gas.

The average price of a tonne of CO₂ in 2015 was 7.60€, which leads to coal-fired power plants having lower marginal costs than gas-fired power plants. Coal therefore outcompetes gas throughout Europe, which has resulted, for example, in the high coal power exports in 2015 from Germany to its neighbours.

4

Outlook: Four major developments will probably characterise 2016: more RES, less coal, less consumption and lower CO₂ prices.

Additional capacity in mainly the onshore and offshore wind energy sector will increase RES production by another 50 terawatt hours. The carbon floor price in the UK, yielding a CO₂ price signal of some 30 euros per tonne, will push out coal in the UK in favour of gas. Further efficiency developments and the relatively mild winter will lower power consumption. The demand for CO₂ allowances will therefore decrease, leading to lower CO₂ ETS prices in 2016 than in 2015


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STUDY

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German power system

BACKGROUND

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Questions or Comments? Feel free to contact me:
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