QUARTERLY REPORT ON EUROPEAN ELECTRICITY MARKETS

CONTENT

HIGHLIGHTS OF THE REPORT

- **Electricity consumption in the EU-27 decreased by 2.7% in the fourth quarter of 2012** compared to the same quarter of the previous year. This was the fifth consecutive quarter of falling EU electricity consumption. In 2012 as a whole, electricity consumption went down by 2.6%, after registering a minor decrease in 2011 (-0.2%).

- In spite of the downward trend in electricity consumption, day-ahead traded volume of power on selected European trading platforms recorded double-digit growth in the first quarter of 2013 and cross-border physical power flows increased by 4% in the EU as a whole, compared to the first quarter of 2012, pointing to **continued increase in market liquidity and further integration of the European wholesale electricity markets.**

- **Historically low temperatures in March 2013 (the lowest in almost fifty years) temporarily impacted wholesale power prices** in those countries which rely heavily on gas-fired power generation and in those in which electricity has an important role in residential heating. In spite of the long-lasting cold weather, prices quickly returned to normal mainly due to healthy power supply and sufficient levels of cross-border power flows.

- **Significant price divergences could be observed between markets in the Central West European market-coupled area in the first quarter of 2013 due to various market specific supply-related factors.** Germany benefited from low power generation costs due to significant wind and solar generation, cheap coal and falling carbon prices during most of the quarter. In Belgium, significant nuclear capacities were still off the grid and in France nuclear availability was lower than expected. Decrease in power imports from the Nordic region also contributed to the significant Belgian, Dutch and French price premiums to the German market, reaching record highs at the end of March 2013 since the beginning of market coupling.

- **Low carbon prices and continued high gas prices further supported coal-fired generation** in the first quarter of 2013. In spite of - the profitability of coal-fired generation, a number of old coal plants have been taken offline, mainly in the UK, to comply with the condition for exemption from the emission requirements of the Large Combustion Plant Directive, under which exempted plants can only operate up to a maximum number of hours.
- **During part of one day in March, significant wind and solar generation in Germany resulted in negative hourly prices for the first time in the market's history.** And in Spain, simultaneously high levels of supply of power generation from intermittent resources and hydro-based generation resulted in daily average power prices close to zero at the end of March. Negative prices translate into operating losses for power generating units and therefore signal the need for better integration of renewables into the power grid.

- **Significant differences in retail prices for electricity continue to be observed between Member States both in the case of households and industrial consumers,** according to **2012** data for median-level consumers.

- **Some convergence in retail prices could however be observed for both household and industrial consumers in recent years.** Typically, there is more convergence in prices across the EU for prices paid by industry than prices paid by households.

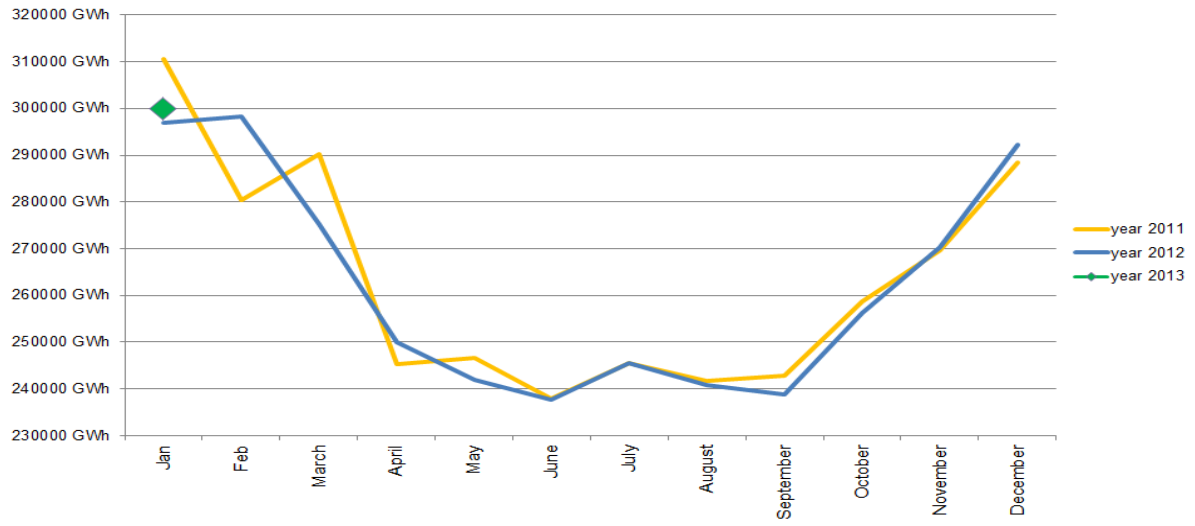
1 Electricity supply, imports and exports

1.1 Evolution of electricity generation

- *Figure 1* presents the electricity generation in the EU-27 on a monthly basis. Power generation is normally the highest in the first and the fourth quarter of each year, primarily owing to greater heating and lighting needs during the winter period.

- In January 2013, power generation in the EU was 1% higher than in January 2012, but it was 2-3% lower than in the same month of 2010 or 2011. Besides changes in temperatures, the sluggish European economic recovery might also have weighed on electricity consumption in the EU.

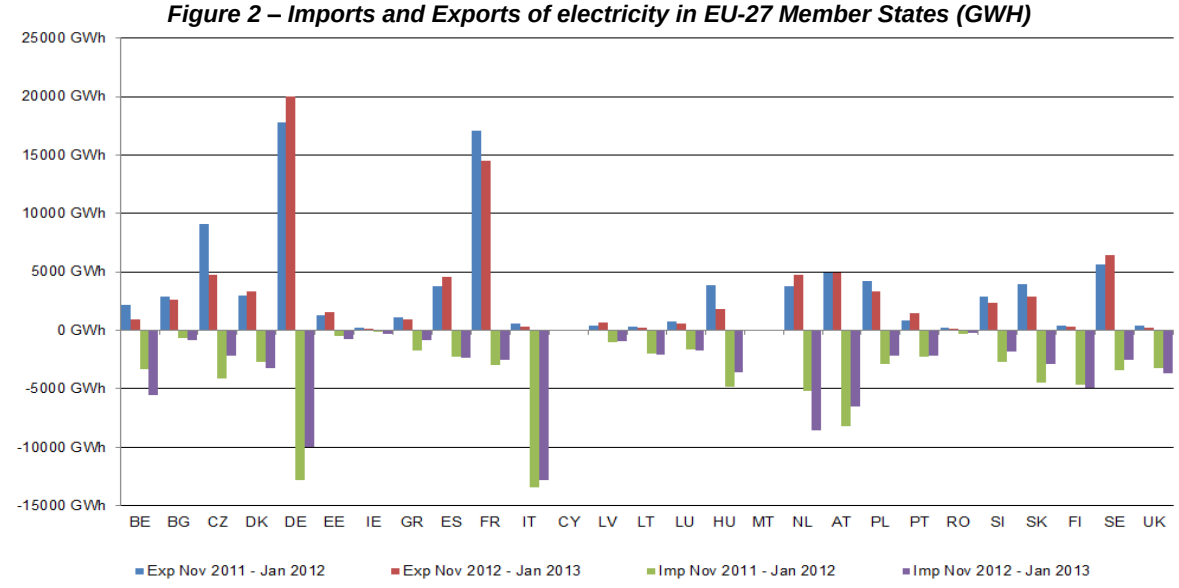
Figure 1 - EU-27 Electricity generation (GWH)



1.2 Electricity imports and exports in EU Member States

- *Figure 2* provides a comparison of electricity exports and imports in the EU Member States between November 2012 and January 2013 and the same period a year earlier. Member States such as Germany and Sweden further increased their net electricity exporter positions in the period 2012/13 compared to the 2011/12 period, while France's strong net exporter position slightly decreased. Belgium and the Netherlands increased their net power importer positions between the two periods.

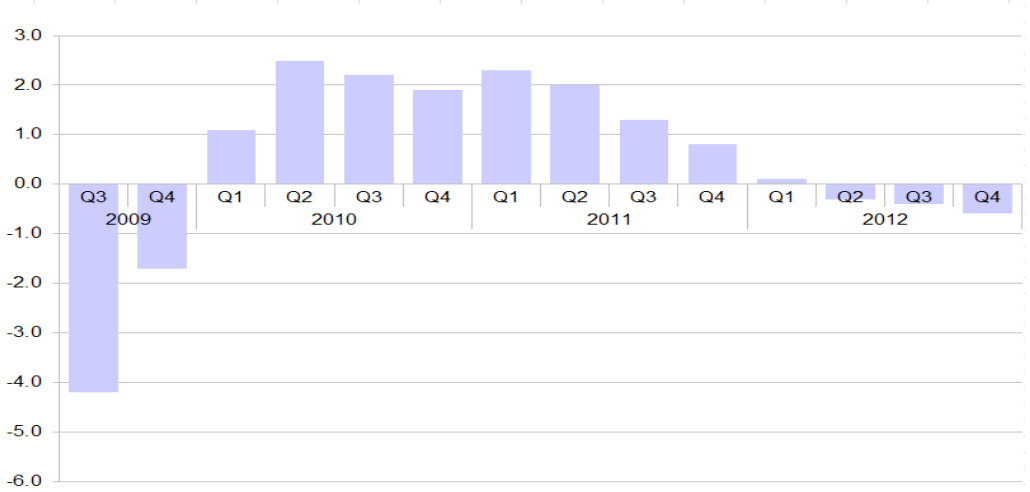
Figure 2 – Imports and Exports of electricity in EU-27 Member States (GWH)



1.3 Drivers of EU electricity demand

- Gross domestic product (GDP) in the EU-27 shrank by 0.9% in the fourth quarter of 2012 compared to the same period of 2011, and by 0.3% in 2012 as a whole. 2012 was the first year since 2009 when annual GDP decreased compared to the previous year, after registering a growth of 2.1% in 2010 and 1.6% in 2011. Gross value-added decreased significantly in Q4 2012 in year-on-year comparison in construction (-4.7%) and industry (-2.2%), which must have impacted electricity consumption in the EU-27 as these two sectors are important energy consumers.

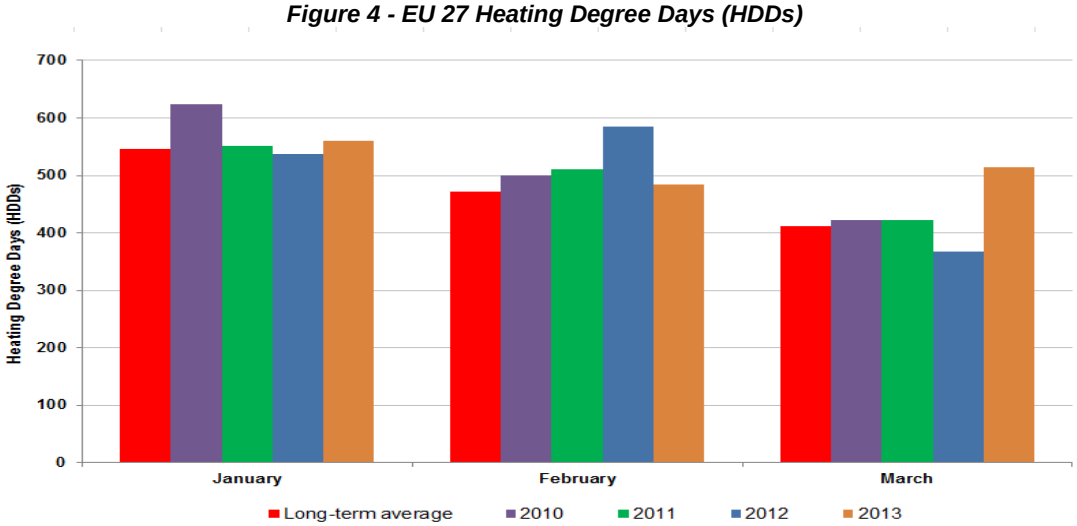
Figure 3 - EU 27 GDP Q/Q-4 change (%)



Source: Eurostat

- In January and February 2013 temperatures in the EU-27 were broadly in line with the long-term seasonal averages, as *Figure 4* shows. However, in March 2013 heating degree days (HDD)* were significantly higher than both the long term average and HDD in March 2012, as in many European countries the lowest average monthly temperatures were registered since more than fifty years.

Figure 4 - EU 27 Heating Degree Days (HDDs)



Source: Eurostat/JRC.
The colder is the weather, the higher is the number of HDDs.

* Please see the Glossary in Chapter 8 for the definitions of professional terms marked by an asterisk (*)

2 Traded volumes on European wholesale electricity markets

- In the first quarter of 2013, the combined traded volume of day-ahead power contracts on European wholesale power trading platforms amounted to 357.1 TWh, representing an increase of 10.3% compared to the same quarter of 2012. In the Central West European (CWE), Central East European (CEE) and Nordpoolspot markets traded volume of day-ahead contracts grew by 5%, 12.8% and 9.5%, respectively.
- Iberian, Italian and Greek markets - where all bilateral trading transactions are carried out in the organised market by law (mandatory pools) - could be characterised by relatively high trading volumes compared to the electricity consumption of these countries.
- As *Figure 5* shows, quarterly traded volume of power in the European day-ahead markets showed an increasing trend during the last couple of years. Market liquidity, measured as the ratio of quarterly traded volume of day-ahead contracts and the quarterly electricity consumption of a given region, also increased significantly. However, in the fourth quarter of 2012, as the growth in traded volume of power was less than the increase in electricity consumption compared to Q3 2012, the liquidity ratio slightly decreased, similarly to each fourth quarter in the previous years. This is related to the sudden increase in European electricity consumption at the beginning of the winter period.
- In the fourth quarter of 2012, similarly to the previous quarters, Nordpoolspot proved to be the most liquid non-mandatory pool in Europe, with a liquidity ratio of 82%, while in the CWE and CEE regions this measure was 29.6% and 15.2%, respectively.

Figure 5 - Traded volumes on major European wholesale electricity markets

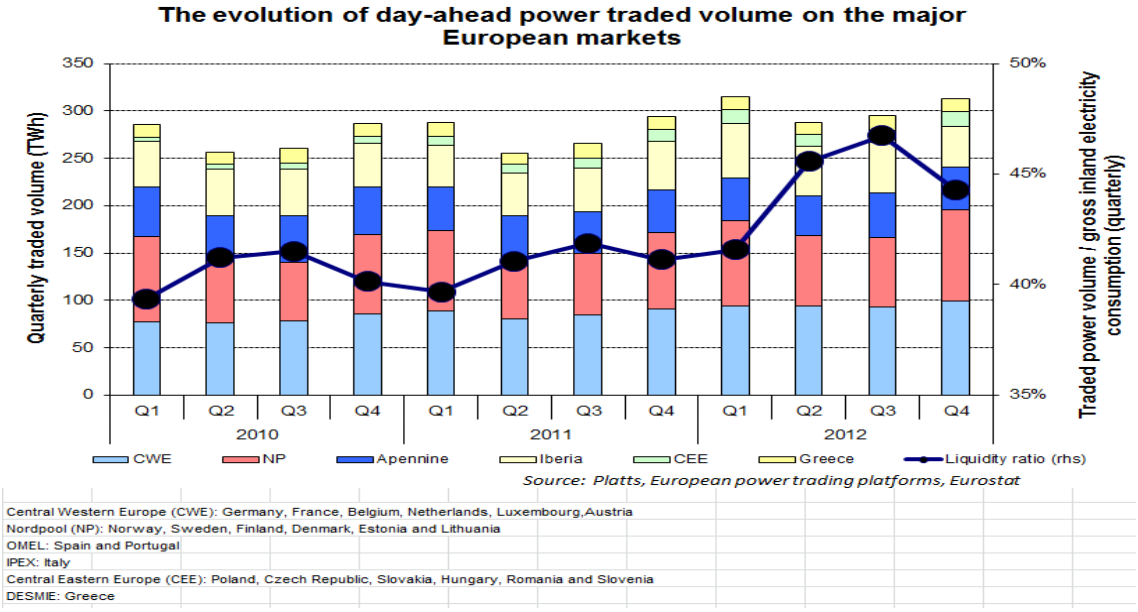
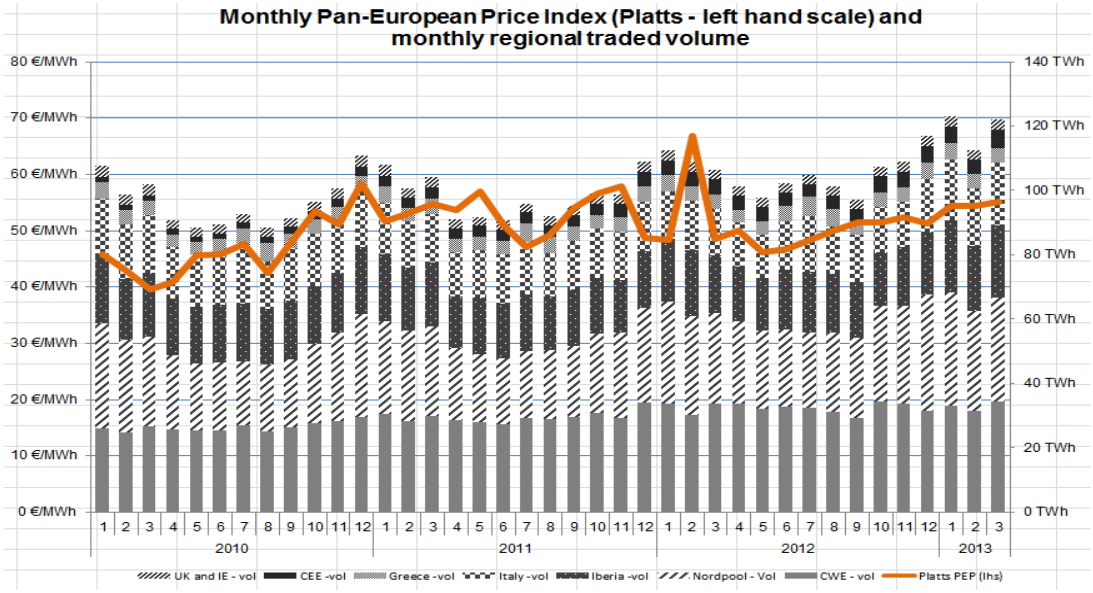


Figure 6: The Platt's Pan European Power Index and the wholesale monthly traded volume of power in different European power regions

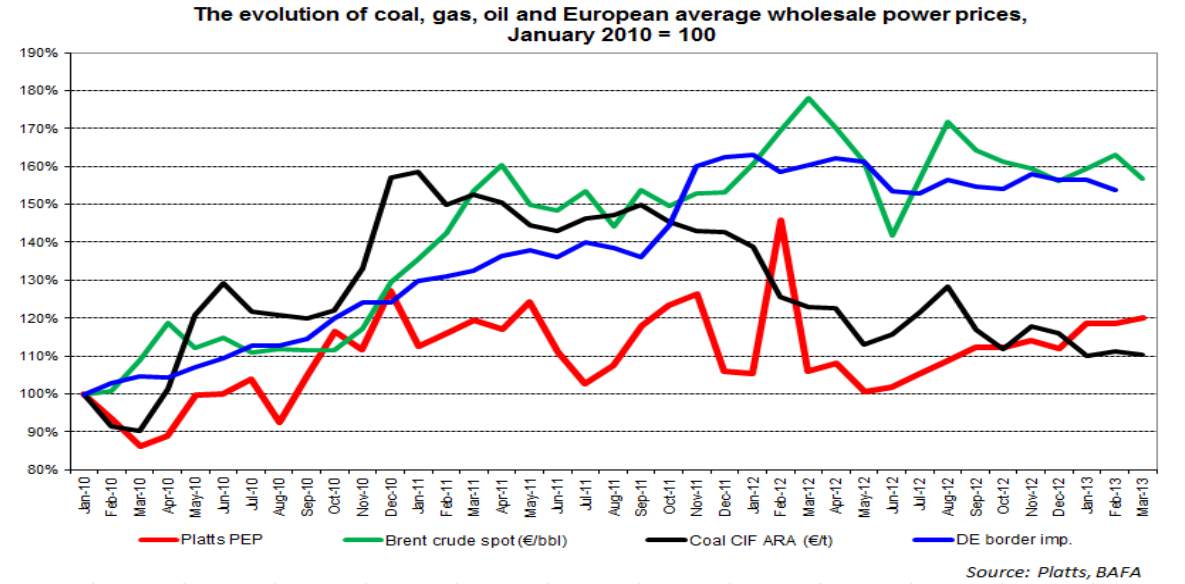


3 Evolution of commodity and power prices

3.1 Evolution of power prices, and the main factors affecting power generation costs

- *Figure 7* shows the evolution of the Platts European Power Index (PEP), in comparison with the price trends of the Brent crude oil spot, German import gas and North-West European import coal contracts.
- Since the beginning of 2011, coal prices decoupled from oil and natural gas prices, a consequence of increased cheap coal imports from the USA, Colombia and Russia. A comparison of the PEP index to the oil and gas prices shows that the former increased by much less than the latter, going up by 20% between the beginning of 2010 and the end of Q1 2013, compared to upwards of 50% for oil and gas prices.
- In the first quarter of 2013, the PEP index continued its recent slow increasing trend, primarily owing to increasing gas prices in Europe and lower hydro availablity in the Nordic markets. Lower generation costs in Central and Western Europe also impacted the pan-European index. By March 2013, the PEP index reached 55 €/MWh, which was the highest since February 2012.

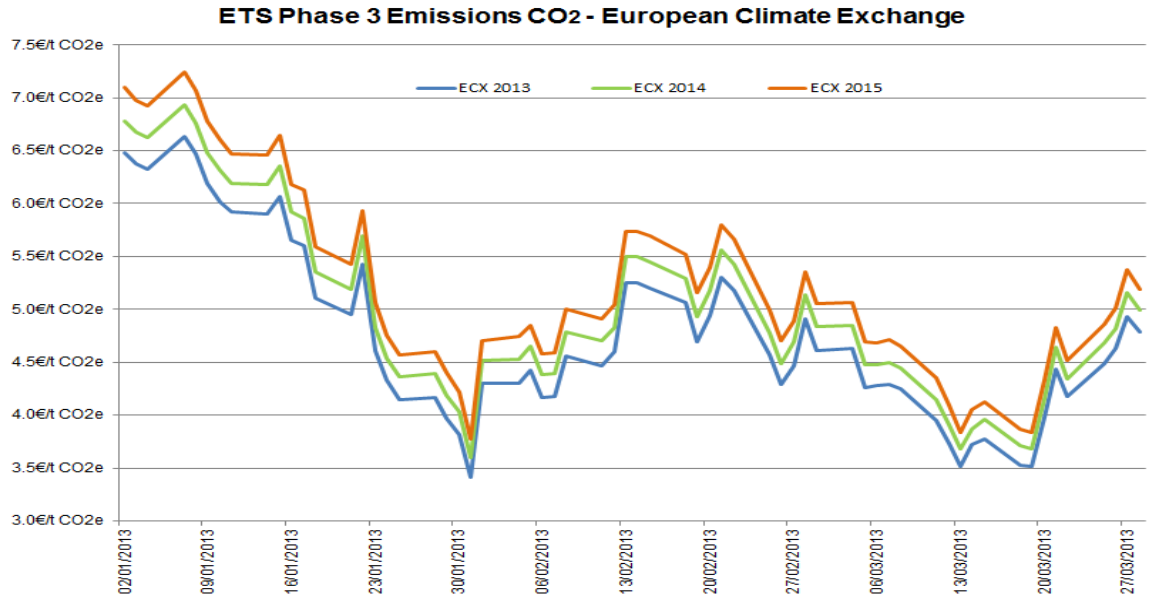
Figure 7 – Evolution of coal, gas, oil and European average wholesale power prices



Platts PEP: Pan European Power Index
Brent crude spot: Benchmark price for crude oil in Europe
Coal CIF ARA: Principal coal import price benchmark in North Western Europe
DE border imp. stands for long term contract based import natural gas price on the German border

- European carbon prices fell to less than 3.5 €/tCO_2e at the end of January 2013 as the EU carbon market continued to be affected by emission allowance oversupply, extending its decline from end 2012 levels of around 7 €/tCO_2e. Until the end of Q1 2013 carbon prices remained in a narrow range of 3.5-5.5 €/tCO_2e.

Figure 8 – Evolution of ETS from April to June 2012



- Coal-fired power generation remained profitable in the first quarter of 2013 as *Figures 9 and 10* on the evolution of clean dark spreads* in, respectively, Germany and the UK show. In the UK, the clean dark spread reached 37 €/MWh by the end of March 2013, which was the highest since November 2008.
- In contrast, gas-fired generation in Germany suffered from low power prices due to lower continental generation costs and relatively high gas prices, which showed an increasing trend. In the first quarter of 2013 the average German clean spark spread* was -12 €/MWh, reflecting the current unprofitability of gas fired generation in the country. In the UK, the respective value was 3.3 €/MWh.

Figure 9 – Evolution of the spot clean dark spreads and spark spreads in Germany

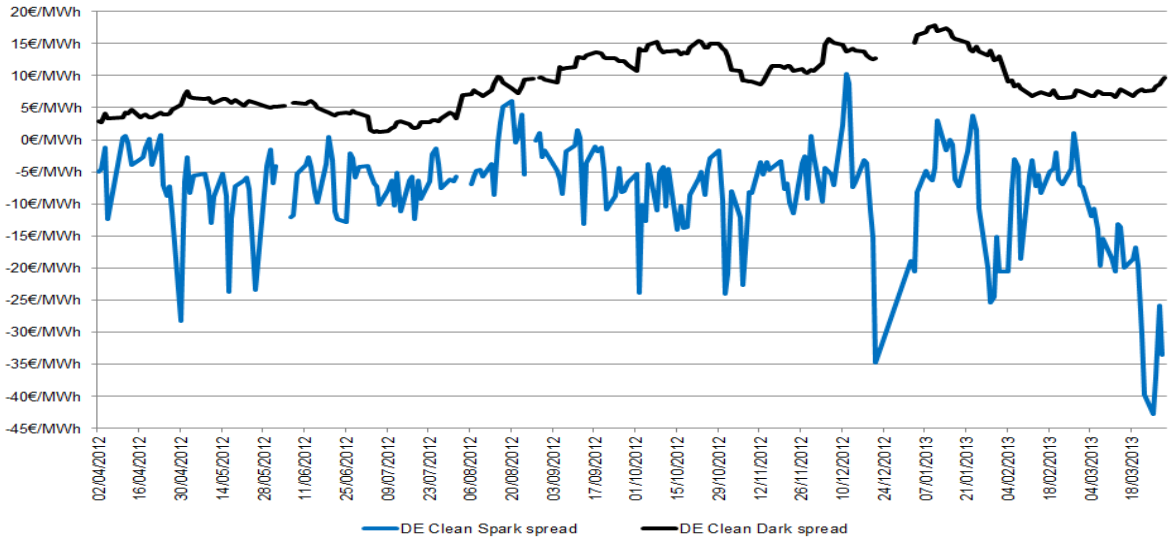
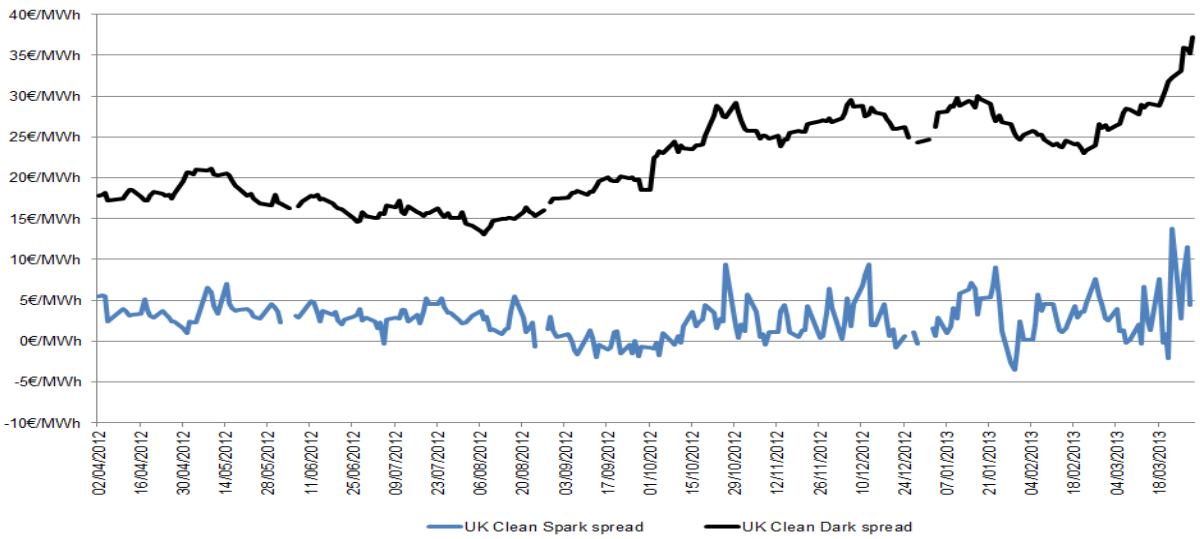


Figure 10 – Evolution of the spot clean dark spreads and spark spreads in the UK



Source: Platts

3.2 Comparisons of monthly electricity baseload prices on electricity markets

- *Figure 11* shows the evolution of monthly average regional power prices in seven different regions of Europe. Although there was a perceivable price convergence between different regions, there were some exceptional periods when prices diverged quite significantly.

- Power prices in Italy were higher than in other regions during the observed period, though during the last couple of months the Italian price premium to other European markets significantly decreased. This was mainly due to the increasing share of renewables in the country's power generation mix and lower gas prices on the Italian PSV hub, converging with other European gas hub prices.

- Prices in the Nordpoolspot market are extremely sensitive to the amount of power generated from hydro in the region; during colder and drier winter periods, prices reach their yearly maxima. Hydro reserve levels are also an important factor in Spain. By the end of March 2013, wholesale electricity prices fell to a three-year low as a result of abundant hydro power generation (see Figure 12).

- In the Central Western Europe (CWE) region renewable power generation in Germany and nuclear availability in France are important factors determining power prices. Prices in Central and Eastern Europe are impacted by the CWE market and other factors, such as hydro supply in the Balkans. This latter factor contributed to the decrease in the average CEE price at the end of the first quarter of 2013 to the lowest level since the beginning of 2009.

- Power prices in the UK are normally higher than continental prices. In March 2013 they increased to the highest level in five years due to extremely cold weather and record high natural gas prices, the latter being the most important determinant of power generation cost in the country.

Figure 11 - Comparisons of monthly electricity baseload prices in regional electricity markets

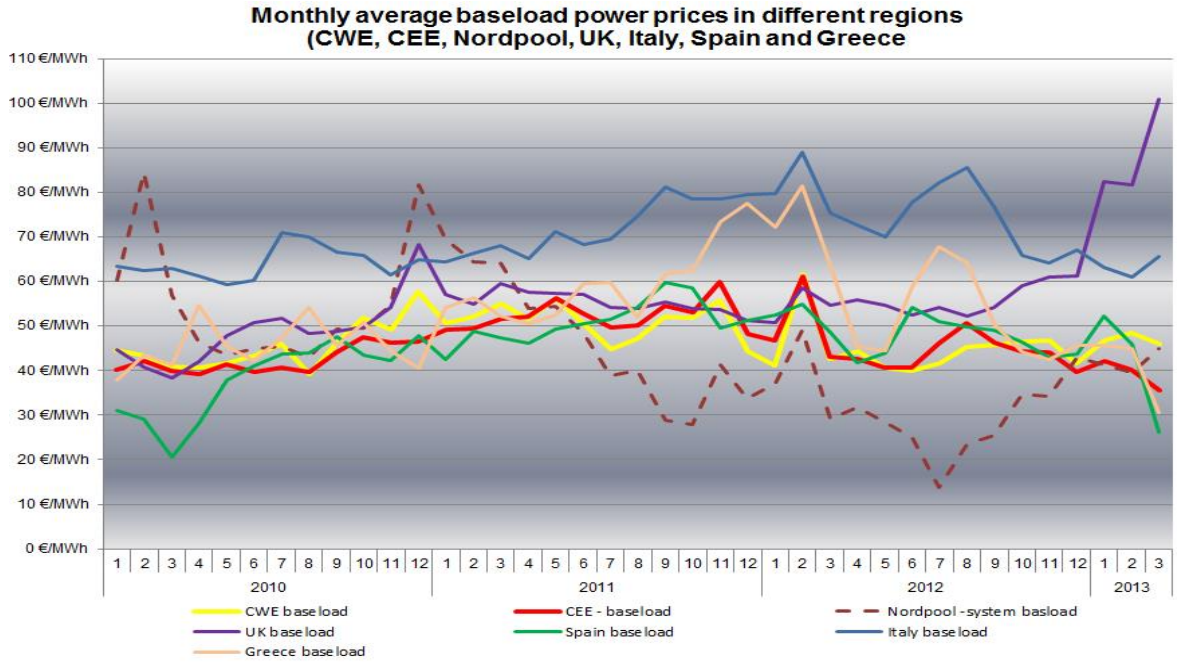
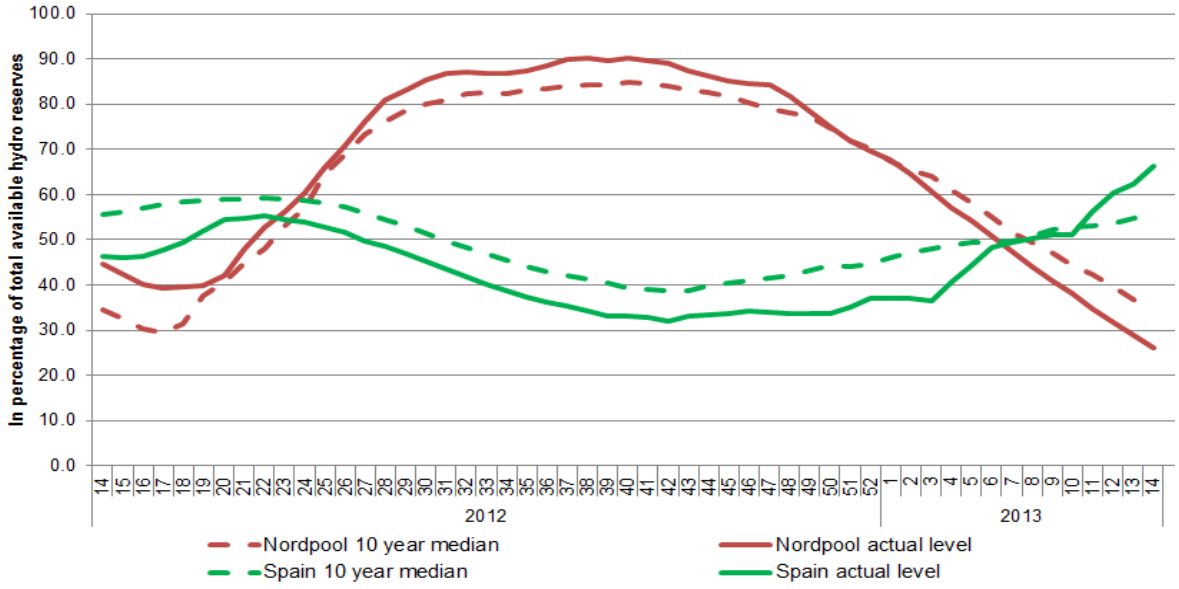


Figure 12 – Weekly evolution of the hydro reservoir levels in Spain and the Nordpool area



4 Regional wholesale electricity markets

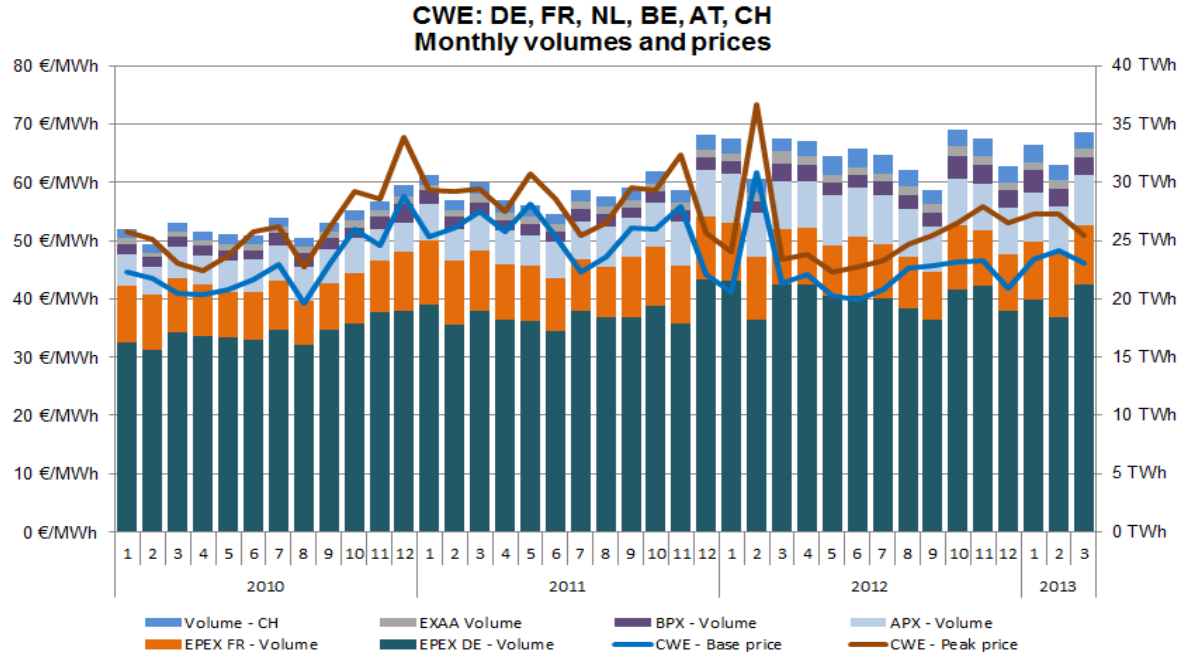
4.1 Central Western Europe (Austria, Belgium, Germany, France, the Netherlands, Switzerland)

- Average monthly wholesale power prices in the CWE region moved in a narrow range in the first quarter of 2013 (baseload: 46-48 €/MWh, peakload: 51-55 €/Mwh). However, these average numbers hid significant differences among individual market price evolutions.
- Cheap coal prices, steep falls in emission allowance prices and a healthy level of wind power generation all contributed to low generation costs in Germany, resulting in a fall of the month-ahead baseload contract to seven-year lows at the end of January 2013.
- In March 2013, cold weather conditions did not have a significant impact on German power prices, although short-lived price spikes following other regional peers resulted in hourly price levels in excess of 100 €/MWh on some trading days. Solar power generation was initially even lower than usual (in January and February)

for that time of year given that the lowest number of sunny hours since the 1950es were registered in that period. But it picked up again and contributed to a good level of renewables supply in March.

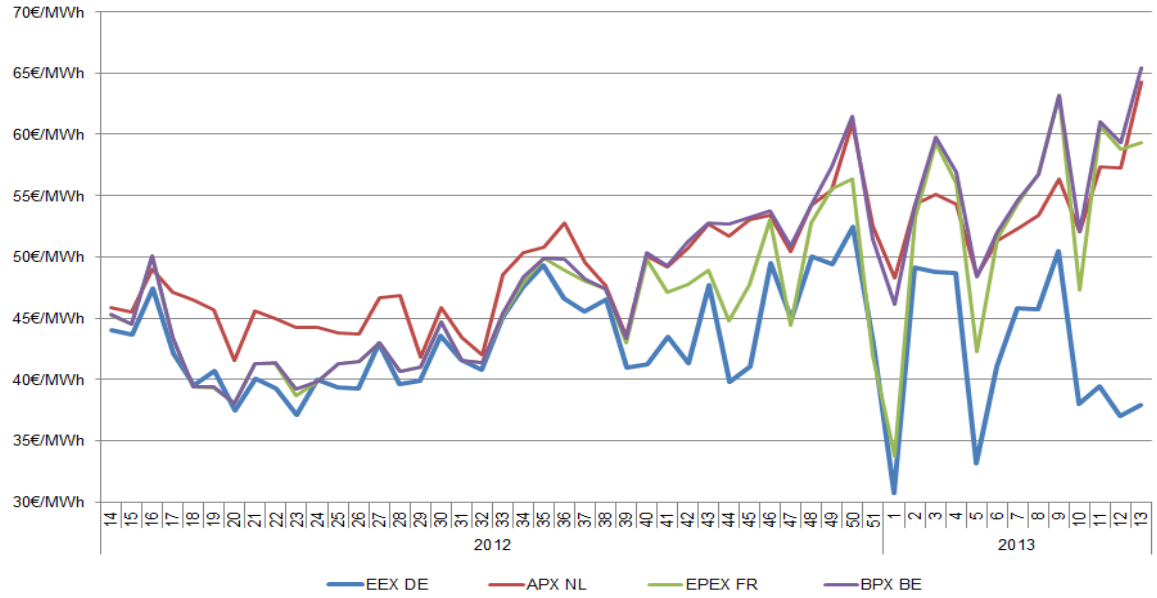
- On the 24th of March 2013, for the first time in German EPEX market history, there were four hours of negative hourly prices during the afternoon hours, a phenomenon which has only occurred during night hours in the past. This was the result of the simultaneously high level of wind and solar power generation that day.
- During the first quarter of 2013 prices in French, Dutch and Belgian markets showed signs of divergence compared to their German peer. In Belgium, two nuclear reactors (Tihange-2 and Doel-3) were off the grid and the country's increased power import needs had to be satisfied by France and the Netherlands. Gas price spikes due to unseasonably cold weather in March 2013 increased generation costs in the Netherlands, and decreasing power imports from Norway also contributed to higher domestic power prices. In France, wholesale power prices were lifted by the cold March weather, increasing the use of electricity in residential heating, and by the replacement of some nuclear generation capacites with more expensive gas-fired generation due to lower-than-anticipated nuclear availability.
- As a consequence of these factors, price premiums of these markets to Germany, already observable in most of 2012, widened significantly during Q1 2013, and reached 16-27 €/MWh (*See Figure 14*) in the last week of March 2013, being unusually high in the coupled CWE market area.

Figure 13 – Monthly traded volumes and prices in Central Western Europe



Source: Platts

Figure 14 – Weekly average wholesale power prices in the CWE region

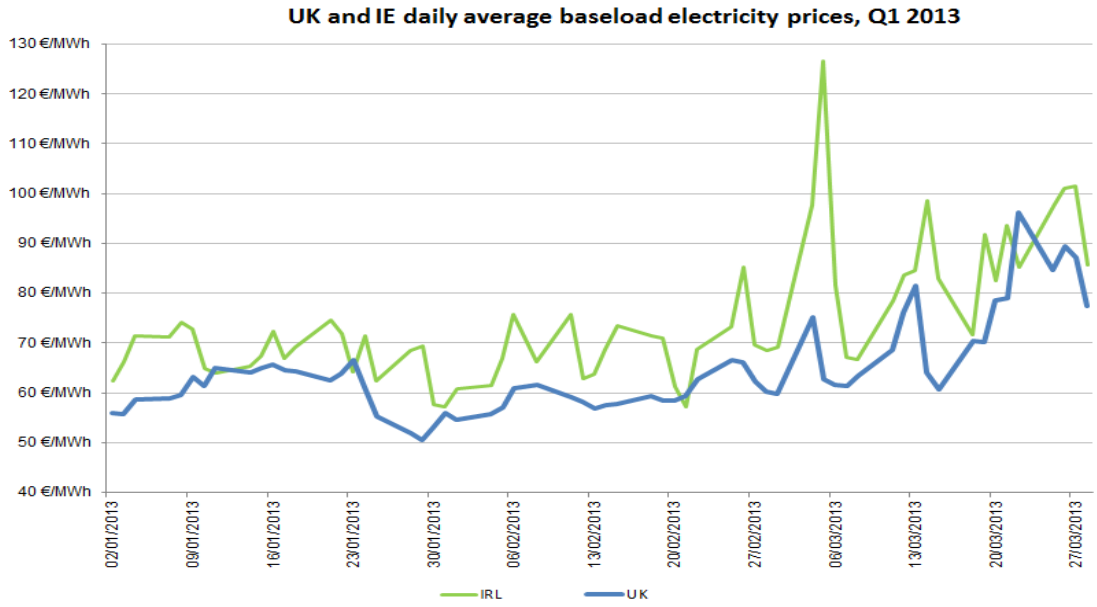


Source: Platts.

4.2 British Isles (UK, Ireland)

- In January and February 2013, UK daily average baseload power price fluctuated in a range of 55-65 €/MWh, which was higher than most of the continental European prices. The power price level was mainly impacted by high domestic gas prices and as wind power generation was low, renewables could not contribute to reducing power generation costs.
- Although clean dark spreads* reached their highest levels in Q1 2013 in the UK in the last four years, the share of coal-fired generation in the power mix has only slightly increased compared to Q1 2012. This could be explained by a number of coal-fired capacities being taken off the grid. Such plants – which had been exempted from the emission requirements of the Large Combustion Plant Directive (LCPD), under the condition that they would be allowed to operate only for a limited time - had reached the limit of their maximum operational hours set by the LCPD.
- As March 2013 was very cold in the UK and gas storages rapidly depleted, domestic gas prices on the NBP hub reached record highs on some trading days. On the 22nd of March the NBP daily average price reached 42.1 €/MWh. This was also due to a maintenance-related disruption in the Belgium-UK gas interconnector.
- On the same day, the UK daily baseload power prices peaked above 96 €/MWh, which was the highest level recorded since January 2009. Although wind generation reached a record high during the last week of March, it had a minor impact on the price level, in parallel with the receding industrial power demand ahead of the Easter holidays.
- As power generation in Ireland heavily depends on gas imported from the UK, the Irish wholesale power price closely tracked the evolution of its UK peer. On the 4th of March, the daily average Irish price rose above 126 €/MWh, mainly due to a temporary import supply disruption on the UK-Ireland electricity interconnector.

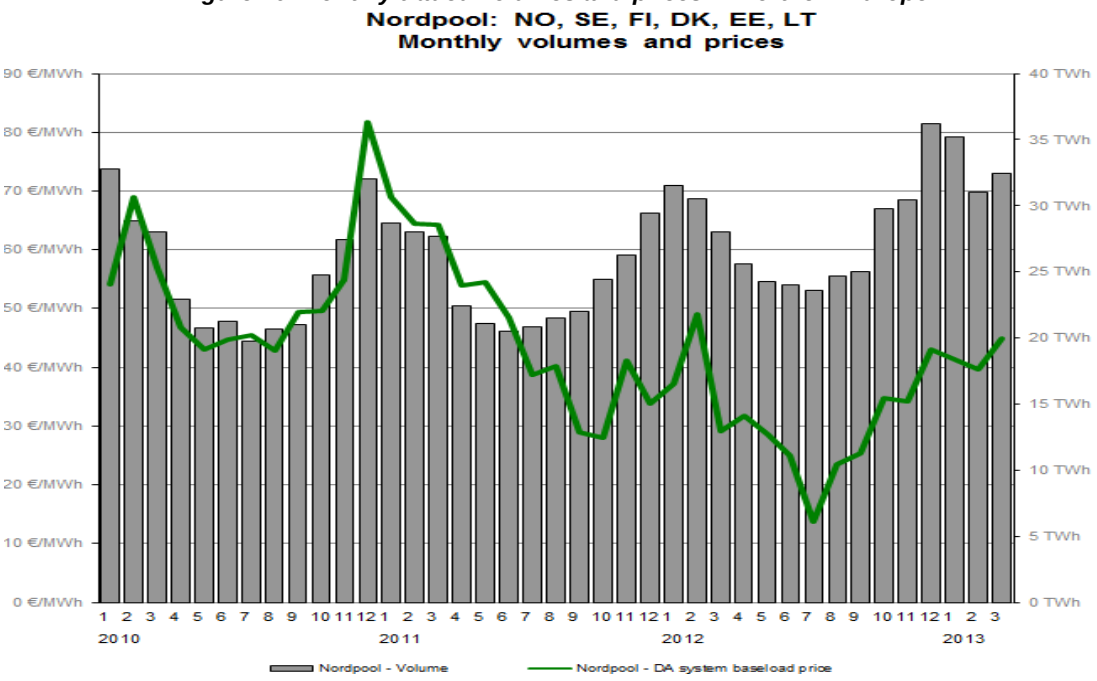
Figure 15 – Daily average power prices in the UK and Ireland



4.3 Northern Europe (Denmark, Estonia, Finland, Lithuania, Norway, Sweden)

- As *Figure 16* shows, the monthly average baseload power price in the Nordpoolspot market shows strong seasonality and the highest monthly price can normally be observed in the first quarter of the year. Hydro reserve levels are the lowest during the first three to four months of the year (See *Figure 12*), and in 2013 actual levels were slightly below the long term average, reducing domestic hydro supply.
- In Q1 2013, the weather impacted demand for power mainly in March 2013, which was colder than normal, while in the first two months temperatures corresponded to the long term seasonal averages. The average monthly power price in March 2013 (44.8 €/MWh) was higher than in February (39 €/MWh), which is quite unusual, as normally the weather is milder in March.
- The daily average Nordpoolspot system price fluctuated in a narrow range of 40-50 €/MWh during most of the quarter. This stability was also due to the healthy level of nuclear power generation in the region, and due to an important contribution of biomass to the overall power mix in Sweden and Finland.
- Lower hydro-based power generation also reduced power exports from the region to Central and Western Europe. Low German power prices resulted in a discount of Nordpool system price to Germany on many trading days, making power exports from the Nordic market to the CWE region less profitable.

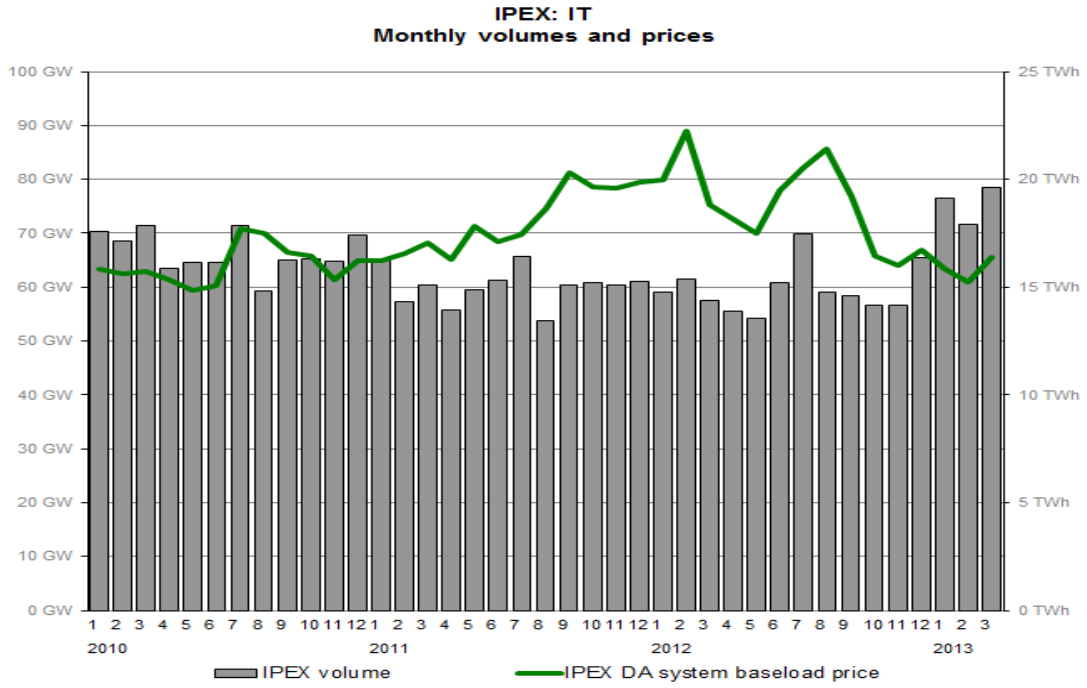
Figure 16–Monthly traded volumes and prices in Northern Europe



4.4 Apennine Peninsula (Italy)

- In the first two months of 2013, low demand for electricity, stemming from limited heating needs and limited industrial power demand, weighed down on wholesale power prices in Italy. On the supply side, decreasing gas prices on the PSV hub and increasing share of wind and hydro based generation assured lower generation costs compared to the same period of 2012.
- As a consequence of these supply and demand side factors, the monthly average national wholesale power price fell below 61 €/MWh in February 2013, reaching its lowest level since June 2010.
- In March 2013 however, wholesale power prices rose again and a monthly average of 66 €/MWh was reached. This was mainly due to the rise in natural gas prices during the last week of March and to the increasing import power price from France, as the Italian power market heavily depends on imports.

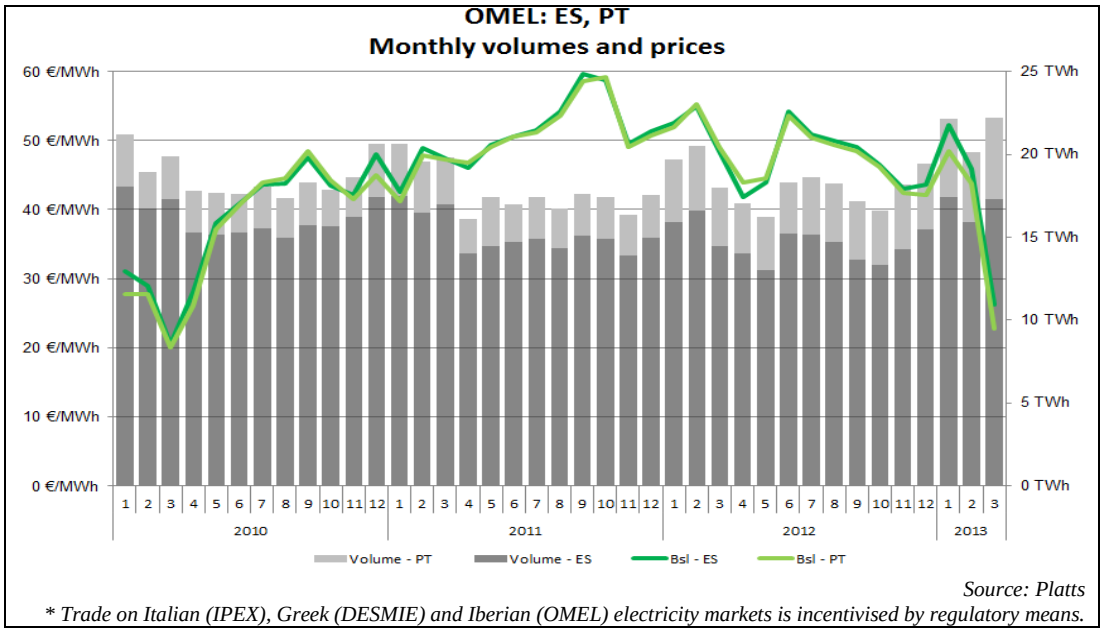
Figure 17–Monthly traded volumes and prices in Italy



4.5 Iberian Peninsula (Spain and Portugal)

- Baseload power prices in the Iberian peninsula experienced a sharp decrease in the first quarter of 2013. While in January 2013 the baseload Spanish price averaged 52 €/MWh and the Portuguese price averaged 49 €/MWh, in March they fell to averages of 26 €/MWh and 23 €/MWh, respectively, the lowest since March 2010.
- On the 28th of March the Spanish daily average baseload price even fell to 0.13 €/MWh, being the lowest since the beginning of 2007. This was mainly due to the subdued industrial power demand ahead of the Easter holidays and low power generation costs.
- The main reason for the low power generation costs was a shift in the generation mix from fossil fuels to cheaper hydro and renewables generation. While in the first two months of 2012 the share of wind in the power generation mix amounted to 17% (and hydro remained below 7%), in January-February 2013 the share of wind was 25% and the contribution of hydro reached 18%.
- In the first quarter of 2013, wholesale prices did not appear to be reflecting the impact of the new 7% tax on electricity generation in Spain. As wholesale power prices in the market are set by sources representing the marginal generation costs (mainly gas-fired generation in the case of Spain), utilities could not pass through the new tax on wholesale prices, as the share of hydro and renewables, having lower marginal generation costs, significantly increased in the first quarter of 2013.

Figure 18–Monthly traded volumes and prices in the Iberian Peninsula



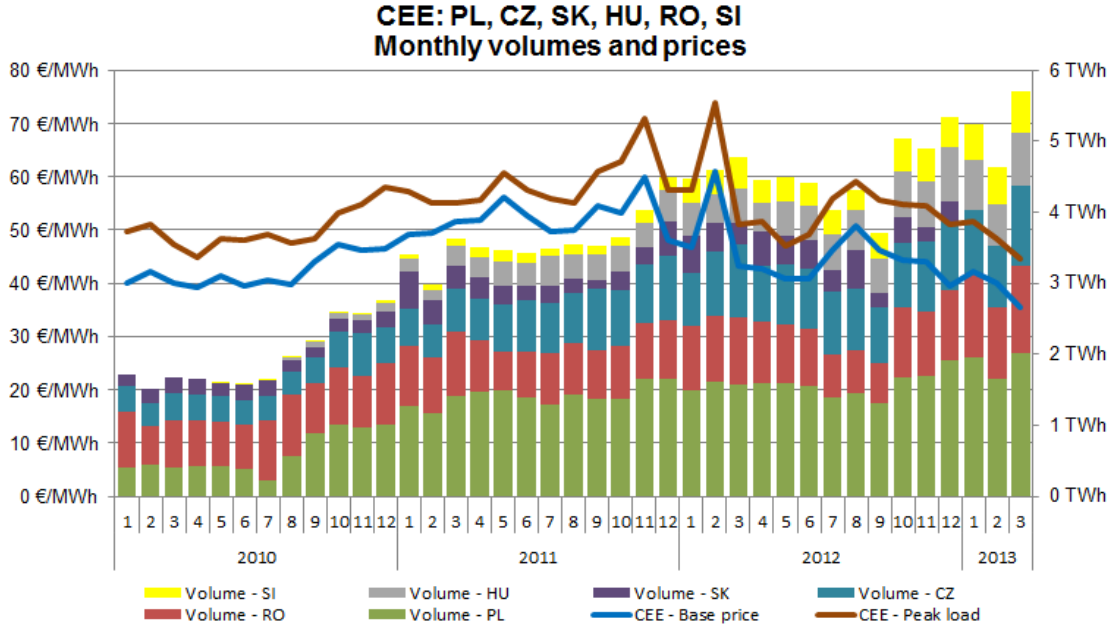
Source: Platts

** Trade on Italian (IPEX), Greek (DESMIE) and Iberian (OMEL) electricity markets is incentivised by regulatory means.*

4.6 Central Eastern Europe (Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia)

- Traded volume of power in the CEE region continued its dynamic growth in in the first quarter of 2013, reaching almost 6 TWh in March 2013, which was more than three times as much as in March 2010. In Q4 2012 the combined volume of traded power represented 15.2% of the quarterly gross electricity consumption in the six CEE countries, which was significantly higher than in the first quarter of 2010 (5%).

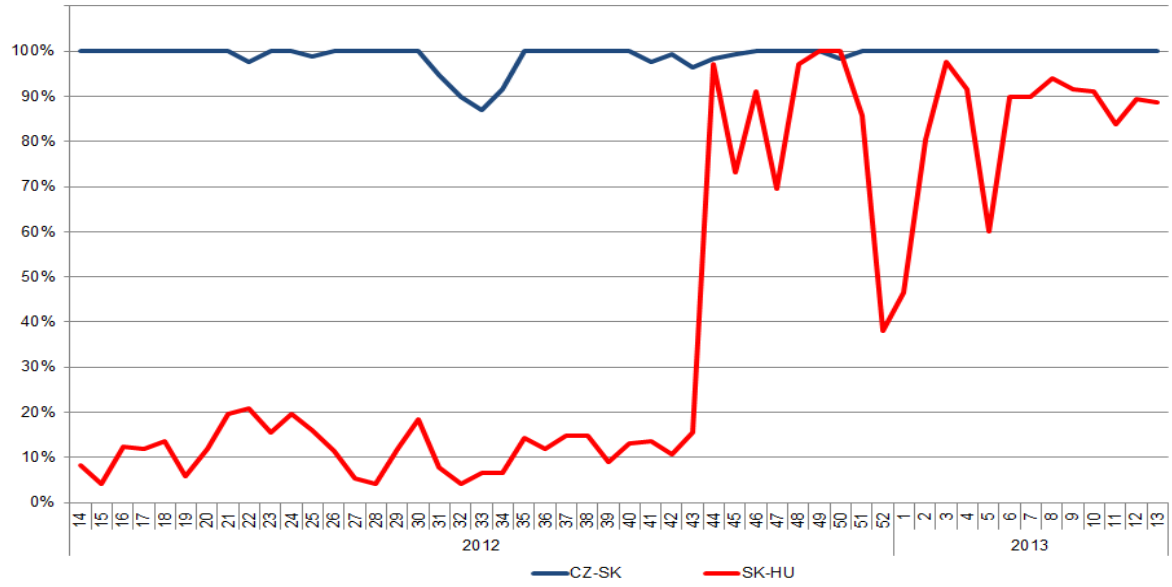
Figure 19–Monthly traded volumes and prices in Central Eastern Europe



- Both baseload and peakload monthly average power prices continued their downward trends in the first quarter of 2013. In March 2013, the monthly average baseload price fell to 35.6 €/MWh and the peakload average was 44.7 €/MWh, reaching their lowest levels since the summer of 2009.
- Milder-than-usual weather in the first two months of 2013, abundant renewable power generation in the region and in Germany, healthy levels of hydro availability in Romania and in the Balkan countries all contributed to low regional wholesale electricity prices. Even the long-lasting cold weather in March could not reverse the downward trend of prices.

- *Figure 20* shows the impact of regional market coupling on the convergence of hourly power prices. In the first quarter of 2013, Hungarian and Slovakian prices converged during 85% of all trading hours, implying that the hourly price differential was less than 1 €/MWh in these periods.

Figure 20 – Weekly percentage ratio of price-convergent hours between the Czech and Slovak markets and between the Slovak and Hungarian markets[1]

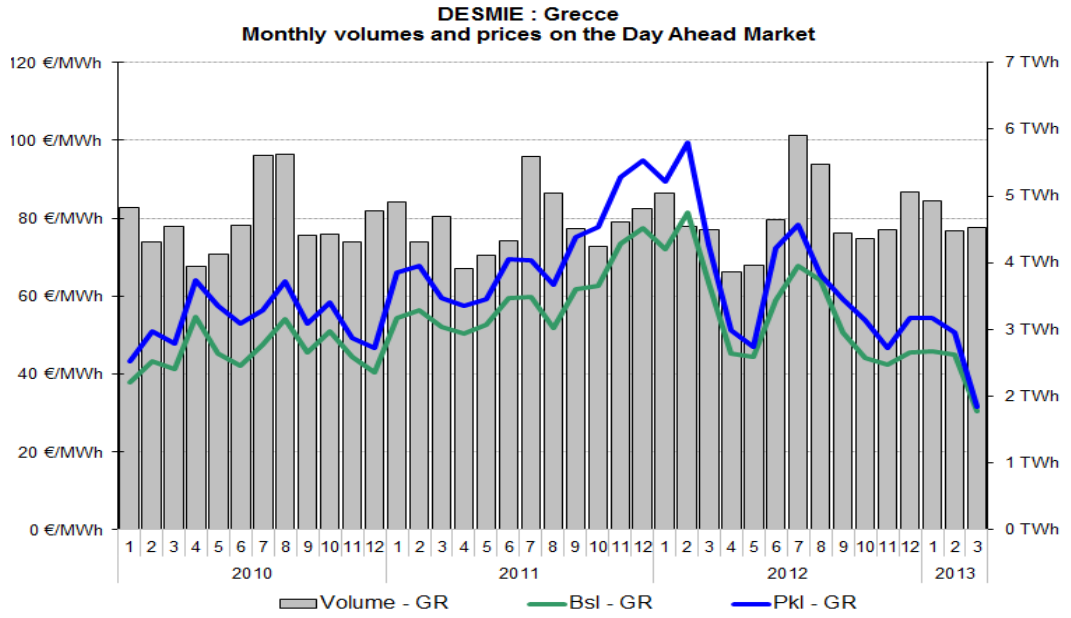


[1]Two neigbouring markets'hourly prices are considered to be convergent if the difference between them is less than 1 €/MWh. The weekly ratio of price-convergent hours means the number of such hours divided by the number of hours in a week (168)

4.7 South Eastern Europe (Greece)

- Greece was among the few countries in Europe where the weather was milder than usual during the whole first quarter of 2013. Mild weather meant that heating-related electricity demand went down, while industrial demand remained subdued.
- In February 2013, both Greek electricity production and consumption fell to their second lowest value during the last decade. The bulk of the decrease in power generation could be linked to fossil fuels, while hydro and renewable based generation increased their share within the power mix, making generation costs lower.
- As a consequence of these supply and demand side factors, Greek baseload and peakload monthly average prices fell to their lowest levels since the beginning of the available time series (30.6 €/MWh and 31.6 €/MWh, respectively). On the 21st of March, the daily average baseload price (10.2 €/MWh) reached its lowest level since July 2005.

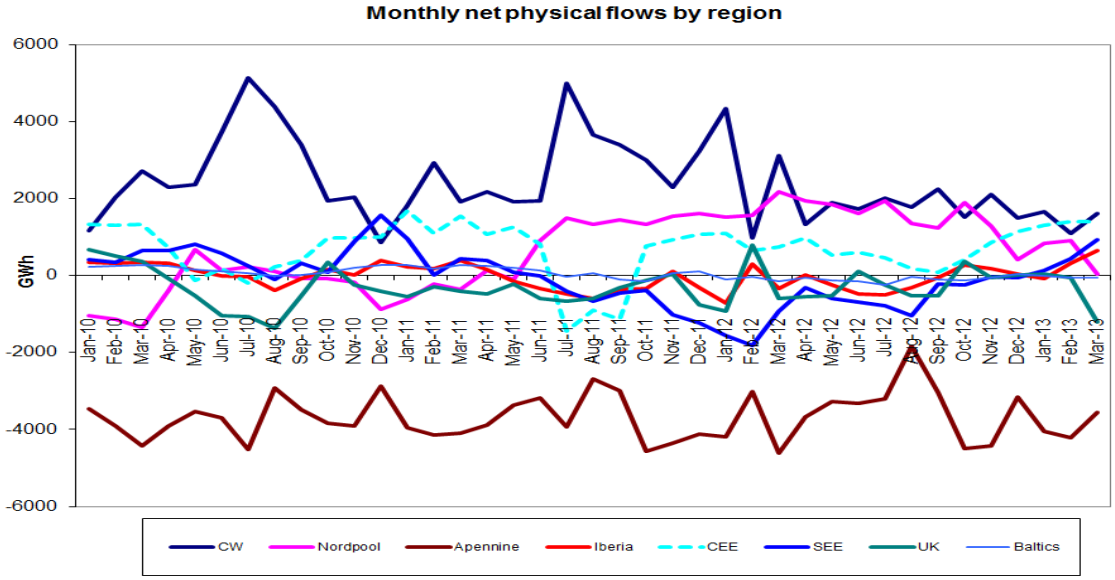
Figure 21– Monthly traded volumes and prices in Greece



5 Building the internal market for electricity: cross border flows and trade

- In the first quarter of 2013 monthly cross-border physical power flows in the EU-27 reached 25 TWh on average, which was the highest level since data has been available. Compared to the first quarter of 2010 cross-border flows grew by nearly 33%, and on a year-on-year comparison, they grew by 4.3% in the first quarter of 2013.
- Traded volume of power in the European wholesale markets increased by more than 10% in Q1 2013. Combined with stagnating electricity consumption and growth in cross border physical flows, this contributed to increasing market liquidity, growing interdependency and integration of European electricity markets.
- In the first quarter of 2013 the CWE region remained in a strong net cross-border power outflow position. Both CEE and SEE regions reached their strongest net outflow position since the beginning of 2011, primarily owing to good hydro availability in the Balkans and good regional renewables supply. The British Isles region reached its strongest net power inflow positions since the summer of 2010, due to increasing import needs. The Nordic area reached a balanced position after being a net power exporter for almost two years.

Figure 22 – EU cross border monthly physical flows by region

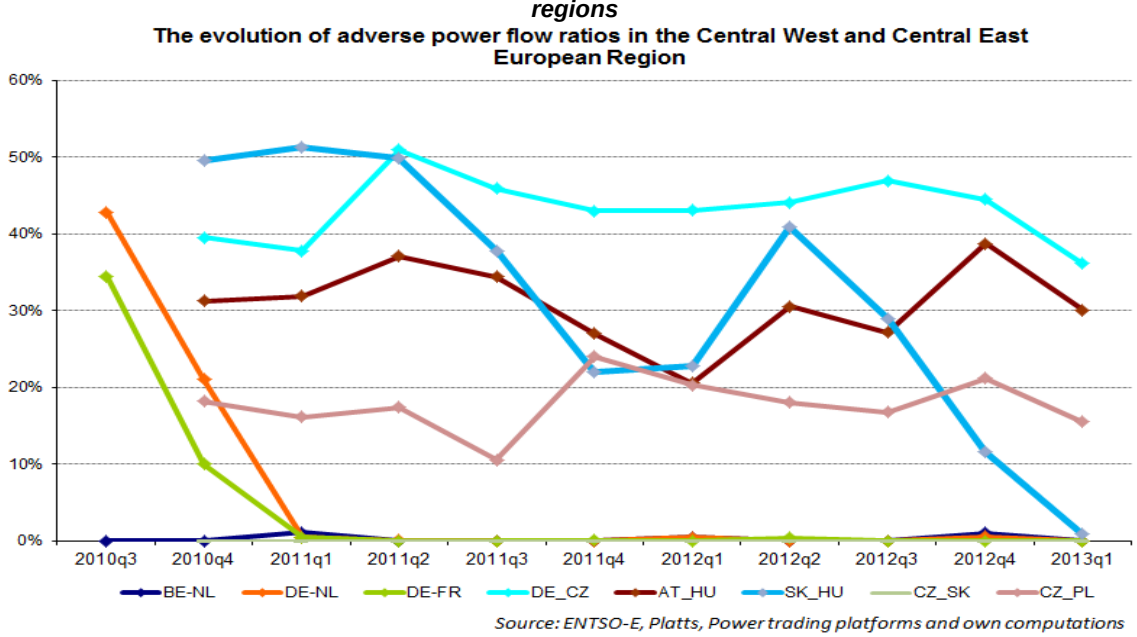


European countries are grouped in the following regions:

Central Western Europe	*DE, NL, FR, BE, AT, CH*	*Nordic*	*SE, FI, DK, NO*
Central Eastern Europe	*PL, CZ, HU, SK*	*British Isles*	*UK, IE (from July 2010 on)*
Iberian Peninsula	*ES, PT*	*Apennine Peninsula*	*IT*
South Eastern Europe	*SI, GR, BG, RO, HR, AL, FYROM, RS*	*Baltic*	*EE, LT, LV*

- The ratio of adverse power flows (or flows against price differentials - FAPDs*) is a useful measure of the effectiveness of existing market couplings or integration of neighbouring power markets. *Figure 23* below provides a perfect example of the difference between coupled and non-coupled neighbouring markets.
- In the Central West European region the ratio of power flows against price differentials remained insignificant in the first quarter of 2013, though prices in certain regional markets showed clear signs of divergence from others. Another good example for market couplings can be found in Central Europe, notably between the Slovakian and Hungarian markets, where adverse flow ratios fell below 1% in Q1 2013 from 40% measured in Q2 2012.
- *Figure 24* shows the evolution of adverse power flow ratios between Italy and its neighbours. Since 2011 market coupling exists between Italy and Slovenia, and as can be observed, FAPD ratios are low between the two countries. However, given the permanently high price premium of the Italian power market to most of its neighbours, low adverse flow ratios might provide misleading information in some cases. While market coupling normally lead to low adverse flow ratios, low FAPD ratios do not necessarily demonstrate the existence of an effectively functioning cross-border power trade relationship.

Figure 23 – Evolution of adverse power flow ratios in the Central Western and Central Eastern European regions



Source: ENTSO-E, Platts, Power trading platforms and own computations

Figure 24 – Evolution of adverse power flow ratios between Italy and its neighbours

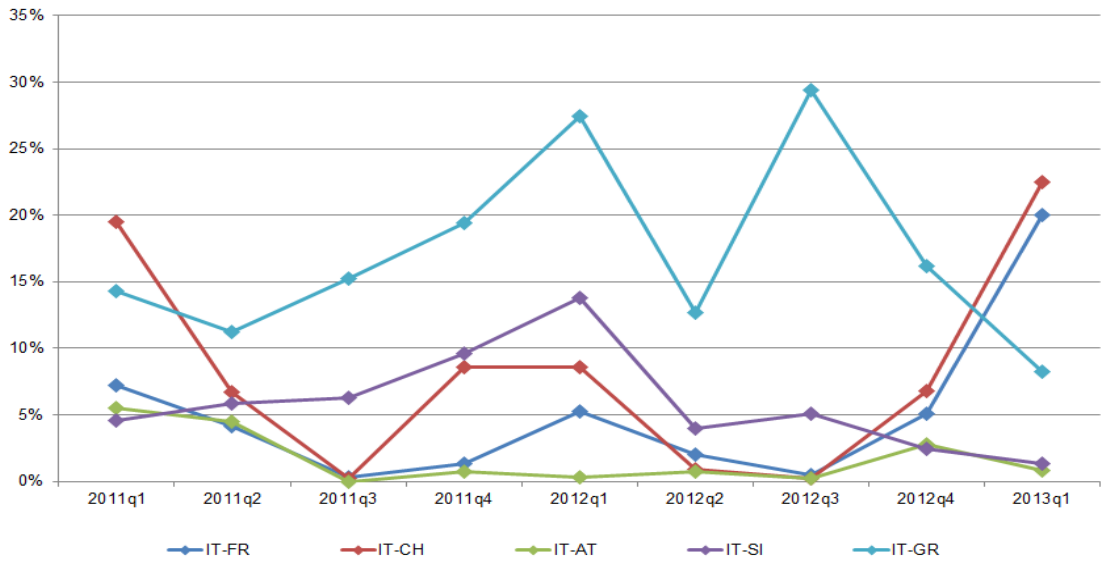
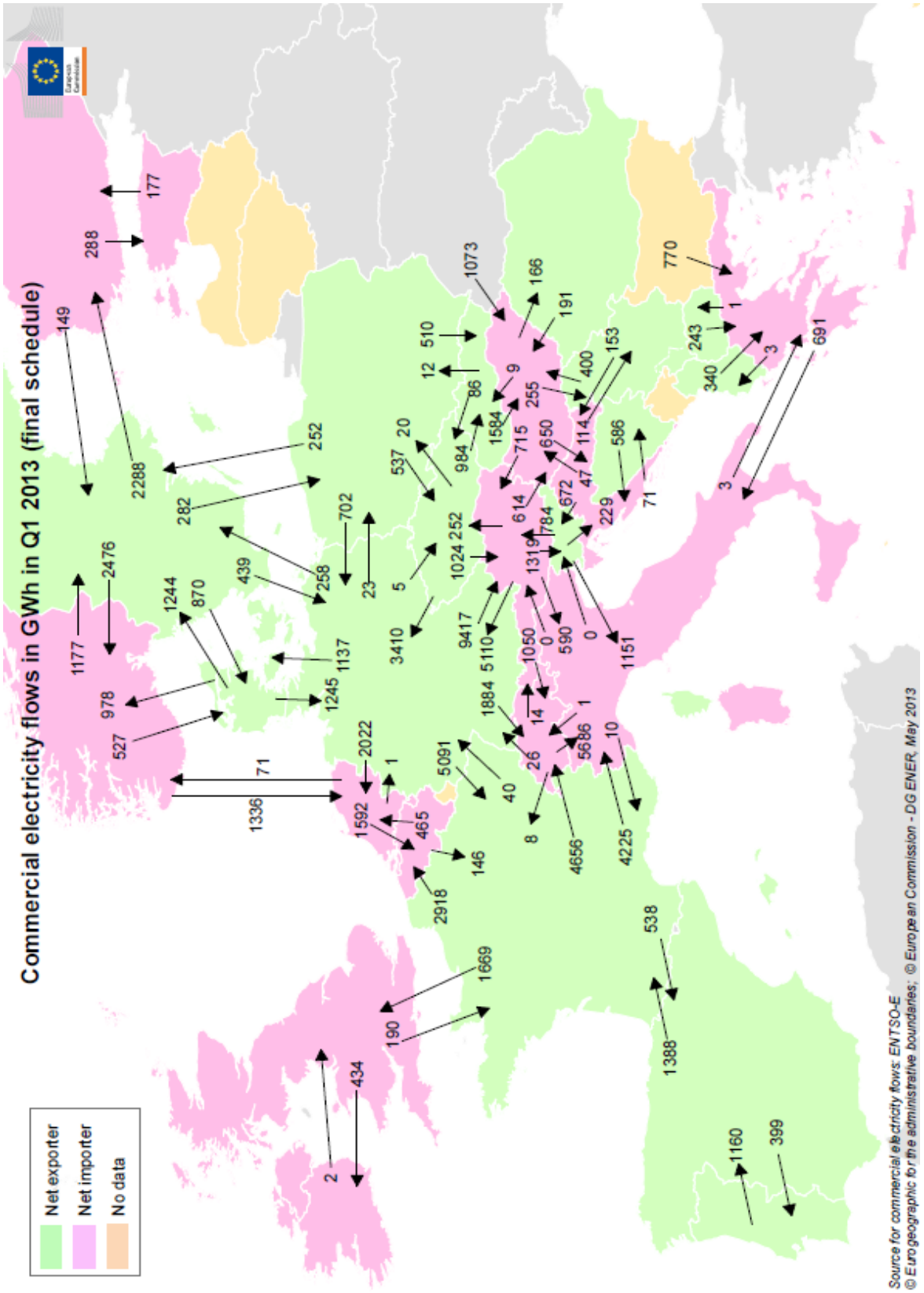


***Figure 25* – Commercial electricity flows in GWh in Q1 2013 (Final Schedule)**



Data for some countries are not available (see the legend). Due to presentation constraints the Northern European countries and Cyprus cannot be included on the map completely. Data on the commercial flows concerning Romania, Bulgaria and Serbia are not complete. There is no data available on Kosovo under UNSCR 12/4499. Data on flows between Germany and Austria are estimates. For the majority of the reported borders, commercial flow data is netted on hourly frequency. In the case of the Czech-Slovak border, gross commercial values are given.

6 Retail electricity prices in the EU

- In the second half of 2012, similarly to the previous semesters, there were significant differences across EU Member States regarding retail electricity prices paid by households and industrial consumers.

- In household consumption band D_c (annual consumption between 2,500 kWh and 5,000 kWh) households in Bulgaria paid the lowest price (9.6 €cents/kWh, including taxes), while households in Denmark paid the highest price (29.8 €cents/kWh, including taxes).

- In industrial consumption band I_c (annual consumption between 500 MWh and 2,000MWh) consumers in Estonia paid the lowest price (9.4 €cents/kWh, including taxes), while consumers in Cyprus paid the highest price (27.3 €cents/kWh).

- In the second half of 2012 the ratio of the most expensive and the cheapest retail electricity price across EU Member States was 3 for industrial customers and 3.1 for households in I_c and D_c consumption bands.

- In most of the household annual electricity consumption bands, the difference in retail prices between the cheapest and the most expensive Member State decreased since 2008 (s*ee Figure 26*). In D_c consumption band, the ratio of the highest and the lowest tax-inclusive retail price was 3.7 in the first half of 2008, while it went down to 3.5 and 3.1, respectively, in the first and the second half of 2012. Thus, greater price convergence could be observed for household consumers in different EU countries in the last five years, though in some periods prices showed signs of greater divergence.

- In the case of industrial consumers the most significant developments in price convergence (in terms of decreasing highest-lowest retail price ratios) could mainly be observed in higher annual consumption bands over this five-year period; in the case of Ic band the ratio slightly decreased from 3.2 to 3.0. In the case of lower annual consumption bands, differences have always been less significant than for large consumers. (*See Figure 27*). Compared to household consumers, the range of highest-lowest industrial retail price ratios across consumption bands was narrower in the second half of 2012 (2.0-3.9 for industrial consumers vs. 3.0-6.2 for households).

- Compared to the first half of 2012 there were only two Member States where household consumers in D_c band paid less in the second half of 2012, while in twenty-two Member States retail electricity prices rose. The highest price increase could be observed in Bulgaria (12.9%), while in Belgium prices went down by 4.5%.

- In the second half of 2012 there were eight Member States where retail prices for industrial customers (having an annual consumption corresponding to I_c band) decreased, while in fifteen Member States retail prices went up compared to the previous semester. The greatest price increase could be observed in Italy (20%), while in France prices fell by 13%.

- The two maps on the next two pages show retail electricity prices paid by households (with an annual consumption between 2,500 kWh and 5000 kWh, including all taxes) and by industrial customers (with an annual consumption between 500 MWh and 2,000MWh, including all taxes) in the second half of 2012, which are the most recent available Eurostat data.

***Figure 26* – Ratio of the highest and lowest retail electricity prices piad by households in different annual consumption bands in the EU-27 (all taxes included)**

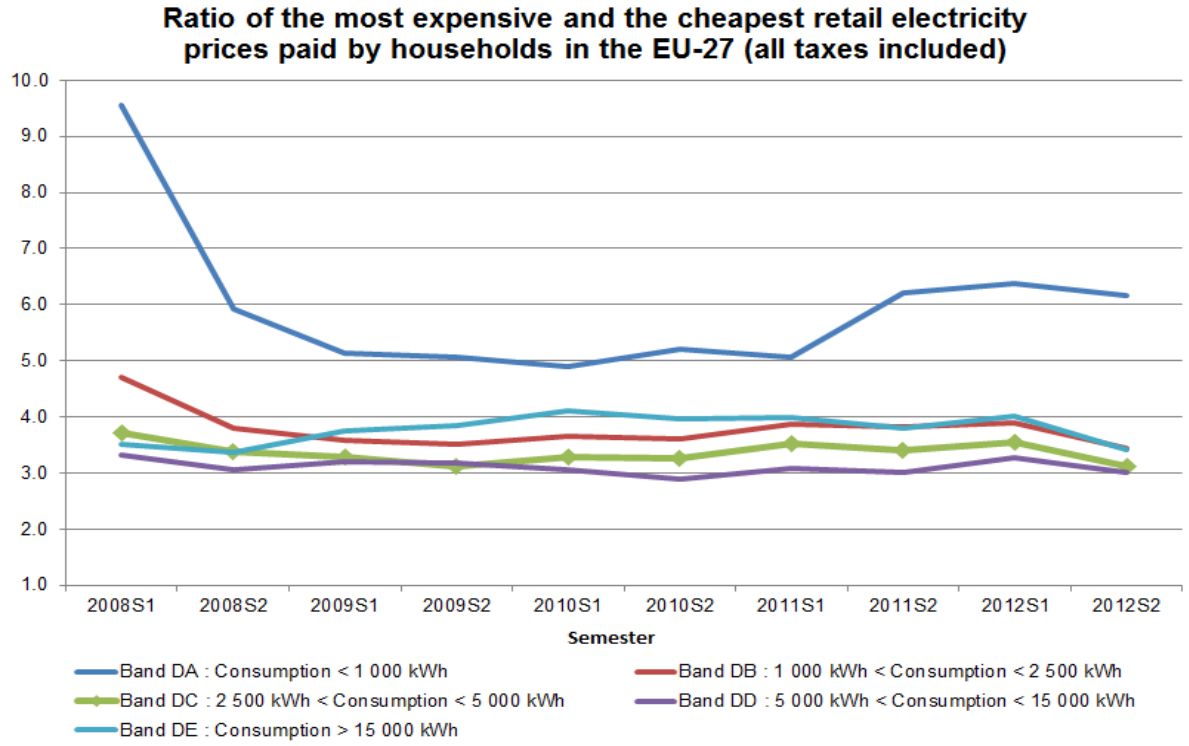


***Figure 27* – Ratio of the highest and lowest retail electricity prices piad by industrial consumers in some annual consumption bands in the EU-27 (all taxes included)**

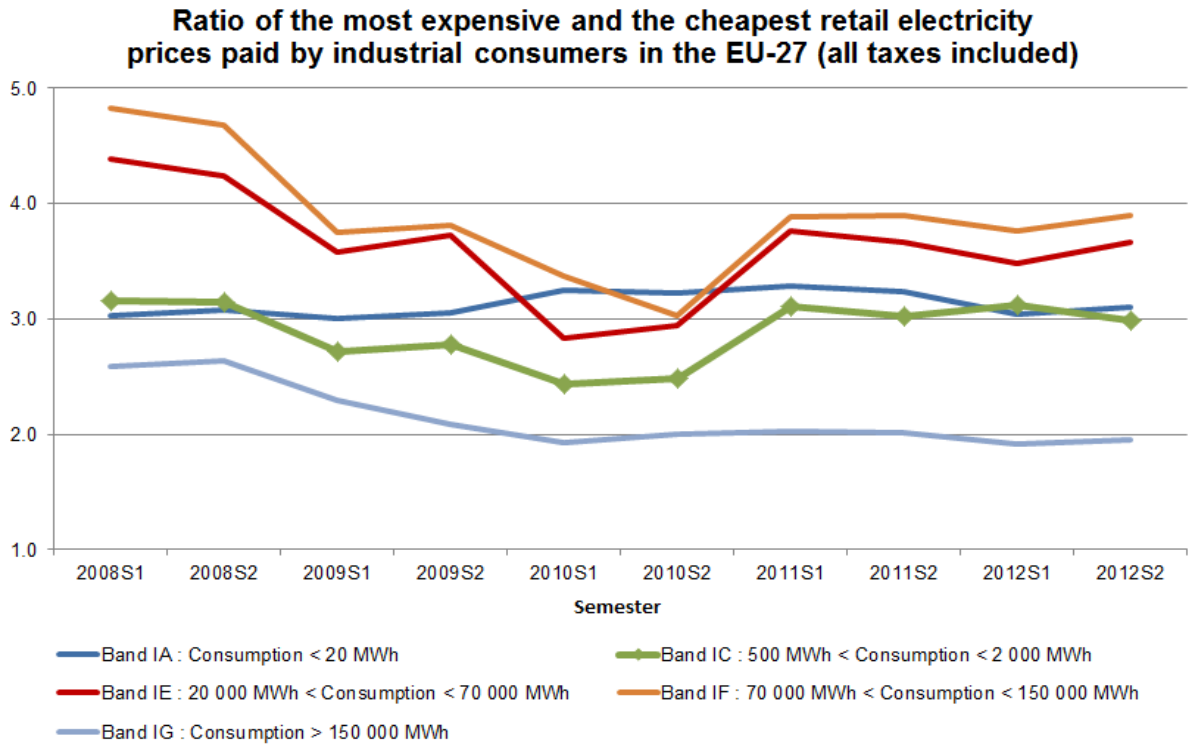
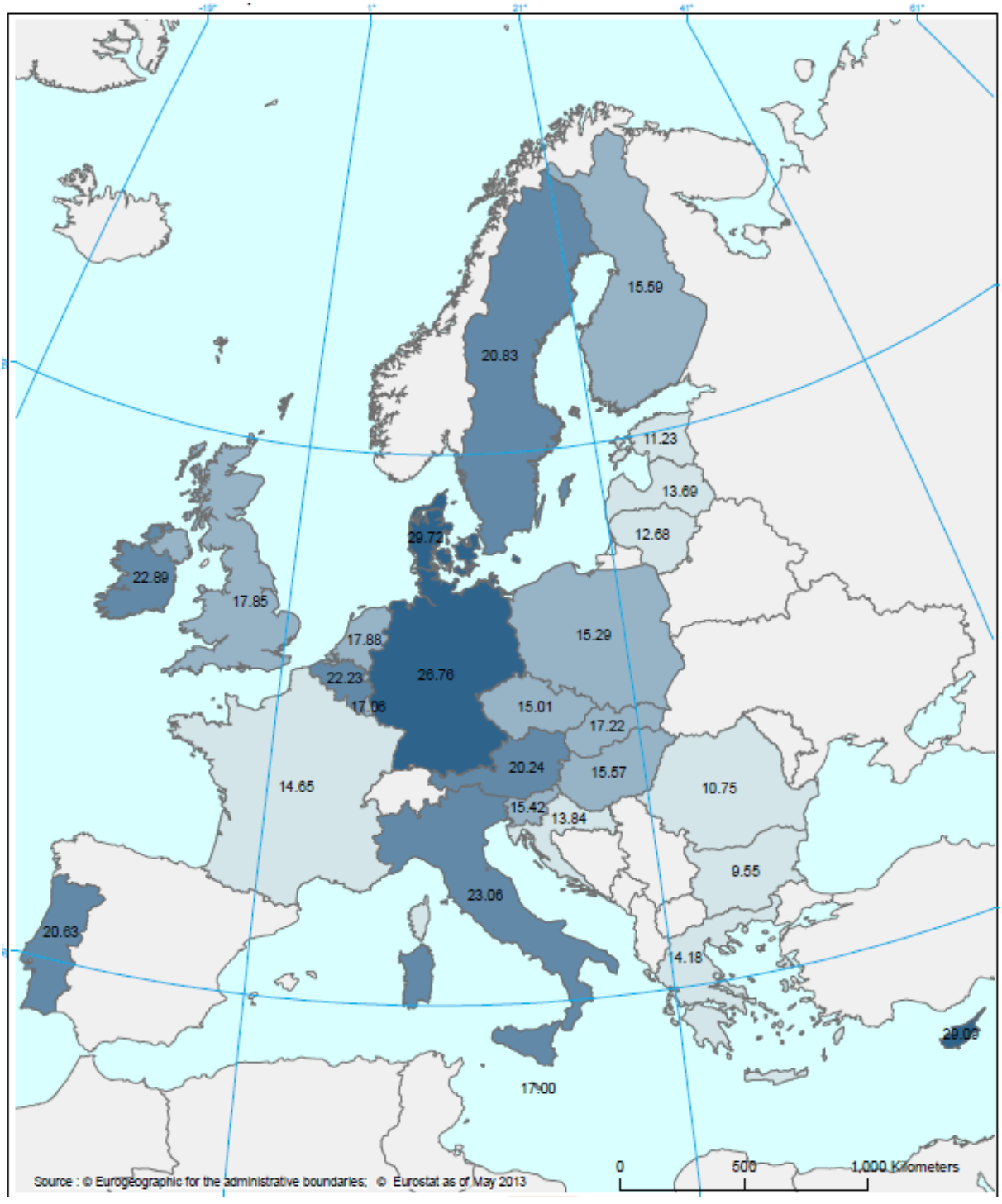


Figure 28 – **Electricity prices (inclusive of taxes) – Households – Prices: 2nd semester 2012**

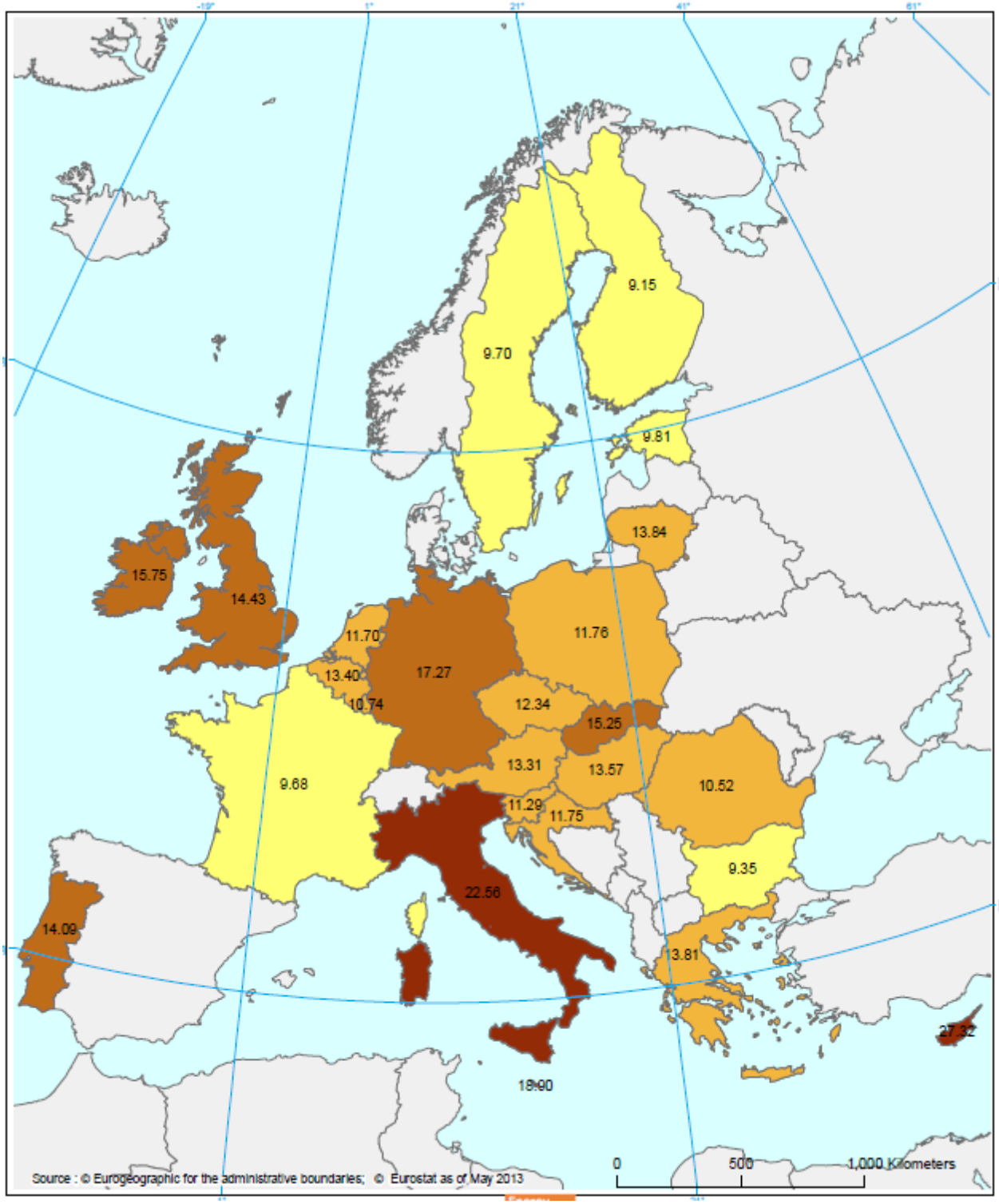


Band Dc : 2 500 kWh < Consumption < 5 000 kWh

Prices per kWh (c€)

- no data
- < 15,01
- 15,01 - 20,00
- 20,01 - 25,00
- > 25,00

Figure 29 – **Electricity prices (inclusive of taxes) – Industrial consumers – Prices: 2nd semester 2012**



Band Ic : 500 MWh < Consumption < 2 000 MWh

Prices per kWh (c€)

- no data
- < 10,01
- 10,01- 14,00
- 14,01 - 18,00
- > 18,00

7 Glossary

Backwardation occurs when the closer-to-maturity contract is priced higher than the contract which matures at a later stage.

Clean dark spreads are defined as the average difference between the price of coal and carbon emission, and the equivalent price of electricity. If the level of dark spreads is above 0, coal power plant operators are competitive in the observed period

Clean spark spreads are defined as the average difference between the cost of gas and emissions, and the equivalent price of electricity.

Contango: A situation of contango arises in the when the closer to maturity contract has a lower price than the contract which is longer to maturity on the forward curve.

Cooling degree days (CDDs) are defined in a similar manner; the higher the outdoor temperature is, the higher is the number of CDDs. On those days, when the daily average outdoor temperature is higher than 21^{o}C, CDD values are in the range of positive numbers, otherwise CDD equals zero.

Dark spreads are reported as indicative prices giving the average difference between the cost of coal delivered ex-ship and the power price. As such, they do not include operation, maintenance or transport costs. Spreads are defined for a coal-fired plant with 35 % efficiency. Dark spreads are given for UK and Germany, with the coal and power reference price as reported by *Platts*.

Flow against price differentials (FAPDs): By combining hourly price and flow data, FAPDs are designed to give a measure of the consistency of economic decisions of market participants in the context of close to real time operation of electrical systems.
With the closure of the day-ahead markets (D-1), the prices for each hourly slot of day D are known by market participants. Based on the information from the power exchanges of two neighbouring areas, market participants can establish hourly price differentials. Later in D-1, market participants also nominate commercial schedules for day D. An event named 'flow against price differentials' (FAPD) occurs when commercial nominations for cross border capacities are such that power is set to flow from a higher price area to a lower price area. The FAPD chart provides detailed information on adverse flows. It has two panels.
The first panel estimates the ratio of the number of hours with adverse flows to the number of total trading hours in a quarter. It also estimates the monetary value of energy exchanged in adverse flow regime compared to the total value of energy exchanged across the border. The monetary value of energy exchanged in adverse flow regime is also referred to as "welfare loss". A colour code informs about the relative size of FAPD hours in the observed sample, going from green if less than 10% of traded hours in a given quarter are FAPDs to red if more than 50% of the hours are FAPDs.
The second panel gives the split of FAPDs by subcategory of pre-established intervals of price differentials. It represents the average exchanged energy and relative importance of each subcategory on two vertical axes.

Heating degree days (HDDs) express the severity of a meteorological condition for a given area and in a specific time period. HDDs are defined relative to the outdoor temperature and to what is considered as comfortable room temperature. The colder is the weather, the higher is the number of HDDs. These quantitative indices are designed to reflect the demand for energy needed to heat a building.

Spark spreads are reported as indicative prices giving the average difference between the cost of natural gas delivered ex-ship and the power price. As such, they do not include operation, maintenance or transport costs. Spreads are defined for a gas-fired plant with 50 % efficiency. Spark spreads are given for UK and Germany, with the gas and power reference price as reported by *Platts*.

Tariff deficit expresses the difference between the price (called a tariff) that a *regulated utility*, such as an electricity producer is allowed to charge and its generation cost per unit.