

# Quarterly Report on European Electricity Markets



Directorate-General  
for Energy

## ● MARKET OBSERVATORY FOR ENERGY

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## EUROPEAN COMMISSION

Günther H. Oettinger



Dear readers,

As the new Commissioner for energy, it is my pleasure to address the growing community of subscribers of our quarterly market reports.

Let me start by saying that the European Commission is fully committed to a functioning and competitive energy market within the European Union. The achievement of this goal will in addition contribute to the policy response required to fight climate change and to secure our energy future.

As you know, the *Quarterly Report on European Electricity Markets (QREEM)* monitors and analyzes the main drivers behind price and volume evolutions, both on the wholesale and on the retail electricity markets across Europe. The report also follows the interactions between countries and regions (commercial cross border transactions) as an indication for the functioning of the internal market.

The final quarter of 2009 offered evidence that maturing wholesale markets are reinforcing the secure operation of networks across Europe. In October 2009 the French grid was facing a very challenging situation of balancing supply and demand. The resulting price spreads – for some hours a MWh was traded at € 3000 – were recognized by market participants as a signal to increase (and in some cases to redirect) inflows and to reduce consumption in the affected areas. As a result grid conditions improved over time. On the other hand, extremely low demand in the early hours of October 4<sup>th</sup> 2009 led to negative prices of – € 500 / MWh in Germany.

Prices of input fuels started to grow again in Q4 2009, pointing to an early sign of recovery of the global economy. Our reports will continue to follow this development and its impact on the evolution of electricity markets across the EU.

Finally, we put a focus in this issue on wooden pellets, one of the most promising sources of renewable energy.



## QUARTERLY REPORT ON EUROPEAN ELECTRICITY MARKETS

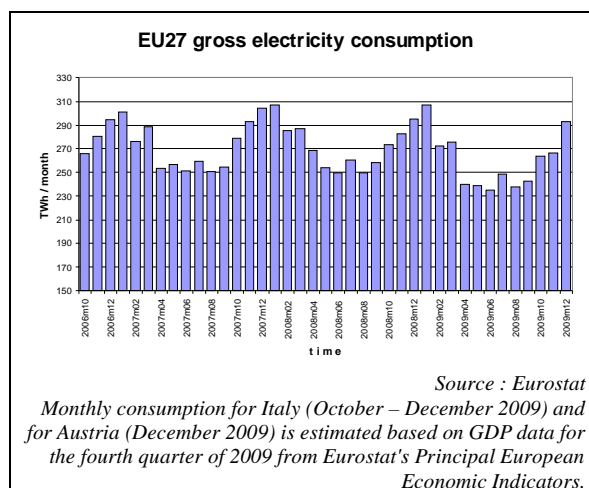
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### A. Recent developments in the electricity markets across Europe

#### A.1 Wholesale markets

Following an established seasonal pattern, the gross consumption of electricity in the European Union increased by almost 100 TWh (+13%) in the fourth quarter of 2009 from its Q3 2009 levels.

On a yearly basis however, consumption fell by 3.5% and 5.7% in October and November 2009. The decline was interrupted in December 2009 when colder than average weather conditions across the continent were among the factors supporting electricity demand from households<sup>1</sup>.



<sup>1</sup> Gross electricity consumption in December 2009 was 293.2 TWh, 1.9 TWh below the corresponding 2008 levels which is less than 0.7%.

#### Disclaimer

This report prepared by the Market Observatory for Energy of the European Commission aims at enhancing public access to information about electricity prices within the Members States of the European Union. Our goal is to keep this information timely and accurate. If errors are brought to our attention, we will try to correct them. However the Commission accepts no responsibility or liability whatsoever with regard to the information contained in this publication.

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As indicated by *Eurostat/JRC* data on heating degree days (HDD)<sup>2</sup>, the months of October and December in 2009 were colder than the same months of 2007 and 2008 and slightly cooler than the corresponding 25 year average.

November 2009 was more than 50 HDDs warmer than the same month of 2008. Compared to the previous year, November was also the month in Q4 2009 with the strongest reduction of EU gross electricity consumption.

EU 27 Heating Degree Days in Q4  
Values for 2007, 2008, 2009 and 1980 – 2004  
average

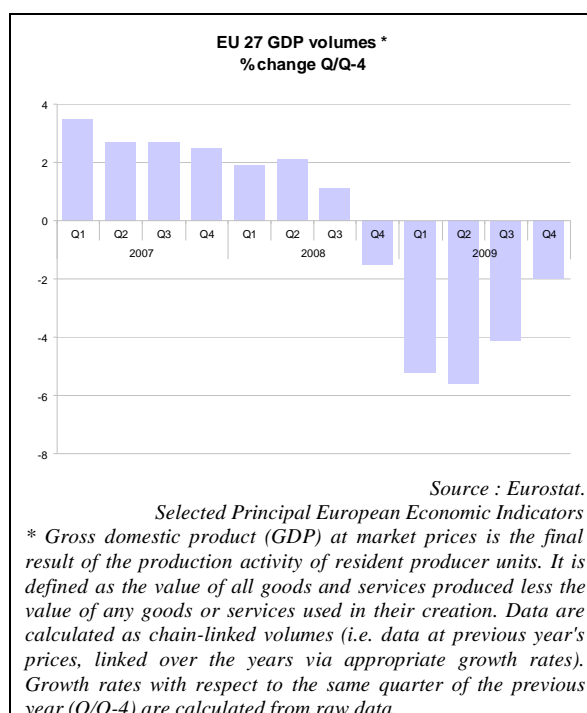
	October	November	December
2007	234.12	404.71	484.01
2008	221.93	372.18	483.96
2009	249.62	318.69	520.91
LT avg.	236.95	391.82	512.14

Source : Eurostat / JRC

It remains to be seen if the developments of the final month of 2009 point towards a tendency of stabilization of electricity consumption. As shown in the next chart, it is premature to speak of economic recovery in the EU. In fact, Q4 2009 was the fifth consecutive quarter of negative GDP growth although the decrease was less severe than the one experienced in previous quarters.

<sup>2</sup> 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.

For a number of Member States the strong relation between economic activity and electricity consumption was confirmed in Q4 2009. For example, while Estonia, Latvia and Lithuania registered the biggest falls in GDP on an annual basis<sup>3</sup>, the decline of electricity consumption in the Baltic region was also above the EU average<sup>4</sup>.



In Q4 2009 prices in the major European fuel markets were moving in the same direction. Such an alignment had not been observed since November 2008 when coal, oil and gas prices were falling in the aftermath of the correction of financial markets.

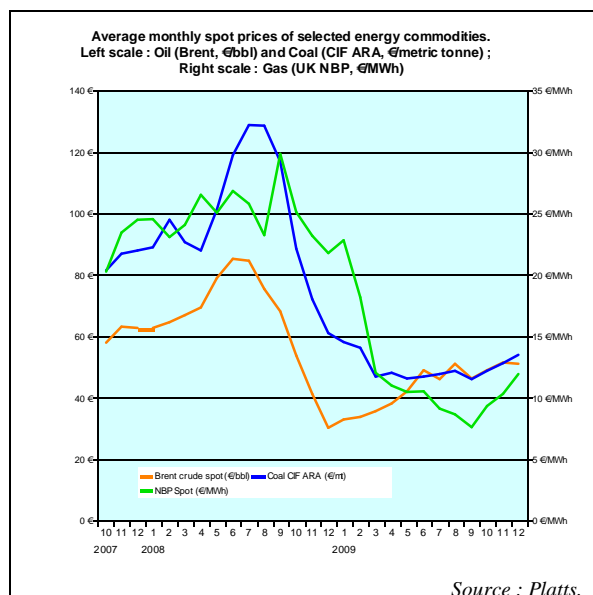
This time around fuel prices edged up but it seems that market specific factors were

<sup>3</sup> Compared to Q4 2008 the GDP growth in Estonia, Latvia and Lithuania in Q4 2009 was respectively -9.5%, -16.9% and -12.8%.

<sup>4</sup> The corresponding year-on-year figures for the months of October, November and December were -7.1%, -6.7% and -3.3%.



as important as general drivers such as the recovery of energy demand in South East Asia.



After reaching a low point of € 7.61 / MWh in September 2009, the monthly average spot price for gas delivered on the National Balancing Point in the UK rose steadily for the remaining months of the year. In Q4 2009 alone it grew by 27% as market participants were preparing for the winter season. Gas prices were still half the levels of those observed in 2008.

Likewise, coal prices in the North Western European region were increasing as demand was expected to increase in the winter season and supply and storages were tight. In Q4 2009 the coal CIF ARA price<sup>5</sup> rose by 10%, most of it during the month of December, marking a shift from the spring and summer months when the price was more or less stable.

<sup>5</sup> Price for a metric tonne of coal (calorific value of 6 000 kcal / kg) delivered at the Amsterdam-Rotterdam-Antwerp area with cost, insurance and freight covered.

The Brent crude oil spot contract was trading around €44 and €54 per barrel in the fourth quarter of 2009 while monthly average prices were close to €50 / bbl. Year-on-year this represents an increase of 68% for the month of December 2009.

The price of Brent continued to follow the value of the dollar on the foreign exchange as the outlook of supply and demand fundamentals remained unclear.

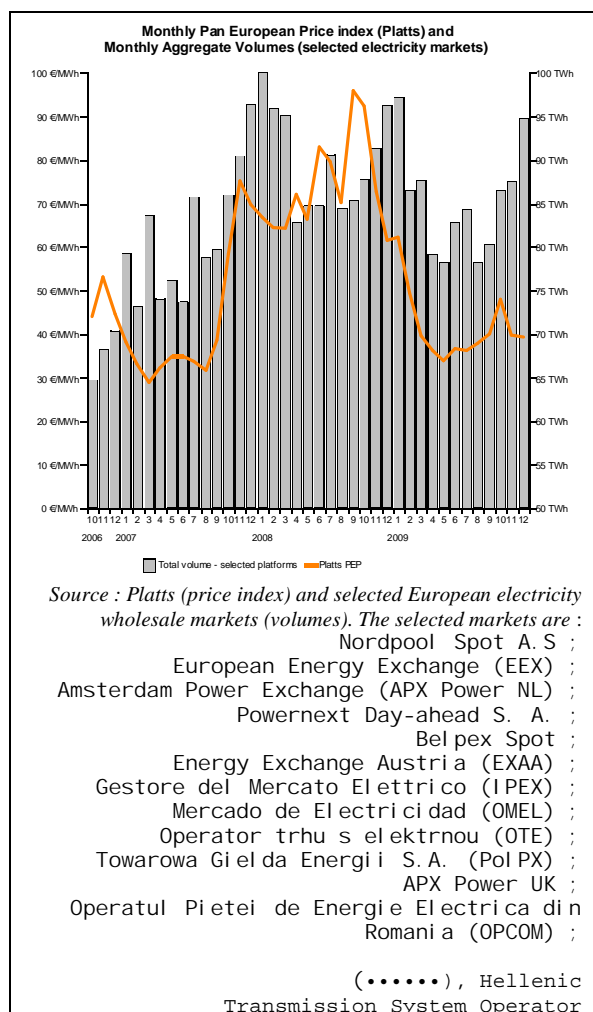
### A.1.1 Day-ahead

#### EU wholesale markets

Contrary to what happened on the markets for input fuels, the price of electricity across the European wholesale markets remained stable at around the €40 / MWh mark throughout Q4 2009.

The notable exception was the third week of October when very tight supply conditions on the French market triggered spot hourly prices to rise to €3000 / MWh, the limit price of the power exchange. A major redirection of the electricity flows in Europe was observed in Q4 2009 as electricity imports into France increased significantly from all neighbouring countries.

One other unusual occurrence in the fourth quarter was the emergence of persistent price differentials across neighbouring markets. It is still unclear if that situation is specific to a particular grid condition in Q4 or if it is revealing of a more general trend.



Volumes of traded energy increased significantly in the fourth quarter of 2009. Compared to the level of Q3 2009 the combined day-ahead turnover of the trading platforms in the selected countries<sup>6</sup> increased by 25 TWh (more than 10%) to reach levels close to 270 TWh.

<sup>6</sup> The *Quarterly Report* intends to cover all Member States, Candidate countries and countries from the European Economic Area that have developed a functioning wholesale market for electricity. For the time being, the selected countries are: Austria (AT), Belgium (BE), the Czech Republic (CZ), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Italy (IT), the Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Spain (ES), Sweden (SE), the United Kingdom (UK) and Norway (NO).

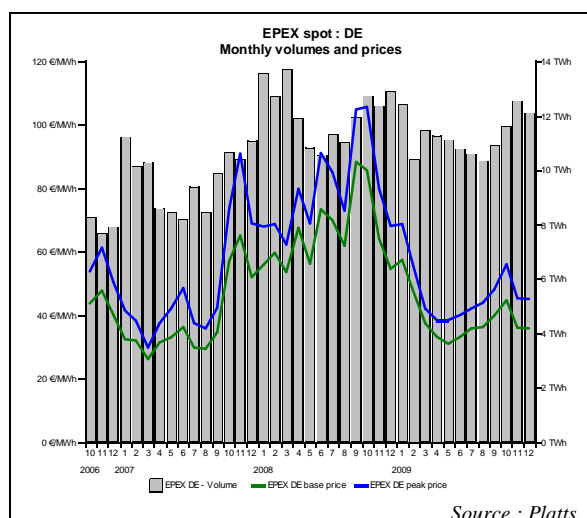
Year-on-year results also appeared strong. Traded volumes in the October – December period decreased marginally, implying that market participants continued to rely on organised markets for price discovery despite the difficult economic conditions which impacted industrial demand for electricity.

## Regional markets

### Central Western Europe

#### Germany

With the start of the winter season traded volumes on the EPEX spot area for Germany rose by 14% compared to Q3 2009. Similar to 2008, the monthly turnover on the day-ahead segment crossed the 12 TWh mark in November and December. This represents roughly a quarter of the amount of electricity consumed in Germany during the respective periods.



Tight grid margins resulting from increased exports to France and low levels of wind drove the October average monthly baseload price up 5 € to €44.57 / MWh. The remainder of the quarter was calmer as peak and base prices returned to levels similar to the ones observed during the spring and summer months.

There were several occurrences of negative prices, mostly during the early hours following national holidays. Negative prices, implying that generators have to pay to remain online when baseload demand is very low, were observed on the EPEX spot exchange on several occasions since Q3 2008.

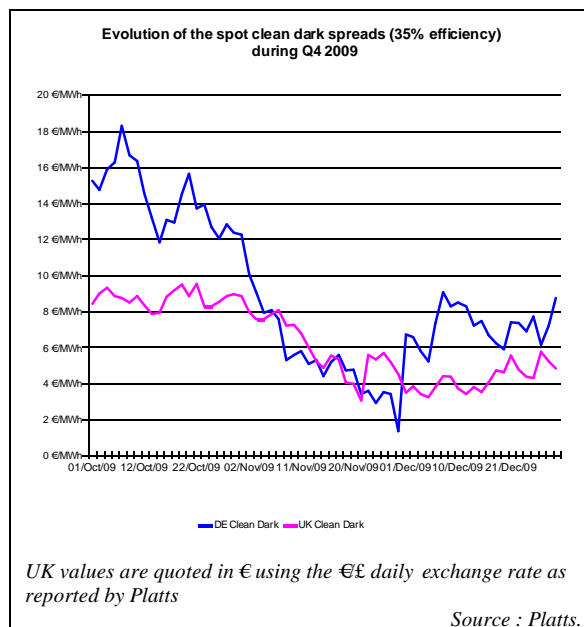
One apparent distinguishing feature in this latest development is the scale of the transacted prices. For example, on the 26th of December 2009, the hourly prices remained well below €– 100 / MWh until 09:00 AM. During this 9-hour interval a total of 158 GWh was exchanged on the EPEX spot German price area. Prices remained negative until midday. Likewise, the spot price for delivering electricity on the grid during the 3<sup>rd</sup> hour of 04.10.2009 went down to € – 500.02 / MWh and around 17 GWh were exchanged in that hour.

It will be interesting to see if such pricing signals will increase the market presence of flexible generators which have the possibility to modify quickly their production levels.

As coal prices started to appreciate while the average monthly baseload remained stable, German clean dark spreads<sup>7</sup> fell

<sup>7</sup> Dark spreads are reported as indicative prices giving the average difference between the cost of coal delivered ex-ship and the power price. As

approximately € 10 / MWh in the fourth quarter of 2009.



The downward trend was partly disrupted by the variation of the price of emission allowances.

## The Netherlands

Market participants continued to trade actively on the day-ahead segment of APX, the Dutch electricity exchange, despite the slowdown of economic activity<sup>8</sup> and the reduced level of electricity consumption<sup>9</sup>.

such, they do not include operation, maintenance or transport costs. Spreads are defined for a coal-fired plant with 35 % efficiency.

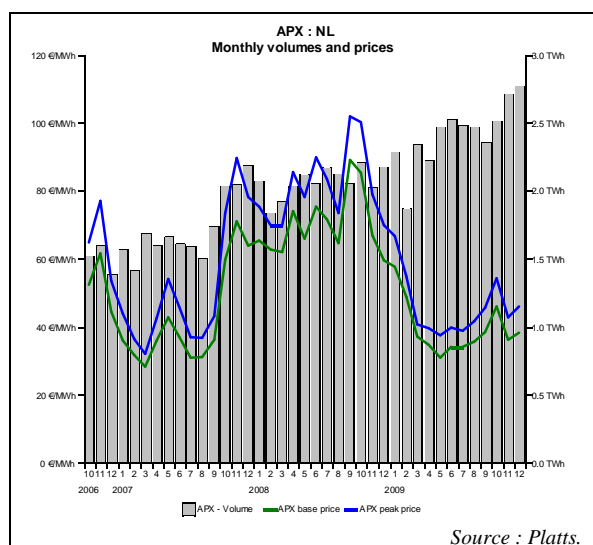
Dark spreads are given for UK and Germany, with the coal and power reference price as reported by Platts.

Clean dark spreads are defined as the average difference between the price of coal and carbon emission, and the equivalent price of electricity.

<sup>8</sup> According to economic indicators of Eurostat, the year-on-year growth for Q4 2009 was – 2.2%.

<sup>9</sup> Compared to the corresponding 2008 levels, the monthly gross consumption of electricity in the Netherlands decreased on average by 6% in Q4.

In November and December 2009 APX reported record turnovers of 2.7 and 2.8 TWh (+30% increase from the previous year) as the day-ahead turnover represents now more than 25% of the gross domestic consumption.

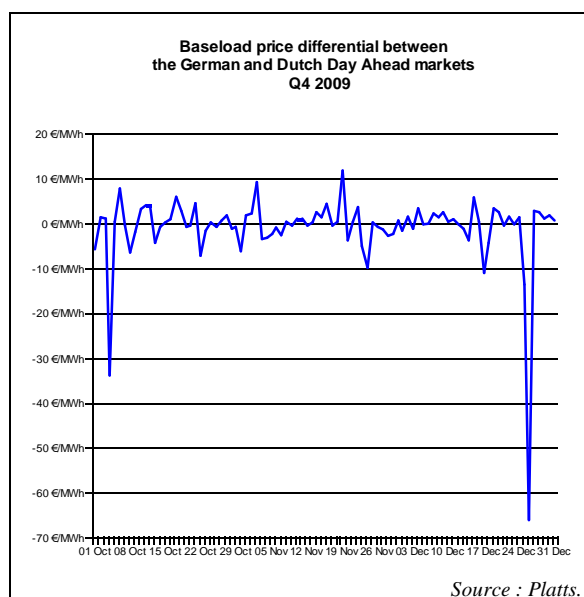


As elsewhere on the continent, grid balance was tight at the beginning of Q4 2009. The baseload monthly average price for October rose by €7 and crossed the €45 / MWh mark.

Later in the observed period wind levels improved and the industrial and residential demand remained weaker than expected. These developments resulted in comfortable grid margins and base prices returned to the €36 – 38 / MWh range seen during the summer months.

Barring episodes of negative prices, the Dutch and German baseload prices followed very close trajectories. Notably, the Dutch contract was traded on average at a small discount (€0.14 / MWh) to the German benchmark.

Even after including the two outliers (see next graph), the price differential remained close to €1 / MWh.



## France

It seems that the common operation of the French, German, Austrian and Swiss day-ahead market is proving beneficial for the liquidity of each price area.

While the gross consumption of electricity in France decreased in each month of Q4<sup>10</sup> and while GDP in the fourth quarter in 2009 was slightly smaller than GDP in Q4 2008, trading volumes on the EPEX spot French area continued to increase.

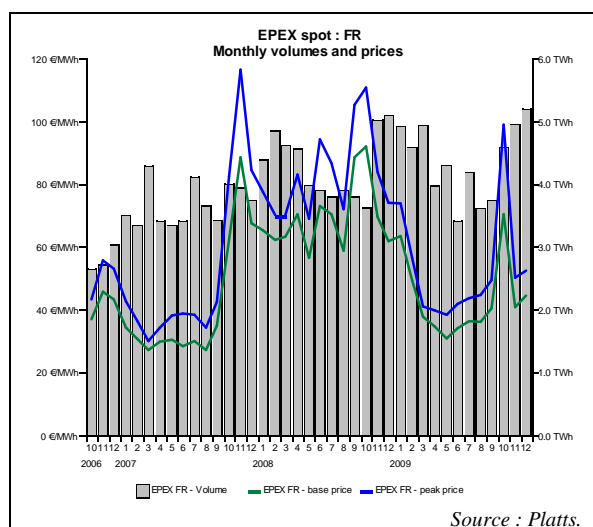
The month of December 2009 offers a good example. Year-on-year consumption fell by 9.5% to 53.7 TWh, however the exchanged energy on the day-ahead segment reached a record level of 5.2 TWh.

<sup>10</sup> The GDP level is compared to the corresponding levels the previous year.

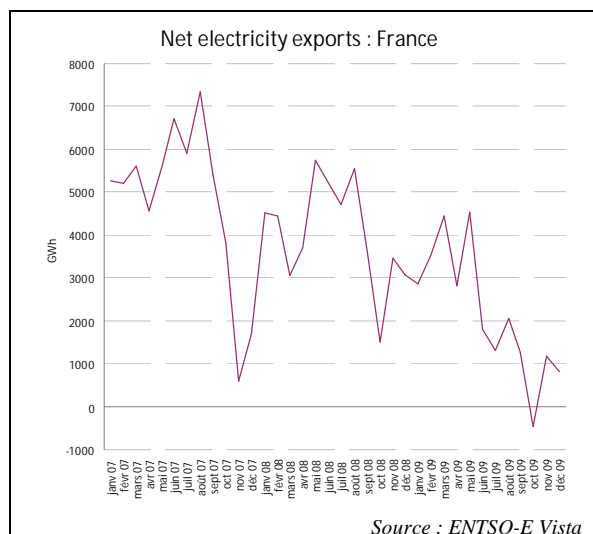


The increased liquidity is providing evidence that more and more market participants are relying on the price discovery function of the power exchange.

The observed period was quite eventful as regards price developments.



According to the *ENTSO-E* database on cross-border flows, the French net exporting capacity decreased strongly, especially during periods with scheduled maintenance works of the nuclear park. At the beginning of Q4 2009 the grid margins were very low as 19 out of 58 nuclear reactors were out for maintenance.



In October, France was a net importer of electricity. Except for Spain, all neighbouring systems increased significantly the French bound cross border flows. Compared to the same month of 2008, Belgian and German imports almost doubled<sup>11</sup>. At 723 GWh (a four-fold increase from a year ago), the UK became the biggest exporter into the French grid for that period. The Swiss and even the Italian system contributed to helping the market out of this difficult situation.

The October events provided further evidence that the functioning of the market is compatible with grid security.

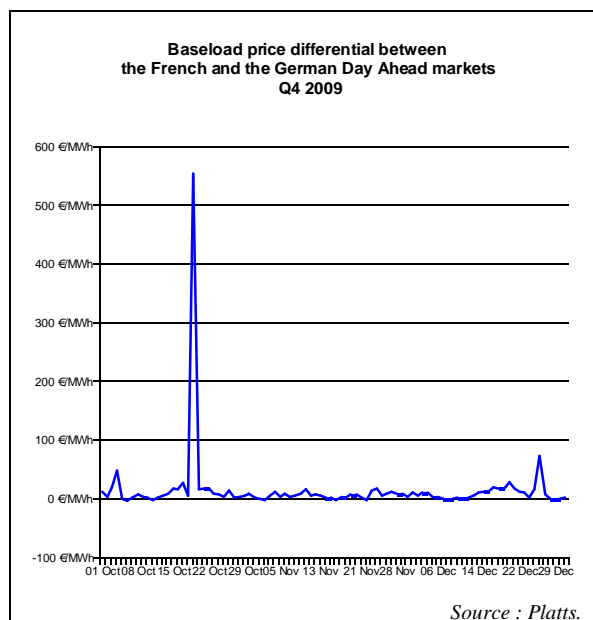
As flexible capacity was increasingly solicited, especially around the third week of October, the pricing signals incited market participants across the continent to envisage redirection of flows towards the French grid.

On the 19<sup>th</sup> of October, the delivery of electricity into the French system was priced at € 3000 / MWh during four consecutive hours (08:00 – 12:00). The 3000 € cap is the maximum authorised price on the EPEX spot platform. Traded volumes decreased during that period but 20 GWh were still exchanged at that price, confirming the extremely tight grid conditions. Brief ripple effects were felt on the German and Belgian markets.

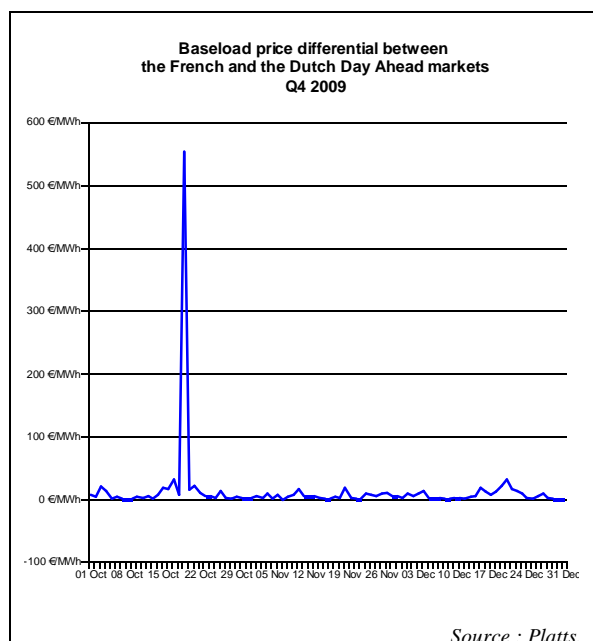
As a result, the average October baseload price was €70.10 / MWh, 30 € above the average values for September and November.

<sup>11</sup> The corresponding values for October 2008 and 2009 were: Belgium (385 vs. 722 GWh) and Germany (115 vs. 211 GWh).

The huge outlier on the 19<sup>th</sup> of October dwarfs all price differentials with neighbouring system.

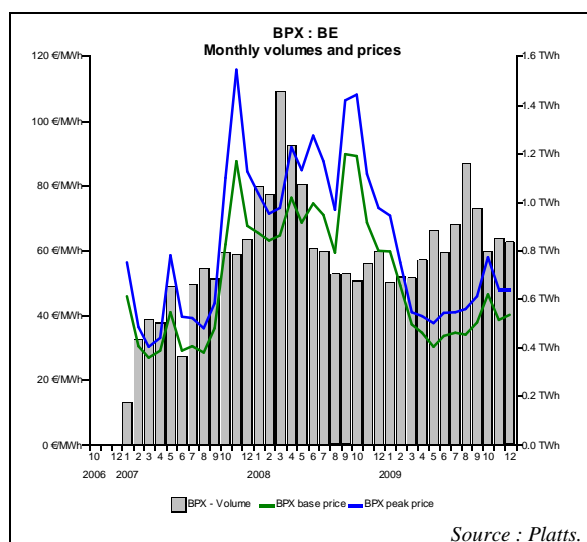


Still, it is clear that the French spot baseload was priced at a premium with respect to the Dutch and German benchmarks during most of the observed quarter.



## Belgium

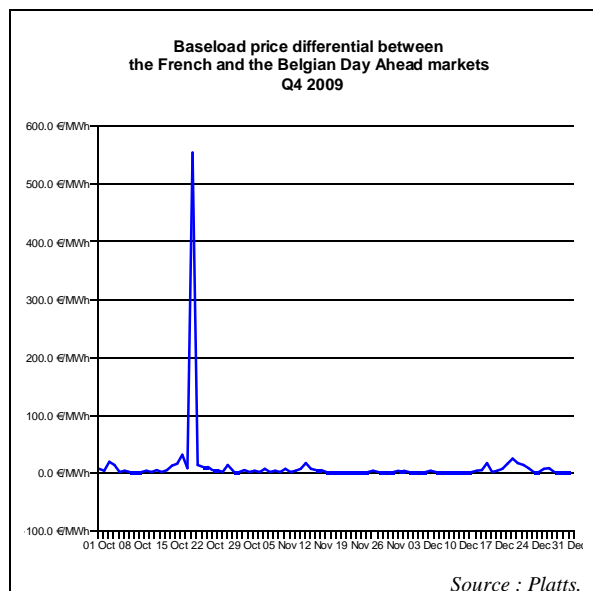
Belgian wholesale prices continued to evolve in close connection to the French and Dutch benchmarks, in line with the trilateral market coupling mechanism.



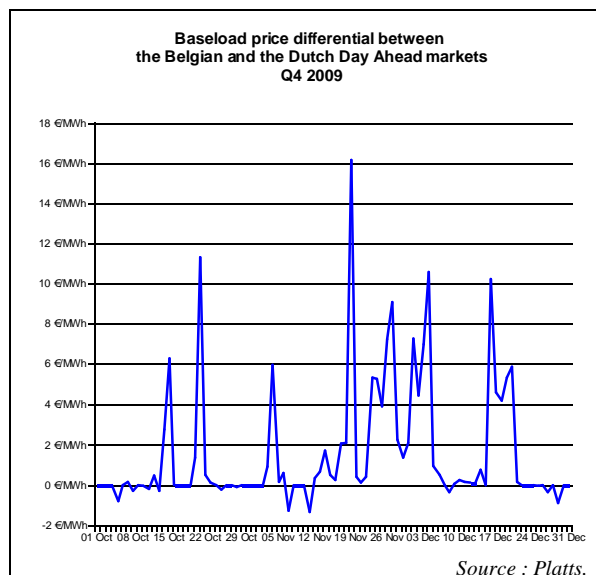
Monthly traded volume in Q4 remained in the 0.8 – 0.85 TWh range, slightly more than a tenth of the gross national consumption.

The October base and peak values were about € 10 / MWh higher than those observed in the second half of 2009 as market conditions were influenced by the tight grid margins of the French system.

On average, the Belgian day-ahead contract was traded at a discount to the French one.



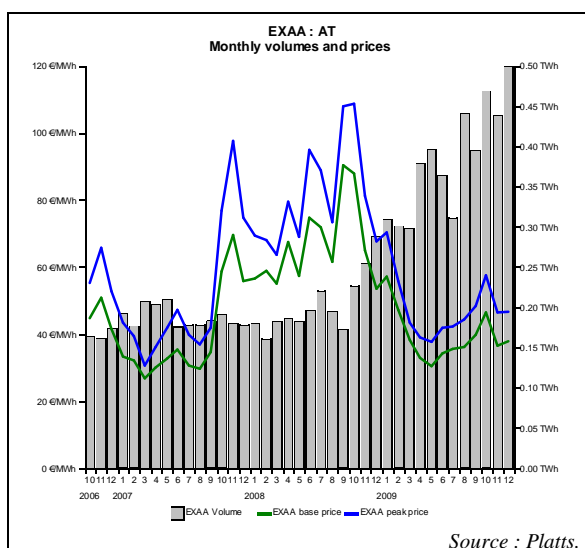
Likewise, Belgian and Dutch contracts were matched except for the times of strong output from the Dutch offshore wind park when both prices decoupled for brief periods. However, on that occasion the price differential was quite significant, the premium on the Belgian contract reaching as high as €16 / MWh.



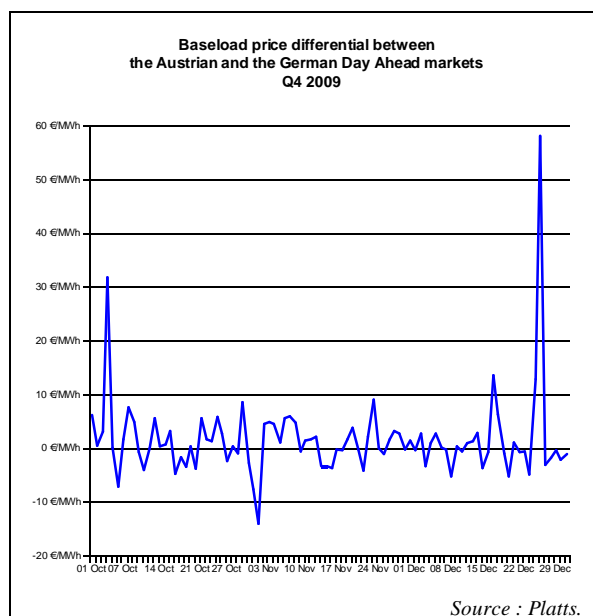
## Austria

Turnover on EXAA, the Austrian power exchange, continued to rise and in October and December it reached record levels of 0.47 and 0.5 TWh respectively (about 8% of the gross national consumption). Traded volume in Q4 2009 was almost twice larger than that of the same quarter of 2008.

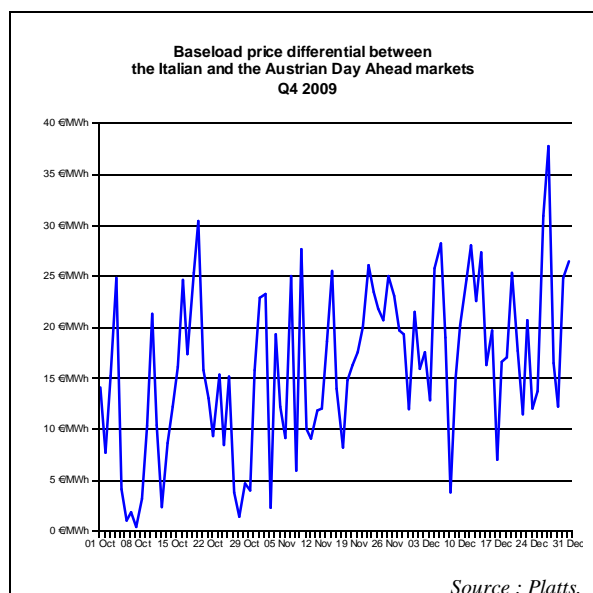
It is interesting to observe that market participants consider trading on EPEX spot (German & Austrian price area) and EXAA as complementary, given that liquidity is improving on both exchange platforms.



Price differentials of both areas were mostly within the €5 / MWh range with the exception of a few periods with negative prices on the EPEX spot as well as some periods with increased output from renewable sources (hydro from the Alpine region and wind from the offshore parks in the North Sea).



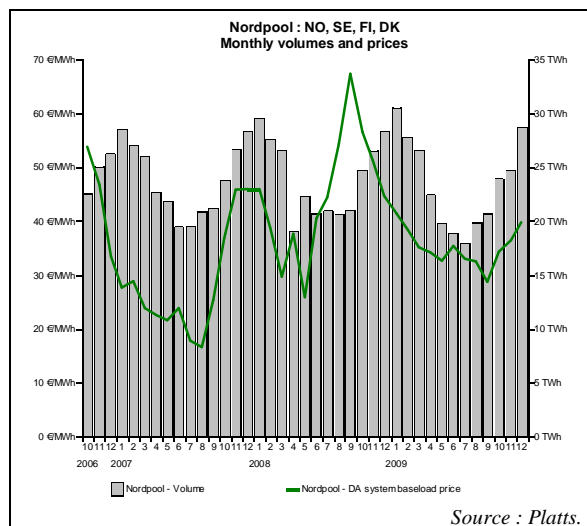
As usual, the Austrian day-ahead baseload contract was traded at significant discount to the Italian benchmark, the discount being mostly in the € 10 – 20 / MWh range.



## Northern Europe

Trading volumes on the Nordpool day-ahead exchange reached 77.5 TWh in Q4 2009. The 20 TWh increase from Q3 2009 levels matched the established seasonal pattern with greater exchange activity during the winter season.

Contrary to the Central Western European region, Q4 2009 electricity consumption was slightly larger than a year ago. It seems that this development was more related to weather conditions<sup>12</sup> than to a recovery of the industrial demand<sup>13</sup>.



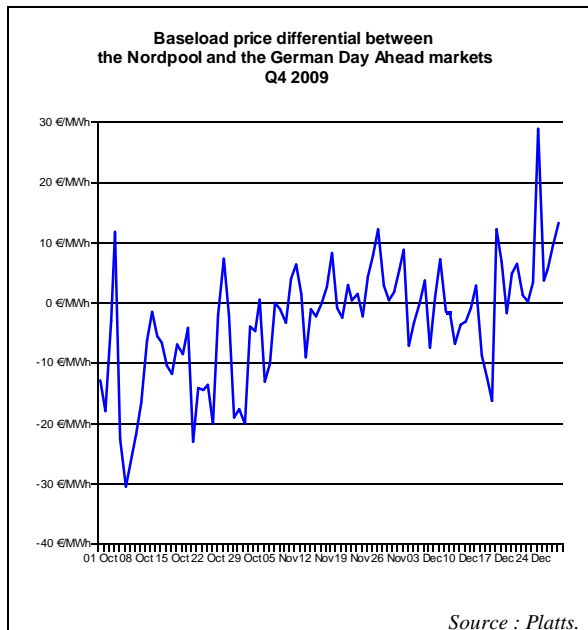
By the end of the observed quarter the monthly average system baseload price increased by more than € 10 / MWh from its low point in September 2009. In Q4 alone it appreciated by more than 15% as a

<sup>12</sup> Concerning the Nordpool, there were on average 200 HDD more in each month of Q4 2009 than the corresponding month of 2008.

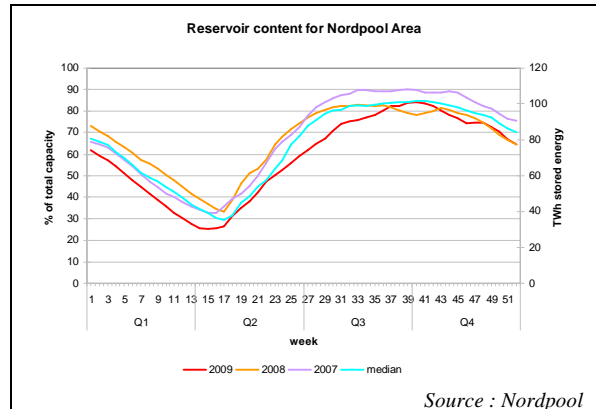
<sup>13</sup> Year-on-year, the Q4 2009 GDP growth across the countries from the Nordpool area varied from -5.1% in Denmark to -0.9% in Sweden.

result of increased demand for heating from the residential sector.

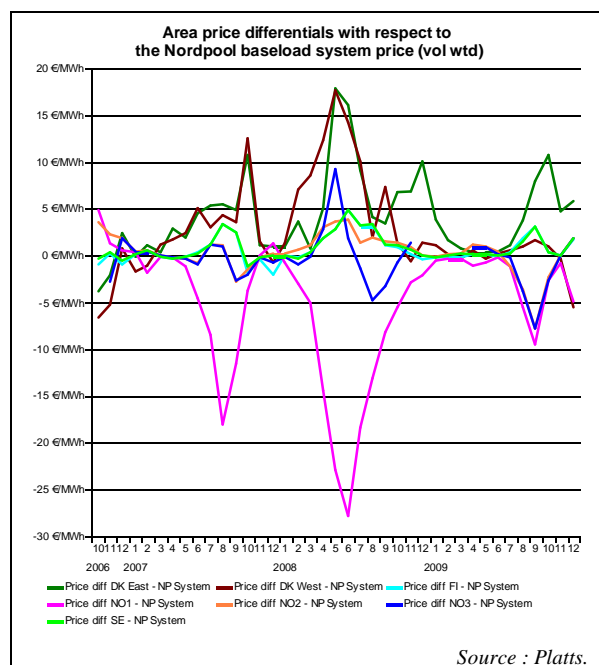
The system baseload price remained well below the levels observed a year ago. At the beginning of Q4 2009 the Nordpool day-ahead base contract traded at a discount to the German benchmark. By the end of Q4 2009 however, Nordic prices went up and the discount was gradually transformed into a premium.



On average, the monthly price differential between the two areas was reduced from € 20 / MWh in September 2009 to less than € 5 / MWh in December 2009. Among the factors that could probably explain such a development were the sustained electricity consumption of the residential sector and the relatively low level of hydro reserves in Q4 2009.



Tight grid conditions at the beginning and at the end of the observed period impacted intra-zonal cross border flows and increased the price spread across Nordpool areas. As usual, the Danish, Swedish and Finnish volume weighted prices were above the system average while the Norwegian benchmarks were below.



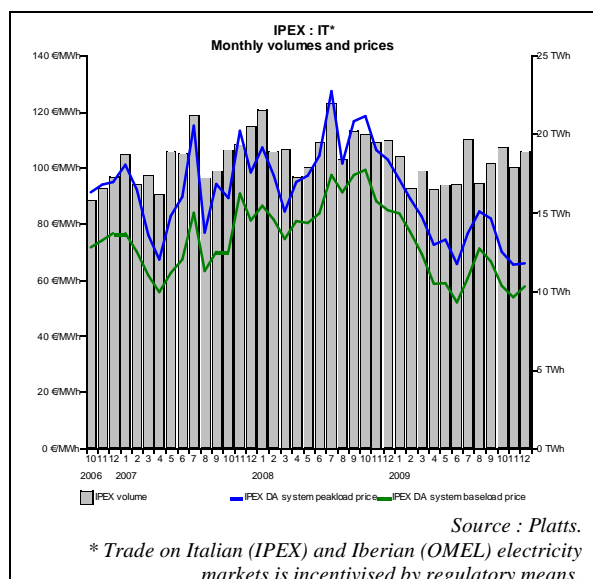


## Apennine Peninsula

### Italy

In Q4 2009 the turnover on IPEX, the Italian electricity exchange, remained in line with the levels observed in the previous quarter.

The average monthly system baseload price decreased by €15 / MWh from the high point reached in August when grid margins were tested by a strong residential demand for cooling.

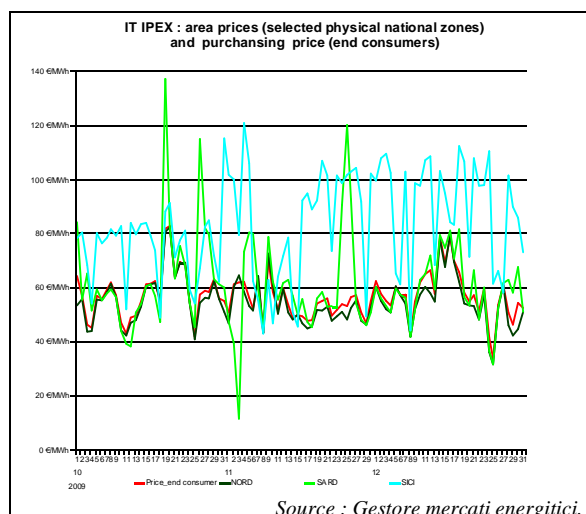


Year-on-year, monthly prices in Q4 2009 were about a third cheaper while GDP growth remained negative for a seventh consecutive quarter.

Zonal prices on the Italian peninsula continued to move in close formation during the fourth quarter of 2009. As a rule, there were few differences observed between the prices for the Northern, the Central Northern, the Central Southern and

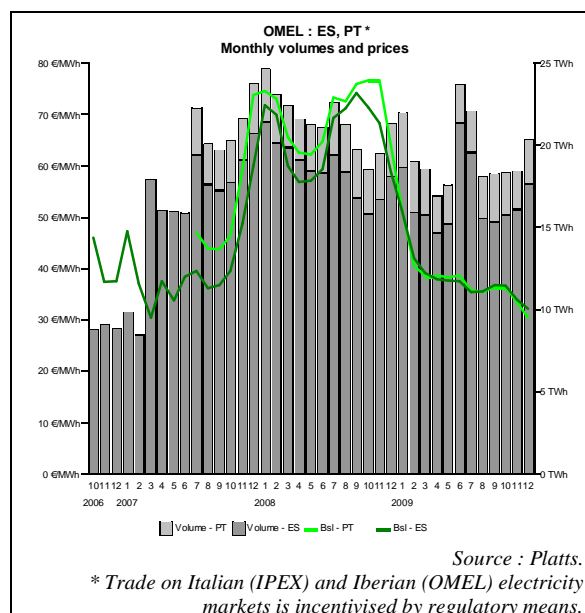
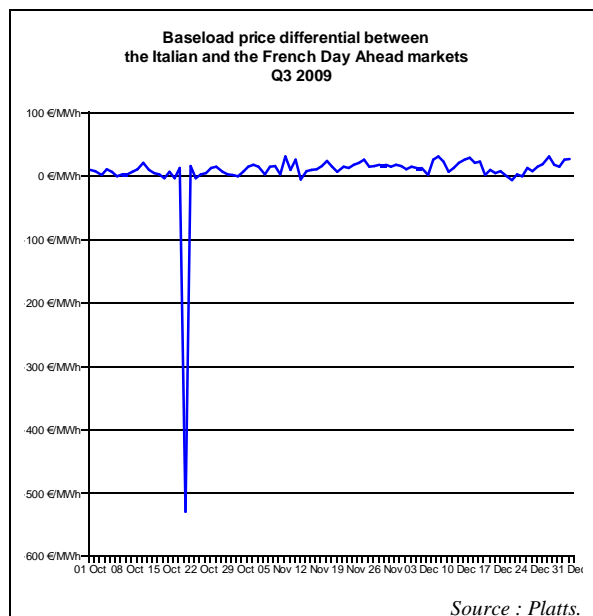
the Southern physical national zones of the Italian grid.

Insular prices were much more instable. In October and November the monthly average prices in Sardinia were about €6 / MWh higher than the national benchmark. In December the premium was reduced to €1.5 / MWh. In Sicily the differences with the monthly system average price were much more pronounced. In October and December these were close to €20 / MWh. In November the premium was close to €30 / MWh.



With respect to the neighbouring countries, the Italian benchmark was again traded at a premium of around €10 / MWh.

The notable exception was the 19<sup>th</sup> of October, the day of extreme price variations in the French area of EPEX spot. According to the data of Entso-E, a total of 890 MWh was imported from Italy during the four consecutive hours priced at €3000 / MWh by EPEX spot France. On that day the Italian contract was traded at a daily average discount exceeding €500 / MWh.



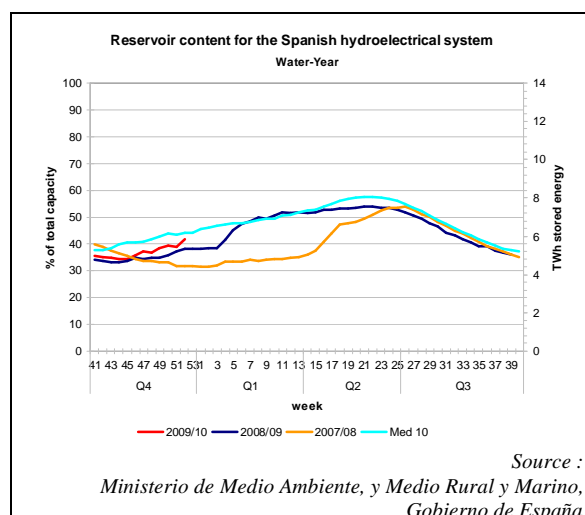
## Iberian Peninsula

### Spain and Portugal

In Q4 2009, trading volumes on OMEL, the Iberian electricity wholesale market, registered a small decrease from the levels observed in the previous quarter. While the Spanish turnover was comparable to the levels recorded a year ago, trading activity in Portugal was more subdued. In November and December 2009 the exchanged volumes on the Portuguese area were about 15% lower than the same months of 2008.

This development may be related to meteorological conditions. According to the Eurostat – JRC data, the weather in Portugal during the observed quarter was much warmer than the same period of 2008<sup>14</sup>.

The grid operation was eased by the moderate residential and industrial demand and by the increasing output from renewable energy sources (mostly wind and hydro) in the closing weeks of Q4. As a result, Spanish and Portuguese wholesale prices decreased by a tenth and remained at levels which were half of those experienced 12 months before.

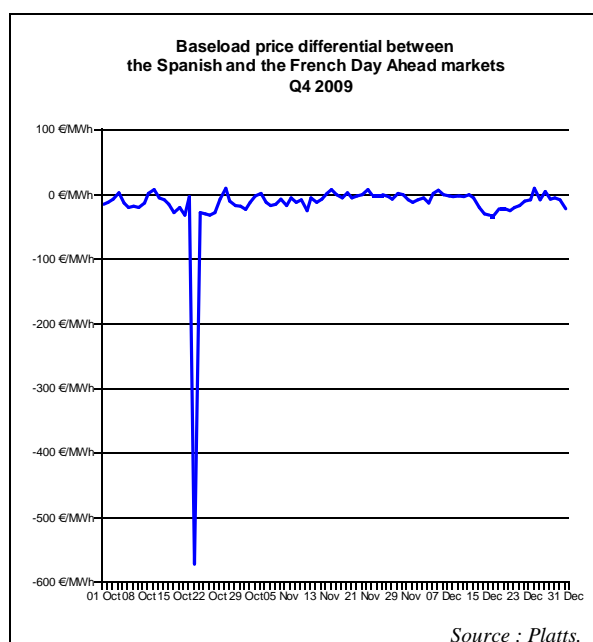


<sup>14</sup> In October, November and December 2009 there were respectively 75%, 47% and 12% less HDDs than in the corresponding months of 2008.

As price differentials within the zone remained insignificant, the Iberian day-

ahead contract was traded at a discount of € 11 / MWh to the French benchmark (outlier excluded).

The Spanish system was able to contribute to the alleviation of the grid condition on the French system by becoming a net exporter of 170 GWh of electricity. For comparison, in Q4 2008 the net imports of Spain from France were around 440 GWh<sup>15</sup>.



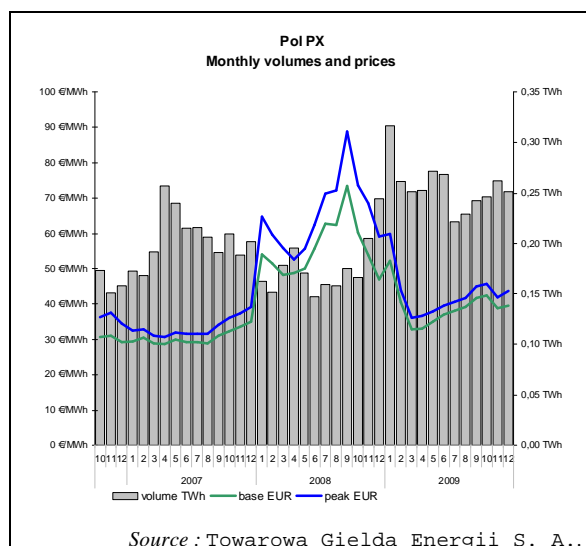
On the 19th of October 2009 the French contract was traded at a significant premium. However, *Entso-E* data indicates that only 52 MWh were imported from the Spanish system in the 08:00 – 12:00 period of extreme prices.

<sup>15</sup> Source : *Entso-E*.

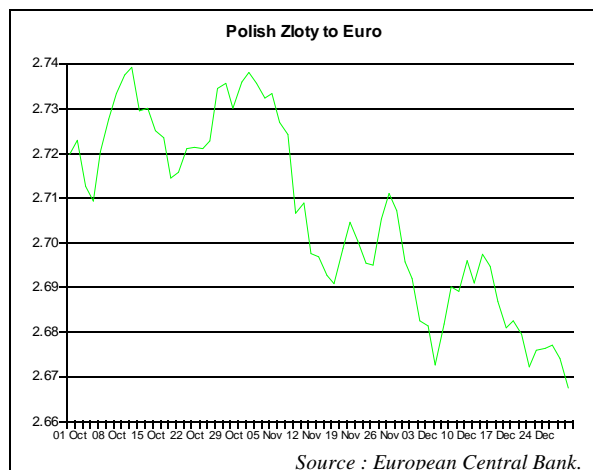
## Central Eastern Europe

### Poland

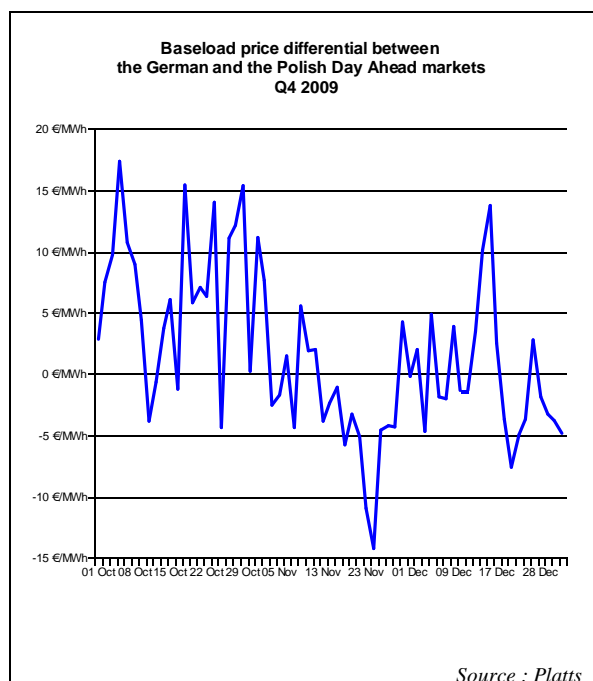
During the observed period the monthly turnover on *TGE*, the Polish electricity exchange, was around 0.25 TWh, representing less than 2% of gross electricity consumption. While this figure may appear modest, October and November trading volumes were 48% and 28% higher than the corresponding months of 2008.



In October the average monthly peak and base prices reached € 45.8 and € 42.3 / MWh, the highest values since January 2009. The November and December prices were €2 to €4 / MWh lower despite the appreciation of the Polish currency against the euro.

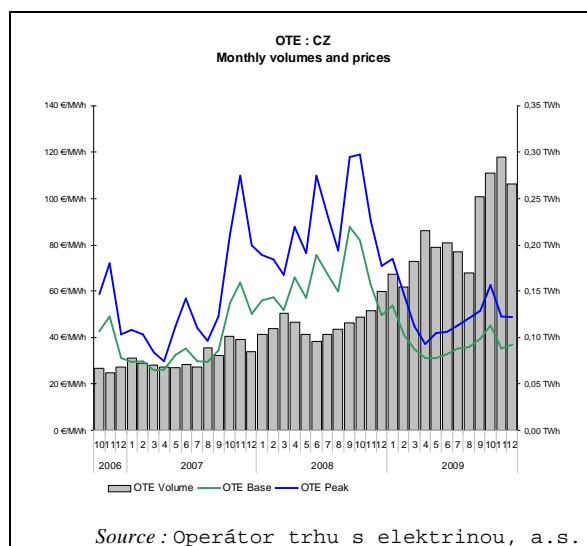


In October the Polish baseload was traded at a € 5 / MWh average discount to the German benchmark. Later in the period the price differential swung in both directions as German prices became more competitive.



## Czech Republic

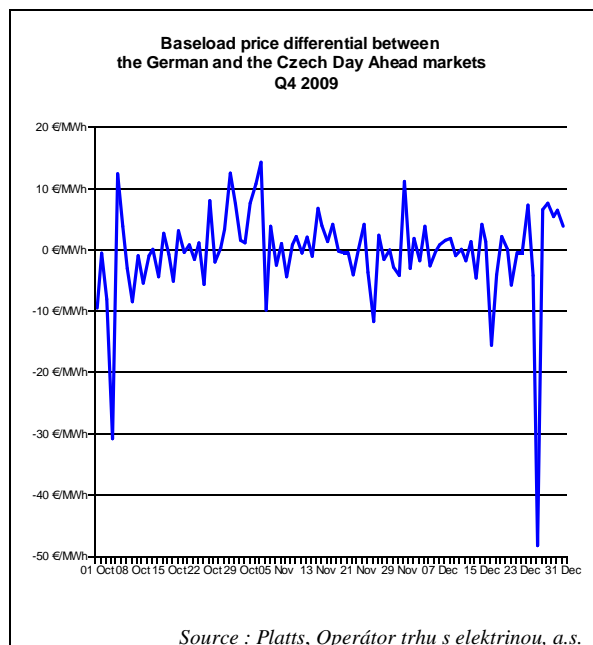
In Q4 2009 the traded volume on the Czech exchange continued to expand strongly, almost doubling in a year. Although the monthly turnover in October and November reached record levels of 0.29 TWh, it represented slightly less than 4% of Czech electricity consumption.



Price developments were in line with those in the Central Western European (CWE) region. The € 5 / MWh increase of the monthly price observed in October redirected the cross border flows westwards.

Later in the period the Czech prices eased down to levels observed in Q3 2008 as grid conditions in CWE improved.

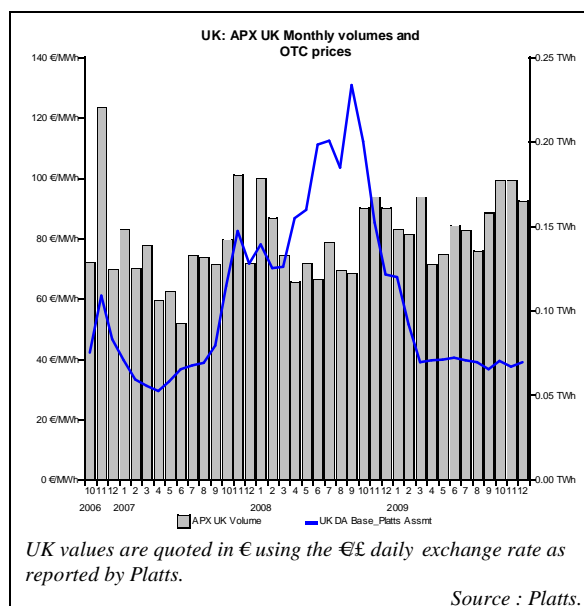
The Czech baseload contract was traded at a discount to the German one. The spread widened during periods of negative prices in Germany.



## British Isles

### UK

The UK monthly average over-the-counter prices, expressed in €/per MWh, remained stable throughout Q4 2009. By the end of December the system baseload benchmark was in the €38 – 40 / MWh range for the tenth consecutive month.

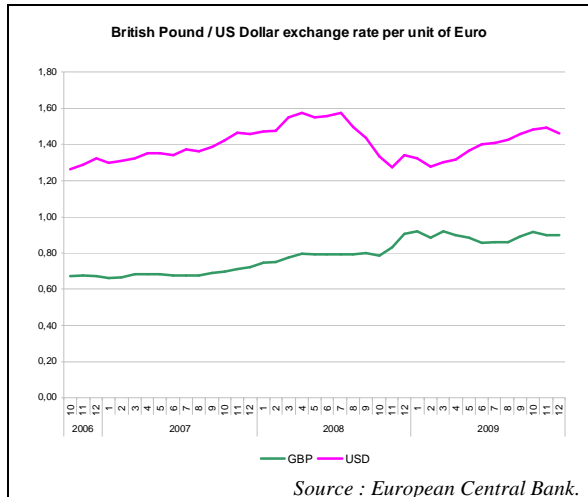


UK wholesale electricity prices expressed in GBP / MWh were also stable as the average monthly exchange rate evolved in the 0.92 – 0.86 Pounds per Euro range.

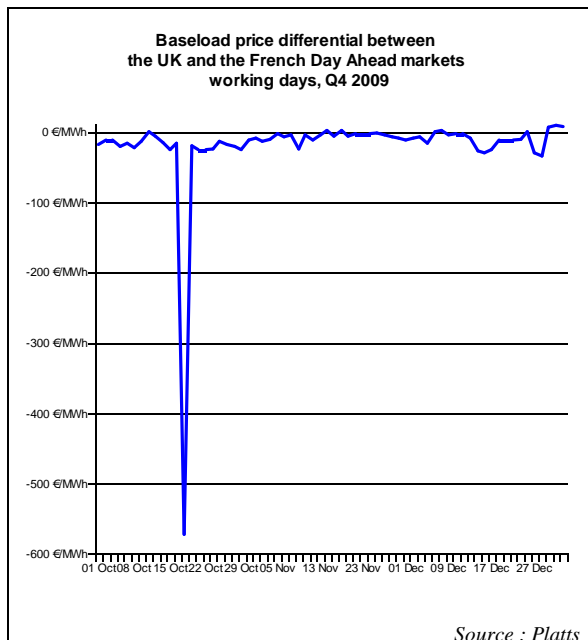
It seems that the modest level of industrial and residential demand, coupled with normal grid conditions were partly responsible for this unusual period of stability.

It is interesting to note that UK OTC prices were not affected by the increasing demand for exports to France.



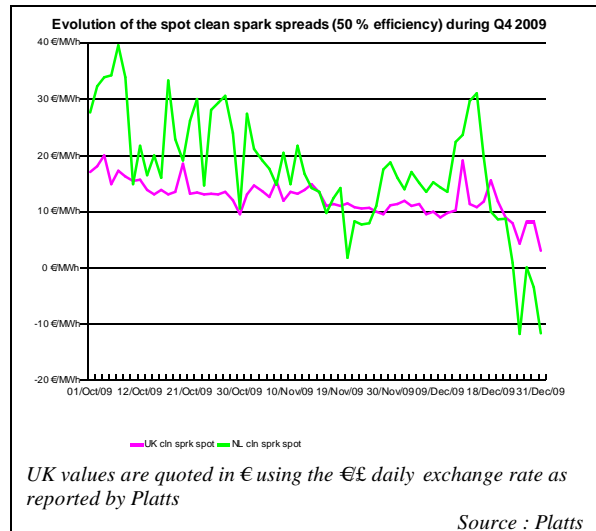


A total of 5.9 GWh of electricity was exported from the UK during the four-hour period when French area prices reached € 3000 / MWh. In that particular day the average price differential reached almost € 600 / MWh.



As gas prices appreciated while the price of electricity was stable, the spark

spreads<sup>16</sup> started to decrease. The prices of emission allowances created some fluctuations but did not change the general downward trend of the clean spark spreads.



<sup>16</sup> Spark spreads are indicative prices showing the average difference between the cost of gas delivered on the gas transmission system and the power price. As such, they do not include operation, maintenance or transport costs. The spark spreads are calculated for gas-fired plants with standard efficiencies of 50% and 60%. This report uses the 50% efficiency.

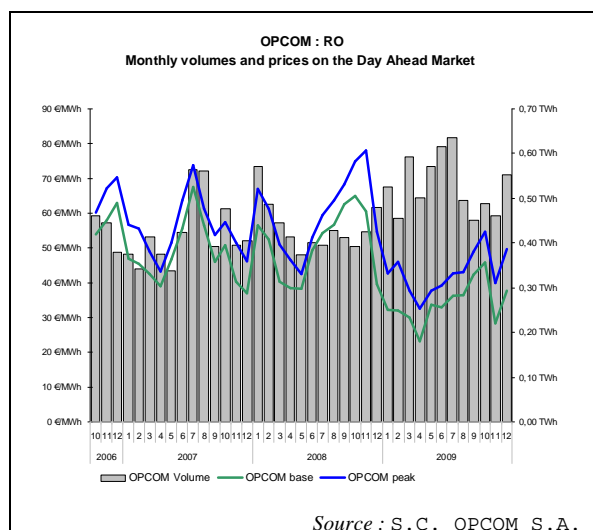
Spreads are quoted for the UK, German and Benelux markets.

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

## South Eastern Europe

### Romania

Market participants on *OPCOM*, the Romanian wholesale market, exchanged on average 0.5 TWh per month in Q4 2009. This represents about 10% of the gross domestic consumption, well above the corresponding figures of other trading platforms in Central and Eastern Europe.

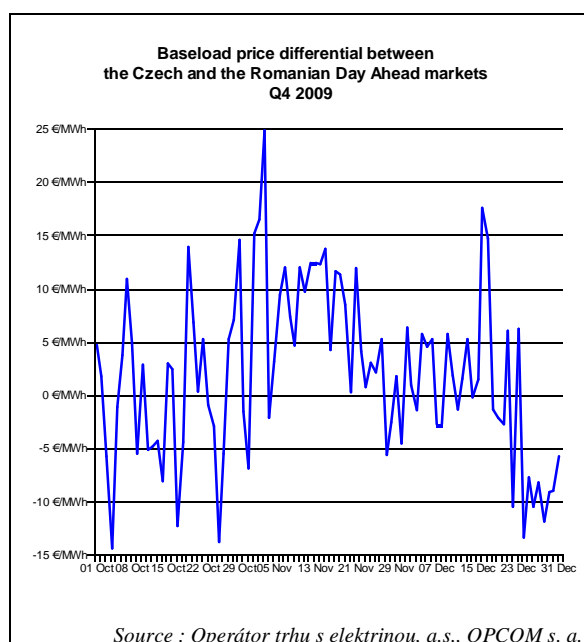


The monthly peak and base benchmarks experienced wide variations in the observed period. In November both prices fell by about €15 / MWh, followed by a €10 / MWh jump in December 2009.

Some of the factors that may explain such developments include the reduced industrial demand resulting from a 6.5% decrease of GDP<sup>17</sup> and the meteorological conditions which were harsh in October

and December and relatively mild in November<sup>18</sup>.

The price spread between the Czech and Romanian baseload contract was very unstable. In Q4 2009 the Czech benchmark was more expensive by about €2 / MWh. Still, in October and December the Czech price was traded at a discount.

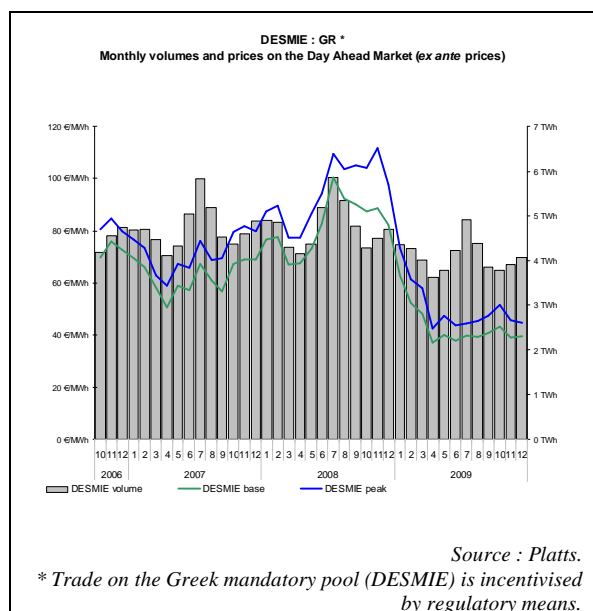


### Greece

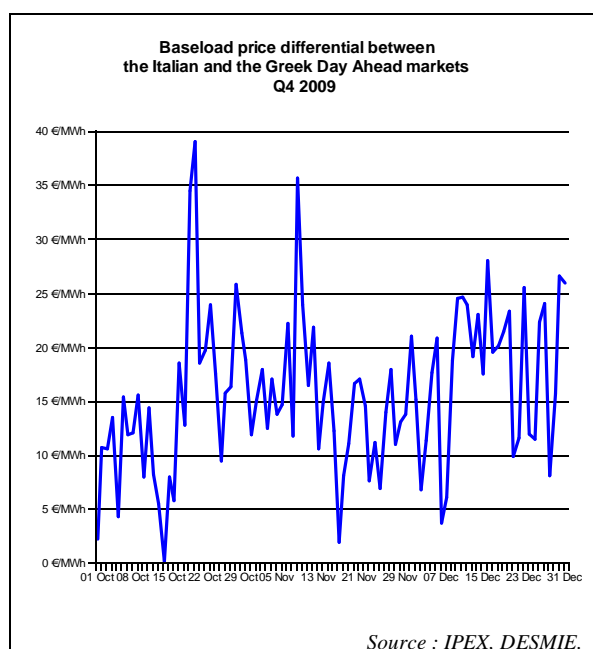
About 4 TWh per month were traded on the Greek mandatory pool in the closing months of 2009. Wholesale prices remained in the €37 – 40 / MWh range observed during the spring and summer months, except for the month of October when benchmarks were about €3 / MWh higher. Starting from April, the 2009 monthly prices were half those of 2008.

<sup>17</sup> The GDP figure is compared to the corresponding level of Q4 2008.

<sup>18</sup> According to the *Eurostat – JRC* database, the HDDs for the 3 months of the final quarter of 2009 were 15.6% and 8.5% above (October and December) and 10.5% below the corresponding 2008 values.

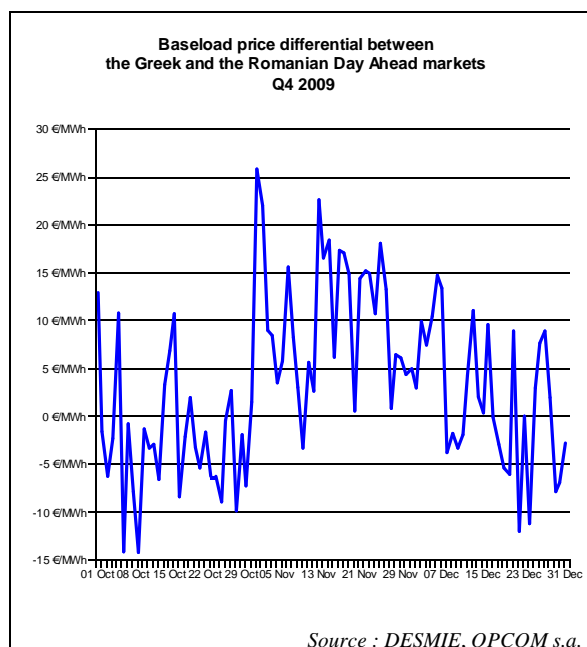


The Greek baseload was approximately € 15 / MWh cheaper than the Italian benchmark. According to *Ensto-E* data, 688 GWh of electricity was exported from Greece to Italy.



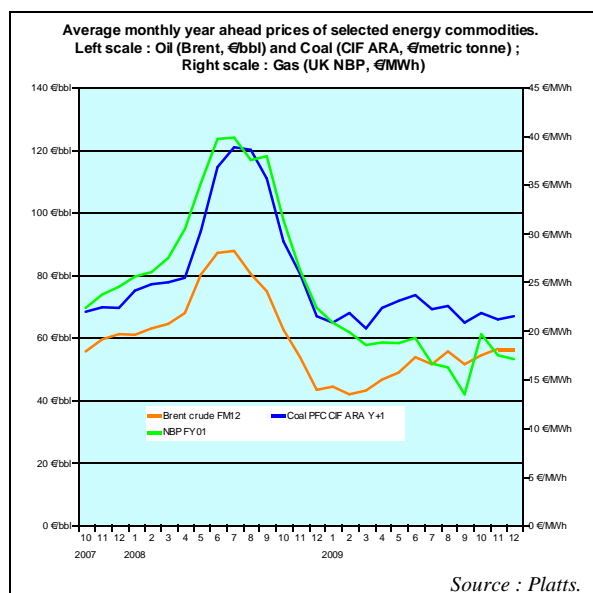
As in previous quarters, the Greek baseload was traded at a €3 – 5 / MWh premium to the corresponding Romanian

contract. The volume of Romanian electricity exports to Greece remains unclear as it is difficult to calculate transit flows through the Bulgarian grid.



### A.1.2 Forward markets

In Q4 2009 the year-ahead contracts of the major European energy products evolved in different directions. The Brent rose slightly (+ 4.07%), the Platts assessment on the coal CIF ARA remained stable (- 1.9%) while the NBP gas decreased by 13%. These developments contrasted with the situation on the spot market where prices increased at the end of 2009.



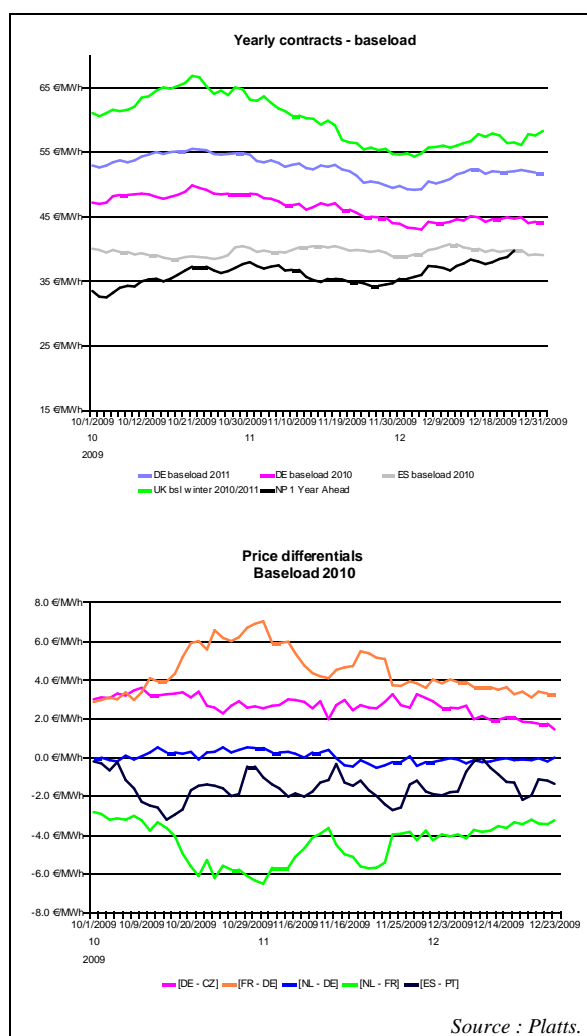
During the observed period the year-ahead contracts were in contango<sup>19</sup> but the difference with the spot decreased. Still, the forward – spot spread remained relatively high, signalling expectations of a significant energy demand increase on the global market.

For example, the average spread of the coal year-ahead contract was around €20 /

<sup>19</sup> A situation of contango arises when the closer to maturity contract has a lower price than the contract which is longer to maturity on the forward curve.

mt in Q3 2008. In the next quarter it fell by €5 / mt<sup>20</sup>.

The year-ahead forwards for delivering electricity across the different European regions were closely related to the prices of input fuels. Once again this contrasts with the situation on the spot market.



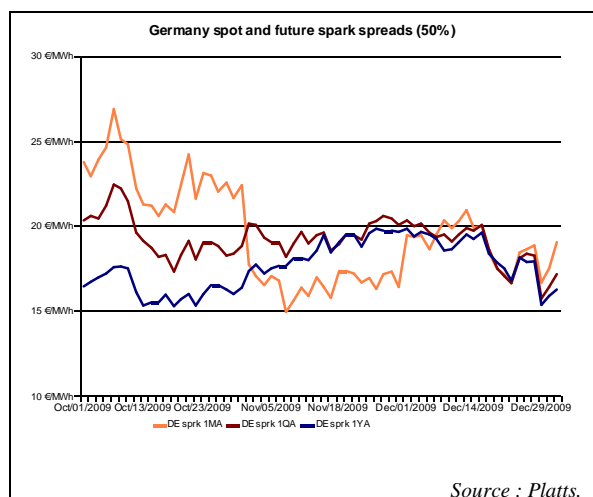
The established pattern of baseload forwards continued throughout the fourth quarter of 2009. Nordic and Iberian contracts were among the cheapest

<sup>20</sup> The Q3 vs. Q4 corresponding values for the Brent and NBP gas were €5.24 vs. €4.89 / bbl and €7.52 vs. 6.94 / MWh respectively.

contracts. The UK baseload was traded at an average premium of €15 / MWh to the corresponding German contract.

The German baseload offered a benchmark in the Central and the Western part of the continent. In Q4 2009 the Dutch and German contracts were traded closely and the French contract was traded at a €4 / MWh premium.

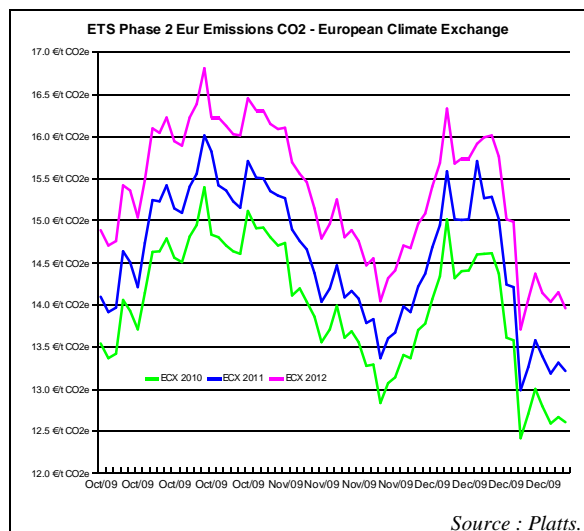
It is interesting to note that the forward curve of the UK, the French, the German, the Dutch and the Spanish contracts was in contango while that of the Nordpool benchmark was in backwardation<sup>21</sup> during most of the Q4 2009 period.



Spark spreads along the German forward curve were priced at similar average levels in the observed period. However, the month, quarter and year-ahead spreads followed different pathways.

Factors that may explain such a development include the uncertainty around the present and future price for

carbon and, to a lesser extent, the evolution of coal and electricity markets.



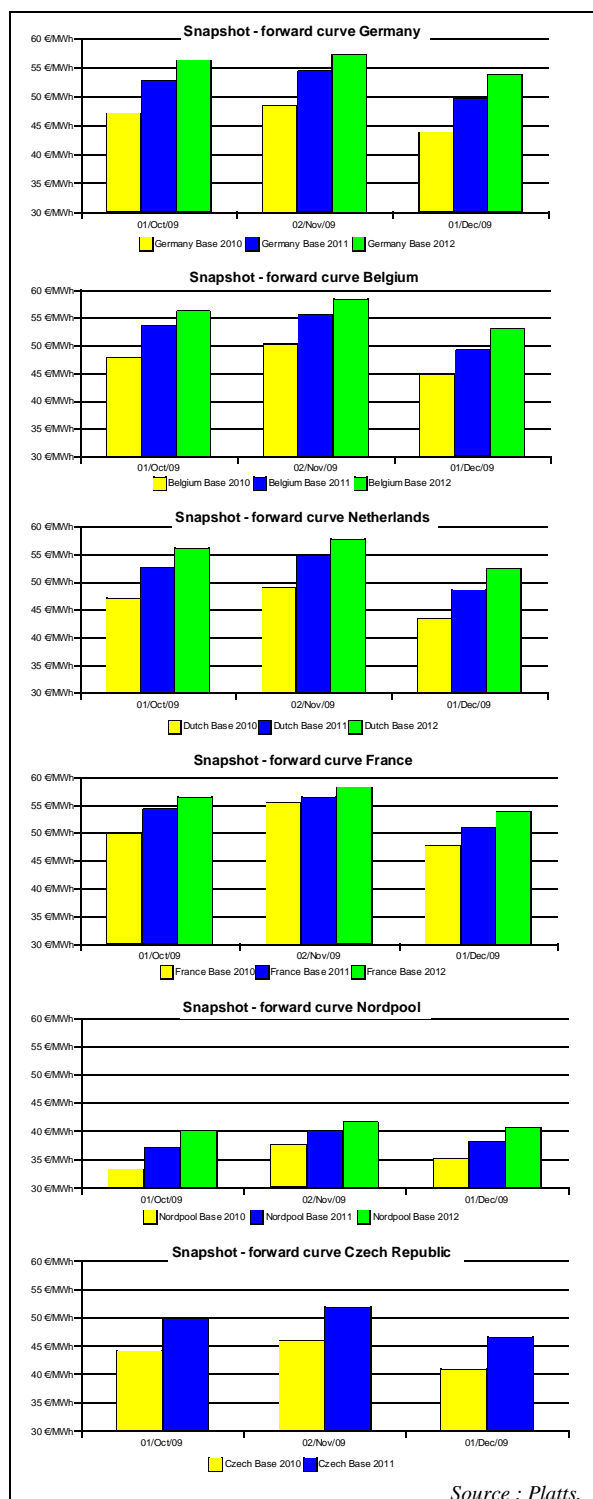
Low liquidity on the far end of the forward curve in the European market for emission allowances forced participants to price up the 2011 and 2012 contract against the closest to maturity contract. The 2010 carbon price was traded in the €13 – 15 / tCO<sub>2e</sub> range during most of the observed period. After two consecutive rises and falls, it finished the quarter below its starting level.

European forward contracts remained in contango throughout Q4 2009, indicating that market participants were expecting a gradual increase of industrial demand for electricity as economic recovery transforms into growth by the end of 2012.

Price levels were very close across the countries of the Central Western European region and the Nordic benchmark was traded at a €15 / MWh premium.

<sup>21</sup> Backwardation occurs when the closer-to-maturity contract is priced higher than the contract which is longer to maturity.

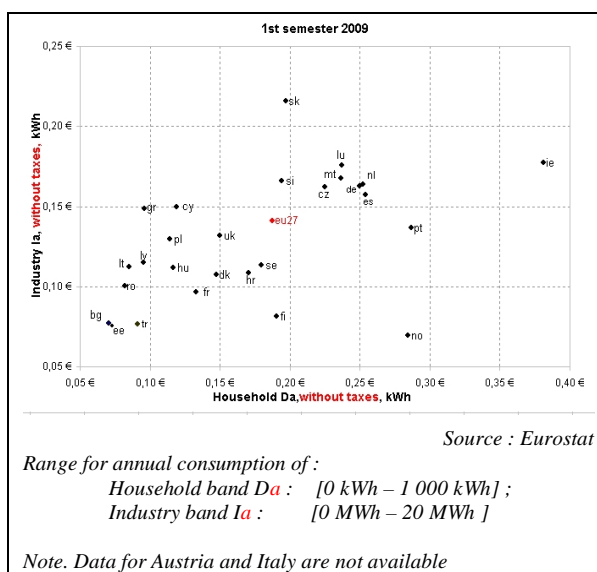




## A.2 Retail markets

### A.2.1 Prices by Member state

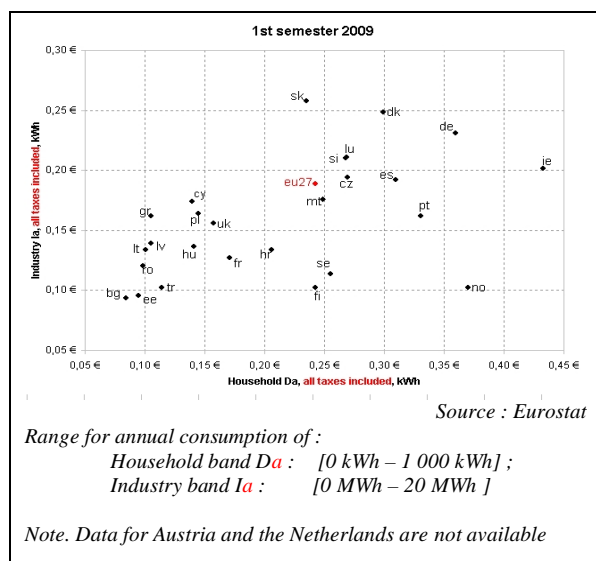
The scatter plot charts show the relation between prices in the lowest annual consumption band paid by households (Band D<sub>a</sub>) and those paid by industrial consumers (Band I<sub>a</sub>). The first chart shows the prices without taxes (net prices) while the second one shows those including all taxes (gross prices).



During the first half of 2009 net prices paid by household consumers decreased by an average of 5.9% on EU-27 level.

Looking at individual countries a great range of price movements could be observed. Household customers faced steep price falls in Cyprus (30.1%); France (29%); Poland (16.5%) and Sweden (15.4%). In contrast, Slovenian and Luxembourgish households experienced a significant jump in prices (27.6% and 19%, respectively), while in Malta an extremely high price increase could be observed (95.9%).

Industrial consumers in EU countries also faced different price movements. Prices fell in Hungary (24.2%); Cyprus (21.5%) and Romania (10.8%), while double digit price increases were registered in Slovakia (20.7%), Spain (20.2%); Portugal (19.7%); Slovenia (14.9%); Latvia (14.2%) and Luxembourg (13.3%). The overall EU-27 average price increase was about 2% for industrial customers.



Prices including all taxes showed similar movements compared to those observed for net prices. However, in some Member States there were significant deviations between the changes of net and gross prices.

Household prices increased in Slovenia (+11%), (+4.8%), Luxembourg (+2.2%), and Denmark (+2.4%). In the first three countries prices including all taxes rose faster than those of pre-tax prices, while in Denmark increases in taxation reduced the effect of price decreases.

Industrial customers also faced significant differences between net and gross prices in the same four countries: Luxembourg (11.8%); Slovenia (+3.2%); Latvia (2.9%)

and Denmark (3.4%). Again in Denmark increases in taxation reduced the effect of price decreases. The differences in price movements implied increasing impact of taxes on prices paid by the final consumer.

In contrast, industrial consumers in the UK and in Germany benefited from a mitigating effect of taxation on price changes.

### A.2.2 Cross-panel data on household electricity prices

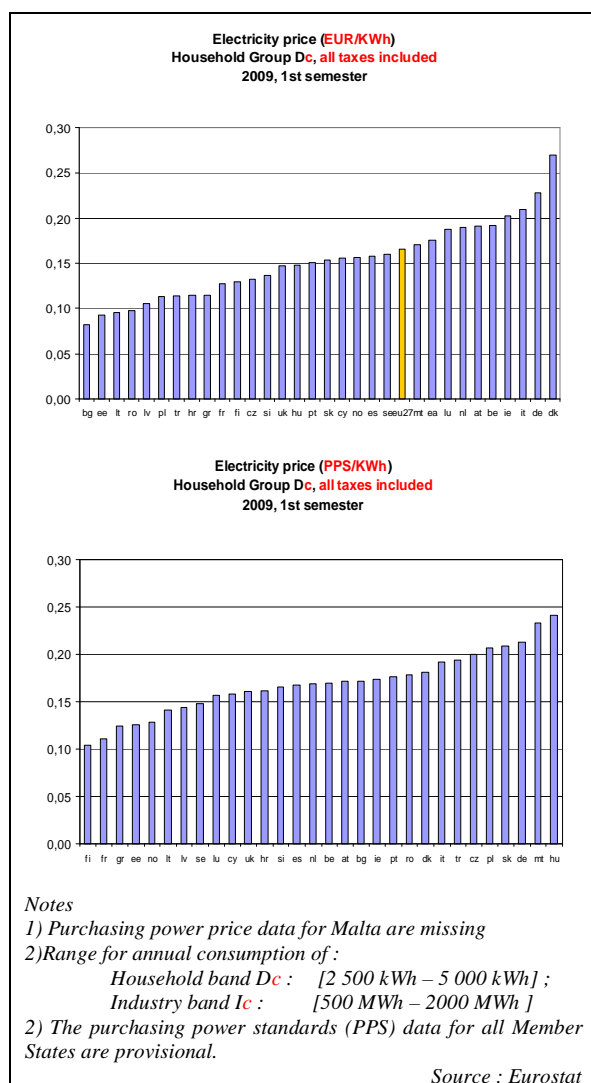
Households in consumption band D<sub>c</sub> (middle level annual consumption) in Member States that joined the EU in recent years paid less per kWh than the EU-27 average (see next chart). The differences between country groups regarding their accession date is cleared after correcting for purchasing power standard (PPS). Different prices are levelled-off by purchasing power parities.

With the exception of a few Member States the ranking of individual countries did not change significantly compared to the second half of 2008.

Expressed in eurocents the average EU-27 price level showed a minor decrease (0.9%) compared to the second semester of 2008. Those countries where households faced significant drops in prices like Cyprus (23%), Poland (12.5%) and the UK (8.5%) generally moved towards the lower end of the scale.

While Cyprus was the fourth most expensive country within the EU in the second semester of 2008, it moved to the twelfth position in the first half of 2009. The UK moved from the eleventh position to the sixteenth (below the EU-27 average). On the lower side of the scale

Poland became the sixth cheapest country from the tenth.

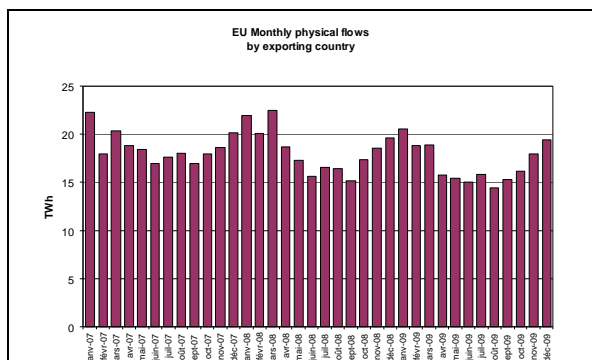


It seems that the PPS correction does not influence the country ranking order in any systematic way. For example, Cyprus fell back from the position of the second most expensive country into the lower third of the scale, while Slovenia moved upwards, similarly to the Czech Republic that became the sixth most expensive Member State regarding the household electricity prices in this consumption band.

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

Similar to electricity consumption, monthly cross border flows started to increase from their three year low values in the fourth quarter of 2009. Although the flow volume rose by 17% compared to the third quarter of 2009, it was still about 3.5% below that of the last quarter of 2008.

Strong annual growth rates were observed in the fourth quarter in Central and Eastern Europe and in the Baltic regions, while in the other regions quarterly cross border flow volumes were still lagging behind those measured in the last quarter of 2008.



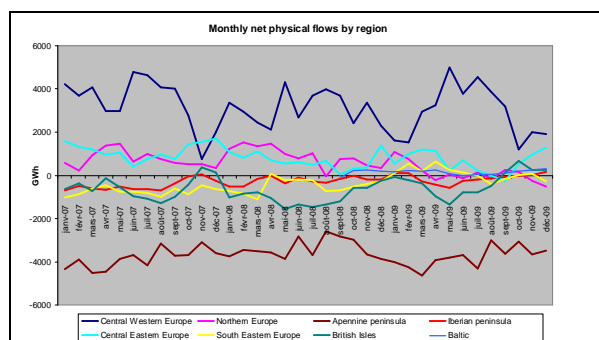
Source : ETSO

Note. Data on IE, MT and CY is missing. Data on EE, LT and LV is available for September 2008. 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 fourth quarter of 2009 the EU net balance of cross border electricity flows turned positive again as was the case in the same period of the preceding years. The Central Western European region continued to post significant positive net balance while the Apennine peninsula

region remained very much on the negative balance side. The former region's net balance was strongly influenced by the drop in outflow volume in October caused by the scheduled maintenance of the nuclear park in France (see pp. 6 and 7 of this report).

The Central Eastern European Region continued to increase its net positive balance, with outflow volumes increasing faster than inflow volumes. The CEE and South Eastern European regions were affected by the large decrease in Ukrainian electricity export to this region. The net flow balance of the Nordic region turned negative, probably because of the relatively low reservoir levels of the hydroelectric dams (see page 11 of this report).



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
Baltic	EE, LT, LV

### C. "Focus on pellets"

Biomass constitutes the raw material for pellet production. Wood pellets are mainly made from residual forest waste whereas mixed biomass pellets are obtained from non-wooden agricultural by-products. The use of pellets as substitute for coal, heating oil or gas in power production, district and residential heating offers the opportunity of a considerable reduction of greenhouse gas emissions.

The recently adopted "Report on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling"<sup>22</sup> shows that wood pellets have emissions ranging from 2 – 34 g CO<sub>2eq</sub>/MJ of pellets; depending on source and processing. Whether biomass or natural gas is used as processing energy has a large impact on the overall emissions. Looking at "best-practice" – pellets from European forest residues processed with biomass – the use of pellets saves 98 % of emissions compared to using coal, and 96 % compared to using natural gas. In absolute numbers this means that one tonne of pellets substituting coal can provide reductions of about 1900 kg CO<sub>2eq</sub> and around 900 kg CO<sub>2eq</sub> by substituting natural gas. According to data from the Pellets Atlas, a total of 10 million tonnes of CO<sub>2</sub> equivalent emissions were saved in the EU-27 plus Norway and Switzerland in the year 2006.

Through milling, drying and compressing of the biomass, pellets are produced with overall conversion losses of less than 10 %. The high density and low humidity of the pellets represent a significant advantage over unprocessed biomass: the energy content is higher and hence, transport as well as storage costs are reduced. High investment costs of pellet heating systems still represent a major barrier for the development of a pellet market in many countries.

The market for pellets developed only recently. The US, Canada, the Balkan and Nordic countries as well as North-West Russia are among the major players on the pellet market. The EU has been a net importer over the last years. In 2009, imports in the EU amounted to 1.6 million tonnes from outside the EU, and 1.8 million tonnes within the EU. From 2006 until the end of 2009, production and consumption in the European Union nearly doubled. Production rose from 4.6 million to 8.9 million tonnes while consumption increased even more : from 4.8 million to 10 million tonnes<sup>23</sup>.

Pellet consumption represented only 0.1 % of the gross energy consumption in the EU-27 in 2008. Austria and Germany are among the few Member States with mature and self-sufficient markets; Denmark, the Netherlands and Belgium are net importers. From the 630 pellet

<sup>22</sup> [http://ec.europa.eu/energy/renewables/bioenergy/sustainability\\_criteria\\_en.htm](http://ec.europa.eu/energy/renewables/bioenergy/sustainability_criteria_en.htm)

<sup>23</sup> Source: Pellet Atlas projection <http://www.pelletsatlas.info/cms/site.aspx?p=9107> .

plants in Europe, the largest production takes place in Germany and Sweden. These countries, together with Denmark, also account for the largest share of consumption in the EU. There is still a high potential to increase production quickly if needed due to the high unused capacities of production. If only the three largest producer countries were to use their full capacity, production would easily increase by 2 million tonnes. Currently, production capacity is estimated to be growing by 900 000 tonnes per year<sup>24</sup>.

The market for pellets can be subdivided into different commodity markets according to the assets traded e.g. bulk pellets for power production and district heating, loose and bagged pellets for residential heating. The demand and consumption patterns differ across countries: Sweden and Denmark mainly consume bulk pellets for heat and power, the Netherlands and Belgium use pellets for large scale power production while Germany's consumption is mainly focused on bulk pellets for residential heating.

Prices of pellets depend not only on supply and demand developments but also on oil prices, transport costs, size and length of the contracts as well as on their use and packaging. Since 2007, pellets prices have been increasing steadily, disregarding seasonal effects.

New EU policies in the field of energy, such as the Renewable Energy Directive demanding 20% renewable energy in the EU in 2020, are also important drivers for the development of a competitive pellet market. The national renewable energy action plans (due in June 2010) will reveal to what extent Member States plan to use biomass, including pellets.

The Renewable Energy Directive required the Commission to assess the need of sustainability criteria for solid biomass (including pellets), similar to the criteria in place for biofuels. The Commission concluded that such EU-wide binding criteria are not necessary, as most of the biomass used in the EU today is from sustainable sources (mainly from EU forest residues), and only 5 % of the biomass consumed is imported. The Commission will reassess the issue in 2011.

<sup>24</sup> Source: Pellet Atlas 2009, Final report on producers, traders and consumers of wood pellets.  
<http://www.pelletsatlas.info/cms/site.aspx?p=9107>