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Quarterly Report on European Electricity Markets

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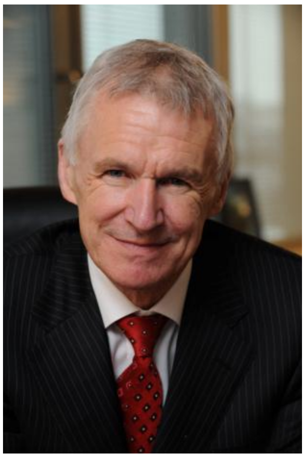
Director-General



Dear readers,

In the third quarter of 2011, several factors combined to keep prices down in EU electricity markets. There was the usual seasonal drop in industrial demand. In addition, in many parts of Europe the weather was cooler than normal in July and early August. These factors, compounded by the macroeconomic situation in the Eurozone, put downward pressure on prices in that period. In addition, a continued oversupply of emission allowances depressed carbon prices which further kept wholesale prices down.

Differences in price trends due to specific regional events come through quite strongly in this report. In September 2011, warm temperatures and maintenance works on some electricity interconnectors in parts of Central, Eastern and Southern Europe helped to push power prices up to levels not seen since 2008. During the same period, abundant rainfalls in Scandinavia pulled power prices below 5 €/MWh in some market areas in Norway. These examples clearly show the need for EU policies to reinforce interconnections in order to reduce regional imbalances.

The issue reports for the first time on developments on the Slovenian wholesale power market.

In the section 'Focus on', we analyse the nuclear stress tests in the EU and some neighbouring states. These were initiated by the European Council's decision after the nuclear power plant accident in Japan in March 2011.

Philip Lowe

HIGHLIGHTS

- In July 2011 weather was cool and rainy in many Central and West European countries and therefore the lack of cooling needs helped to keep prices lower. Concerns about the eurozone's and global economic situation, falling carbon emission prices and lower industrial demand all resulted in decreasing prices in the Central West European region until mid-August 2011.

- In the second half of Q3 2011 power prices started to rise again in the majority of the European markets. This was helped by better performance of equity and commodity markets and by rebounding CO_2 emission prices. Although from the second half of September 2011 commodity markets took a downturn again, power prices on many European markets remained close to their quarterly highs.

- September 2011 was a particularly warm month regarding the seasonal norms in almost all Europe and this resulted in extra cooling demand mainly in Southern Europe and in some countries of the Central East European region. On the Spanish and Italian markets baseload power prices reached their highest levels last seen in 2008 during some trading days of Q3 2011.

- Some one-off events affecting power prices in Q3 2011 were also noteworthy. At the end of August 2011 gas prices on the UK market showed a sudden upturn, based on information on planned maintenance works on LNG gasification facilities in Qatar. This spike in gas prices resulted in rises in power prices in the UK, which proved to be short-lived after gas prices normalised. Other important event during September 2011 was the maintenance works on interconnectors between Hungary and its tow neighbours (Austria and Slovakia) that exerted upward pressure on regional power prices also affected by warm weather. On the Nordic markets, especially in Norway extremely low daily prices could be observed in mid-September due to abundant rainfalls.

- In this quarterly report the 'Focus on' part deals with the nuclear stress test performed during 2011 in the European countries and in some of the neighbours of the EU. Carrying out such stress test was decided by the European Council in spring 2011 after the Fukushima nuclear power plant accident in Japan.

NEW FEATURES IN THIS REPORT

- Market reporting coverage has been extended to Slovenia.

QUARTERLY REPORT ON EUROPEAN ELECTRICITY MARKETS

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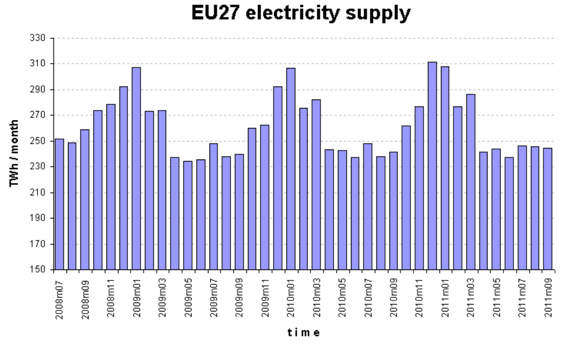
A. Recent developments in the electricity markets across Europe

In the third quarter of 2011 electricity supply in the EU-27 amounted to 736.8 TWh. This was 1.3% higher than the electricity supply measured in the third quarter of 2010 and increased by 1.9% compared to Q2 2011. The evolution of electricity supply in the EU-27 has a strong seasonal nature: in the second quarter it reaches the lowest quarterly volume in the year and in the third quarter it remains still low. The third quarter of the year is the peak of the holiday season that also reduces industrial demand in many European countries, though cooling needs of households implies an additional power demand.



Source : Eurostat

Adapting to the changes in Eurostat's database, electricity supply is now presented instead of gross inland consumption.

The next table shows the number of cooling degree days[1] (CDD) in those European countries where cooling needs of households entail an extra demand for power during the summer period. On EU-27 level and in the majority of the selected countries July 2011 was cooler than the same month of 2010. CDDs corresponded to the long-term values in July 2011 or were slightly higher than the twenty-year average. In August 2011 as temperatures rose CDDs were above the long-term average in almost all of the observed countries.

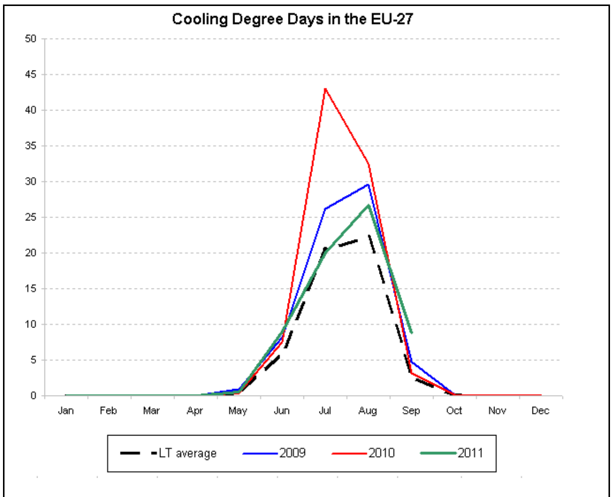
September 2011 proved to be a particularly warm month on the whole continent, providing for a support on power demand and electricity prices in many European countries. The chart showing the evolution of cooling degree days makes it easy to compare the summer periods of the last couple of years.

Cooling Degree Days (CDD) for the EU-27 and selected EU countries* in Q3 2011 - LT. average refers to the average of values measured between 1984 and 2004

		July	August	September
Bulgaria	2010	43.26	105.36	0.00
	2011	67.94	39.47	15.66
	LT. average	41.87	37.88	2.13
Cyprus	2010	192.26	268.65	161.69
	2011	199.72	215.67	133.94
	LT. average	171.14	179.64	87.23
Spain	2010	105.41	90.83	15.89
	2011	58.75	88.82	25.88
	LT. average	59.42	59.69	9.57
Greece	2010	119.54	178.46	10.71
	2011	125.50	111.93	54.76
	LT. average	95.46	91.95	13.38
France	2010	22.56	7.89	0.00
	2011	2.37	17.39	2.78
	LT. average	8.91	14.62	0.41
Hungary	2010	61.81	16.42	0.00
	2011	40.99	38.29	5.14
	LT. average	23.54	24.57	0.31
Italy	2010	110.07	64.72	2.14
	2011	53.06	94.03	40.82
	LT. average	52.09	69.52	5.12
Malta	2010	186.95	203.60	68.79
	2011	176.41	184.25	114.19
	LT. average	157.18	192.58	97.51
Portugal	2010	90.59	96.46	19.85
	2011	32.82	48.04	21.02
	LT. average	54.39	46.97	18.29
Romania	2010	48.94	67.03	0.00
	2011	43.00	21.47	6.95
	LT. average	27.72	24.92	1.02
EU-27	2010	43.08	32.48	3.11
	2011	20.06	26.71	8.87
	LT. average	20.53	22.27	2.67

**Countries, where the sum of the three months' long term average CDDs exceeds 20.*

Source : JRC.



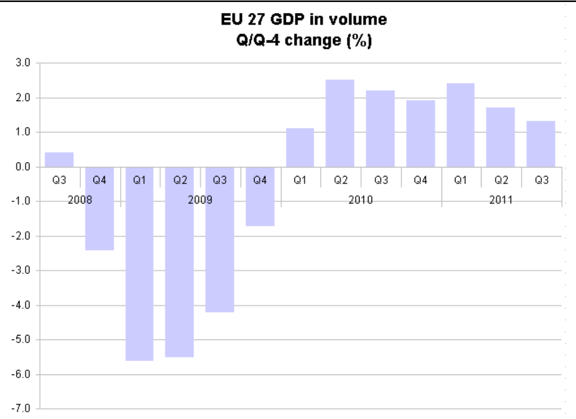
Source : JRC.

July and August of 2011 were not so warm on EU-27 level as these two months of 2009 or 2010; though were slightly warmer than the twenty-year average. However, September 2011 was the warmer than in the last couple of years.

The overall situation of the economy has a strong impact on electricity demand. In the third quarter of 2011 the EU economy

[1] 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. 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.

showed a growth of 0,3% compared to the previous quarter. However, on a year-on-year basis the GDP growth was 1,3%, showing a sign of slowdown after growth values recorded in the first and the second quarter of 2011 (2,4% and 1,7%, respectively). Industrial branches consuming a significant amount of electricity such as manufacturing industry or trade and transport showed only a moderate growth (0,2% and 1.8%). In construction gross value added decreased by 1.1% compared to Q3 2010.

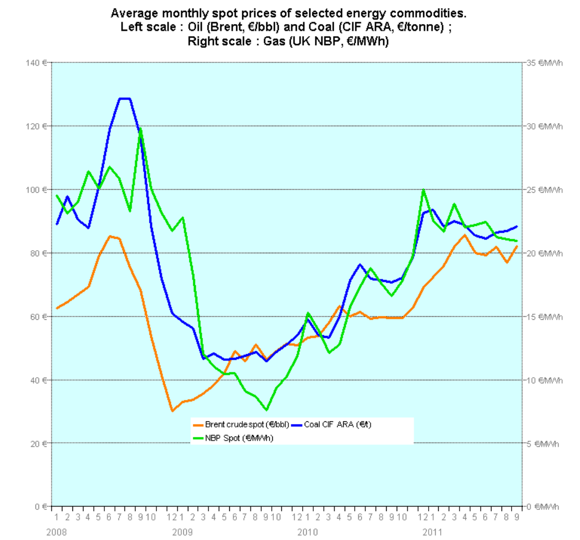


Source : Eurostat.
Selected Principal European Economic Indicators
** Gross domestic product (GDP) at market prices is the final result of the production activity of resident producer units. It is defined as the value of all goods and services produced less the value of any goods or services used in their creation. Data are calculated as chain-linked volumes (i.e. data at previous year's prices, linked over the years via appropriate growth rates). Growth rates with respect to the same quarter of the previous year (Q/Q-4) are calculated from raw data.*

A.1 Wholesale markets

At the beginning of the third quarter of 2011 oil prices showed a slight increase in July, reaching 82 €/bbl on a monthly average. In August oil prices started to decrease as stock markets showed significant losses on concerns about the eurozone. However, in the second half of the month prices rebounded in parallel with other commodities.

Monthly gas prices on UK NBP showed a gradual decrease during the whole Q3 2011, reaching 20.9 €/MWh in September 2011 as opposed to 22.4 €/MWh in June 2011.

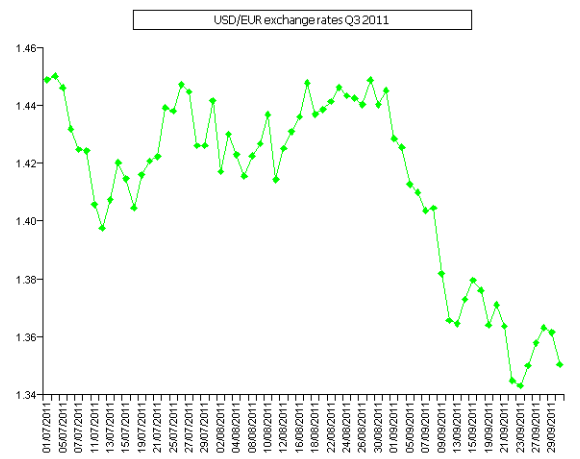


Source : Platts.

During the summer period gas prices are usually lower compared to other periods of the year as industrial demand decreases and heating demand falls out. In this summer the lower reinjection need of underground gas storages also contributed to lower gas demand and prices. However, in September as industrial demand returns after the holiday season and as October, the first months of the heating season gets closer, prices usually increase. On the 1st of September 2011 the daily UK NBP gas price was 22.2 €/MWh and at the end of the month it fell to 17 €/MWh which was an unusual price drop in September. The main reason for this decrease in prices was a two-week maintenance on the Belgium-UK gas interconnector that made gas flows from the UK to the continent unavailable, thus increasing domestic gas supply in the UK and pushing down spot prices. For this reason gas was traded in the UK on a discount to continental Europe during most of the month. In the last week of

September both oil and gas prices fell following the bearish mood of equity and commodity markets.

Monthly coal prices showed a steady increase in Q3 2011 from 84.4 €/MWh in June 2011 to 88.4 €/MWh in September. In fact, coal prices showed a high degree of stability during the third quarter of 2011, however, as the next chart shows, the euro depreciated against USD (at the beginning of Q3 2011 USD/EUR currency rate was 1.449 while until the end of the quarter it slipped to 1.35) and this was an important factor for the increasing prices in euros.

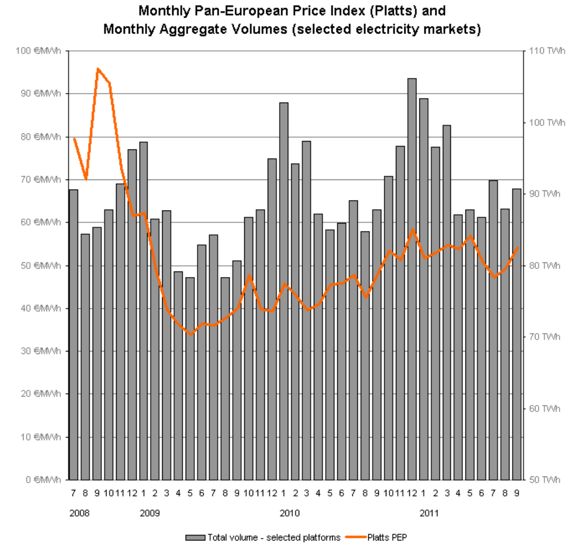


Source : Platts.

A.1.1 Day-ahead

EU wholesale markets

In the third quarter of 2011 traded volume of day-ahead power on selected EU markets (see the box below the chart) was 270.5 TWh, which was 3,4% higher than in the third quarter of 2010. This traded volume amounted to 36.8% of the gross inland electricity consumption in these selected countries.



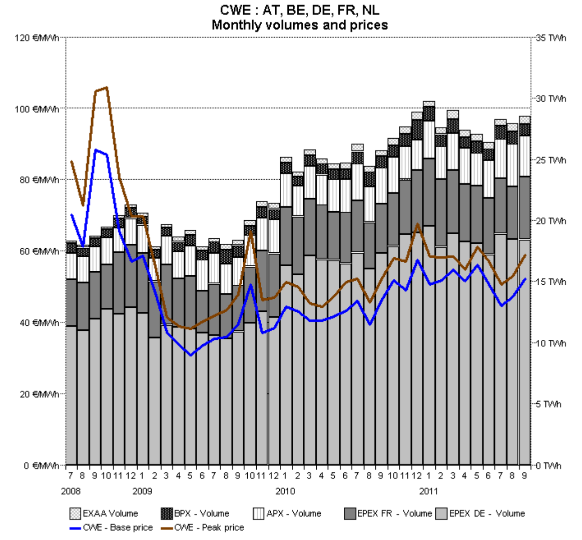
Source: Platts (price index) and selected European electricity wholesale markets (volumes). The selected markets are :
Nordpool Spot A.S ;
European Energy Exchange (EEX) ;
Amsterdam Power Exchange (APX Power NL) ;
Powernext Day-ahead S. A. ;
Belpex Spot ;
Energy Exchange Austria (EXAA) ;
Gestore del Mercato Elettrico (IPEX) ;
Mercado de Electricidad (OMEL) ;
Operator trhu s elektrinou (OTE) ;
Towarowa Gielda Energii S.A. (PolPX) ;
Hungarian Power Exchange (HUPX);
APX Power UK ;
Operatul Pietei de Energie Electrica din Romania (OPCOM) ;
Διαχειριστης ελληνικου συστηματος μεταφορας ηλεκτρικης ενεργειας (ΔΕΣΜΗΕ), Hellenic Transmission System Operator

The Platts Pan European Price Index (PEP) dropped to 47.2 €/MWh in July 2011, which was almost 10 €/MWh lower than two months before. This was the lowest monthly price level since August 2010. The main reason behind this decrease in prices was that the German decision on the future of the country’s nuclear power generation did not have a major impact on supply margins any longer and the market calmed down. Another important factor was the cool weather in July 2011 in Western and Central Europe that practically eliminated the demand arising from the cooling needs of households. In August 2011 as temperatures began to rise and power generation costs were also up due to higher commodity prices, PEP index rose to 49.3 €/MWh. In September the increase in prices continued, lifting the PEP index to 54.1 €/MWh, which was the highest since March 2011. Increase in prices was helped by the exceptionally warm weather in many parts of Europe and rising commodity prices in September 2011.

Regional markets

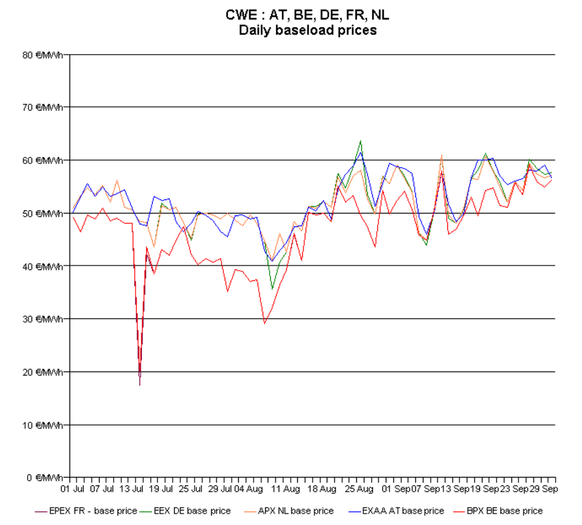
Central Western Europe: AT, BE, DE, FR, NL

In July 2011 both monthly average day-ahead baseload and peakload prices[2] decreased to their lowest level since August 2010 (44.7 €/MWh and 50.6 €/MWh, respectively). In August monthly averages started to increase that continued in September, adding approximately 8 €/MWh to the lows measured in July. The quarterly volume of traded power in the CWE region was 84.7 TWh in Q3 2011, representing about 28.2% of the gross inland electricity consumption of the five countries in the region. The overall majority of the regional power trade was carried out on the German EPEX trading platform (66% of the regional traded volume in Q3 2011), followed by EPEX France (16%) and the APX in the Netherlands (12%).



Source : Platts.

The next chart showing the daily evolution of baseload power prices on the markets of the Central West European power region provides for an interesting change in price trends within the third quarter of 2011. Until mid-August prices on the regional markets followed a downward trend and in the second week of August they reached their quarterly lows (with the exception of France and Belgium, where the lowest prices occurred on 14th of July - the French national holiday - within Q3 2011).



Source : Platts.

The main reasons for this declining price trend in the first half of the quarter were

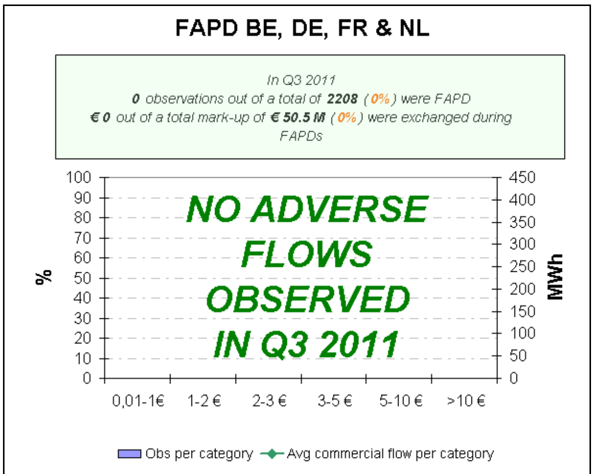
[2] Central West European power region comprises Germany, France, the Netherlands, Belgium and Austria. Both regional monthly baseload and peakload power prices are computed as of traded-volume-weighted averages of the five countries' prices.

cooler than usual weather (lower cooling demands), abundant wind power generation in the second half of July 2011, economic concerns in the eurozone and falling CO_2 emission prices. The beginning of the holiday season in France in August and increasing hydro-based power generation in the Alps after a several months' drier period also contributed to decreasing power prices.

From the second half of August 2011 as summer weather returned (prompting higher cooling needs), equity and commodity markets started to rise and some plant outages decreased the regional power supply prices turned up and rose above 50 €/MWh in the last week of the month. As power demand in the Central East European Region rose due to a heat wave in some countries (see also page 18), CWE power exports to the east also temporarily reduced domestic supply.

From the end of August until the end of Q3 2011 CWE power prices fluctuated in a range of 50-60 €/MWh during most of the time. The volatility increased compared to that of earlier periods of the quarter, following the movements of commodity and emission markets as well as wind and temperature fluctuations.

In the third quarter of 2011 no adverse flows[3] could be observed in the CWE price region, similarly to Q2 2011. Since the market coupling took place at the end of 2010 the CWE region functions well as a coupled market.



Source : Platts.

The movement of the German clean dark spread[4] followed closely the evolution of

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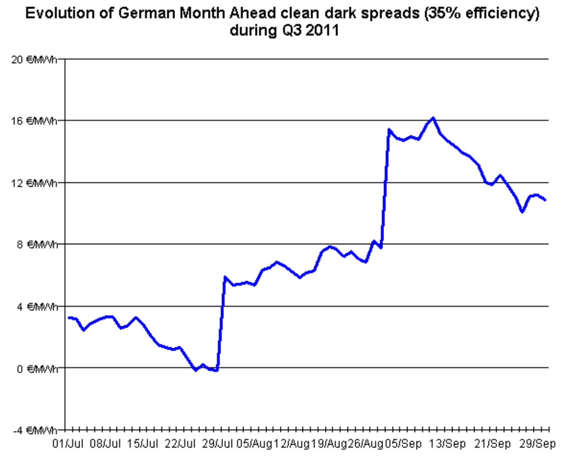
[3] By combining hourly price and flow data, FAPDs are designed to give a measure of the consistency of economic decisions of market participants in the context of close to real time operation of electrical systems.
With the closure of the day-ahead markets (D-1), the prices for each hourly slot of day 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.

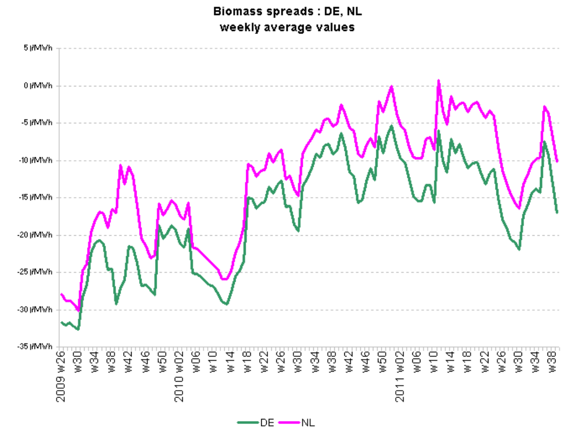
[4] Dark spreads are reported as indicative prices giving the average difference between the cost of coal delivered ex-ship and the power price. As such, they do not include operation, maintenance or

the German power price, however on some trading days significant changes in carbon prices also affected the clean spread. For example at the end of July and in early August, as carbon prices fell, clean dark spreads turned up. In contrast, in July and in the second half of August movements in the power price exerted a greater influence on the evolution of the German clean dark spread. In the second half of September coal prices edged higher, reducing the clean dark spread.



Source : Platts.

Biomass spreads[5] were still in the negative range during the third quarter of 2011. As German weekly power prices began to fell in July and freight rates as well as pellet prices remained stable, biomass spread reached its lowest value on week 30 (-21.9 €/MWh). Later as power prices began to soar and pellet prices and freight rates rose only moderately the biomass spread got closer to zero, however, its quarterly peak was still negative (-7.4 €/MWh on week 36). Dutch biomass spread moved in parallel with the German one as electricity prices in both countries followed a similar evolution and freight rates were not taken into account.



Source : APX – Endex (wood pellets, industrial grade) ; Platts (electricity and emission prices; freight rates)

During the first five weeks of the third quarter of 2011 French nuclear plant effective availability gradually decreased from 50 GW to 45 GW and then as several nuclear plants were taken offline for maintenance works it dropped to 37.1 GW on the 13th of August.

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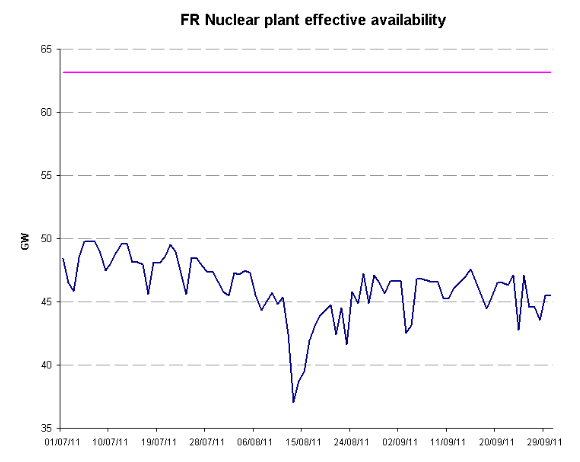
transport costs. Spreads are defined for a coal-fired plant with 35 % efficiency.

Dark spreads are given for UK and Germany, with the coal and power reference price as reported by *Platts*.

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

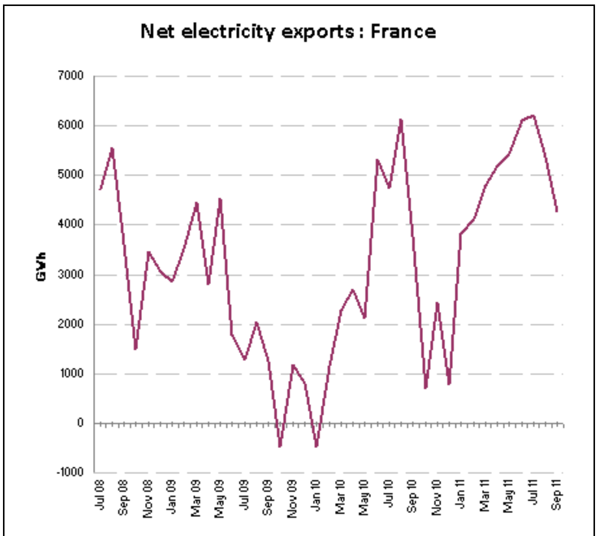
[5] Biomass spreads are indicative values giving the average difference between (1) the combined price of electricity and carbon emission on the corresponding day-ahead market and (2) the price of industrial wood pellets (delivered month-ahead ex-ship at Rotterdam). Biomass spreads do not include operation and maintenance costs. However, the German spreads include transport costs of shipping the pellets along the Rhine (Rotterdam – Cologne area).

Specific calculation assumptions: conversion factor of 1 ton of standard wood pellet contains 4.86 MWh of energy; generation efficiency of coal and biomass fired power plants equals 35%; the price of carbon emission is defined as the difference of the German dark and clean dark spreads, calculated according to the methodology of *Platts*.



The installed capacity of the reference fleet is 63.13 GW.
Source :RTE France

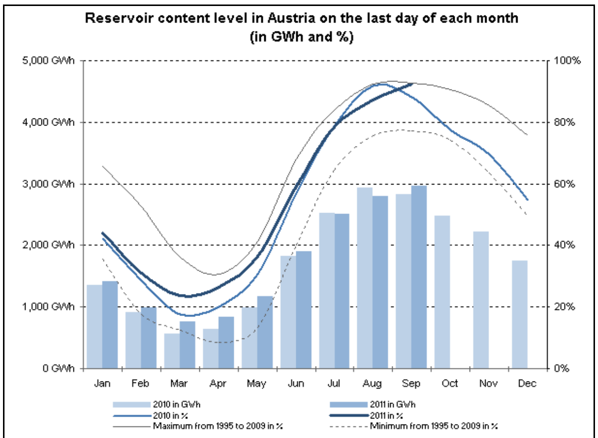
Although industrial demand significantly decreased at the same time as holiday season started in France, the reduction in cheap nuclear power generation helped in propelling up power prices in the whole CWE region. Later in the quarter nuclear availability recovered but at the same time temperatures became warmer and in September the industrial demand picked up again. Nuclear availability hovered around 45 GW during the last month of Q3 2011.



Source : ENTSO-E Vista

In July 2011 French net electricity export was 6.2 TWh, reaching its highest value since August 2007. Price discounts to the neighbouring markets played an important role in high export volumes. As this price discount to France's neighbours in the CWE region decreased in the second half of Q3 2011 the net export also started to diminish.

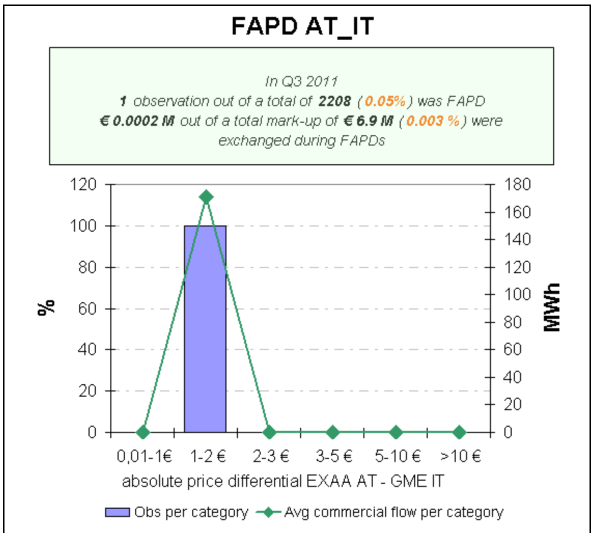
The next chart shows the evolution of hydro reserves in Austria.



Source : E-Control GmbH, Austria

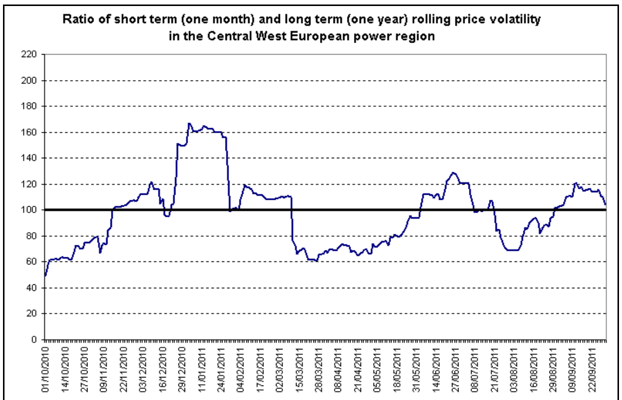
Following a seasonal pattern hydro-based power generation was low during the spring months of 2011 and at the end of the second quarter generation began to rapidly increase. By the end of Q3 2011 the monthly hydro-based power generation reached 3 TWh and hydro-reserve levels stood close to a fifteen year high. The increasing level of hydro generation helped to stabilise Austrian electricity prices, incurring less volatility than that of its German or French peers.

In Q3 2011 only one reverse power flow could be observed between Austria and Italy as there was only one hour (on the 1st of August between 07:00 and 08:00) when Italian prices were lower than their Austrian counterparts. As the average Italian price premium was 25.3 €/MWh in Q3 2011 the probability of adverse flows was very low.



Source : Platts.

As power prices showed a permanent decrease in July 2011 volatility became lower in the first month of Q3 2011. As this trend reversed from the second half of the quarter and as price movements often showed alternating directions (affected by weather, gas prices or extra power demand from the CEE region) volatility significantly rose until mid-September. In September the RVI stood above 100, implying that short term volatility was higher than the longer term one.

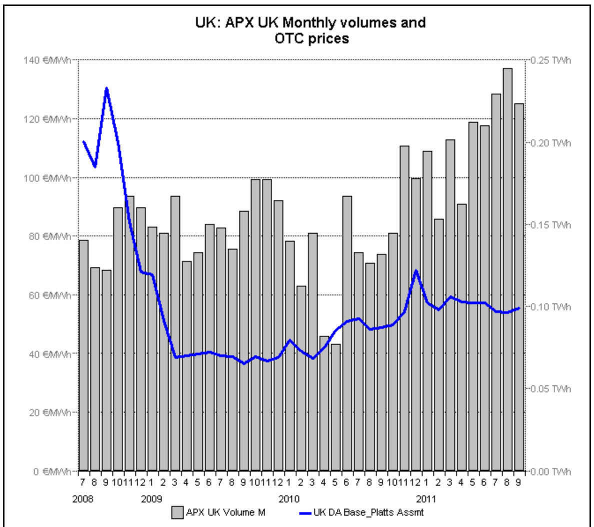


Source: Power price and volume data, own computations.

British Isles

UK

During the third quarter of 2011 the monthly average of UK day-ahead baseload power prices fluctuated in a very narrow range. While in June 2011 this monthly average was 57.1 €/MWh, in August it decreased to 54.0 €/MWh and in September 2011, though turned out to be a little bit higher, it reached only 55.3 €/MWh.

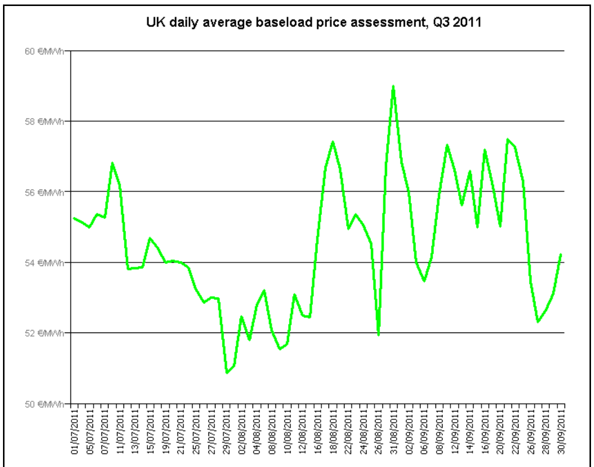


UK values are quoted in € using the €/£ daily exchange rate as reported by the European Central Bank.

Source : Platts.

The monthly average prices, showing a high degree of stability, masked some important price movements that can better be tracked by looking at the chart of daily average prices.

In July 2011 the UK baseload power prices generally followed a downward trend that correlated to lower fuel (mainly gas) prices measured in euros negative market sentiment on the equity markets stemming from the uncertainties in the eurzone and summer weather being cooler than normal, resulting in the lack of cooling extra-demand.



UK values are quoted in € using the €/£ daily exchange rate as reported by the European Central Bank.

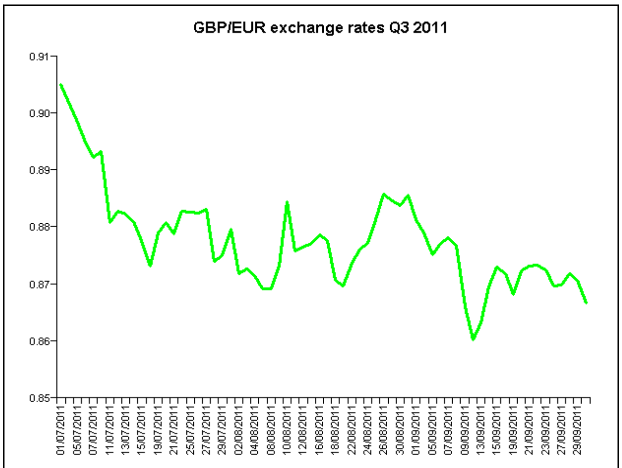
Source : Platts.

In the first half of August 2011 prices stabilised on a lower level. From the second half of that month the volatility of prices increased significantly. As equity markets in Europe came to calmer period oil and gas prices began to rebound that affected power prices as well.

At the end of August and in the beginning of September two events supported the volatile price movements: on one hand, 29th of August was a public holiday that reduced the daily demand for power. On the other hand, in Qatar several LNG production units were to go to maintenance in the forthcoming months according to company announcements which sparked some fears of gas shortage on the market. In addition, there were also fears that (flexible) spot cargoes could be diverted to the Pacific basin (price there was much higher as a result of the increased Japanese demand which had to compensate missing nuclear capacities.

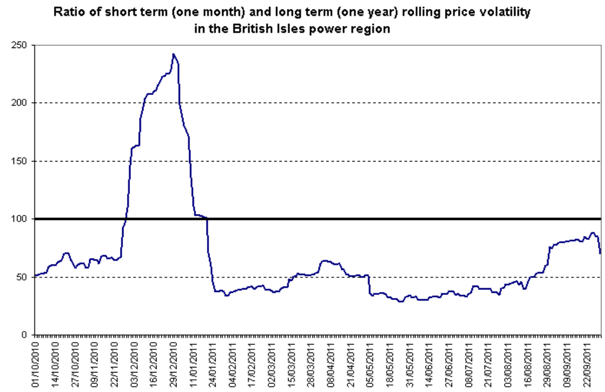
Although a couple of days later prices fell steeply, revealing an overreaction of the Qatar gas situation during the previous days, in September prices remained on a higher level. On the 21st of September the UK-France power interconnector was taken offline for maintenance of two days that resulted in higher UK prices. In the last days of Q3 2011 an abundant supply of LNG helped to push down prices to a level last seen during August 2011.

The appreciation of the British pound against the euro also resulted in higher prices during the last weeks of Q3 2011. As this chart shows the GBP/EUR currency rate was above 0.90 at the beginning of July 2011, while in the second half of September it hovered around 0.86-0.87.



Source: ECB.

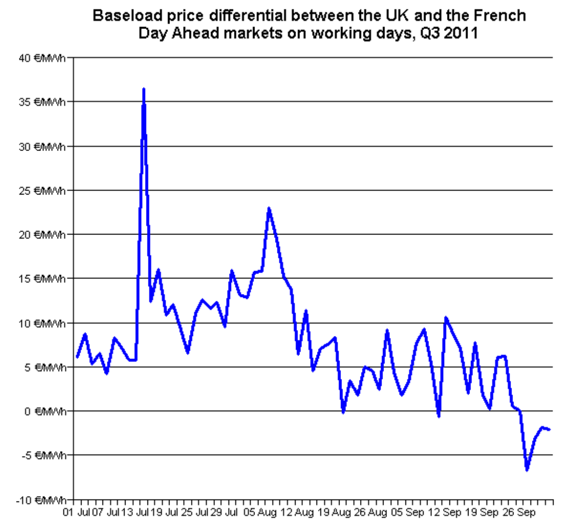
As the next chart shows price volatility in the third quarter of 2011 started to increase from mid-August, due to the events described in the previous paragraphs. However, it must be noted that the short term price volatility was still below the one-year long term one, implying that prices in this quarter were less volatile than usual.



Source: Power price and volume data, own computations.

UK power was traded on a significant price premium to the French market during the third quarter of 2011 (with the exception of the last week of September). The two highest values of UK-France price premium were measured on the 14th of July and on the 8th of August. The former date was a public holiday in France, resulting in low daily prices, in the latter case French prices were also low, due to usually low holiday season industrial demand and good nuclear power plant availability.

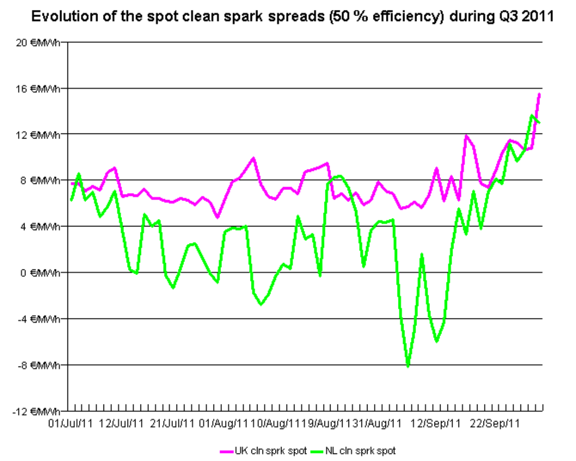
In the last days of September as continental power prices were up and UK prices decreased due to an abundant gas supply on the British market, the prevailing UK price premium turned to a discount for a couple of days of time.



Source : Platts

As the next chart shows UK clean spark spreads hovered around 8 €/MWh during most of the third quarter of 2011. However, from mid-September they started to increase rapidly, mainly due to the relatively high power prices coupled with falling CO2 emissions and lower gas prices resulting from an abundant LNG supply on the market. On the 30th of September 2011 UK clean spark spot reached 15.5 €/MWh, which was the highest value since December 2010.

As Dutch power prices were generally traded on a discount to the UK market, Dutch clean spark spreads were lower (on some days they even turned to negative) than those of the UK, although by the end of the quarter they managed to catch up to their UK counterparts.

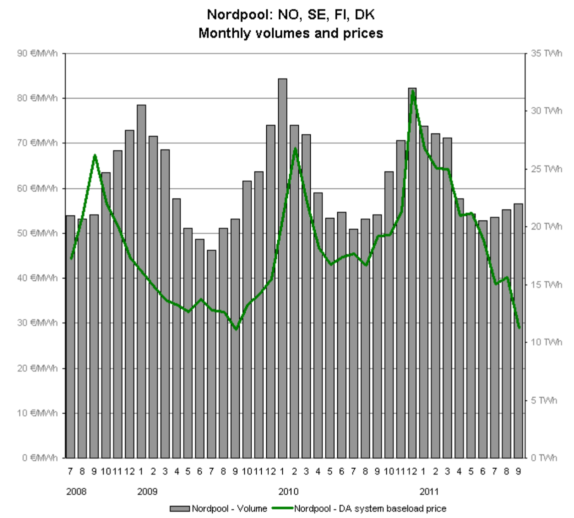


UK values are quoted in € using the €/£ daily exchange rate as reported by Platts

Source : Platts

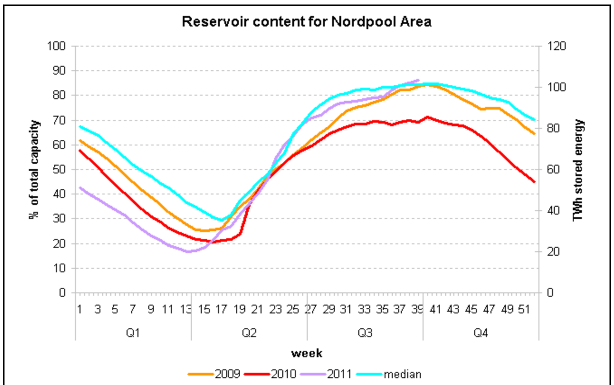
Northern Europe (DK, EE, FI, NO, SE)

Monthly Nordpool spot baseload power prices followed a strong seasonal pattern in the first three quarters of 2011: while they reached very high values (above 80 €/MWh) in the beginning of the year, in September 2011 the average monthly prices were less than 29 €/MWh, the lowest since May 2008. Monthly traded volumes of power reached their lowest value in May 2011 during the last year and since then a slow increase could be observed until the end of Q3 2011. Traded volume on the spot market reached 64.4 TWh in Q3 2011, which was about 78% of the region's gross inland electricity consumption during the same period, underlining the liquid nature of the Nordic markets.



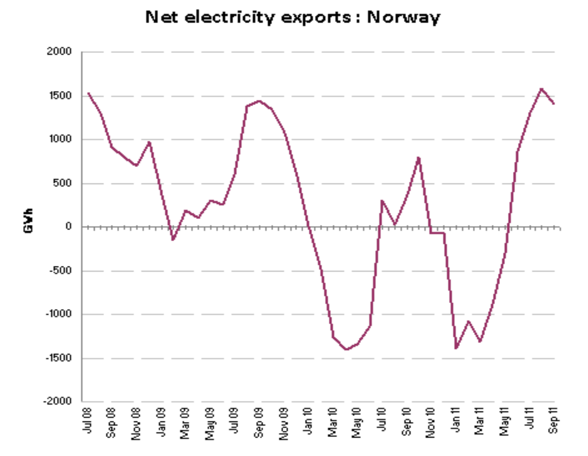
Source : Platts.

This seasonality strongly correlated to the changes in temperatures on one hand (both traded volume of power and monthly prices reached their peak during the winter period in the last couple of years) and the level of hydro reserves that serves as an indication of hydro-based power supply. Although the beginning of 2011 was quite dry in the whole region, by the end of Q3 hydro levels were above the long term median, putting a significant downward pressure on power prices.



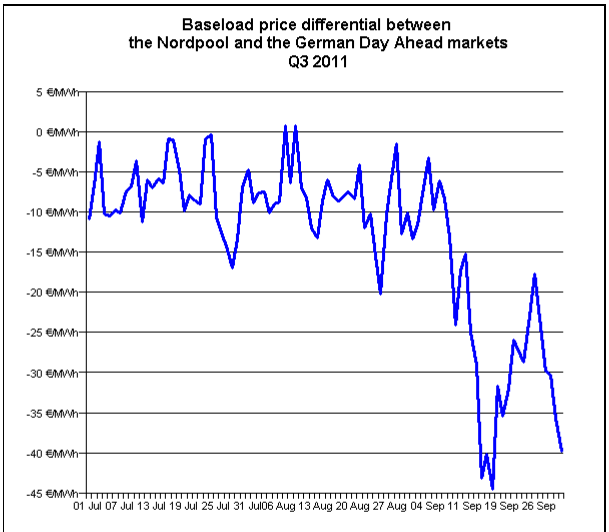
Source : NPS

As power produced in the Nordic countries became significantly cheaper in September 2011 compared to the continental prices, net electricity exports of Norway where the power prices was the cheapest in the region reached a three-year high in this month.



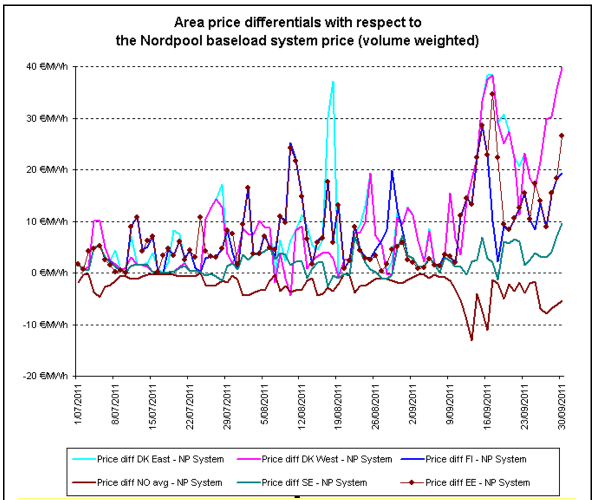
Source : ENTSO-E Vista

While daily average power prices in the Central West European region generally moved upwards during September 2011, NordpoolSpot system prices reached extremely low levels in mid-September and by the end of the month, prompting price discounts of 40-45 €/MWh on some days.



Source: Platts.

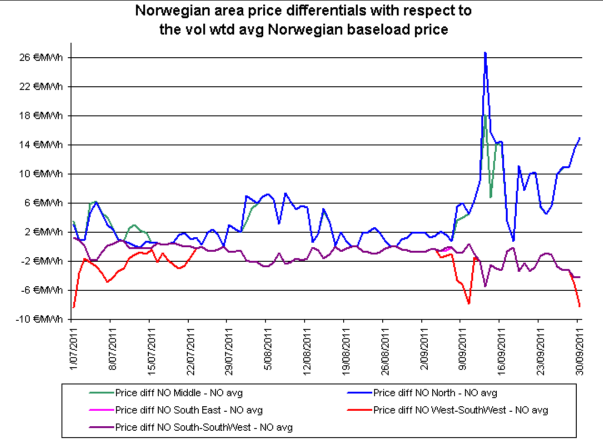
Looking at the chart showing the deviation of daily regional prices compared to the Nordpoolspot system prices it seems that Norwegian and Swedish prices, which were close to the system price, exerted a downward pressure on the whole system while other regional prices did not follow this behaviour.



Source : Platts, NPS.

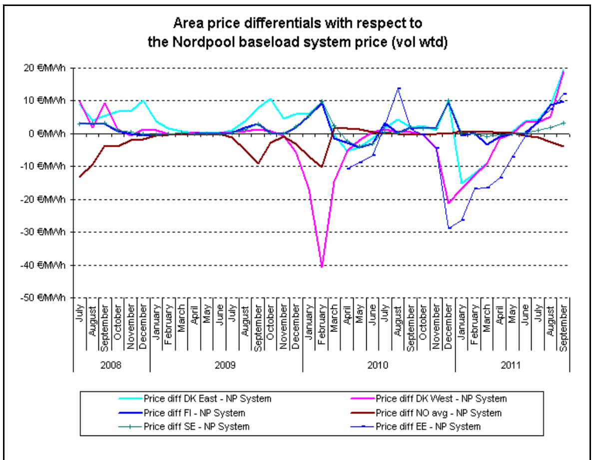
The most surprising price deviations on a daily level occurred on the 16th of September 2011, when Danish regional prices were about 55-56 €/MWh, the Nordpool system price 17.9 €/MWh, while in Oslo and Kristiansand power regions of Norway the daily price was only 3.6 €/MWh. These price deviations show that extreme price differentials among areas can turn up even in the case of a well-functioning regional market coupling.

The extremely low prices in some Norwegian regions were strongly related to the suddenly increased hydro-based generation (as a consequence of abundant rainfalls in a short period of time). On the other hand, the power produced in the two south-western regions of Norway could not be transported either to other regions of Norway or to other Nordic countries, given limited interconnection capacities among the regions.



Source : NordpoolSpot

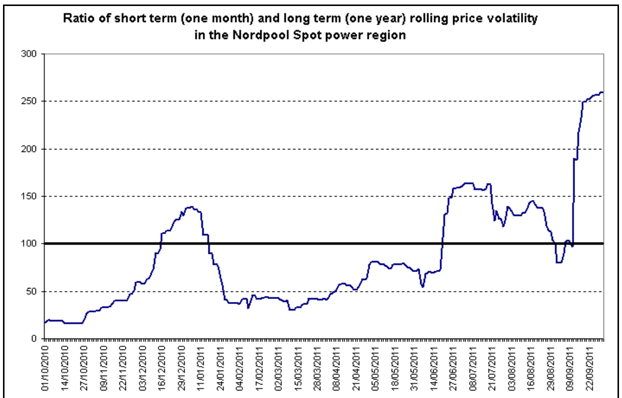
Middle and northern regions of Norway could only benefit of low prices to a lesser extent. The same refers to Sweden, while Finnish, Danish or Estonian customers could not benefit at all from low Norwegian prices, given that they did not have a direct link to cheap Norwegian regions.



Source: Nordpool Spot.

On a monthly basis prices in regions other than Norway and Sweden showed a high level positive deviation compared to the Nordpoolspot system price as they could not follow the price fall stemming from the increased hydro-based power generation in Norway.

As extremely low prices rebounded in the remaining period of Q3 2011 the price volatility in the Nordic region rose to its highest level since February 2010.

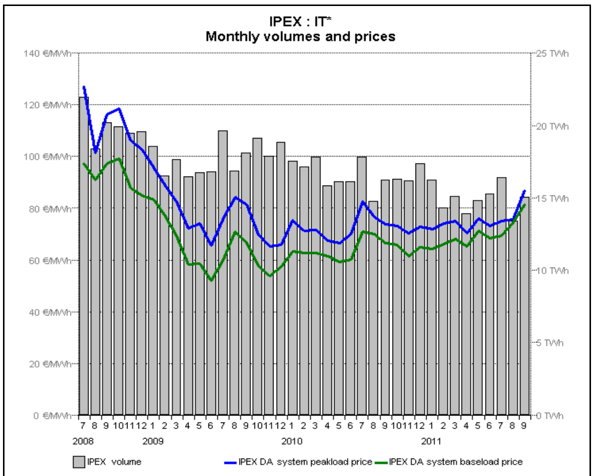


Source: Power price and volume data, own computations.

Apennine Peninsula

Italy

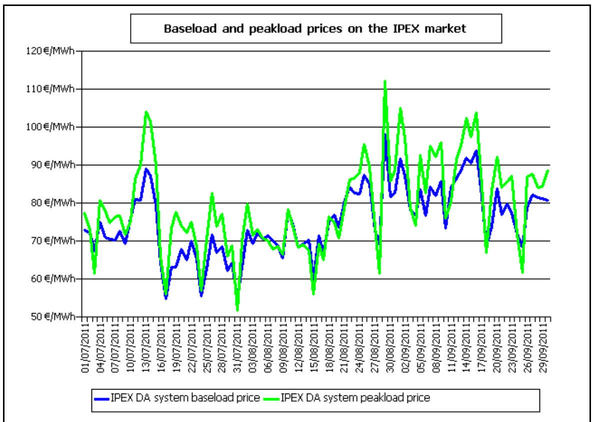
Italian monthly day-ahead power prices rose significantly during the third quarter of 2011: while in June the monthly average baseload power price was 68.4 €/MWh, in September 2011 it reached 81.3 €/MWh. During the same period monthly average peakload prices went up from 73.2 €/MWh to 86.9 €/MWh. Both baseload and peakload prices reached their highest levels since the beginning of 2009.



Source : Platts.

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

The reasons behind these high prices can be better understood if we take a look at the evolution of daily power prices.



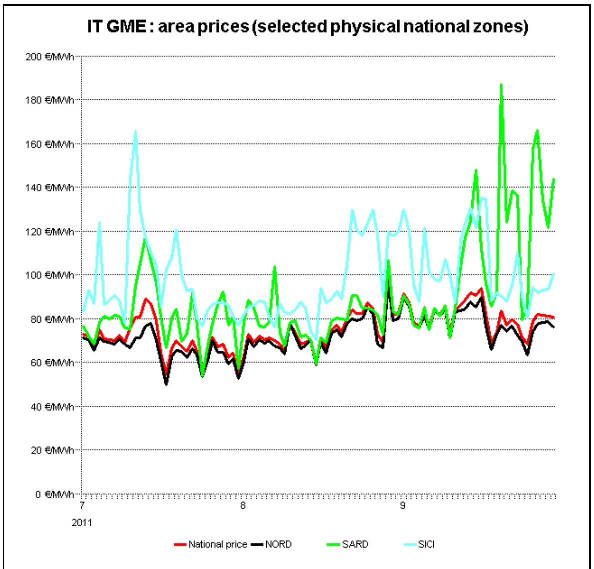
Source : Platts.

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

Prices in most of July 2011 were lower than or similar to those in the same month of the previous year. This was mainly due to lower prices of the energy commodity mix (fuel costs), lower emission prices and temperatures corresponding to the seasonal average. Then from the second half of August as fuel prices began to rise and the weather turned warmer than usual, daily power prices started to soar and on the 29th of August both baseload and peakload prices reached a level has not been seen since August 2008.

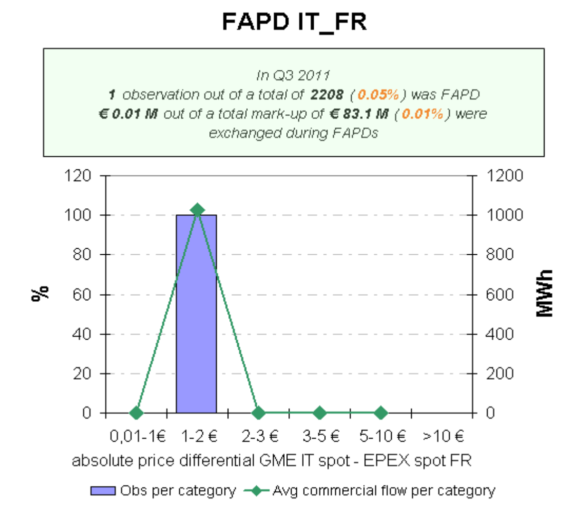
In September 2011 prices began to retreat as fuel prices, especially gas prices began to decrease but warmer-than-usual weather helped in keeping power prices at high levels.

Taking a look at the chart of the evolution of Italian area prices it is useful to remark that while northern area prices were still strongly aligned to the national average, Sicily and Sardinia prices showed significant deviations from the system price on a number of trading days. It is interesting to see that Sardinia area prices, which began to couple with the system price in Q2 2011 after the inauguration of the SAPEI interconnector, decoupled again from mid-September onwards. In mid-September there were some days (on the 14th, 15th and 20th) when hourly prices reached even 300 €/MWh in the Sardinia region. Price spikes in Sardinia might have reflected limitations both in transmission capacity from the mainland Italy and the lack of available generation capacity on the Sardinian island.



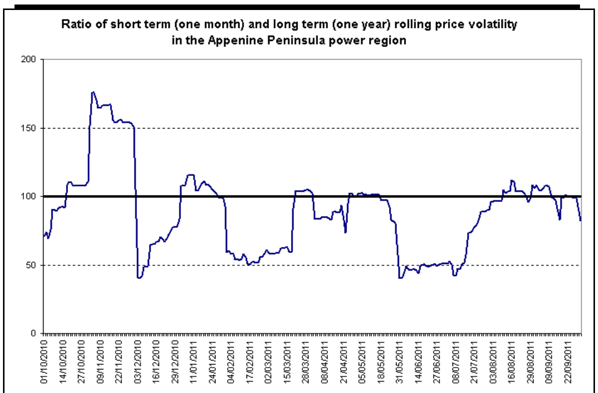
Source : Gestore mercati energitici.

As the premium of the Italian market over French prices was significant during the whole Q3 2011 (more than 32 €/MWh on average), there was only one hour in the whole quarter when adverse flows could be observed. In this case the low FAPD ratio refers to 'quasi-unidirectional' power flows caused by significant price differentials. The same phenomenon could be observed for the market relation between Italy and Austria (*see page 9*).



Source : Platts.

At the beginning of Q3 2011 the value of short term volatility was lower than the long term trend. From mid-July the RVI indicator started to rise and in August it reached 100, meaning that current volatility got close to the longer term value. Volatility started to increase after a first transitory hike occurred in power prices in mid-July, and later in the third quarter of 2011 price moving events described above contributed to permanently higher RVI indices.

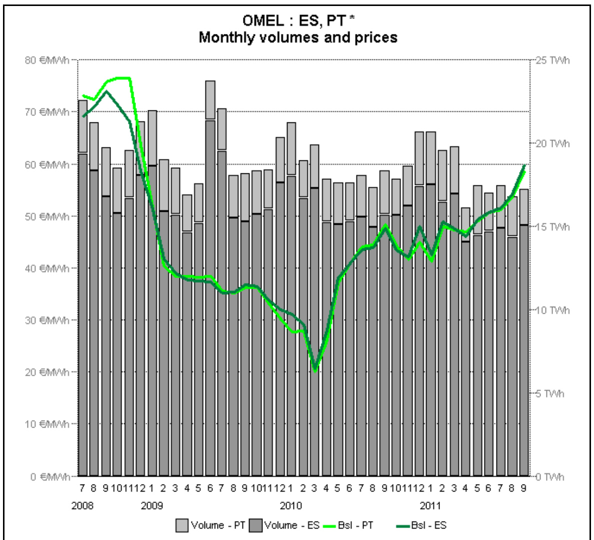


Source: Power price and volume data, own computations.

Iberian Peninsula

Spain and Portugal

Monthly average baseload power prices in the Iberian power markets rose during the third quarter of 2011. While in June 2011 the monthly average of day-ahead baseload price was 50.6 €/MWh both in Spain and Portugal, in September 2011 the two respective values were 59.7 €/MWh and 58.7 €/MWh. September average power prices were the highest ones since December 2008 in both countries.



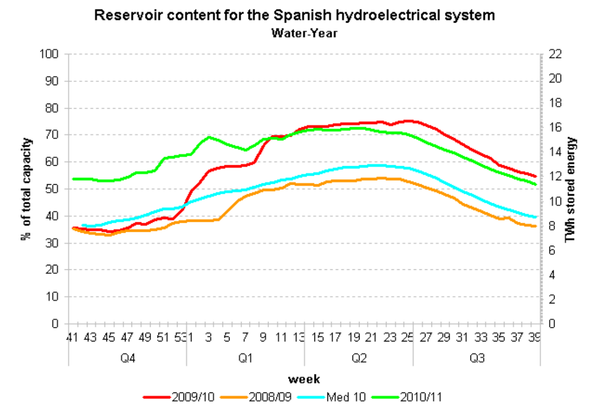
Source : Platts.

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

In July 2011 hot weather played an important role at the beginning of the month, pushing baseload power prices on a two and a half year high level on the 4th of July. Lower-than-usual wind levels and tighter system supply in the consequence of a planned outage of Almaraz nuclear reactor also contributed to higher price levels. In the second half of the month power prices became lower as the system supply improved and the hot spell was temporarily over.

During the month of August 2011 the increase in power prices gained a new momentum as wind power generation was low and hot weather created an excess cooling demand for power. It seems that abundant solar power generation was not sufficient to reverse this trend. On the 23rd of August daily baseload power prices reached a thirty-one month high level.

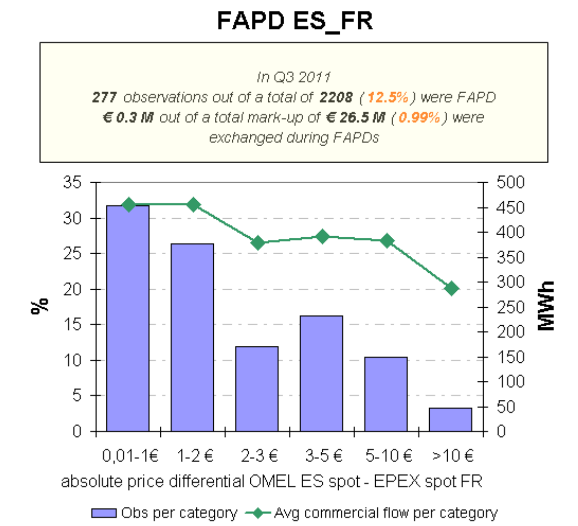
In September as wind generation remained low and daily peak temperatures exceeded the usual values by several degrees during almost the whole month power prices reached rarely high levels on some days. During the last week of the month as the tightness of supply was also reinforced by an outages of the Cofrentes nuclear plant baseload prices reached their highest levels since March 2008. The peak point in Q3 2011 for daily baseload power prices was reached on the 26th of September (65.3 €/MWh).



Source : Ministerio de Medio Ambiente, y Medio Rural y Marino, Gobierno de España

The 2010/2011 water year on the Iberian-peninsula ended at the end of September 2011. Reservoir content levels were substantially higher during Q3 2011 than the ten year median, although they were slightly lower than those at the end of the previous water year. This relatively high level of hydro reserves could do only a little for mitigating the tightness of the grid arising from weak wind power generation and high temperatures.

During almost all of the third quarter of 2011 Spanish and Portuguese electricity prices showed a significant premium to the French market. In consequence, the ratio of those hours when power flowed from Spain to France (from the higher price region to the lower one) was only 12.5% of all the time. Interestingly, the majority of all FAPD events fell into the range of price differentials of 0-2 €/MWh.



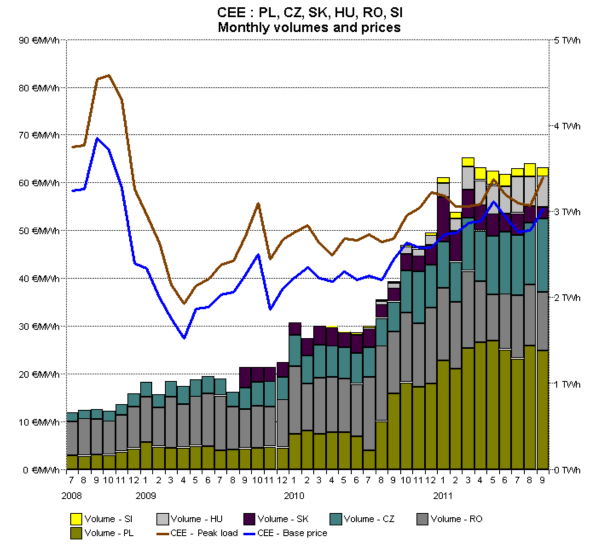
Source : Platts.

Central Eastern Europe (CZ, HU, PL, RO, SK, SI)

Monthly average power prices in the Central East European Region[6] that reached their highest levels in May 2011 since the end of 2008 began to decline in June. The slide in prices continued in July

[6] In this part of the report Central East European power region comprises Poland, the Czech Republic, Slovakia, Hungary, Romania and Slovenia. Both regional monthly baseload and peakload power prices are computed as of traded-volume-weighted averages of the six countries' prices.

while in August prices stabilised. Both regional baseload and peakload average price in August (50 €/MWh and 54.9 €/MWh) were the lowest since February 2011. September 2011 brought a significant upturn in both baseload and peakload monthly average prices; reaching 54 €/MWh and 60.4 €/MWh, respectively.



Sources:
TGE (PL),OTE(CZ, SK), OPCOM(RO), HUPX(HU), BSP (SI)

As the next table shows this monthly price increase in September could be observed on all of the six markets, but it was especially robust in Romania, Hungary and Slovenia.

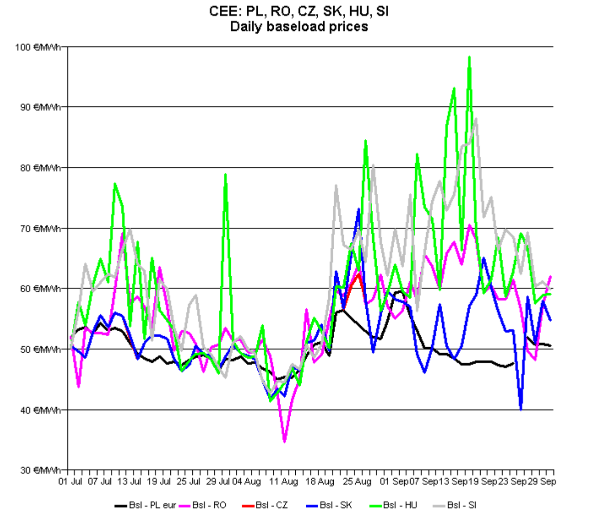
The combined traded volume in CEE market was 10.6 TWh in Q3 2011, representing 14.5% of the six countries' gross inland electricity consumption in the same period. The quarterly traded volume[7] was up by 2.5% compared to the previous quarter and by 77% compared to Q3 2010. This latter huge increase was mainly due to the expansion in traded volumes on the Polish and Czech markets. More than 40% of the regional traded volume was carried out on them Polish PolPX platform while the Czech OTE and the Romanian OPCOM had a share of 22% and 21%, respectively in Q3 2011.

Monthly average baseload power prices (€/MWh)			
2011	July	August	September
Hungary	54.2	54.9	65.2
Poland	49.3	48.9	49.9
Czech Republic	46.7	49.1	52.0
Slovakia	46.7	49.6	52.0
Romania	51.2	50.7	59.2
Slovenia	52.5	52.9	67.8

The evolution of daily baseload prices showed a completely different picture from that of the preceding two quarters.

The most significant difference between Q3 2011 and the previous quarters is the volatility in some markets, especially in Hungary. In the first half of July 2011 high prices occurred on this market as a consequence of high temperatures and arising cooling demand. Later in that month Hungarian prices realigned to other regional markets and until the end of August there were only one day (6th of August when prices exceeded 100 €/MWh for several hours). At the end of August an unusual heat wave assured a higher than normal cooling demand that sent the power price higher (84 €/MWh daily average on the 26th of August).

[7] Slovenia is not included in this comparison as it is covered from this report onwards.



Sources: TGE (PL),OTE(CZ, SK), OPCOM(RO), HUPX(HU), BSP (SI)

Higher-than-normal temperatures remained a price driving factor during the first three weeks of September 2011. On the supply side the most important event was the significant reduction in the Austrian-Hungarian and Slovakian-Hungarian power interconnector's capacity due to maintenance works from the 12th of September for two weeks onwards. Furthermore, power flows from the Balkans and Romania also dropped due to lower volume of power generation in these countries. Hungarian baseload daily average prices topped at 98 €/MWh on the 15th of September during Q3 2011.

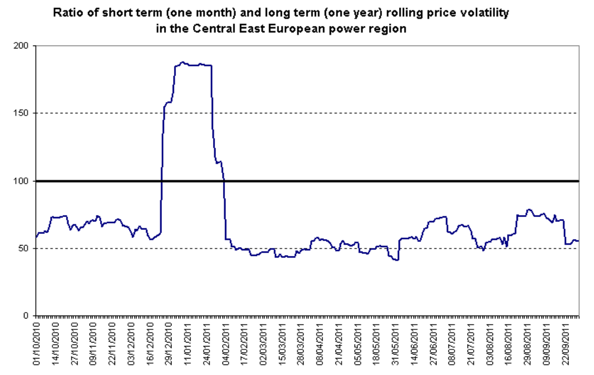
Slovenian power prices, which closely followed the regional pattern in the first half of Q3 2011, showed signs of alignment to Hungarian prices from the second half of August. Extra power demand from Hungary and eventually lower levels of power generation in the Balkans helped to boost Slovenian prices.

Romanian power prices, which used to be the cheapest in the CEE region during the first half of 2011 were higher than Polish, Czech or Slovak prices on a number of trading days during Q3 2011. Higher prices might have been linked to higher than normal temperatures on these days. In mid-September as prices were very high in the neighbouring Hungary and as the level of river Danube was low, rumours about taking offline Cernavoda nuclear power plant also caused spikes in prices. On the 17th of September the daily average power price was 73.7 €/MWh, which was the highest since November 2008.

Polish electricity prices seemed to be the least volatile during this quarter. In July prices decreased as the weather was cool and prices were also low in the neighbouring countries. In August 2011 prices climbed higher on better weather and improving export opportunities to Poland's neighbours. In September prices became cheaper again on the back of higher renewable generation in the region. In the Polish case competitive coal based power generation also contributed to lower volatility.

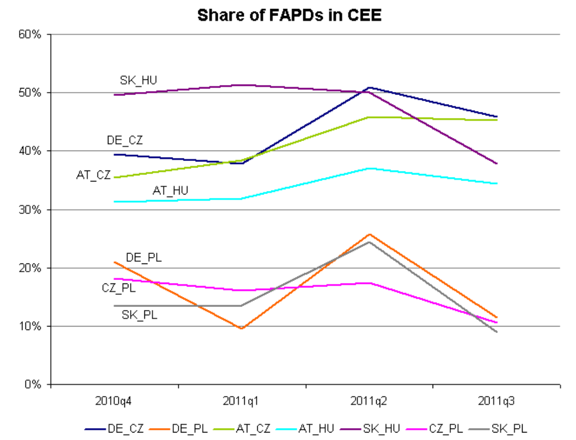
Czech and Slovak prices were moving in line with the Polish ones, although during those periods when power exports to Hungary suddenly increased they showed a temporary upturn. In mid-September 2011 as the Slovak-Hungarian interconnector was out, the differential between Hunagrian and Slovak prices widened, and as it resumed operation, Hungarian prices dropped whereas Slovak prices jumped.

Although the RVI indicator remained below 100 during the whole Q3 2011, implying that short term volatility was less than the one-year backward looking figure, it is worth noting here that volatile Hungarian and Romanian prices weighed on the whole region, especially in July and September 2011.



Source: Power price and volume data, own computations.

The next chart shows the evolution of the ratio of adverse flows in Q3 2011 and in the three preceding quarters. It seems that German-Polish, Czech-Polish and Slovak-Polish market relations could be characterised by lower FAPD ratios (in Q3 2011 these ratios were around 10%). On the other hand, in the case of Austrian-Hungarian, Austrian-Czech, German-Czech and Slovak-Hungarian relations high FAPD ratios (30-50%) could be observed, showing a low degree of integration between these neighbouring markets. In the case of Slovak-Hungarian market relation the significant decrease was rather due to higher price differentials between the two markets due to the outage of the interconnector in September 2011.



Sources
Platts, ENTSO-e, OTE, HUPX, PolPX

No adverse flows could be observed between the Czech and Slovak markets as they are coupled since 2009.

The next sheet provides an overview about the percentage distribution of the adverse flows in different price differential ranges in Q3 2011. Normally the highest ratio of FAPDs falls into lowest price differential range, and the percentage of adverse flows decreases in higher price differential ranges.

Distribution of FAPDs across the price differences

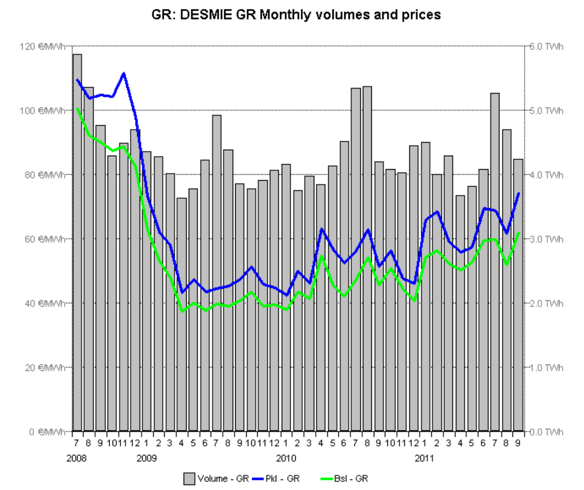
	0.01-1€	1-2€	2-3€	3-5€	5-10€	>10€
DE_CZ	25%	20%	14%	18%	17%	4%
DE_PL	37%	26%	15%	12%	9%	3%
AT_CZ	54%	26%	9%	7%	3%	1%
AT_HU	52%	28%	11%	6%	4%	1%
SK_HU	36%	30%	17%	10%	5%	3%
CZ_PL	36%	27%	12%	9%	8%	8%
SK_PL	28%	22%	11%	13%	15%	11%

Sources
Platts, ENTSO-e, OTE (CZ-SK), HUPX, PolPX

South Eastern Europe

Greece

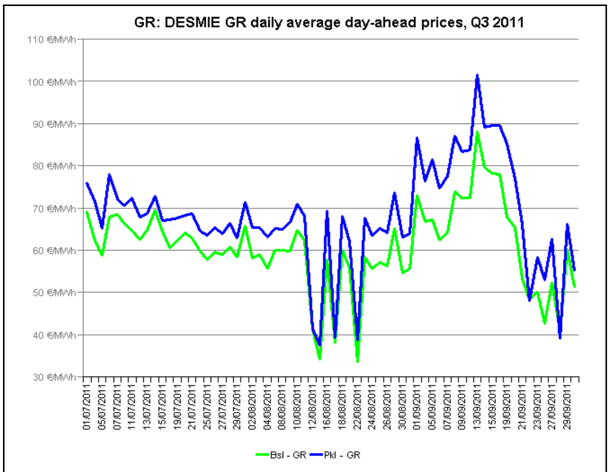
In July 2011 monthly average baseload and peakload prices were close to the levels they finished the second quarter of 2011 (59.7 €/MWh and 68.6 €/MWh, respectively). Then in August both monthly baseload and peakload prices dropped by 8 €/MWh compared to July, however, they bounced back in September 2011 to a level last seen in January 2009 (61.8 €/MWh and 74.2 €/MWh, respectively). The seasonality in traded volumes of power (higher monthly July and August volumes) could be observed in 2011 again, primarily owing to higher cooling needs of households.



Source : Platts.

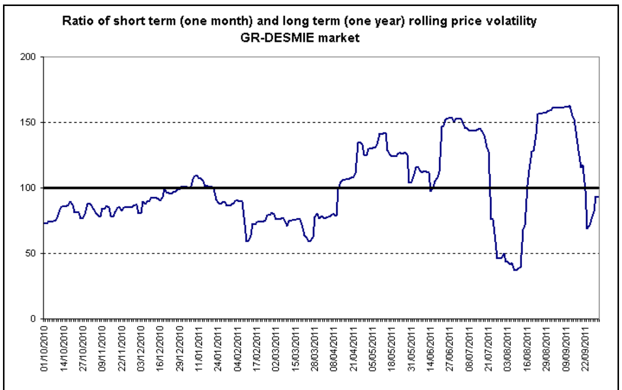
** Trade on Italian (IPEX), Greek (DESMIE) and Iberian (OMEL) electricity markets is incentivised by regulatory means.*

Until mid-August 2011 both baseload and peakload curves, showing the evolution of daily average prices followed a slightly downward trend line. During the following two weeks prices became extremely low on some days, due to a public holiday followed by a long weekend, prompting lower demand for power and increased cheaper power imports to Greece. From the last week of August 2011 until mid-September prices rose significantly, due to higher than normal temperatures that prompted extra demand for power (cooling needs). Lower level of hydro generation (hydro-based generation was substituted by costlier fossil fuels) and a special tax on natural gas imposed with the effect of the 1st of September 2011 also contributed to the increase in prices. On the 13th of September daily baseload and peakload prices reached their quarterly peaks (88 €/MWh and 101 €/MWh, respectively). This escalation of prices was also influenced by an unplanned outage (Thisvi gas plant). In the second half of September 2011 baseload and peakload prices retreated from these high levels, finishing Q3 2011 in a range of 50-60 €/MWh.

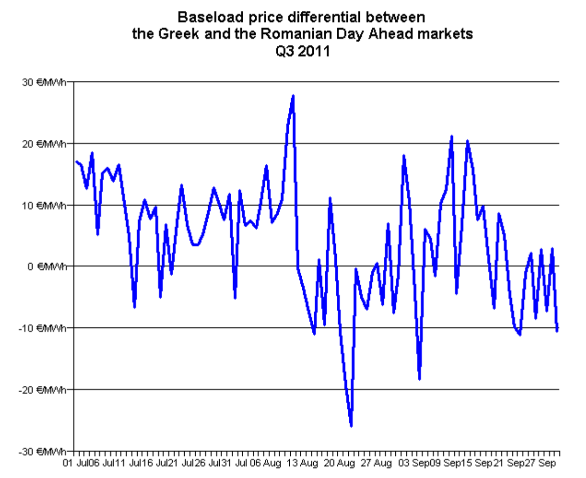


Source : Platts.

Until mid-August 2011 the volatility of Greek baseload prices decreased as prices followed a smooth downward trend line. In mid-August price changes compared to the previous day exceeded 20 €/MWh on some days, triggering an increase in volatility to that reached levels of the end of Q2 2011. High volatility remained until mid-September and afterwards as prices showed steady decline volatility decreased as well.

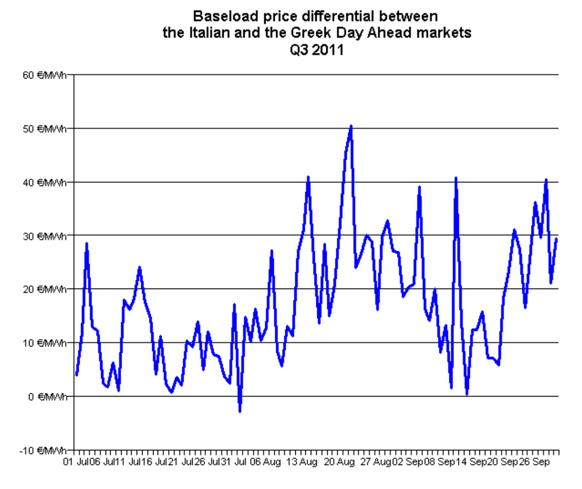


Source: Power price and volume data, own computations.



Source : DESMIE, OPCOM s.a.

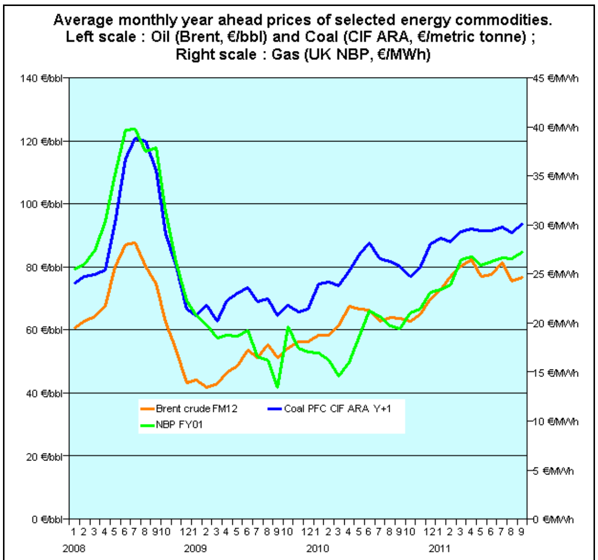
Volatility of Greek power prices can be tracked on the evolution of their premium to Romanian prices. As Romanian prices were high in mid-July or in the second half of September, this premium turned to discount as it was the case in mid-August when Greek daily price volatility was high. Italian prices showed discount to their Greek counterparts only on the 1st of August; the quarterly average Italian premium to the Greek market was 17.3 €/MWh. On the 22nd of August the daily Italian premium exceeded 50 €/MWh as Italian prices were very high during the last week of August 2011.



Source : IPEX, DESMIE.

A.1.2 Forward markets

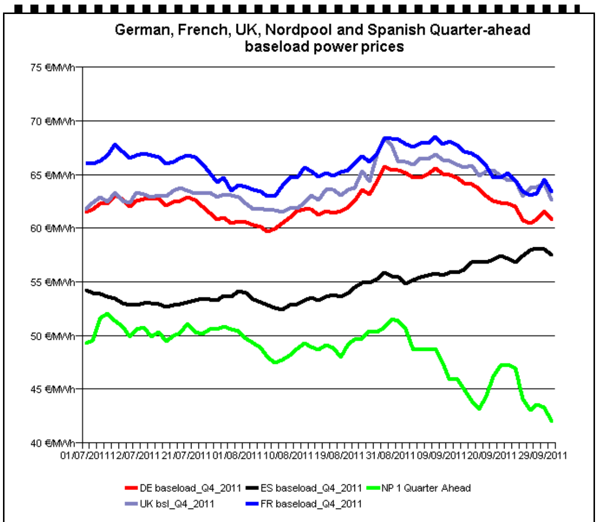
The monthly average of year-ahead crude oil price became slightly lower by the end of Q3 2011 than it was at the end of Q2 (76.6 €/MWh in September vs. 77.6 €/MWh in June), though in July it rose above 80 €/MWh. Year-ahead coal prices continued to rise during the third quarter of 2011 and in September they rose to a three-year high (93.7 €/t). In the case of natural gas a decoupling between spot prices and year-ahead contracts could be observed during Q3 2011 as spot prices decreased while year-ahead contracts rose to 27.3 €/MWh, which was the highest level since October 2008.



Source : Platts.

It seems that year-ahead gas contracts were not really affected by bearish spot gas prices in September 2011 (*see page 3*) and stable spot coal prices were outperformed by slightly increasing year-ahead coal prices in the last month of Q3 2011. In contrast, year-ahead crude oil prices followed the trend of the spot market.

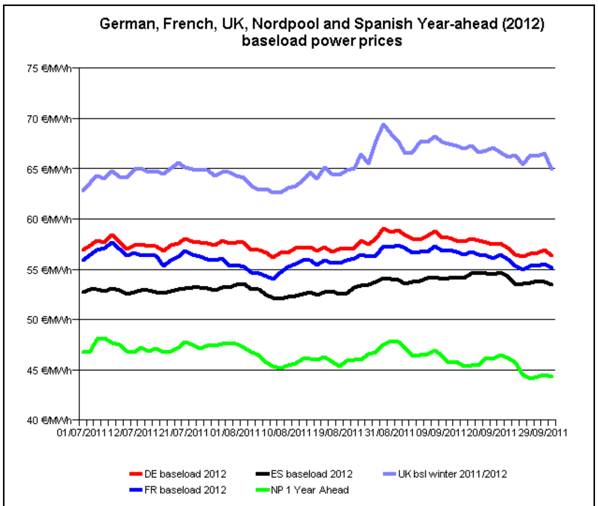
In the third quarter of 2011 German, French and UK quarter-ahead baseload power prices moved in tandem with each other; following a similar pattern as in the case of spot prices. From the beginning of July 2011 until mid-August a downward trend could be observed, then until the end of August prices rose, influenced by news from potential LNG supply shortage (*see page 10*). Then in September quarter-ahead prices began to decrease contrary to the spot prices that remained either stable or set their quarterly highs during this month. This must have been in relation with worsening economic outlook that weighed on future power demand.



Source : Platts.

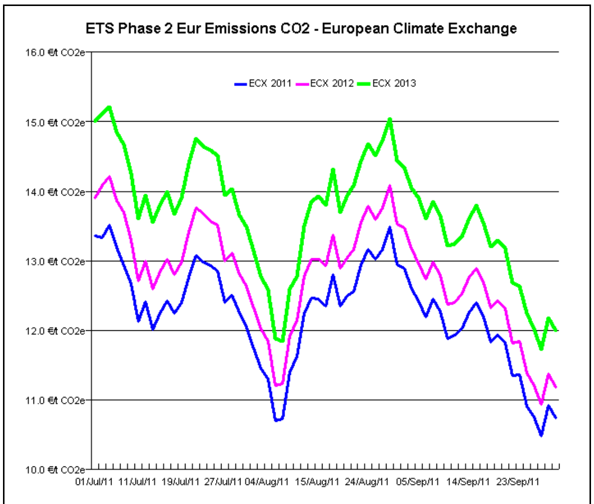
In the case of the Spanish market continuously growing spot pool prices from mid-August pushed up quarter-ahead prices. On the other hand, Nordpool contracts, being fairly stable in July and August 2011 were dragged down by very low spot prices in September 2011.

Year-ahead contracts were influenced by the same events that affected spot or quarter-ahead prices, though the magnitude of price changes was less on the far-end of the price curve. A sudden upturn in UK gas prices could also be observed in the case of year-ahead at the end of August 2011, primarily owing to gas supply concerns.



Source : Platts.

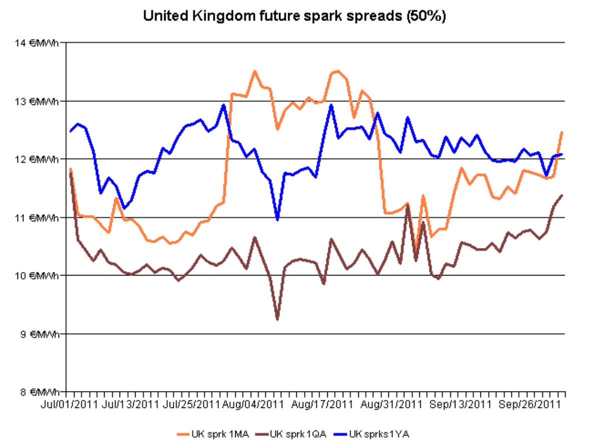
The significant fall in European emission contracts that started in the second half of June 2011 continued in the first month of Q3 2011 and at the beginning of August prices fell below 11 €/t CO_2e. The main reasons for this permanent slide in prices were economic uncertainties in the eurozone, the bad performance of global equity markets, cooler than usual summer weather that put a lid on power prices and the ongoing fears on long-lasting oversupply in emissions market.



Source : Platts.

In August 2011 as global commodity and equity markets rebounded emission prices also rose, however, from the beginning of September the economic situation began to exert a downward pressure on emission prices and they finished Q3 2011 close to their lows measured at the beginning of August.

Both quarter-ahead and year-ahead future spark spreads in the UK fluctuated in a narrow range of 2 €/MWh during the third quarter of 2011, primary owing to the strong correlation between forward gas and electricity prices. In the case of month-ahead spark spreads a transitory upward shift could be observed in August, primarily owing to an increase in month-ahead power prices.



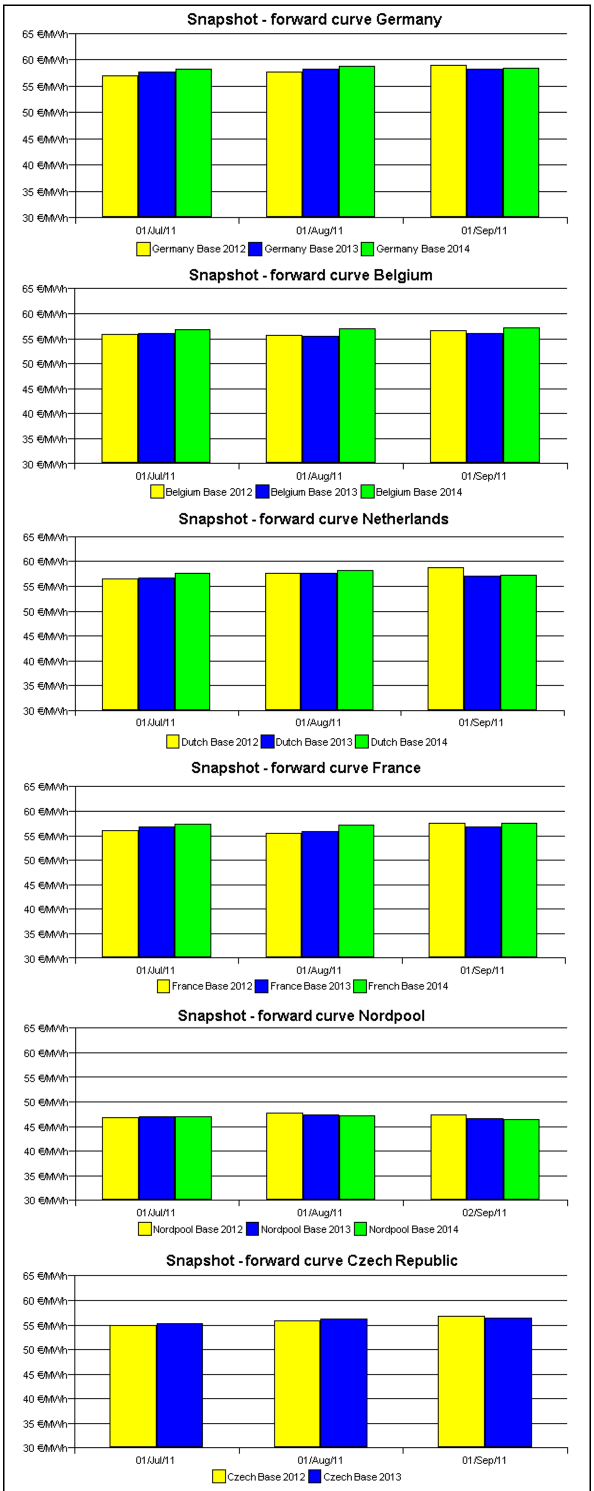
Source : Platts.

In the case of the majority of markets presented on the next chart on the first day of July and August 2011 forward curves were either in a slight contango[8] or they were flat. At the beginning of September 2011 year-ahead forward prices were higher than those for 2013 or 2014, putting the curves into a slight backwardation[9] or still leaving them in a rather flat situation.

The higher spot prices must have had an upward pressure on the near end of the forward curve. In the case of the Nordic markets a slight backwardation could be observed even in August as forward prices anticipated further decreases on the whole curve.

[8] 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.

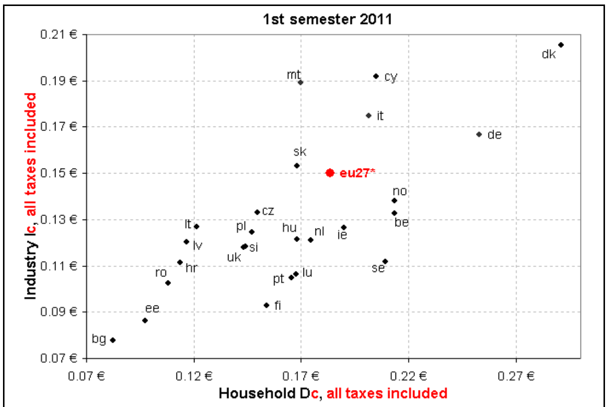
[9] Backwardation occurs when the closer-to-maturity contract is priced higher than the contract which is longer to maturity.



Source : Platts.

A. 2 Retail markets

The next two charts show the electricity prices paid by household consumers in the Member States of the EU as well as in Croatia, Norway and Turkey, using between 1.000 and 2.500 kWh in each year, and industrial consumers that use between 20 MWh and 500 MWh annually (consumption bands *Dc* and *Ic* according to Eurostat's consumption categories). The first chart shows the household and industrial customer prices including all taxes (gross prices), while the second one shows prices without taxes (net prices).



Source : Eurostat

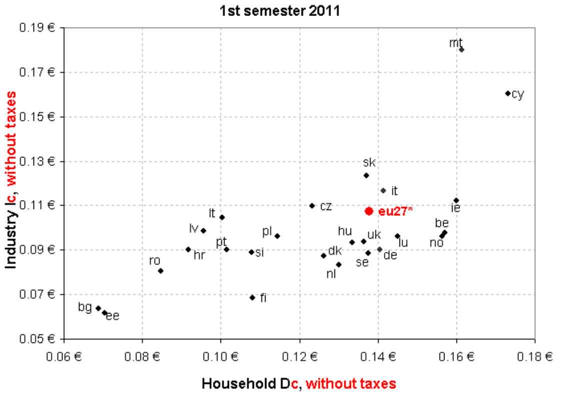
Range for annual consumption of :

Household band Dc : [2.500 kWh – 5.000 kWh] ;

Industry band Ic : [500 MWh – 2.000 MWh]

Notes: Data for Austria, Spain, France, Greece, Turkey are not available: eu27 is the last available weighted average, as of 2nd semester 2010.*

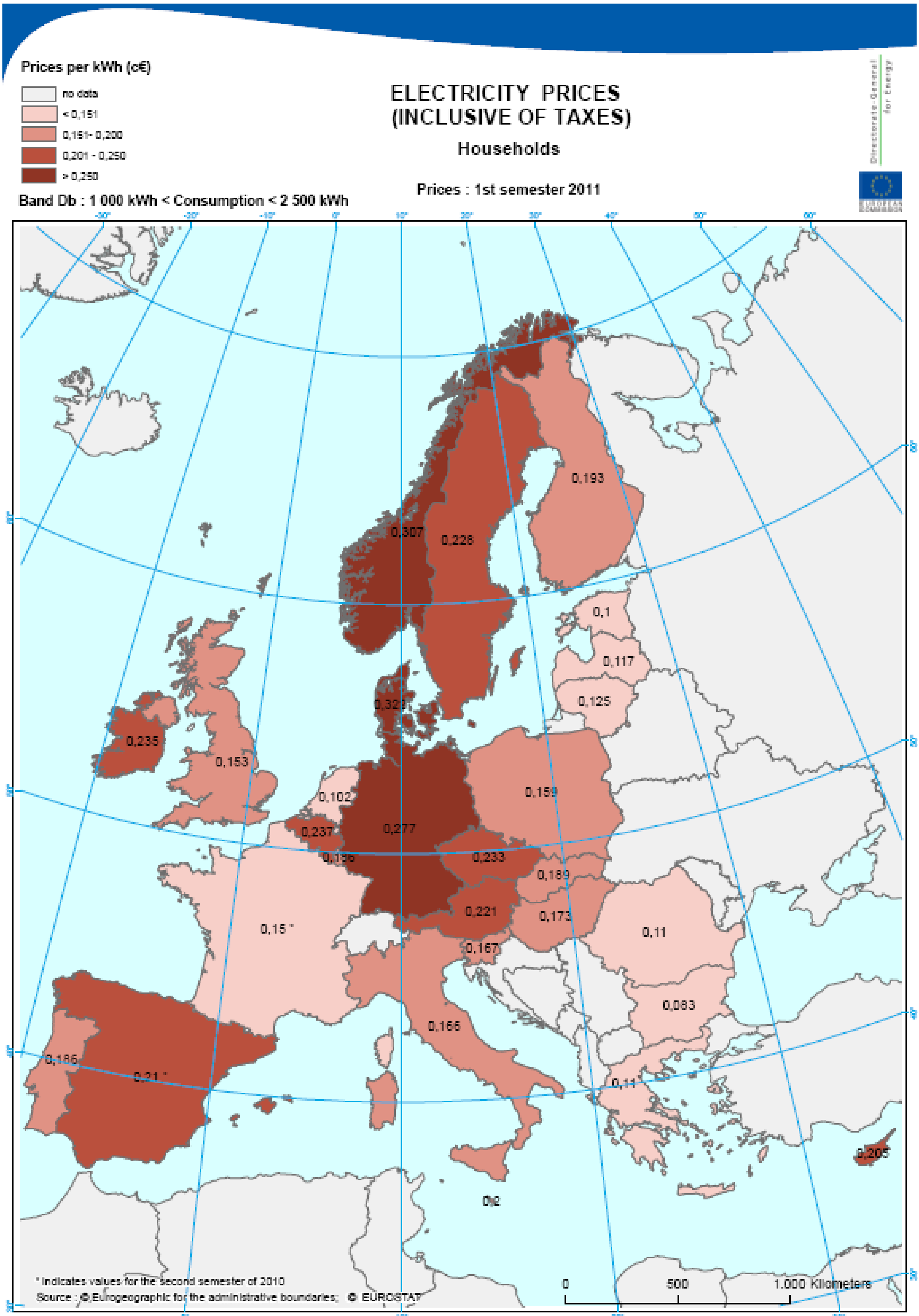
During the second semester of 2010 and the first semester of 2011 the ratio between the cheapest and most expensive gross prices for households increased from 3.3 to 3.5 and from 2.5 to 2.6 for industrial consumers. In absolute terms the range between the cheapest and most expensive net (pre-tax) prices for household consumers amounted to 21 cents/kWh for households (2 cents increase with respect to second semester 2010) and 13,5 cents for industrial consumers (slight increase with respect to second semester 2010).

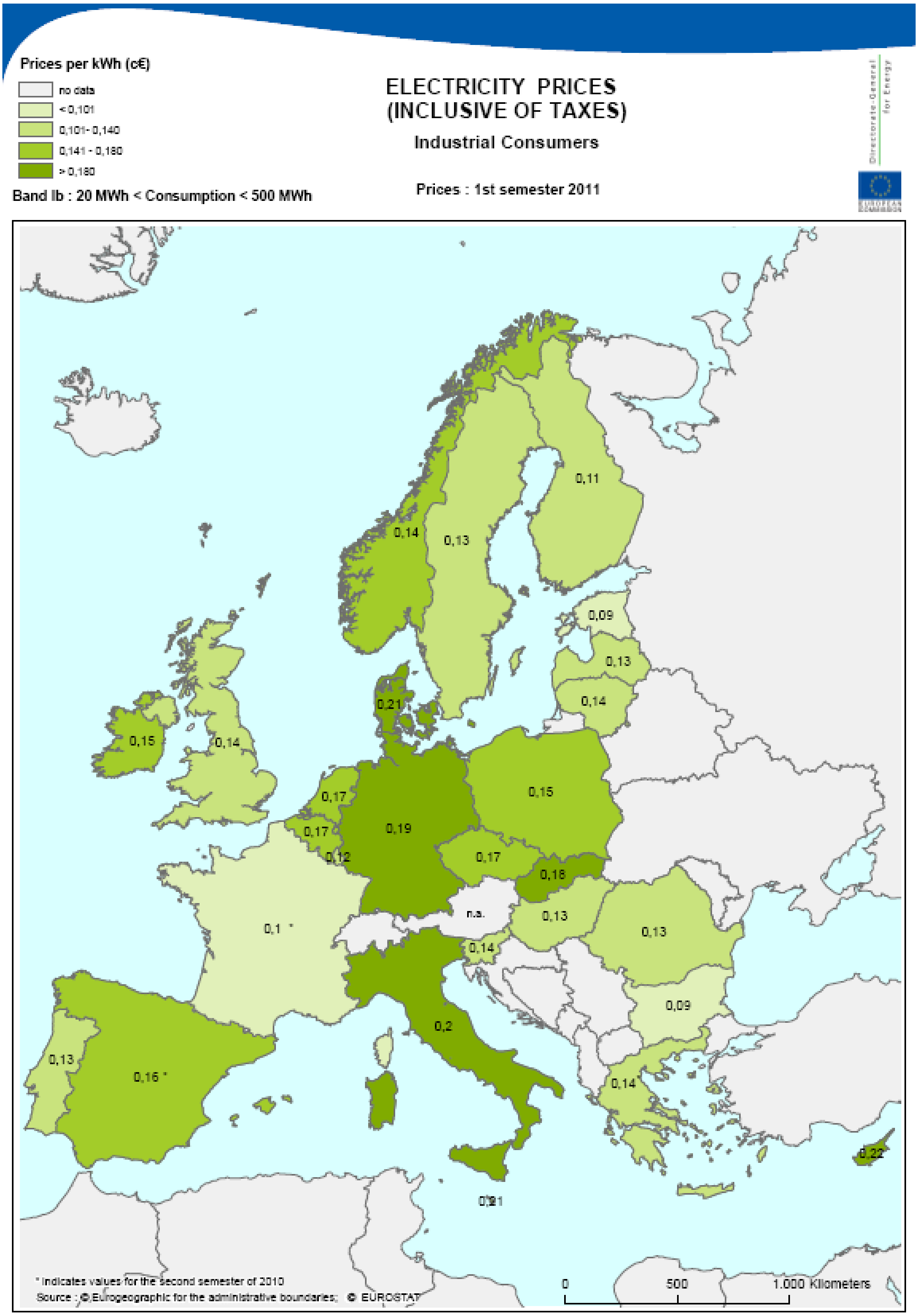


Source : Eurostat
Range for annual consumption of :
Household band Dc : [2.500 kWh – 5.000 kWh] ;
Industry band Ic : [500 MWh – 2000 MWh]

Notes: Data for Austria, Spain, France, Greece, Turkey are not available: eu27 is the last available weighted average, as of 2nd semester 2010.*

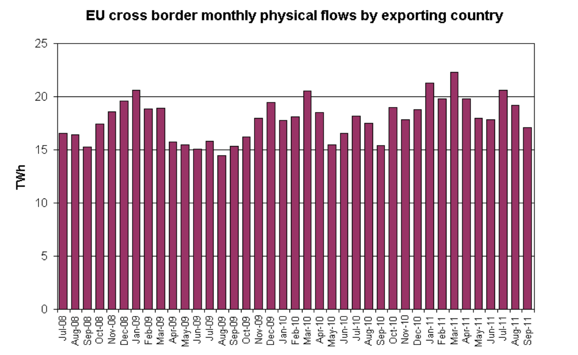
The next two maps show the electricity retail prices paid by household and industrial consumers in the first half of 2011. The maps show prices of Band *Db* in the case of households (meaning prices for a household with an annual electricity consumption between 1.000 kWh and 2.500 kWh, according to Eurostat's classification), and Band *Ib* industrial consumer prices, having an annual consumption between 20 MWh and 500 MWh.


Prices per kWh (c€)
no data
< 0,151
0,151- 0,200
0,201 - 0,250
> 0,250
Band Db : 1 000 kWh < Consumption < 2 500 kWh
ELECTRICITY PRICES
(INCLUSIVE OF TAXES)
Households
Prices : 1st semester 2011
Directorate-General for Energy
0,193
0,307
0,228
0,1
0,117
0,125
0,32
0,235
0,153
0,102
0,159
0,237
0,277
0,156
0,233
0,189
0,221
0,173
0,15 *
0,11
0,167
0,083
0,166
0,186
0,21 *
0,11
0,205
0,2
* Indicates values for the second semester of 2010
Source : © Eurogeographic for the administrative boundaries; © EUROSTAT
0
500
1.000 Kilometers


Prices per kWh (c€)
no data
< 0,101
0,101- 0,140
0,141 - 0,180
> 0,180
Band Ib : 20 MWh < Consumption < 500 MWh
ELECTRICITY PRICES
(INCLUSIVE OF TAXES)
Industrial Consumers
Prices : 1st semester 2011
Directorate-General for Energy
0,11
0,14
0,13
0,09
0,13
0,14
0,15
0,14
0,21
0,17
0,19
0,15
0,17
0,12
0,17
0,18
n.a.
0,13
0,13
0,1 *
0,14
0,09
0,2
0,13
0,16 *
0,14
0,22
0,21
* indicates values for the second semester of 2010
Source : © Eurogeographic for the administrative boundaries; © EUROSTAT
0
500
1.000 Kilometers

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

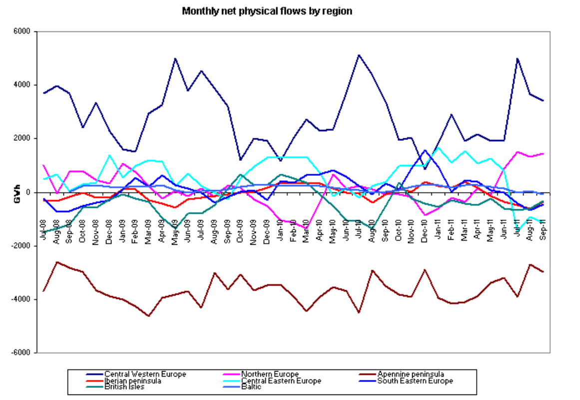
The volume of physical cross border electricity flows was 56.9 TWh in the third quarter of 2011, which was close to Q2 2011 volume of 55.6 TWh but it was substantially lower than in Q1 (63.4 TWh). This corresponds to the seasonality observed during the last couple of years as power flow volumes are higher during winter periods. The year-on-year growth in cross border flows (11.3%) outperformed the increase in traded volumes (3.4%) in Q3 2011, implying a healthy evolution and growing interrelated nature of the European electricity markets.



Source : ETSO

Note. Data for MT and CY are missing. Data for EE, LT and LV are available since September 2008, and for IE since July 2010. Data on physical flows from and to LU is incorporated in LU's neighbouring countries : DE, BE, FR. Data for a number of Member States is still partial, particularly for Member States in the South East European Region.

In the case of Nordic markets low prices compared to the Central West European region assured the profitability of exporting power; the monthly volumes of net power outflow (1.3-1.5 TWh) were the highest in the last three years. The Central East European region became a net importer in Q3 2011 primary due to higher prices stemming from tight grid margins. As prices were constantly growing in the area of the Iberian-peninsula the region remained in a net importer position. The South East European region also became a net importer in the consequence of higher prices and lower domestic power generation in some countries of the Balkans.



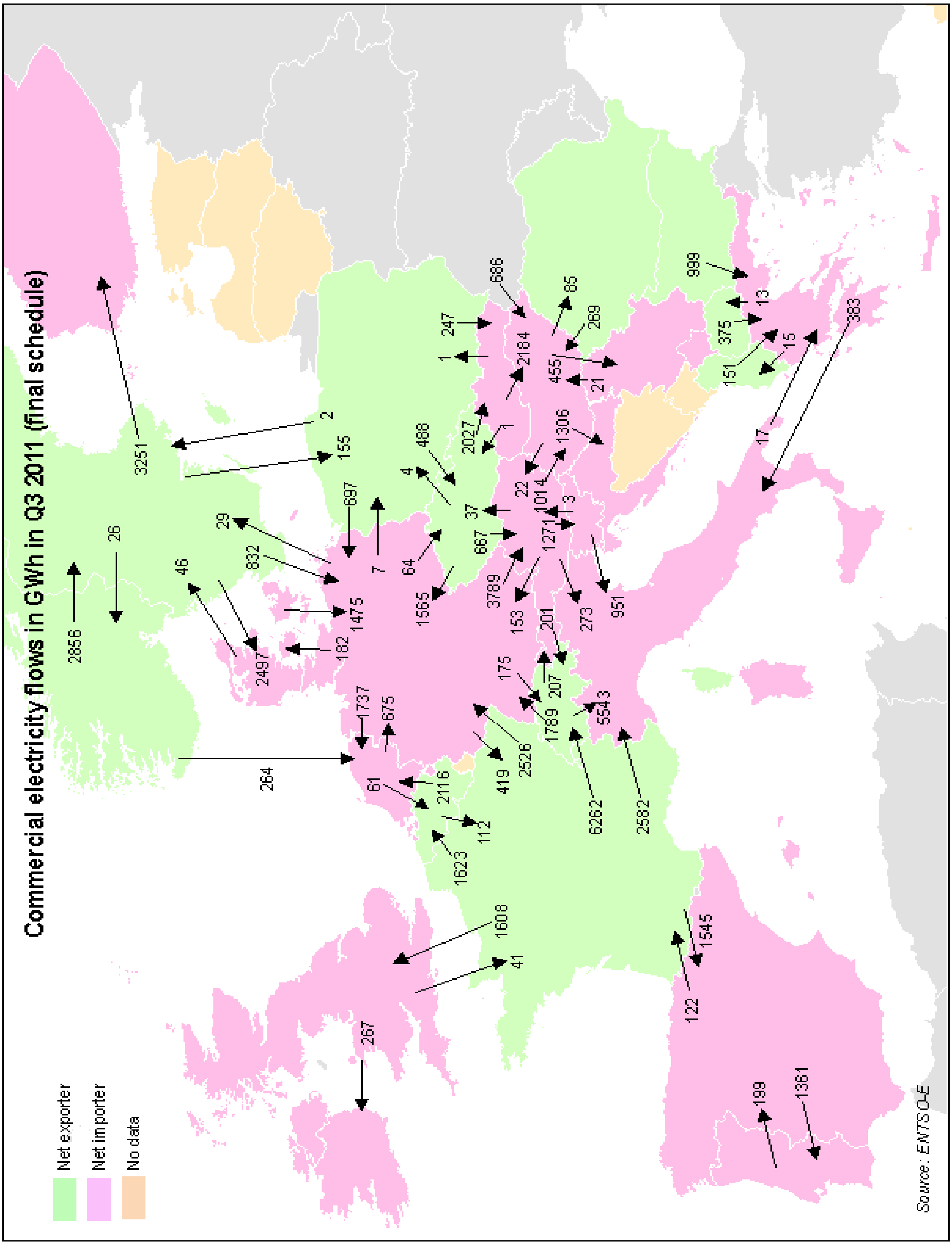
Source : ETSO.

European countries are grouped in the following regions :

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

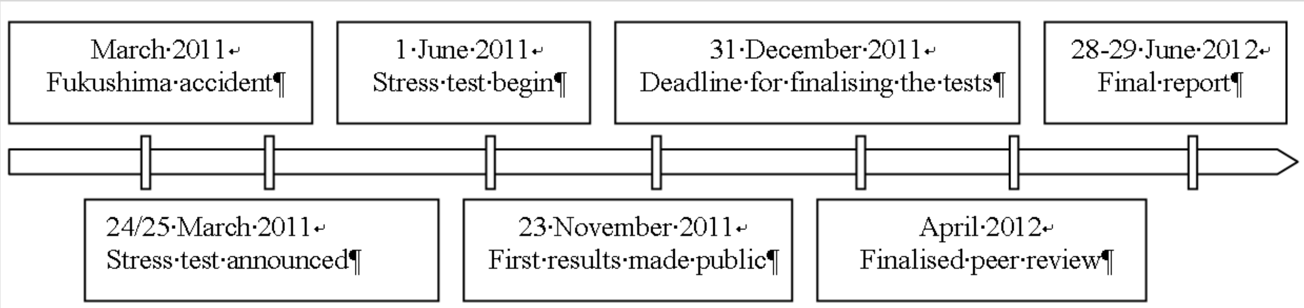
Note to the map:

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. For the case of the Czech-Slovak border, gross commercial values are given.


Commercial electricity flows in GWh in Q3 2011 (final schedule)
Net exporter
Net importer
No data
Source: ENTSO-E

C. *"Focus on EU Nuclear stress tests"*

After the Fukushima nuclear accident the European Council requested a review of the safety conditions of all EU nuclear plants, through a transparent and comprehensive risk and safety assessments, so-called "stress tests"[10]. From the 1st of June 2011 all 143 plants in the EU were being assessed based on EU-wide criteria. Those EU tests were performed in addition to national level frameworks. The tests have been carried out according to the agreed time schedule.
The first results ("Interim report") have been published on 24th of November and final results will be presented to the European Council on 28-29 June 2012.



The aim of the tests is to assess whether the safety measures are sufficient to cover extreme unexpected events. In particular, one of the most important lessons that can be drawn from Japanese case is that two accidents can happen simultaneously. In fact, Fukushima power plant withstood the earthquake. The disaster was caused by the tsunami that interrupted the power supply which was necessary to cool the fuel in the plant. Hence, the risk of core meltdown with radioactivity leakage was not directly caused by the earthquake itself, but from the subsequent overheating of the plant due to the interruption of power supply for the cooling of the facilities.

International participation. All the Member States with operating power plants participated in the tests: Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, the Netherlands, Romania, Slovak Republic, Slovenia, Spain, Sweden, the United Kingdom and Lithuania (currently decommissioning its nuclear plants). Neighbouring countries as Ukraine and Switzerland also accepted to fully take part in the tests[11]. Russian Federation stated that such tests have already been performed but expressed its interest in participating in peer reviews will take place between January and April 2012.

[10] Source: http://www.ensreg.eu/EU-Stress-Tests, last accessed on the 4th of January 2012.
[11] See press release [IP/11/1450], available at http://ec.europa.eu/energy/nuclear/safety/stress_tests_en.htm, last accessed on the 4th of January 2012.

In order to ensure full transparency, all reports and peer reviews are or will be made available at www.ensreg.eu. Furthermore, it is the declared that the European Commission intends to further enhance cooperation with the International Atomic Energy Agency. In particular, the Commission wants to contribute to the improvements in global legal framework for nuclear safety, with particular respect to the Nuclear Safety Convention[12].

The tests

The central element of the tests is the evaluation of safety margins for natural and man-made accidents, which may cause loss of electrical power and loss of cooling capacity. The tests assess whether a power plant can withstand two main types of events:
1. Natural disasters, including earthquakes, flooding, extreme cold and hot weather, snow and ice, tornados and other extreme conditions.
2. Man-made failures and actions, including airplane crashes and explosions close to the plant (caused by fire, terrorist attacks, explosion of fuel tanks).
The reports also deal with management of severe accidents, which are the procedures to follow in the case of serious accidents such as: damage to the fuel, core meltdown and loss of containment capacity resulting in radioactive leakage.

First findings and areas of improvement

At this stage of the assessment any conclusion on the results of the stress tests would be premature. The Commission will base its initiatives on the final report to the European Council.
Nonetheless, the interim report contains preliminary suggestions on the identification of the policy areas where further action is deemed to be necessary, either by proposing new legislation or by improving coordination among Member States. The Commission is in particular considering the following areas of improvement[13]:

- Today Member States apply different safety provisions for nuclear power plants (example: minimum distance from the sea). New EU legislation could lay common legal provisions for the siting, design, construction and operation of nuclear plants. Those criteria should become the reference when licensing or checking the operations of a plant.
- National regulators are responsible for the licensing and the checking of nuclear plant operations. Given their key role in ensuring nuclear safety, it is desirable to enhance their independence and transparency.

[12] See Commission Interim Report [MEMO/11/827] - 24 November 2011, available at http://ec.europa.eu/energy/nuclear/safety/stress_tests_en.htm, last accessed 4th Jan 2012.
[13] See supra, Commission Interim Report [MEMO/11/827]

- Nuclear emergencies do not stop at Member States' borders. There is a need for coordinated international and cross border nuclear risk management plans which could ensure better coordination and response to an emergency.
- An EU approach to liability should be put in place, with an EU-wide compensation scheme for victims of nuclear accidents. Since victim protection should not depend on the victim's nationality, some minimum EU-wide requirements should be put in place.

The cost of the security measures in France. Following the Fukushima accident and nuclear stress tests, the French Nuclear Safety Authority (ASN) found that, although all of the 79 installations in the country proved sufficiently safe not to be shut down, new security measures are however deemed as necessary[14]. The ASN aims at ensuring the resistance of French power plants to the same natural disasters as the ones that happened in Fukushima. In particular the implementation of such measures would include flood-proof diesel generators and bunkered back-up control rooms at the plants. EDF (the largest electricity producer) which runs 59 nuclear plants in the country has estimated that the investment cost required could have some implication on power generation costs.

[14] See: "*Avis no2012-AV-0139 de l'Autorité de sûreté nucléaire du 3 janvier 2012 sur les évaluations complémentaires de la sûreté des installations nucléaires prioritaires au regard de l'accident survenu à la centrale nucléaire de Fukushima Daiichi*", available at http://www.asn.fr/index.php/Les-actions-de-l-ASN/La-reglementation/Bulletin-Officiel-de-l-ASN/Avis-de-l-ASN/Avis-n-2012-AV-0139-du-3-janvier-2012-de-l-ASN (last accessed on the 5th of January 2012)

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