Quarterly Report on European Gas Markets

Directorate-General for Energy

EUROPEAN COMMISSION

- MARKET OBSERVATORY FOR ENERGY

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EUROPEAN COMMISSION

Günther H. Oettinger

Dear readers,

It is my great pleasure to address you as the new energy Commissioner. The *Quarterly Report on European Gas Markets (QREGaM)*, the first issue of which was released a year ago, has been providing you information on developments in the European gas markets, which are going to receive due attention during my term.

The final quarter of 2009 marked the beginning of the new gas year. Traded volumes on EU gas hubs continued to increase as gas consumption was influenced by changing meteorological conditions and by the economic prospects of gas users.

On the supply side, LNG imports increased significantly as new terminals in Italy and the UK became operational. In 2009, about a quarter of the EU gas imports was covered by LNG, offering a further diversification of our supply sources. In this report we also focus on unconventional gas which may add interesting options to our policy, in particular as regards security of supply.

Our report notes a trend of increasing wholesale gas prices which started already in the previous quarter. For the time being it remains unclear if this development is a signal of recovering economy or mostly the influence of the increased winter consumption.

QUARTERLY REPORT ON EUROPEAN GAS MARKETS

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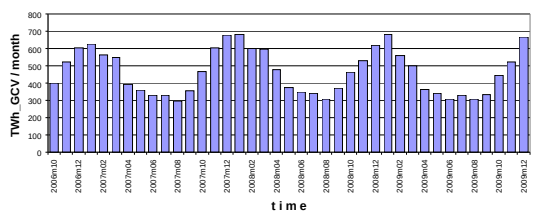
A. Recent developments in the gas markets across Europe

A.1 Wholesale markets

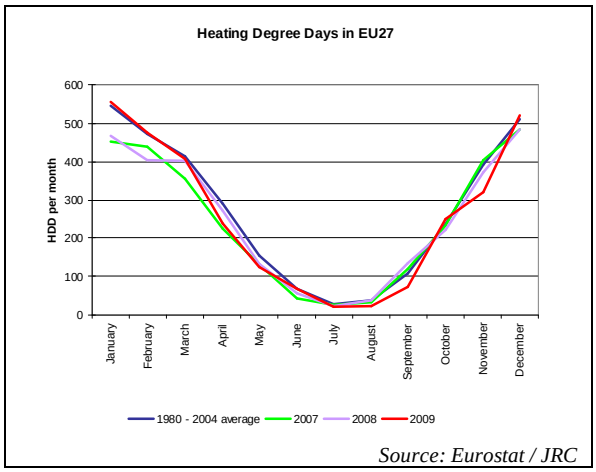
European gas markets were in the last quarter of the year challenged by the still volatile economy and instable weather. Whereas November was an unusually warm month, temperatures dropped considerably in December.



Source: Eurostat
Values for Portugal from May 2009 are estimations based on previous consumption, GDP growth and Heating Degree Days

As is usually the case the last quarter of the year saw an increase in gas consumption with the highest figures in December. Currently available data show that in December 2009 gas consumption in the EU (670 TWh) was close to consumption levels recorded in December 2007 (680 TWh), while it was 8.5 % higher than consumption in December 2008 (620 TWh).

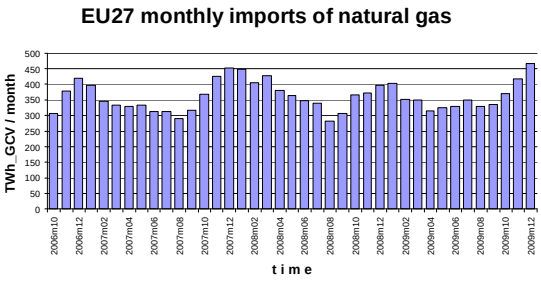
The countries which experienced the largest increases in gas consumption between December 2008 and December 2009 were Sweden (67 %), Luxembourg and Romania (both 49 %). The three countries with the highest consumption in December 2009 were the United Kingdom, Germany and Italy. Relative to December 2008 consumption in these countries increased by 6.5 %, 13 % and 2.5 % respectively.



Source: Eurostat / JRC

One possible explanation for the described increase in gas consumption can be found in the number of heating degree days (HDDs)[1]. In December 2009 there were 37 more HDDs in the EU than in December 2008. Moreover, comparing Q4 2009 and Q4 2008 shows that there were 11 more HDDs in 2009. This matches with the higher overall gas consumption in Q4 2009.

[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.



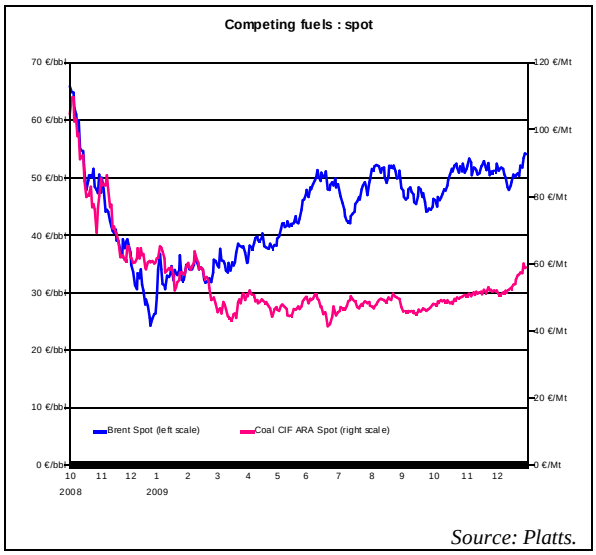
Source: Eurostat

Values for Portugal from May 2009 are estimations based on previous consumption, GDP growth and Heating Degree Days

The EU gas imports revealed a similar picture as consumption. December 2009 imports exceeded December 2008 imports, and were close to the level of December 2007 imports. In percentage terms, the preliminary data show 17 % more TWh of gas imported in December 2009 compared to December 2008. On a quarterly basis, there was 10% more gas imported in Q4 2009 relative to Q4 2008.

A.1.1 Spot markets

Spot prices for crude oil and coal stabilised in the third quarter and moved to higher levels in the last quarter of 2009. Throughout the last quarter, an increasing trend could be observed, although crude oil prices were again more volatile than coal prices.

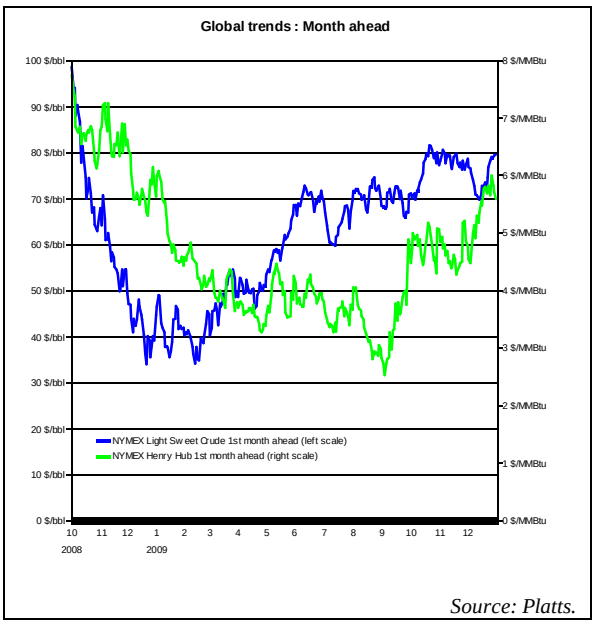


Source: Platts.

The price of Brent at the beginning of the fourth quarter was 46 €/bbl, but by mid-October it had increased to above 50 €/bbl. By the end of the observed period Brent reached 53.9 €/bbl, which was the highest price recorded that year.

The coal prices were growing consistently from October till December, but contrary to the Brent prices they did not reach higher levels when compared to Q4 2008. The average coal CIF ARA price[2] in December 2008 was 61.0 €/Mt, whereas in December 2009 it was 53.9 €/Mt[3].

Prices of crude oil and gas traded in the *New York Mercantile Exchange* also rose. The chart shows that the month-ahead price for light sweet crude oil increased throughout the year. The average month ahead price in January 2009 was 41.9 $/bbl and in December 2009 it was 74.6 $/bbl, representing an increase of 78 %.



Source: Platts.

While the price of gas at Henry Hub also experienced an increase in Q4 2009, its overall movement during the year was different. After oil prices reached their lowest value in February and continued growing constantly afterwards, the month ahead gas price reached its lowest yearly level of 2.5 $ / MMBtu only in the beginning of September,. After this the price started growing again and by the end of December it reached similar levels as at the beginning of the year.

The US gas market was well supplied by domestic conventional and unconventional sources and LNG deliveries. This factor, together with the relatively modest level of industrial demand may have contributed to the decoupling of oil and gas prices observed in 2009.

[2] 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.

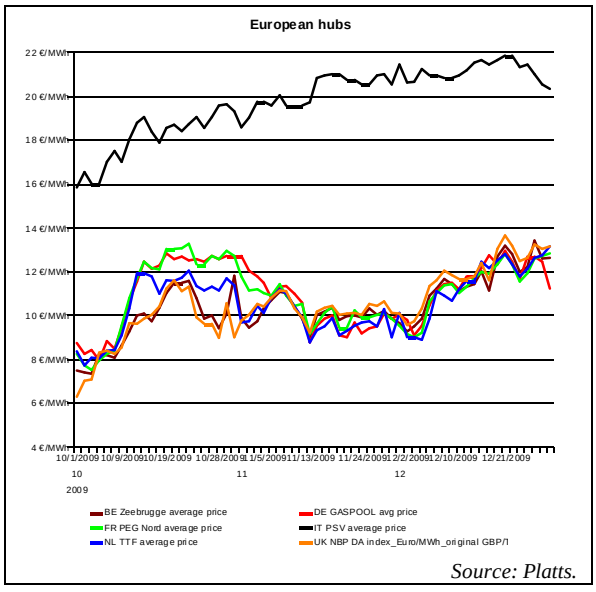
[3] As the chart on competing fuels shows, the price for coal increased steeply in December, reaching almost 60 €/Mt by the end of the month. This can be attributed to the cold weather conditions in Europe and China, which created competition on the world coal markets. Furthermore, coal demand from India increased significantly during that period.

A.1.1.1 European hubs

In Q4 2009 the European hubs experienced increasing prices.

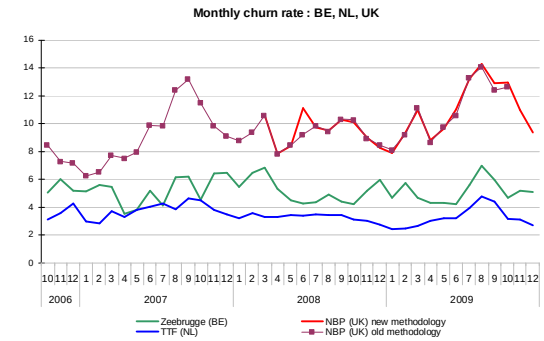
On PSV, the Italian wholesale gas market, prices often moved independently from the other EU gas hubs. Elsewhere the prices evolved in an N-shape: with prices increasing in October, falling in November and increasing again in December. It appears that milder weather in November combined with well supplied markets and continued economic weakness led to a price decrease.

For most of the month of October prices were lower on NBP. In mid-November the TTF prices slipped under the NBP and this situation remained unchanged almost the whole time until the end of the quarter. This coincided to large extent with the Interconnector gas flows. The mode changed in mid-November and for the rest of the quarter gas kept flowing from the continent to the UK.



Source: Platts.

Apart from PSV, the PEG Nord price was the highest average price for a short period in October, when it also reached its highest value within the observed quarter (for comparison TTF reached its highest value at the end of the quarter). In the second half of December PEG Nord had for a while the lowest value among the hubs (again apart from PSV). See the analysis of the French market on page 9 for further details.



Sources: Huberator (BE), Gas Transport Services (NL), National Grid (UK), Platts.
The definition of the UK churn rate was modified as from November 2009. Following a change in the volume categories reported by National Grid, the new churn formula uses daily nominations instead of throughput. For comparison both churn rates are reported in this issue.

The observed quarter brought also a decrease in churn rates[4] (although the Zeebrugge churn rate increased slightly in November). The table presents the percentage changes in traded and physical volumes in December 2009 compared to November 2009.

	NBP	TTF	Zee
Traded volumes	6.8	6.3	-12.4
Physical volumes	25.0	20.4	-10.7

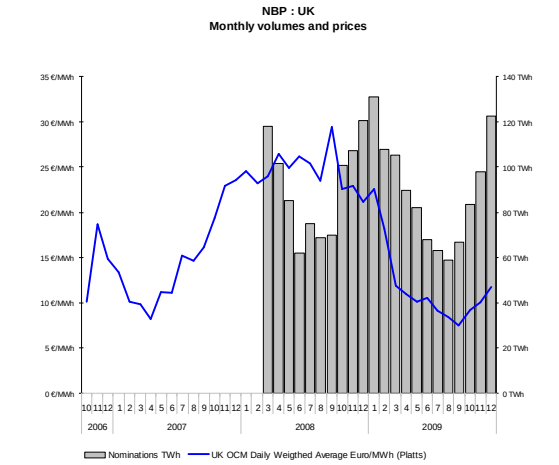
[4] The churn rate is an indicator for the liquidity of a market / hub. It measures the **ratio between traded and physically delivered volumes**.

As can be seen, the decrease in the churn rates in December was mostly related to the changes in physically delivered volumes, which increased more than the traded volumes[5].

UK: National balancing point (NBP)

The weighted average price at NBP grew considerably from the low level it reached in September. On a monthly basis it increased by 23 % in October, by 9 % in November and by 17 % in December. The monthly average in December was 11.8 €/MWh, which is 57 % higher than the September average. On the other hand, the December 2008 average was 80 % above the average one year later.

In October the UK experienced cold weather, which influenced the demand for gas. However, the number of UK heating degree days was lower in October than in some continental countries, for example Germany and the Netherlands. As a consequence smaller amounts of Norwegian gas were sent to the UK and more to the continent, where prices were higher. The decreased supply of Norwegian gas was offset by flows from storages, LNG terminals and later also by milder weather in November.



Sources: National Grid (UK), Platts. Following a change in the volume categories reported by National Grid nominations are used to present the monthly volumes instead of physically delivered trades.

In November, the British market was well supplied, especially in the second half of the month. There was a high supply of pipeline gas which along with the mild weather decreased to some extent the need for LNG[6]. The conditions changed in December with increasing temperatures and by the middle of the month the observed price reached 12 €/MWh. It appears that other factors also contributed to the December price increase, such as cold weather in the US and increasing prices at Henry Hub along with some cutbacks in the Norwegian gas flows.

Even with cuts in flows from Norway, UK prices did not rise substantially during the

[5] Or, as in the case with Zeebrugge, physically delivered volumes decreased less.

[6] In general the number of LNG cargoes delivered to the UK was much higher in 2009. The UK received more LNG cargoes in 2009 than the previous four years combined. Among the factors that could explain this development are the increase of regasification capacities (in 2009 two new terminals became operational), less global competition for LNG due to the economic downturn and higher prices on NBP compared to Henry Hub.

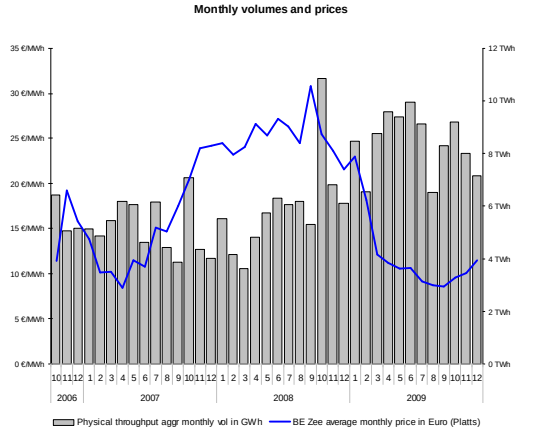
peak gas demand period. This development differs from the one observed a few years ago. It may be explained by the addition of new gas infrastructure and by the relatively low level of industrial demand.

Observing overall monthly volumes for Q4 2009, the analysis shows that the nominations were 7.5 % lower than in Q4 2008. In December 2009 they were 1.5 % higher than the year before.

Belgium: Zeebrugge

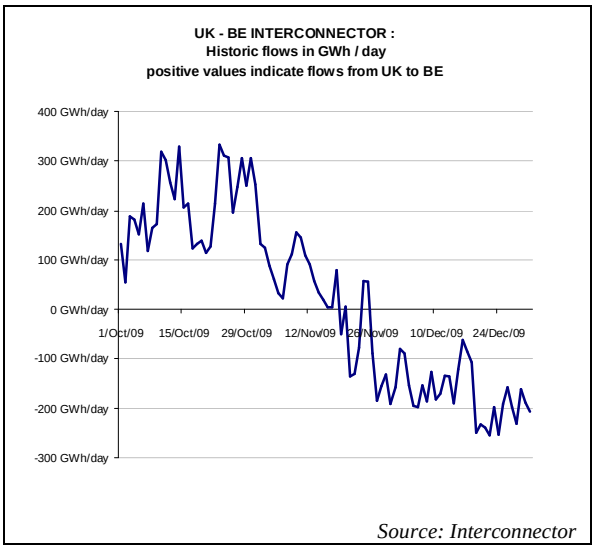
Similarly to NBP, average monthly prices at Zeebrugge were growing continuously from October to December. The average price in December was 20 % higher than the average price in October.

A comparison of daily prices shows that within this period the NBP-Zeebrugge spread went from negative to positive. While in October gas at Zeebrugge was mostly sold at a premium to NBP, in November the trend reversed. This situation lasted almost the whole month of December.



Sources: Huberator (BE), Platts

When looking at the monthly throughput volumes over the course of the years presented in the chart, the highest volumes in the last quarter were always reached in October. This coincides with the beginning of a new gas year and it seems it has an influence on the hub in this particular month.



Source: Interconnector

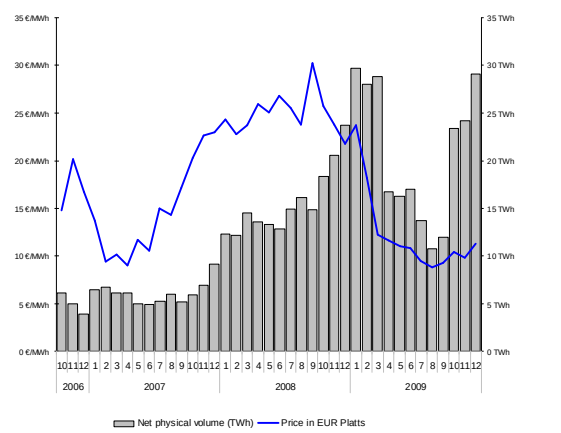
The Interconnector flows reflected the general trend in NBP-Zeebrugge spread movements. While the spread was mainly negative, gas was flowing from UK to Belgium. This corresponds also to the period of low NBP prices, when the UK market was generally regarded as being well-supplied. With higher demand and growing prices in the UK, the Interconnector's operation mode changed.

Netherlands: Title transfer facility (TTF)

During the observed quarter wholesale prices were volatile at the Dutch TTF. At the beginning of the quarter the increasing trend from Q3 continued with prices reaching 12 €/MWh in the second half of

October. Afterwards prices began decreasing and in the first half of November they fell below 9 €/MWh. When this period of decreasing trend ended, prices started growing again and ended the quarter above 13 €/MWh. This is however still much beneath the price registered at the end of Q4 2008, of 21 €/MWh.

It seems that price changes were largely driven by factors related to supply and temperature. After low temperatures in October it became warmer in November, with temperatures rising above the seasonal average. This put additional pressure on prices in an already well-supplied market. In December, prices were pushed up by the cold weather, which appeared to have had a strong impact on trading. Due to weather forecasts and related expectations prices began increasing before the significant drop in temperatures occurred in mid-December.



Sources: Gas Transport Services (NL)[7]*, Platts.*

In terms of volumes, Q4 experienced a big increase compared to Q4 2008. The cumulative quarterly net physical volumes were 24 % higher in Q4 2009 than Q4 2008. According to *Gas Transport Services*, the national transmission operator, this increase was mainly due to the trend of increasing liquidity throughout the last years. The sharp increase in October was presumably also stimulated by the beginning of the new gas year.

Germany: NetConnect (NCG)[8], Gaspool[9]

The German hubs entered the new gas year by registering a fall in price over the course of a single day from above 10 €/MWh to under 9 €/MWh. This was a period of well supplied markets and mild weather conditions. Soon after however, the price climbed above 10 €/MWh again, which seems to have been driven by sharp changes in temperatures and similar trends on TTF.

The price movements during the rest of the quarter were close to TTF as well. In November the prices in the three market areas reached the lowest monthly averages in the observed quarter (10.3 €/MWh on both NCG and Gaspool, and 9.8 €/MWh on TTF).

Throughout the whole quarter the average monthly prices in Germany were above the TTF prices. However, there were instances whereby gas in Germany was sold at a discount to the TTF price. This was the

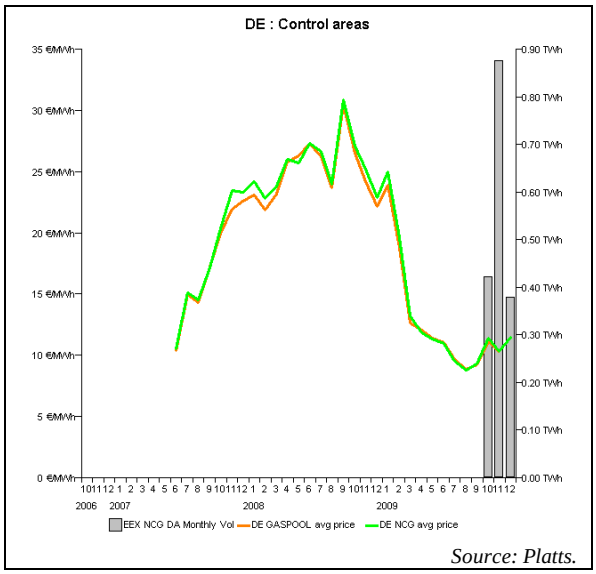
[7] For a specific period, the traded volume is the sum of the nominated volumes on TTF made by shippers and confirmed by GTS.

[8] NCG is formerly known as *E.ON Gastransport (EGT)*.

[9] Gaspool is formerly known as BEB. The new market area started on the 1st of October 2009.

case especially in the second half of November with Gaspool prices.

As for the previous quarter, one of the possible reasons for this development is that the take or pay obligations added volumes to the system. The extra volumes might have been transferred into the new gas year and in combination with the mild weather in November this could have created a pressure on prices.

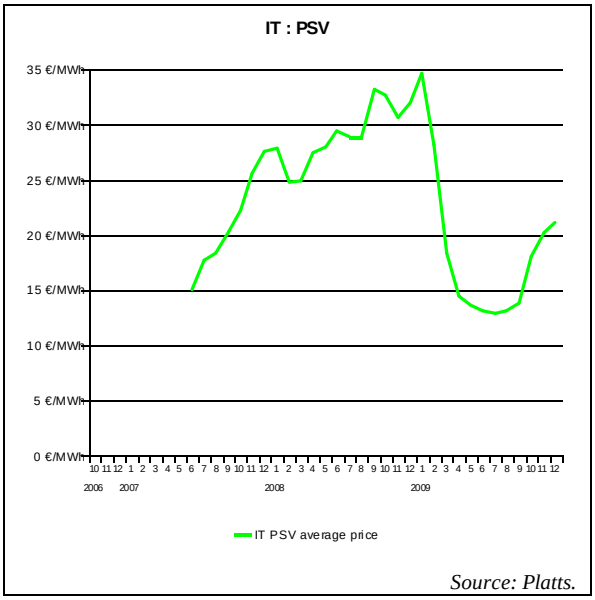


Source: Platts.

The average price in December was close to 11.5 €/MWh for both German market areas, which was the highest average price since April 2009.

Italy: Punto di Scambio Virtuale (PSV)

Contrary to the other European hubs, the prices on PSV were growing steadily during the whole quarter, without the typical drop in November seen elsewhere. Consequently, the second half of November and beginning of December was also the period where the price differences between PSV and other hubs were also the highest. In the first week of December these differences climbed to above 12 €/MWh.

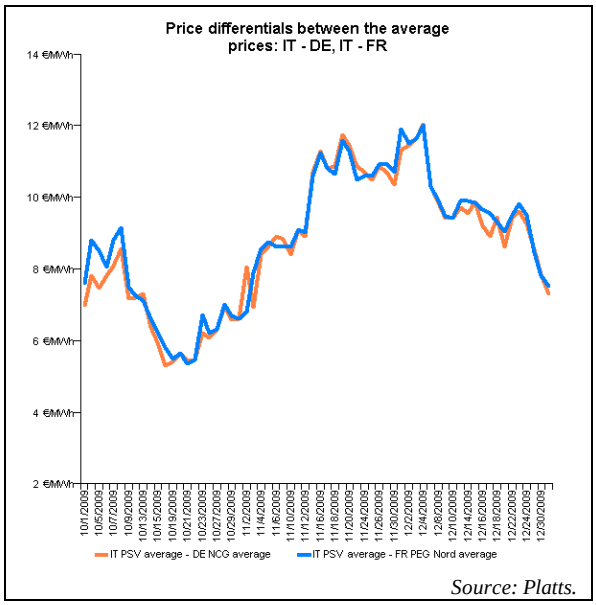


Source: Platts.

One of the reasons for the PSV price hike could be the disturbed transit through the Transitgas pipeline at the end of October when the pipeline was damaged by falling rocks[10]. Also, in mid-December the northern, industrial, part of Italy was hit by unusually cold weather conditions. This led to increased demand from both the households and the power generation sectors.

More than 50 % of electricity in Italy is produced with gas. The latest exact available Eurostat data show that the share of natural gas in the 2007 electricity mix was 57 %.

[10] *Transitgas* is the pipeline bringing primarily Norwegian and Dutch gas to Italy through Switzerland. It is 293 km long and it began operating in 1974. Because of the Alpine environment, this type of disturbances can sometimes occur.



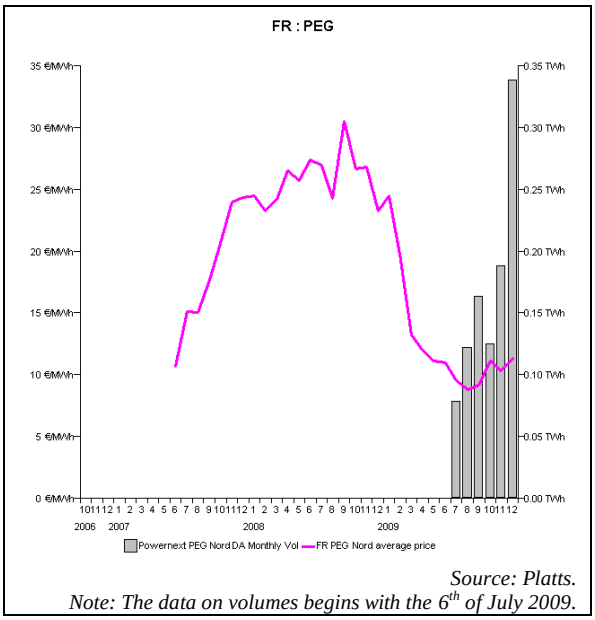
Source: Platts.

In the second half of December the other European hubs also reacted to the cold weather conditions throughout Europe. This might provide an explanation why the price differences were lower during this time. Nevertheless, at the end of the year gas at PSV was still sold at a premium of more than 7 €/MWh when compared to PEG and NCG.

France: Point d'Echange de Gaz (PEG)

The prices on the French hub in Q4 2009 were considerably lower compared to Q4 2008. For example, the average price in October 2009 was 11 €/MWh, while the year before it was 27 €/MWh. This amounts to a year-on-year decrease of almost 60 %.

Although PEG is influenced by TTF, it sometimes moves independently from TTF. Looking at the peaks reached in Q4 2009 (on the 22nd of October and the 31st of December) the relative position between the two hubs changed. In October PEG was above TTF (13.2 €/MWh vs. 12.0 €/MWh) while in December it was below TTF (12.8 €/MWh vs. 13.1 €/MWh). The price development in third week of October may be linked to the unusual conditions on the electricity grid in France where day-ahead prices reached € 3000 / MWh during four hours of the 19th of October[11].



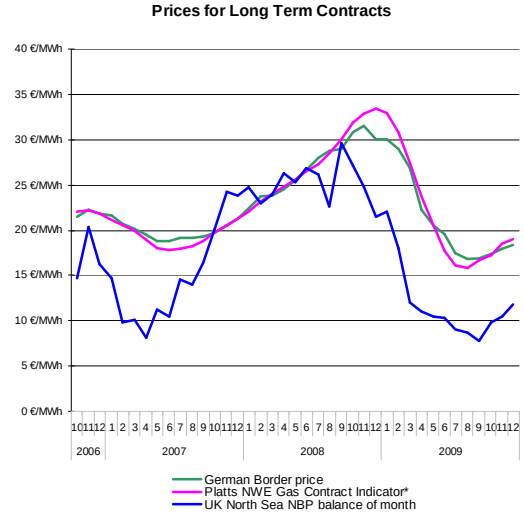
Source: Platts.
Note: The data on volumes begins with the 6th of July 2009.

A further analysis of the price movements shows that the average price in Q4 2009 was 10.9 €/MWh and in Q3 2009 it was 9.2 €/MWh. This represents a 19 % increase. It can reasonably be assumed that the primary driver for this increase was higher demand due to the colder season.

[11] For more information, check the Q4 2009 issue of the *Quarterly Report on European Electricity Markets* which could be found here : http://ec.europa.eu/energy/observatory/electricity/electricity_en.htm

A.1.1.2 Reported border prices on long term contracts for pipe gas

The development of the long-term prices indicates an upturn in the trend. As the chart shows the third quarter was the period with the lowest prices, after which prices increased.



Sources: Federal Office of Economics and Export Control (BAFA); Platts
**Note. For dates prior to May 2009, the Gas Contract Indicator values are calculated retrospectively using gasoline cargoes (CIF) to North West Europe with 0,1% and 0,2% sulphur content*

While it may be too early to confirm a change of direction in the prices of long term contracts, some indicators suggest that these may increase in the near future.

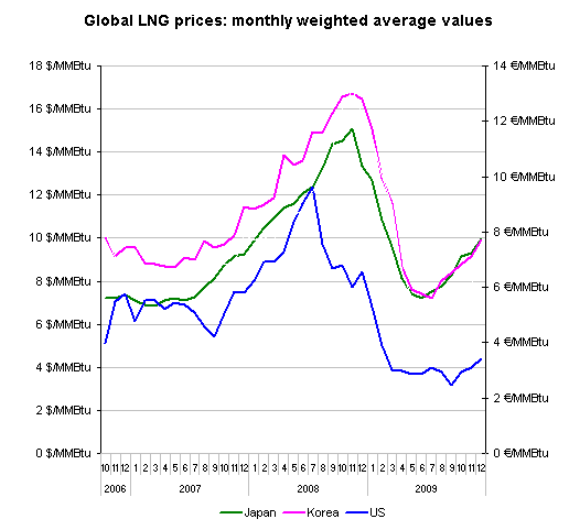
Long term purchase and sale contracts for natural gas index the price of gas to that of oil, often with a predefined time lag. As shown on page 3 of this report, an upward trend can be observed for the price of the *Brent* with periods of increased volatility during the 2009 summer.

Preliminary 2010 figures for the *Platts Gas Contract Indicator* also show an increase in the prices of gas under long term contracts.

A.1.1.3 Reported prices for LNG deliveries

North America and Asia

Global LNG prices grew significantly in Q4 2009. Between October and December, Japanese prices grew by 9 %, Korean prices by 12 % and US prices by 17 %. Although US prices experienced a considerable increase, they remained well below Japanese and Korean prices.



Source: Gas Strategies.
An important change was introduced in the formula for calculating monthly prices. Previously these prices were an average of prices charged by different suppliers. Starting from the present quarter the averages will be weighted by the monthly LNG deliveries of each supplier.

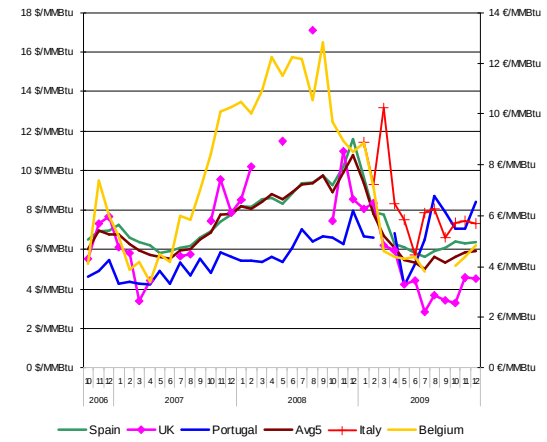
Industrial demand for LNG in Japan rose steadily from the levels observed in the previous quarter, which is a reasonable explanation for the price movements. The consequences of the earthquake on the 11th of August might also have had a positive

effect on demand, given that after the disruption, not all nuclear reactors were back online. Nevertheless, even if demand seems to be recovering, it is still below the levels of Q4 2008.

In South Korea, industrial demand and colder weather appear to have influenced the market as well. By the end of the quarter these factors became even more important. Korean demand was partly satisfied by Yemen LNG, which sent its first shipment to Korea[12].

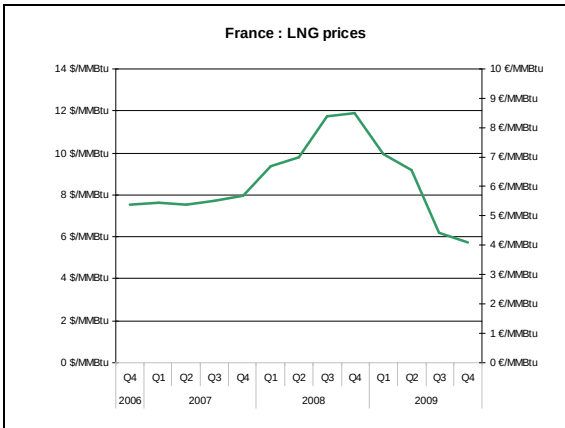
Europe

On average the prices for European exports increased in the last quarter of 2009. The UK market experienced the largest increase in the calculated average quarterly price (however, the UK LNG price is still the lowest one when compared to the other countries). The Q4 2009 average price was 20 % higher than the Q3 2009 average. The development of the UK LNG price was similar to the NBP price. It indicates that the NBP price influences the pricing of the LNG coming to the UK. In Q4 2009 70 % of it originated from Qatar.



Source: Eurostat COMEXT
LNG data for France is confidential.
LNG data for Greece is not available.

The LNG prices for Spain, which remains the largest European LNG importer, increased as well, but to a lesser degree than the UK price (5 % compared to Q3 2009). Spanish prices were less volatile throughout the last quarter. The increase took place mainly between September and October, while beyond that prices were more stable.



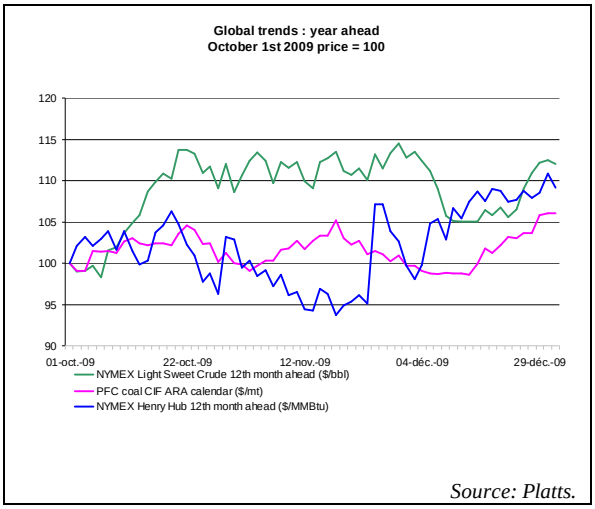
Source: Gas Strategies.

For the French LNG market the first results show that prices kept on decreasing also in Q4, dropping below the level of

[12] Yemen started producing LNG on October 15th and the first tanker left on November 7th. The liquefaction terminal consists of two trains, the second one still in construction. The overall capacity of the terminal is 6.7 million tonnes per year and the company signed long-term contracts with clients in Europe and South Korea *(Source: yemenlng.com).*

4 €/MMBtu. This is the lowest quarterly level in the presented period.

It is interesting to note that Fos Cavaou, the new French regasification plant, received its first methane tanker. The gas was used for the technical preparation of the facility before it becomes operational in 2010 and therefore it did not enter the grid.



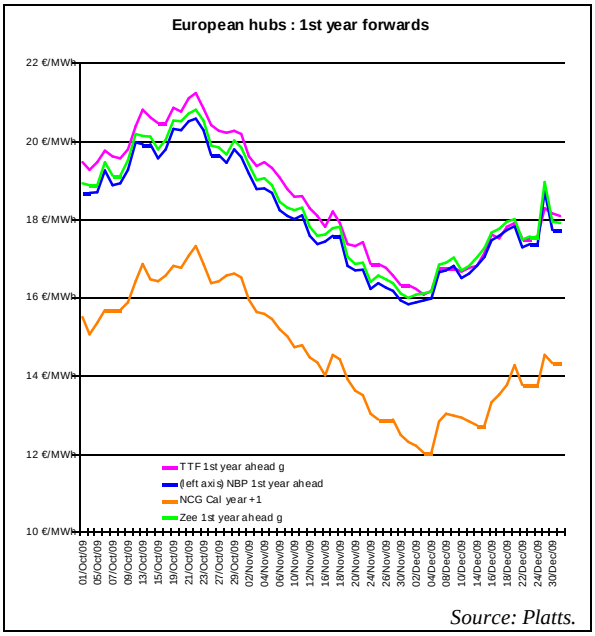
Source: Platts.

A.1.2 Forward markets

In the fourth quarter of 2009 the prices of different energy products showed low volatility, and within the course of December crude oil, coal and gas hub prices moved upwards, showing a stronger correlation then before (see the chart showing the NYMEX crude oil, CIF ARA coal and Henry hub gas prices). The upward movement might have been due to colder weather conditions which affected not only spot market prices but forward quotations as well.

In the beginning of the period NYMEX light sweet crude oil prices stood at 75.40 $/bbl and on the 31st December they reached 84.44 $/bbl. The *Platts Forward Curve* (PFC) coal prices climbed in the same period from 82.25 $/mt to 87.20 $/mt. The price volatility of these three energy products was smaller than in the previous quarters.

The next chart shows the evolution of year-ahead gas prices on the major European hubs. It reveals that during the first three weeks of October prices were moving upwards, then a considerable slide followed until the beginning of December when they started to rise again.

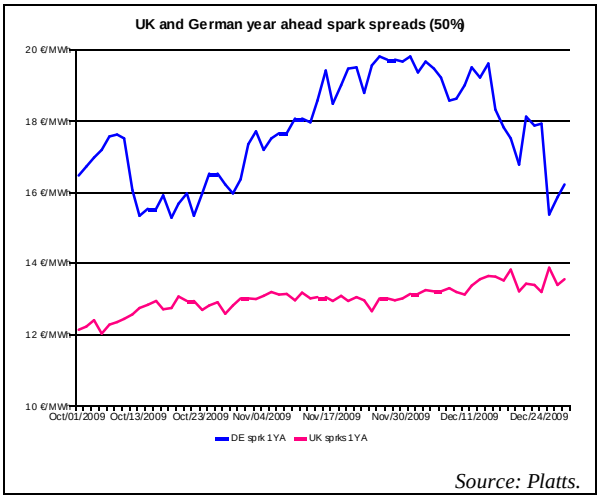


Source: Platts.

The evolution of forwards prices[13] was in line with those of spot market prices. Forward prices were dragged down by fears of low winter storage withdrawals that would have reduced the demand next summer.

The spot price decrease was mainly the consequence of mild weather in November and well supplied gas markets.

German year-ahead spark spreads[14] were higher than those of the UK market during the whole fourth quarter, primarily owing to lower forward gas prices on the German market. Electricity forward prices on the German market were relatively stable, which combined with declining forward gas prices led to the highest German spark spreads values in the last two years. The volatility of German spark spreads proved to be higher again in this period than that of the UK market.



Source: Platts.

The next charts show the forward curve[15] on TTF (Netherlands), the NBP (UK) and Zeebrugge (Belgium). The Dutch and UK hub prices were in backwardation[16] in early October and November, while in early December this disappeared and a fairly flat situation arose regarding the relation of the prices of observed forward periods.

In this period of the year the close forward curve[17] is in backwardation under normal market conditions because the seasonal pattern of consumption – lower demand during spring and summer time – affects gas prices.

The curve remained flat in Q4 2009, implying that market participants expect an increase in prices of gas during the second half of 2010.

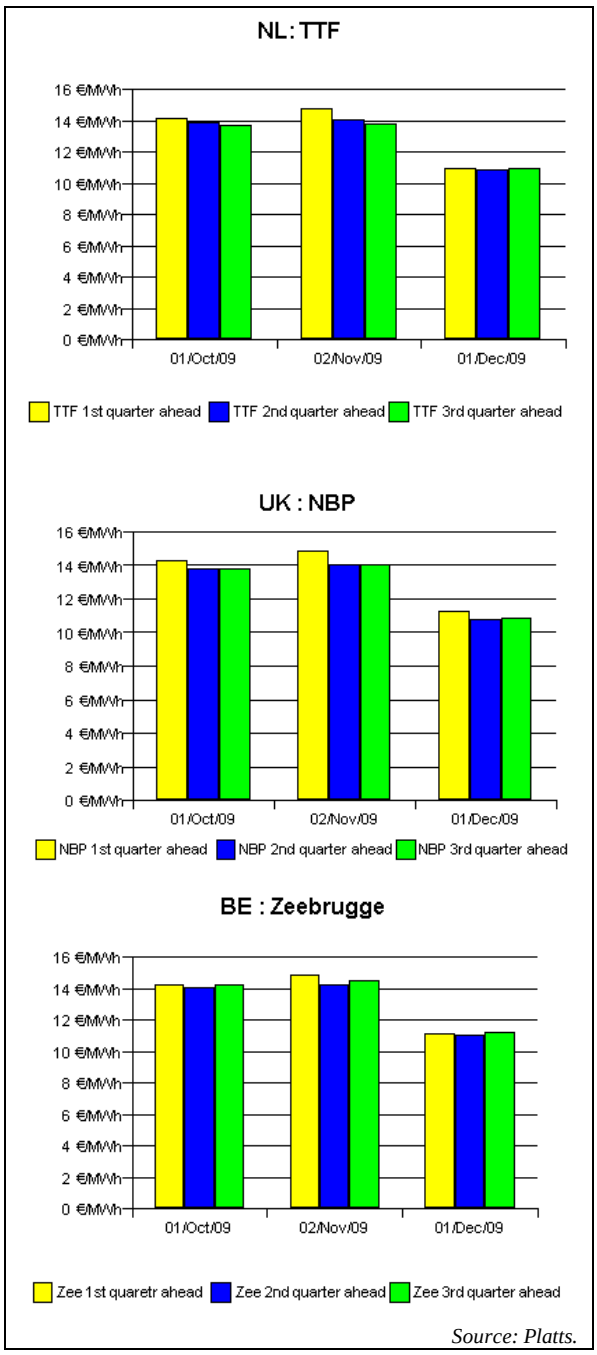
[13] Contrary to spot prices, the *NCG* German contract is traded at a € 4 discount with respect to other EU hubs. This is entirely attributable to the difference in contract specifications. The German gas contract is the only one traded on a **calendar year** and not **gas year** horizon. The gas year contract is formulated to contain the entirety of the winter in one contract. The calendar year splits the key demand driving season into two contracts. As a result, the calendar year contract is traded at a discount.

[14] 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. Spark spreads are calculated using a **calendar year** gas contracts.

[15] Pricing information is only available for the first three quarters ahead.

[16] The situation of *backwardation* arises when the closer to maturity contract has a higher price than the contract which is longer to maturity on the forward curve. The 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.

[17] Up to three quarters ahead.



Source: Platts.

A.2 Retail markets

A.2.1 Prices by Member State[18]

The following two scatter plot charts describe the relation of the prices (without- and with taxes) paid by household and industrial customers in the lowest annual consumption band (D_1 and I_1) in EU Member states and in Croatia and Turkey.

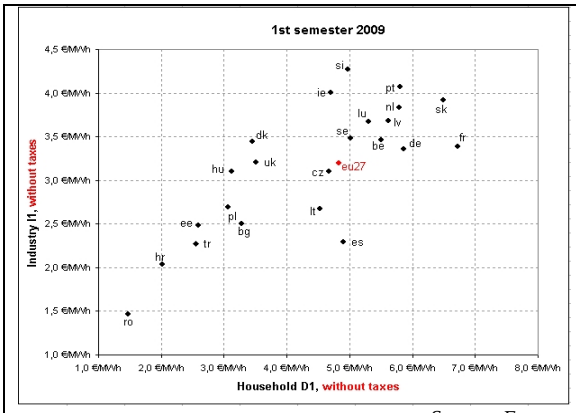
Looking at the EU-27 average pre-tax (net) price evolution an approximately 8% drop could be observed in case of both domestic and industrial customers compared to the second semester of 2008. The possible reason for this price decline was the spill-over effect of decreasing wholesale gas prices that began in the second half of 2008.

The most significant price falls in household consumption net prices could be observed in Poland (19.9%); Sweden (18.8%); Romania (14.1%); Italy (13.9%) and France (12.7%).

Industrial customers faced significantly lower net prices in Poland (26.8%), Sweden (24.3%), Lithuania (25.7%), Spain (21.8%) and Belgium (21.4%). The Lithuanian industrial price evolution is especially interesting in the light of adverse price movements in household prices (a 26.8% pre-tax increase). Significant price jumps also occurred in Bulgaria (increase of 14.2% for households and 20.2% for industrial users), Latvia

[18] It should be noted that the indicative Eurostat categories of household and industry consumers are not necessarily representative of the average customer for a given Member State due to different consumption patters across the EU.

(9.9% increase for households), and in the Netherlands (9.1% price rise for industrial customers)



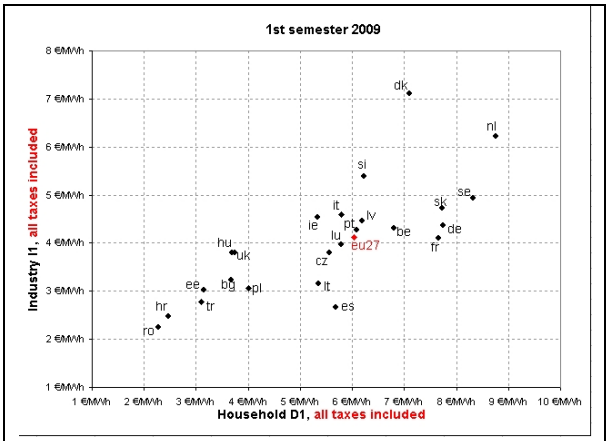
Source: Eurostat

Range for annual consumption of :
Household group D1 : [0 MWh – 5,56 MWh] ;
Industry group I1 : [0 GWh – 0,28 GWh]
Note. Data for Austria, Cyprus, Greece, Finland and Malta are not available

Prices including all taxes (gross prices) showed a similar movement in the case of most of the observed countries. Nevertheless, in some cases the changes in taxation resulted in either a smaller decrease or a higher increase in gross prices. In Latvia and in the Netherlands for example, household consumption prices rose faster (by 5.1% and 4.5%, respectively) than the increase in net prices would have implied, while in Sweden the price fall was 3% less than that of the net prices.

Industrial customers experienced smaller differences between the evolution of net prices and gross prices, but in the case of Latvia and the Netherlands customers experienced an increase in final prices that was some 2% higher than the increase in net prices In contrast, industrial customers in the UK faced a steeper decrease of final consumer prices than would have been suggested by the decrease of net prices (a 2.2% difference between the evolution of gross and net prices). This implies a lower tax burden for these customers.

Both the household and industrial EU-27 customers faced a slightly smaller final price decrease (about 1% on average) compared to the fall in net prices.



Source: Eurostat

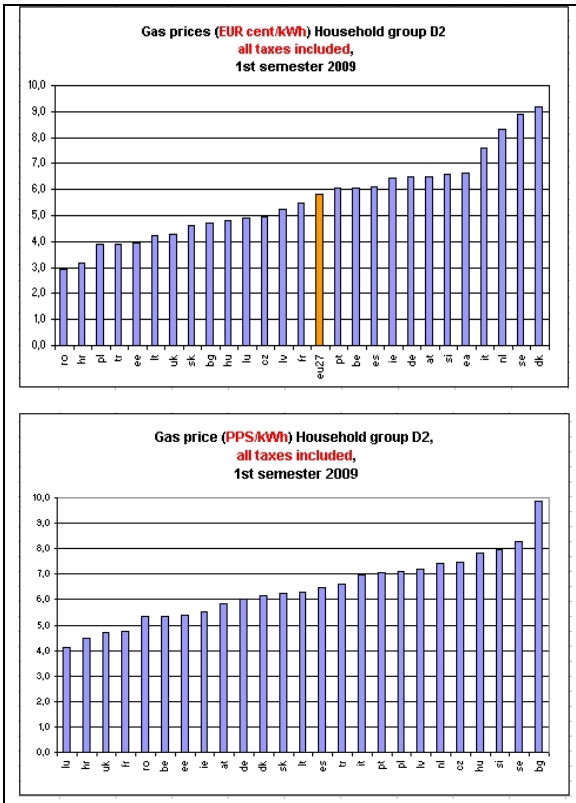
Range for annual consumption of :
Household group D1 : [0 MWh – 5,56 MWh] ;
Industry group I1 : [0 GWh – 0,28 GWh]

Note. Data for Austria, Cyprus, Greece, Finland and Malta are not available

A.2.2 Cross–panel data on natural gas prices of households

The two following charts show gas prices (including all taxes) paid by households having an intermediate annual consumption (Band D_2). The first chart shows the prices in eurocents per kWh and the second shows the prices corrected for Purchasing Power Parity (PPP). It can be seen that most of the countries that joined the EU in recent years have prices which are lower than EU-27 average prices, while after correcting for PPP this distinction between old and new Member States does not seem so obvious.

Taking a closer look at the changes in the ranking order between the second semester of 2008 and the first half of 2009 it can be seen that the ranking order remained stable.



Household group D2 : [5,56 MWh – 55,56 MWh]
Data for Cyprus, Malta, Finland, Greece are not available
Source: Eurostat

The EU-27 average price level (measured in eurocents per kWh) fell by 7.2%. In some cases the countries' position in the ranking order changed significantly. For example the ranking of Austria, where prices rose by 5.4%, moved from a below-average position to the seventh most expensive country. In contrast, Poland, where a 24% price fall occurred, became the third cheapest country, while Belgium stepped back from the fifth most expensive position to the eleventh place, similarly to Germany (stepping back from being the third to the eighth most expensive country). In both Belgium and Germany the price fall exceeded the 7.2% EU-27 average decrease (17% and 15%, respectively).

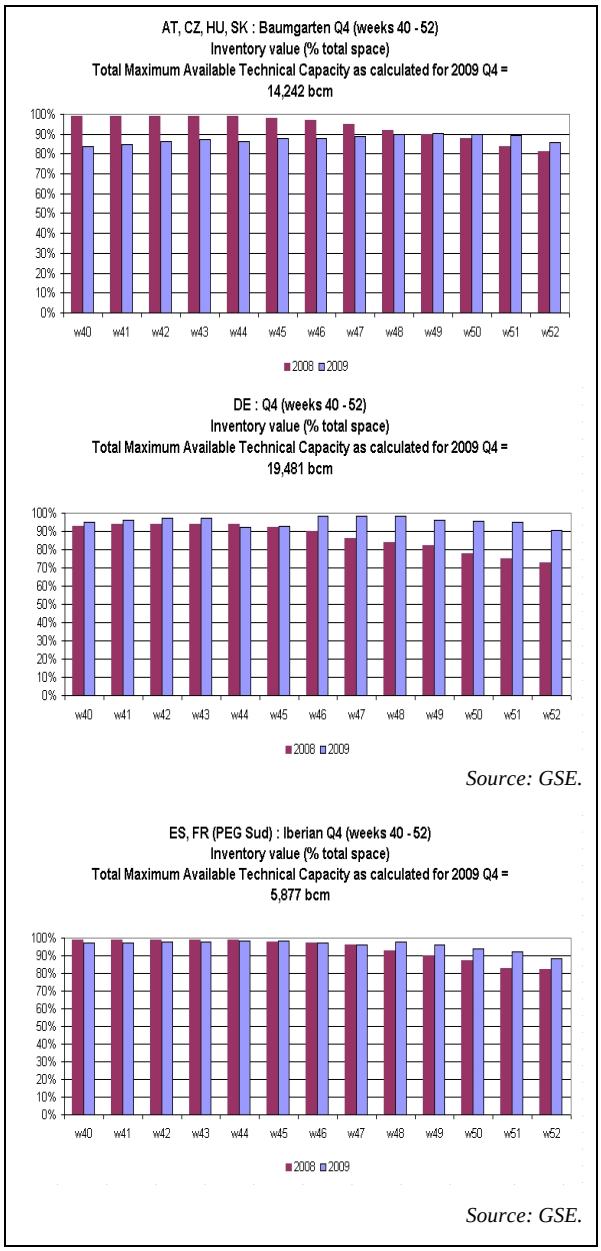
Looking at the ranking order after correcting for PPP Poland, Belgium and Germany also showed significant step-backs in their positions. Meanwhile, Hungary became the fourth most expensive country (from the tenth position), and Latvia also stepped forward (from the twelfth to the seventh position of the most expensive countries)

B. Midstream flows

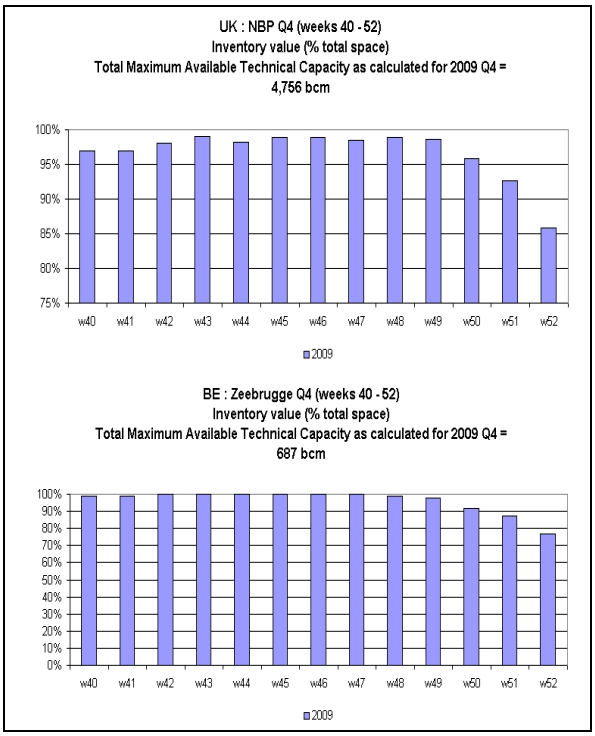
B.1 Storage

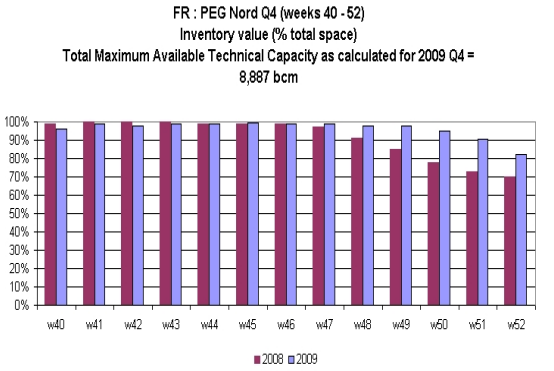
The most important event of every fourth quarter regarding the levels of gas inventories is the beginning of the winter and of the heating season. In the following charts, a weekly comparison can be followed about the level of inventories in the same weekly periods of 2008 and 2009 in different countries or regional markets.

The common feature of these storage facilities is that until mid-November their storage level was quite high, exceeded 90% in almost all cases (with the exception of the Central and Eastern European Region – Baumgarten). This latter case might have been a consequence of the late effect of the depletion of inventories during the early 2009 gas crisis. In the last couple of weeks of 2009 the intensity of inventory depletion was less than that of the same period of 2008 in the case of all markets.



The main reason for this phenomenon was that the weather was milder in almost all EU countries during November 2009 than in the same period in 2008 (weather can be characterized by monthly heating degree days, and in November 2009 the EU-27 average value was 14% lower than a year earlier). Although the weather turned colder in December (resulting in higher monthly heating degree day values), the acceleration of the decrease in the inventories could not offset the impact of the earlier milder period, and in mid-December inventory values were over 90% in all observed countries. That was significantly higher than the values of the preceding year. In Germany and France (PEG Nord) the 'percentage' inventory values observed in the last week of the year were 18% and 12% higher than the last week of 2008. It is worth noting that November monthly heating degree day values were 18% and 24% lower in these two countries, while December values were fairly similar to those of the same period of 2008.





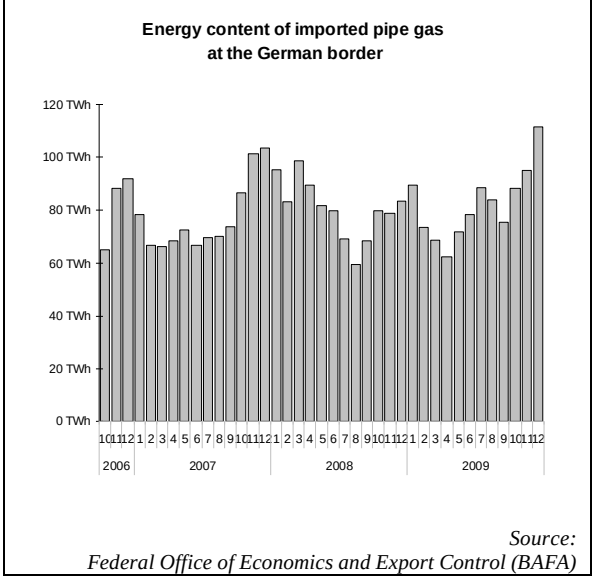
Source: GSE.

During the last four weeks of the year, the largest drop of inventory levels could be observed in Belgium (Zeebrugge, by 22%) and in the UK (NBP, by 13%), signalling the effect of harsh weather conditions.

B.2 Pipeline

In the second half of 2009 a visible growth could be observed in the volume of imported pipe gas at the German border. Beside seasonal effects, the growth might be related to the take-or-pay obligations in the long term contracts for natural gas or to the colder weather than in 2008[19].

While in the first two quarters of 2009 the contraction in imported volumes was more than 15% compared to the same quarter of 2008, in the third quarter of the year a 26% increase could be observed, and in the fourth quarter this increase in import remained strong (21.8%). In December 2009 the monthly energy content exceeded the 100 TWh value for the first time in 24 months.

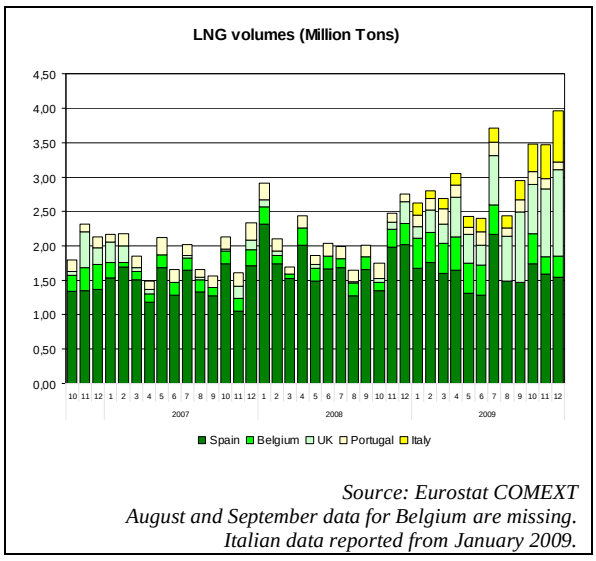


Source:
Federal Office of Economics and Export Control (BAFA)

[19] According to the *Eurostat – JRC* data, in Germany there were 3063 HDDs in 2009 and 2971 in 2008.

B.3 LNG

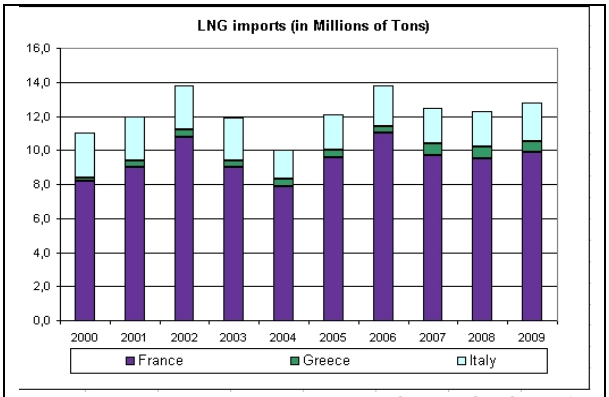
In 2009 a considerable jump could be observed in the demand for LNG on European markets. As the chart below shows, LNG import volumes climbed to a record high in the last quarter of 2009. Looking at the combined imported values[20] of Spain, the UK, Belgium and Portugal the increase of annual volume was about 27%. The LNG import into the UK was more than the combined volume of the preceding four years. (See also footnote comment on page 5).



Source: Eurostat COMEXT
August and September data for Belgium are missing.
Italian data reported from January 2009.

In 2009 the combined volume of LNG imported by Spain, Portugal, Belgium and the UK increased by 7 million tons, a quarter higher than the corresponding volume for 2008.

Factors that contributed to this development were the competitive level of global LNG prices (compared to that of EU pipe gas under long term contracts) and the interesting options offered by LNG regarding diversification of the sources of supply of natural gas.



Source: Gas Strategies

[20] Italy is not taken into account in the annual comparison because of lack of data for 2008

C. *"Focus on unconventional gas"*

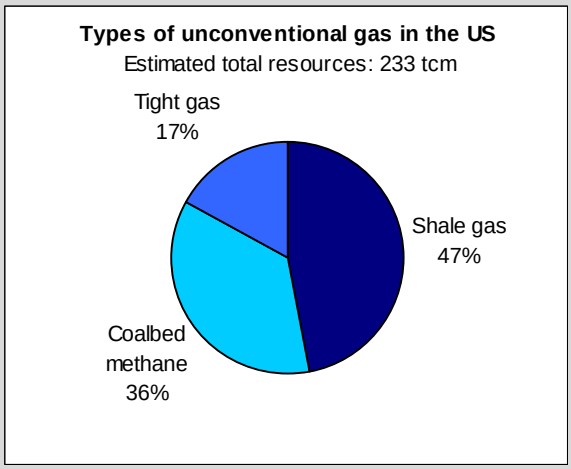
Unconventional gas currently accounts for 45 % of recoverable gas reserves worldwide. In general, gas is denoted as unconventional whenever the technology to extract it is not yet well developed or too costly to use. Improved technology of horizontal-well drilling combined with hydraulic fracturing turned many unconventional gas resources into a profitable business by reducing production costs and hence expanding supply possibilities.

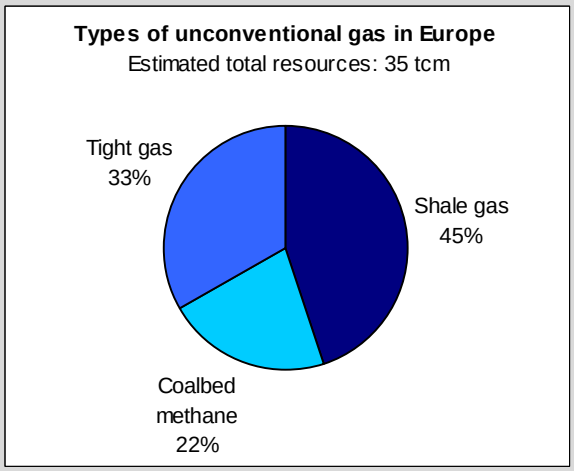
There are three types of unconventional gas which have been exploited in the past decade: tight gas, shale gas, and coalbed methane. Tight gas is mostly found in impermeable, hard rock in highly pressurised pockets. The extraction of the gas out of the rock, which is done by fracturing and acidifying, is complex and hence costly. Shale gas is trapped in fine-grained sedimentary rock. With the help of water injections, the small pore spaces are broken down and the gas is released. Coalbed methane (also known as coalmine methane, coal seam gas) is usually a by-product of the coal industry. It is found in coal mines, either in the coal itself or in the surrounding rock. As soon as mining activities start, the contained gas is unleashed into the atmosphere, induced by the process of mining. What initially represented an important safety problem has been turned into a profitable recovery of unconventional gas.

The market for unconventional gas has developed rapidly in the US and Canada, especially in the last three years. In 2009, the US accounted for almost 70 % of the global unconventional gas output. By 2007, new technologies, more specifically horizontal drilling, decreased the average cost of production in the US below the level of conventional gas extraction. In particular, shale gas was turned into a profitable business, contributing to increasing US gas resources by 39 % from 2006 to 2008, and representing the largest share of unconventional gas resources (however, it is estimated that only 10 % of the shale gas resources in the US are recoverable).

Unconventional gas endowments in other regions of the world are still uncertain and recovery possibilities are often limited by technology, water supply, environmental impacts, and distance to existing pipelines.

The results of different studies on the amount of resources vary considerably. The estimated resources in Europe are presumed to be relatively small compared to the US. According to the World Energy Outlook 2009, only 4 % of the global unconventional gas resources are located in Western and Central Europe.





Source: World Energy Outlook 2009, International Energy Agency

The EU acknowledged the possible contribution of unconventional gas among other indigenous fossil fuels to the security of supply in the EU. Exploitation of this new source is in an early stage in Europe and more data on resources and reserves in the potential basins will be needed. Initiatives on this are underway. One example is the 'GASH' project aiming to establish a comprehensive database on shale gas formation and their occurrence in Europe by compiling data in geodetic surveys.

Apart from geology, factors such as population density, public acceptance and availability of appropriate technology and service industries will affect the future of unconventional gas in Europe.

Despite the uncertainties, 2009 was characterised by intensive applications for acreage in preparations for exploratory drillings. However, it may take several years before sufficient data is available to draw conclusions on the proportion of the resources that can be turned into usable reserves.

In any case, there is potential worth exploiting at least locally. Unconventional gas exploration and partial production activities are ongoing in Austria, France, Germany, Poland, Sweden, and the United Kingdom.

Shale gas recovery outlooks for France and Poland seem also promising. Coalbed methane is found mainly in coal mining areas in Germany, United Kingdom, Poland and Czech Republic. Exploration for tight gas focuses so far on Germany and Hungary.