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Markets

The French wholesale electricity and natural gas markets

2008 report

December 2009

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Methodology notice

This report is based on information collected from market participants, such as producers, suppliers, exchanges or brokers. It is the case in particular concerning the audits performed by CRE of EDF's nuclear and hydraulic power plants valuation models and of EDF Trading market intervention models. These audits were conducted with the assistance of independent external consultants, specialists in electricity and competition issues. The conclusions of the audits are based on data transmitted by the company. The data were not seized by CRE as part of procedures of article 33 of the law of 10 February 2000. Hence, the conclusions presented in this report do not preclude the results of formal investigations that CRE or any other competent authority with formal investigation powers may conduct in the future.





Introduction

The second report on the operation of French wholesale electricity and natural gas markets deals with CRE wholesale market surveillance activities. It follows on from the different work undertaken or announced in the first surveillance report and in the proceedings of the CRE deliberation held on the 8th of January 2009. It capitalizes on the experience gained in this area since the Law of the 7th of December 2006 gave the CRE market surveillance powers. It is also based on feedback from discussions and interaction with the different stakeholders, through the public consultations held by CRE in 2008 and 2009.

SURVEILLANCE WORK, AN INTEGRAL PART OF THE FRENCH LEGISLATIVE FRAMEWORK ...

Before the Act of the 7th of December 2006, the CRE had powers of surveillance provided by the Law of the 13th of July 2005, which were limited to transactions on organised electricity markets, as well as cross-border trades. Market surveillance did not therefore cover gas and, in the case of electricity, did not include surveillance of transactions on brokerage platforms.

The Law of the 7th of December 2006 extended the powers of surveillance to gas and all transactions. Article 28 of the Act of the 10th of February 2000 amended by the Law of the 7th of December 2006 provides for surveillance by the CRE, “(...) *for electricity and natural gas, of the transactions conducted between suppliers, traders and producers, of transactions conducted on organised markets, as well as cross-border trade. It ensures that the transactions of suppliers, traders and producers are consistent with their economic and technical constraints (...).*”.

Since the Law of the 7th of December 2006, market surveillance applies to:

- electricity and gas,
- bilateral transactions, trading on exchanges and cross-border transactions,
- all maturities, from short-term markets to long-term contracts,
- all French wholesale market counterparties, whatever nationality they may have,
- contracts for physical delivery, as well as to financial products.

The Law also allows extensive surveillance of market participants' behaviour, in that the CRE can oversee not only transactions between operators but also their bids and the correspondence between the prices charged and the position of each operator.

... WITHIN THE BACKGROUND OF WORK CARRIED OUT UNDER THE EUROPEAN LEGAL FRAMEWORK

The surveillance conducted by the CRE is completely in line with the European context. The CRE cooperates with the different directorates of the European Commission on those aspects related to competition law.

French law already allows cooperation between the CRE and the other sector regulators, subject to reciprocal obligations. The Law of the 10th of February 2000 as amended by the Law of the 7th of December 2006 provides that “The obligation of professional secrecy does not oppose the disclosure by the French energy regulatory commission of the information or documents it holds to parliamentary commissions with jurisdiction in energy matters or an authority of another European Union member state with similar jurisdiction to that of the French energy regulatory commission, subject to reciprocal obligations, provided that its members and officers are bound by the same professional secrecy obligations as those set out in this article”.

This principle of cooperation should eventually be extended to the area of market surveillance once the new European directives have been passed concerning common rules for domestic electricity and gas markets (the third package, Directives 2009/72/CE and 2009/73/CE of the 13th of July 2009). These directives bring about harmonisation of market surveillance jurisdiction for national regulatory authorities (NRA). Pursuant to Articles 37 and 41 of the electricity and gas directives, NRA missions now entail:

- “monitoring the level of transparency, including of wholesale prices, and ensuring compliance of electricity (or natural gas) undertakings with transparency obligations”
- “monitoring the level and effectiveness of market opening and competition at wholesale and retail levels (...)”.

These directives also encourage cooperation between sector regulators and financial market regulators and introduce new provisions on record keeping obligations. Article 40 of the electricity directive provides that “Member states shall require supply undertakings to keep at the disposal of the national authority, including the regulatory authority, the national competition authorities and the Commission, for the fulfilment of their tasks, for at least five years, the relevant data relating to all transactions in electricity supply contracts and electricity derivatives with wholesale customers and transmission system operators”. A similar provision is made in the gas directive (Article 44).¹

¹ In this respect, it can be mentioned that these provisions were the subject of recommendations within the European consultation bodies, to which CRE made an active contribution throughout 2008 (see the CRE activity report of the 1st of July to the 31st of December 2008).



A SECOND SURVEILLANCE REPORT DEALING WITH VARIOUS, PREVIOUSLY ANNOUNCED STRUCTURAL SUBJECTS AND MEETING STAKEHOLDERS' EXPECTATIONS

When it published its first surveillance report, the CRE announced a number of actions to be taken related to electricity and gas. This report deals with these actions. They include the audits related to the valuation methods used by EDF for its nuclear and hydroelectric generation or the analysis of electricity and gas transactions carried out in 2007, which, in the case of gas, focus particularly on the supply conditions of operators in the South and South-West zones.

Market participants also expressed their expectations, in a public consultation held by the CRE in the spring of 2009. A summary of the contributions was published in July 2009. It can also be mentioned that in addition to the queries on several structural subjects, there was a strong demand for greater transparency in:

- trading and market development and liquidity, especially for gas,
- the fundamentals (electricity generation and information on the use of gas infrastructures).

In order to address these different subjects, the electricity and gas sections of this report are divided into four main chapters dealing with the development of trading, wholesale market price trends, the fundamentals (generation, infrastructures) and, finally, the analysis of electricity transactions and the supply of alternative gas operators.

Summary of the report

ELECTRICITY

Electricity prices and trading

There was a sustained rise in the wholesale market in 2008. The volume traded reached 655 TWh, an increase of 13% compared with the previous year. However, a clear slowdown in trading can be seen during the first half of 2009, which can be linked to the general climate of recession and the financial crisis.

Cross-border trade shows a decline in the net export balance in 2008 and the first few months of 2009. This can be explained by the considerable increase in volumes imported, reflecting growing import requirements for peak times, and a drop in exports, particularly in 2009. The rise in imports is essentially the result of import flows from Germany and Switzerland.

As regards market prices, the changes observed since early 2008 are generally consistent with the balance between supply and demand on one hand and with the trend of fossil fuel prices on the other hand. Analyses of price increases of some futures products identified with the approach of VPP auctions in the first surveillance report show that these increases can be explained by price movements of the fundamentals.

At European level, price comparisons between France and the neighbouring markets show the structural differences in the generation mix, as well as the great sensitivity of French consumption to changes in temperature (a drop of one degree in the temperature results in an increase of 2,100 MW in demand due to the large-scale use of electric heating).

Analysis of transparency of the production

Analysis of how the different generating technologies are used gives the following results:

- the load duration of each of the fuel type is consistent with its merit order in 2008;
- in 2008, the estimated period of marginality of nuclear power is below that recorded in 2007 (5% in 2008, against 15% in 2007), while the frontiers are now more often marginal (39% in 2008, against 25% in 2007).

In accordance with its proceedings of the 8th of January 2009, CRE conducted audits on EDF's method of valuing its nuclear and hydraulic plant. These audits were begun in May 2009 and completed in December 2009. They were carried out with the assistance of outside consultants.



The audits took place in a wider framework of analysis of the medium-term models used by EDF to optimise its generation plant while meeting the constraints of the supply-demand balance over its perimeter, and going as far as Day-1 optimisation and market trading decision-making models.

The conclusions of these audits do not challenge the valuation principles used, which are based on minimising production costs.

The audits also examined EDF Trading's market operation methods and its daily optimisation tools. EDF Trading's transactions are generally consistent with marginal costs. A retrospective analysis of marginal costs and EPEX spot prices was conducted on the basis of an estimate of the hours when EDF is assumed to be marginal. Based on the results of the audits carried out, the CRE found that the differences observed between prices and costs² are at levels which do not suggest market power being exercised. The difference between spot prices and marginal costs will be subject to regular, specific monitoring by the CRE.

Finally, after analysis of the quality of forecast data for the generation plant, we can conclude that this data is not yet sufficiently reliable, even though improvements have been made and further improvements have also been announced by the UFE to be implemented by late 2010. In its report of the 20th of November 2009, the CRE reiterated the importance of publishing unplanned shutdowns for each unit. UFE, in its statement on the 23rd of November, announced planned changes for 2010, in particular, the publication at the end of 2010, within a period of 30 minutes, of unplanned shutdowns affecting production units of more than 100 MW.

Analysis of transactions

Analysis of transactions on the EPEX Spot Auction electricity market show that, overall, order books are a reflection of the balance of the system.

Data which were collected by the CRE in the summer of 2008 and covers all of the transactions carried out in 2007 on Y+1 and Y+2 products by operators in the French market, represents an overall volume of nearly 247 TWh. Over half of these transactions were made within the group (for example a parent company and its trading subsidiary). Excluding these transactions, the pure bilateral market represented around 6% of the volumes of Y+1 and Y+2 calendar products traded during 2007.

2. Marginal costs of the system

NATURAL GAS

Gas prices and trading

The wholesale gas market changes since 2008 have occurred against a background of a number of key events for gas markets in France. These events are related to the international environment, on the one hand, with the reversal in oil prices in the summer of 2008, the economic recession and the appearance of gas surpluses in comparison with world demand and, on the other hand, to developments specific to the French market, like the merger into a single zone of three previous transmission zones in the north in France (North-H, East and West) on the 1st of January 2009. This encouraged greater liquidity in the North area as well as increased arbitrage opportunities between long term import contracts indexed on oil and market purchases.

An increase in the volumes delivered to PEGs (French gas exchange points) can be observed. Gas trading on the French intermediated market, all maturities together, has shown strong progress since 2008 and this trend continues in the first half of 2009. The volume of trading reached nearly 66 TWh over 2008, against 27 TWh in 2007. At 69 TWh, the volume of trading in the first half of 2009 exceeds that of 2008 of the most traded place, the North Zone.

Over the greater part of 2008, wholesale gas prices in France followed a rising trend, related to oil product indexing, with a time lag of several months. Their low 2009 levels reflect the general context of weak demand in comparison with the gas available on international markets. Current market price levels in France are clearly below the price levels of long term contracts indexed on oil.

This trend in gas prices was similar in France and Europe, even though isolated instance of lack of correlation between the European markets have been observed. Considerable price differences between the PEG Nord and Zeebrugge, in November 2008, have, for example, been found. The CRE carried out investigations in order to identify the factors specific to the French market which might have contributed to this episode. The main conclusions of this investigation are as follows:

- no market manipulation was detected,
- trade-offs between long-term supplies and short-term purchases were a factor in supporting market prices at the PEG Nord in November 2008,
- as regards the French grid, the maintenance work on GRTgaz network limited the daily available capacity in few occurrences,
- short-term arbitrages from Belgium remain structurally difficult to establish.



Infrastructure use

Recent changes in infrastructure access conditions in the North zone now mean that this zone can fulfil most of the conditions for becoming an effective market place where natural gas suppliers can balance their requirements and their resources. However, a number of points still need to be improved, including the harmonisation of network access conditions between the North GRTgas zone and the adjacent European markets, the emergence of a real secondary market and the possibility of physical flows from France to Belgium and Germany.

In the south of France, restraints on market development persist: supply constrained by the present design of entry capacities and the fact that there are two distinct market places. However, access conditions in the south of France should improve with the commissioning of Fos Cavaou and the development of interconnections with Spain.

Supply of the participants

The supply structure for new entrants is stable over time. It is balanced between imports and purchases at PEGs. Even though the majority of imports are made by French incumbent suppliers, they hand over some of the gas imported to the PEGs, forming a significant source of supply for new entrants.

In the South zone, since the end of the gas release programme, alternative suppliers have increasingly used the North-South link to supply their customer base in this zone. Supply in the South-West zone is divided between purchases from the PEG and supplies from the South zone and, marginally, Spain. Overall, the end of the gas release programme has not prevented the development of the activity of alternative suppliers, whose market share in the south of France climbed steeply between 2008 and 2009.

This analysis was based on data collected by the CRE in the summer of 2008 which covers all of the transactions carried out for Summer, Winter and Y+1, Y+2 products in 2007 by operators on the French market, for an overall volume of nearly 7.2 TWh, on the pure bilateral market.

Section I

Wholesale electricity markets

1. THE DEVELOPMENT OF THE MAIN WHOLESALE MARKET SEGMENTS	11
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4. THE ANALYSIS OF TRANSACTIONS	57



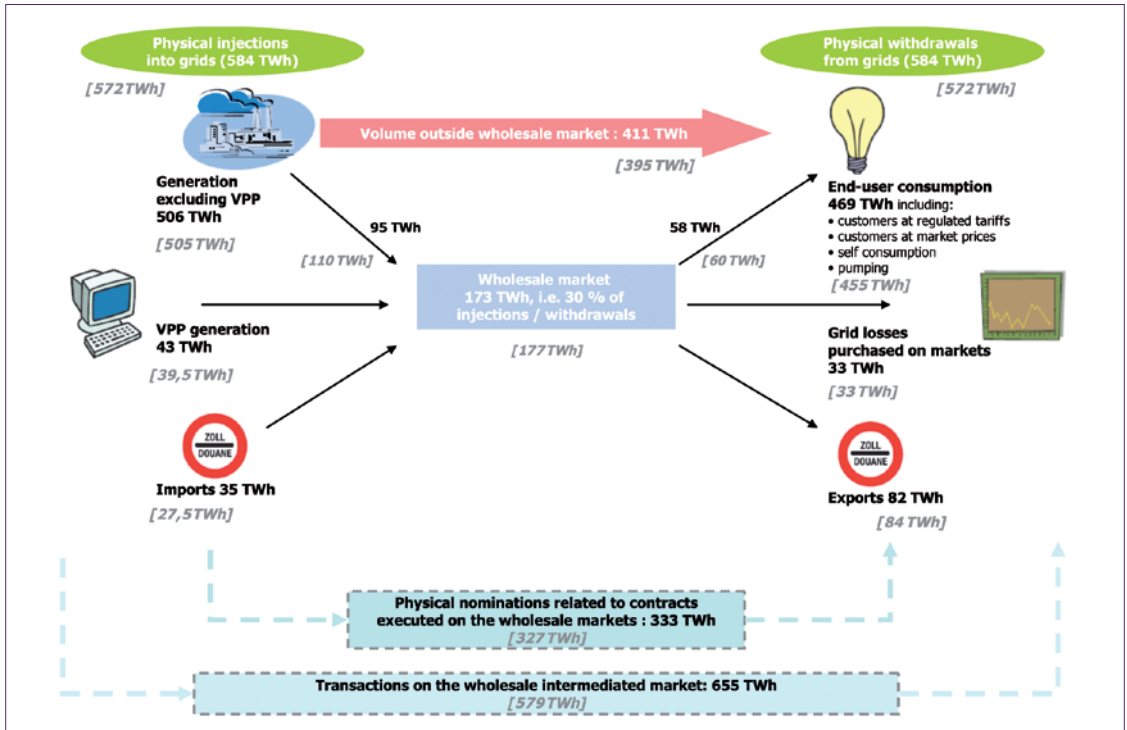
1. THE DEVELOPMENT OF THE MAIN WHOLESALE MARKET SEGMENTS

Activity on wholesale electricity markets is mainly the result of producers optimising the flexibility of their generation facilities, trading transactions, cross-border trade and market participants covering their forecast consumption in order to meet their customers' needs.

In 2008, physical deliveries between participants resulting from contracts concluded on wholesale markets (intermediated and bilateral), represented 333 TWh. On the intermediated wholesale market, the volume of trade reached 655 TWh in 2008, a clear increase compared with 2007 (579 TWh). The flows of energy physically injected into the network which are linked to trade on the wholesale market are estimated at 173 TWh (physical wholesale market), against 177 TWh in 2007. This volume is calculated on the basis of physical injections into the French market (584 TWh) from which off-market volumes are deducted (411 TWh), assumed to correspond to end user demand addressed to integrated participants upstream-downstream and linked to their own production. The reduction of this valuation of the "physical" wholesale market compared with the previous year (-4TWh) can be explained by a fall in exports (-2TWh) and less frequent use of the wholesale market for supplying end users.

The diagram below shows a simplified overview of these different flows for 2008 and 2007 (figures in brackets). The aim of this section is to set out the changes in the intermediated wholesale market and three main segments of the physical wholesale market, i.e. cross-border trade, EDF's VPP sales and loss purchases by French grid operators.

FIGURE 1 – Energy flows between French wholesale market upstream and downstream segments in 2008



Data: RTE; Analysis: CRE

1.1. A sustained progress on the intermediated wholesale market on all segments in 2008, although it shows signs of a slowdown in the first half of 2009

Activity on the French intermediated wholesale market consists of transactions carried out on organised markets and the intermediated OTC market (brokerage platforms). This covers the main part of activity on the French electricity wholesale market.

The volume of trading on the wholesale market was up 13% compared with 2007 and amounted to 655 TWh in 2008. 115,573 transactions were recorded in 2008. The increase in the volume of electricity traded in France over this period reflects the growth observed over all market segments (intraday, day-ahead and futures) (table 1). In terms of macro-economic data, in 2008, electricity trading represented around 140% of French consumption, an increase of 10 percentage points compared with 2007.

The increase in volumes and the number of transactions is reflected in the growth of the number of balancing entities operating on the French market in 2008 (table 2), driven essentially by greater activity of financial traders.

**TABLE 1 – Volumes and number of transactions**

Volumes (TWh)	2007	2008	H1 2008	H1 2009
Intraday	0.29	0.78	0.36	0.48
Day-Ahead Continuous	16.73	20.31	12.18	8.34
Day-Ahead Auction	44.21	51.63	26.35	26.34
Futures	517.66	582.12	333.37	337.56
Total	578.89	654.84	372.26	372.72

Number of transactions	2007	2008	H1 2008	H1 2009
Intraday	10 623	29 491	13 988	15 556
Day-Ahead Continuous	32 001	36 279	20 332	15 767
Day-Ahead Auction	n.a.	n.a.	n.a.	n.a.
Futures	35 941	49 803	28 840	24 627
Total	78 565	115 573	63 160	55 950

Data: Brokers, EPEX Spot France, EPD France; Analysis: CRE

TABLE 2 – Balancing entities operating on the French market

Classification	Number of balancing entities operating		
	2007	2008	H1 2009
Integrated European generators	33	34	37
Financial player traders	22	30	20
New European entrants	15	18	17
French generators	9	8	8
New French entrants	5	6	6
Others	3	4	4
ELD ³	5	4	4
Industrial companies	5	6	4
Total	97	110	100

Data: Brokers, EPEX Spot France, EPD France; Analysis: CRE

Slower, more volatile trading in the first half of 2009

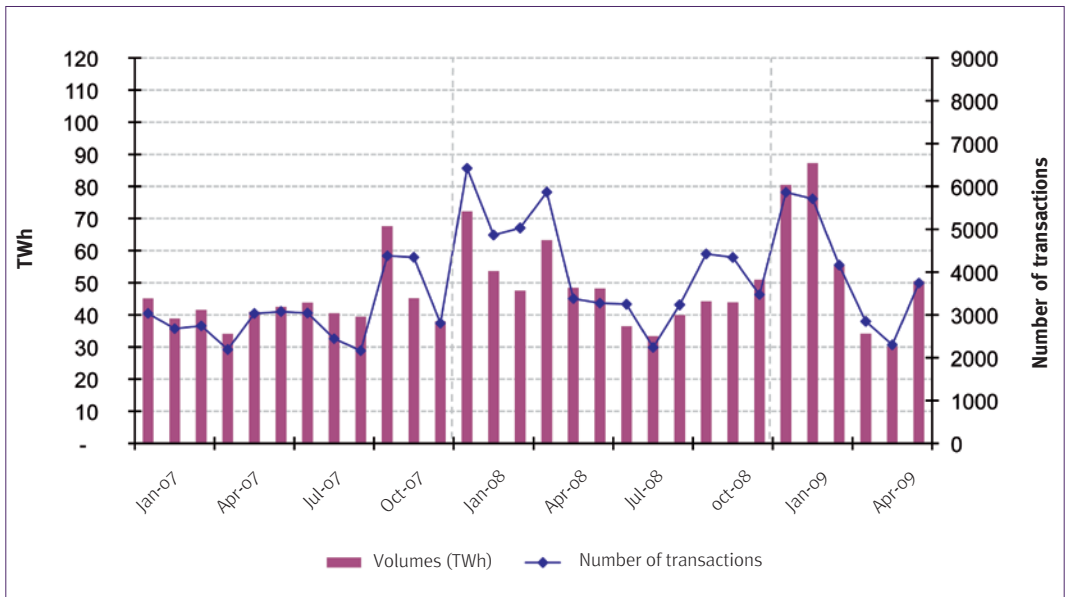
Data for the first half of 2009 shows a clear slowdown in trading. Volumes traded amounted to 373 TWh for a total of around 56,000 transactions. Compared with the same period last year, volumes in the first half of 2009 are virtually unchanged and the number of transactions has fallen by about 11%.



A fall in the number of transactions in the first half of 2009 is recorded on the futures market (-15%) and the *day-ahead continuous* market (-22%). The only exception concerns the intraday market which has just recently developed⁴. In general, these findings can be linked to the overall climate of recession and the financial crisis, particularly as there has been a drop in the number of balancing responsible entities, essentially financial player traders.

In addition, monthly data shows considerable volatility in trading since the beginning of 2009 (figure 2). The large volumes observed over the first two months of the year are the result of trading in high volume calendar and annual products. This large volume made up for the impact of the fall in the number of trades in shorter maturity products. The peaks in volume recorded in January and February 2009 can be explained by the large-scale activity of certain French and European incumbent generators and a financial trader. Since then, these operators have significantly reduced the volumes they trade on markets. The strikes that affected French production were responsible for part of the fall observed in volumes in the second quarter of 2009.

FIGURE 2 – Monthly changes in volumes and numbers of transactions on the intermediated futures market



Data: EPD France, Brokers; Analysis: CRE

4. Launch of a trading platform on this segment by Powernext / Epex in July 2007

1.2. The balance of volumes traded at interconnections, significantly down, reflects the growing need for imports at peak times and a fall in exports, especially in 2009

A decline due essentially to the increase in the volume of imports and a drop in exports in 2009

In 2008, the cross-border flows represented 81.6 TWh in exports and 34.7 TWh in imports (table 3). The net export balance, at 46.8 TWh, is therefore significant, but in decline compared with 2007 (net exports of 55.7 TWh). This decrease is essentially due to a strong rise in the volume of imports, from 27 TWh in 2007 to nearly 35 TWh in 2008, associated with a slight decrease in the volume of exports. Data on the early months of 2009 (January-August), compared with the same period of 2008, confirm this rising trend for imports and a falling trend for exports. There is a marked drop in exports over 2009.

TABLE 3 – Cross-border flows

	Germany Exp. Imp. Net	Belgium Exp. Imp. Net	United Kingdom Exp. Imp. Net	Spain Exp. Imp. Net	Italy Exp. Imp. Net	Switzerland Exp. Imp. Net	TOTAL Exp. Imp. Net
2007	8.0 -16.2 -8.2	11.8 -1.6 10.1	9.2 -3.1 6.1	7.3 -1.9 5.4	20.7 -0.4 20.4	26.1 -4.2 21.9	83.1 -27.4 55.7
2008	6.4 -19.0 -12.6	10.9 -1.9 9.0	12.9 -1.4 11.5	5.8 -3.0 2.8	19.6 -1.8 17.8	26.1 -7.7 18.4	81.6 -34.7 46.8
jan-08 aug-08	4.8 -13.0 -8.2	9.1 -0.7 8.4	9.5 -0.5 9.0	4.0 -1.8 2.2	12.9 -1.1 11.9	17.3 -4.6 12.7	57.5 -21.7 35.8
jan-09 aug-09	5.2 -11.3 -6.1	2.5 -3.6 -1.1	6.1 -1.5 4.7	3.9 -2.3 1.6	13.1 -0.3 12.7	17.3 -6.6 10.7	48.2 -25.7 22.5

Source: RTE; Analysis: CRE

The rise in imports is particularly due to Germany and Switzerland, with imports from the latter increasing from 4.2 TWh in 2007 to 7.7 TWh in 2008. An increase in imports can also be seen with Belgium, Spain and Italy and for all of these countries, the net export balances are down compared with 2007 levels. In the case of Belgium, a net import balance is observed over the early months of 2009 (-1.1 TWh), against a net export balance of 8.4 TWh over the same period of 2008. Trade with the United Kingdom finally represents the only noteworthy exception. The net export balance virtually doubles to 11.5 TWh in 2008 at this border. This is consistent with the long term positive price differences between England and France throughout 2008 (see chapter 2).

Cross-border flows generally consistent with price spreads

A link between price spreads and direction of trade at interconnections is expected. Analysis of the individual behaviour of participants during their nominations at interconnections, consistent with this link, is given in section 4.3 of the report.

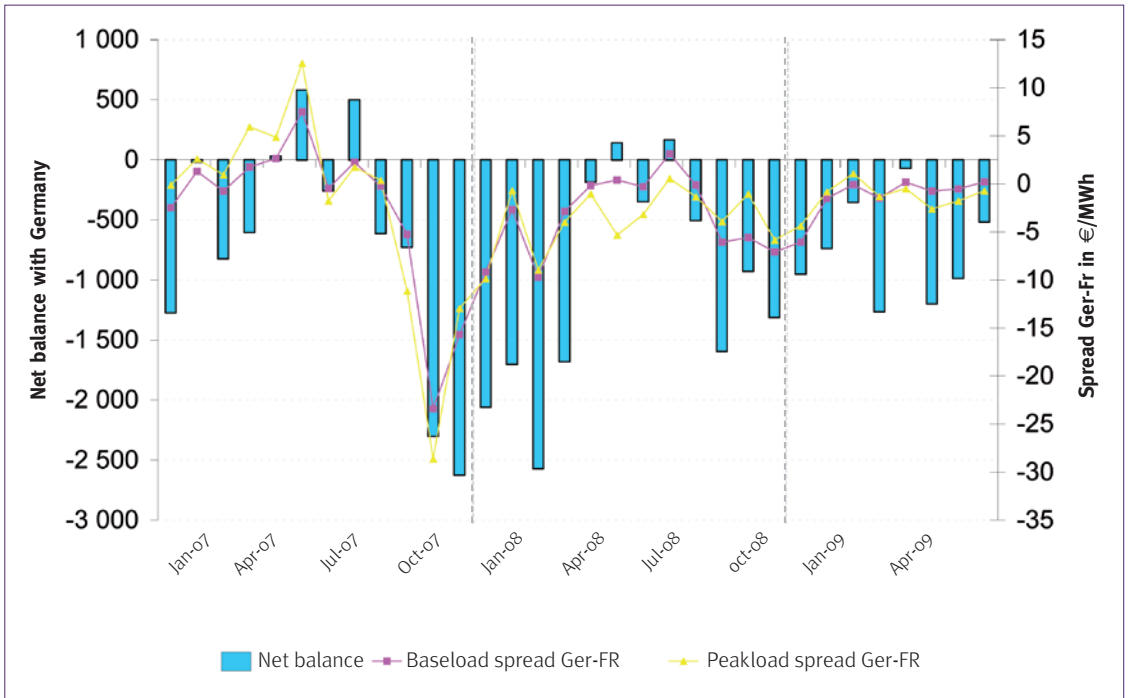
From a general point of view, the positive export balances, observed at all borders with the exception of Germany, are consistent with the direction of positive differences between average prices compared with France (*Day-ahead, baseload*) (Figure 3).



The position of net imports from Germany is also consistent with the average price level in France, higher than prices across the Rhine. The monthly changes in net trade balances at borders generally correlate with change in price differences, the correlation being particularly clear in the case of Germany and Great Britain (figures below). More generally, cross-border trade structure can be linked to the generation capability structures in the different countries (see chapter 2).

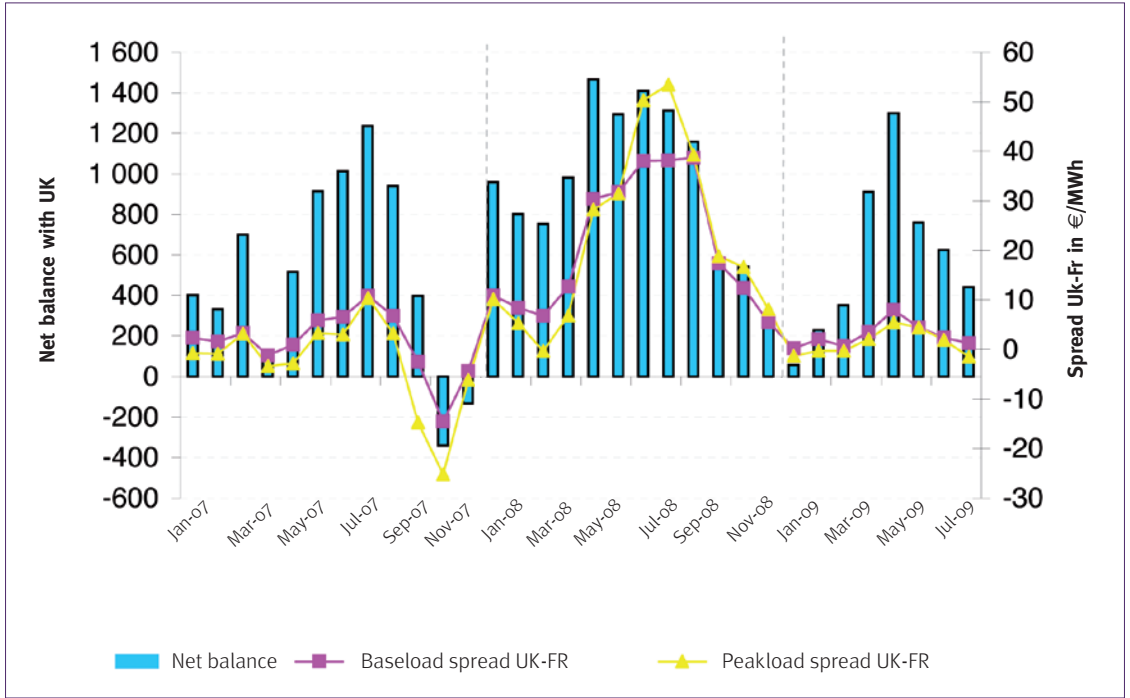
FIGURE 3 – Net export balance and price spread with neighbouring countries

3.a. France – Germany



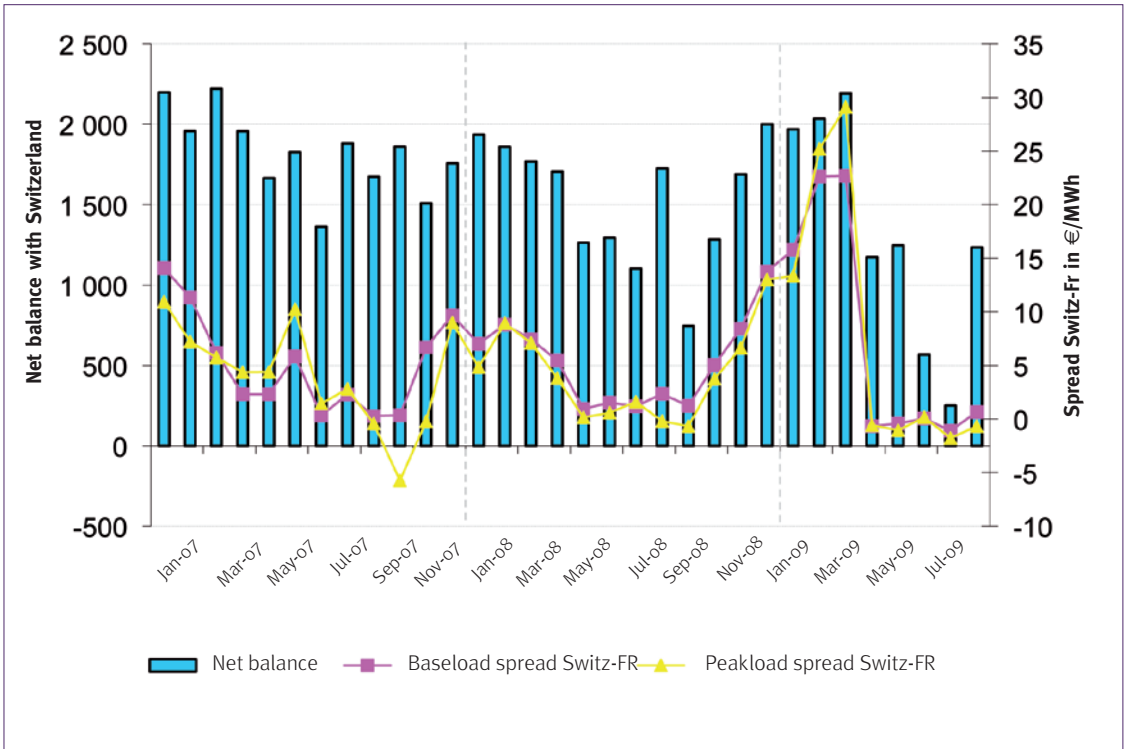


3.b. France – United Kingdom





3.c. France – Switzerland



Sources: RTE, EPEX Spot; Analysis: CRE

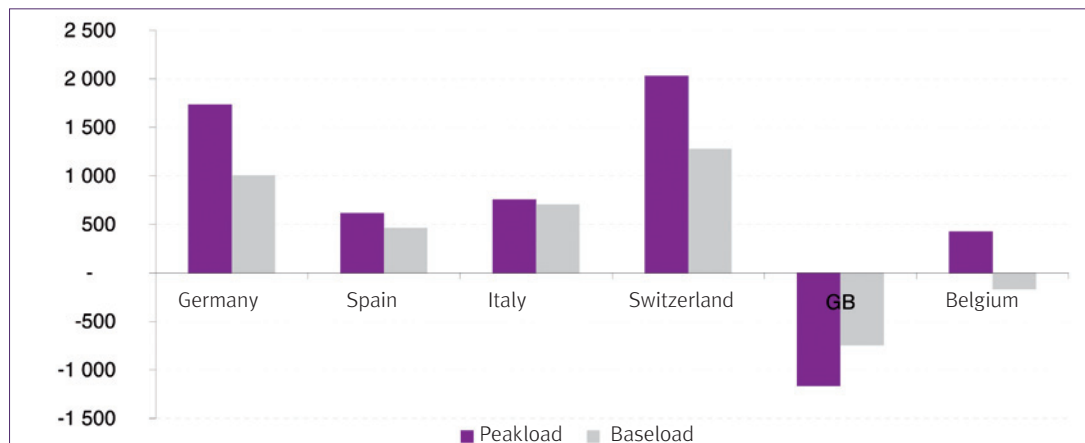
Growing import needs for peak time products

Imports over 2008 increased by around 7 TWh compared with 2007 levels. This rise in imports occurred essentially at peak hours, which accounted for 60% of the overall level of the rise in imports (Figure 4).

The increase can be explained by the use of hydro peaker, i.e. as the storage dam in Switzerland, whose production costs are lower than those of thermal power stations in France running at peak hours, as fuel were driven up by the rise in oil prices over a large part of 2008. The acceleration in imports of peak products can also be seen in the case of imports from Germany and, to a smaller extent, from Spain and Belgium.



FIGURE 4 – Change in cross-border imports
Change in cross-border imports in GWh between 2007 and 2008
Distribution between peak times and off-peak times



Source: RTE; Analysis: CRE

1.3. The sale of losses to grid operators reveals a growing share of options products, sold by a limited number of participants backed by generation facilities

Purchases by the grid operators RTE and ERDF, necessary to offset their losses, represented 33 TWh in 2008 and 17 TWh in the first half of 2009. RTE and ERDF put out tenders several times a month to buy products enabling them to cover losses on their grid. In 2008, 112 calls for tenders were put out by the two grid operators; 49 were organised in the first half of 2009. This should be compared with the 121 calls for tenders in 2007. As a result of the calls for tenders in 2008 and the first half of 2009, grid operators bought monthly products (from M+1 to M+18), quarterly products (from Q+1 to Q+5), and annual products (from Y+1 to Y+4). Since early 2009, RTE has also been covering part of its needs on the EPEX Spot *day-ahead* market.

Table 4 summarises the breakdown of energy committed contractually by sellers. Participants are selling growing volumes of options products and the share of firm products or products similar to firm products for the sellers (otherwise called premium deals) was lower in 2008 than 2007. In 2008, grid operators used 40% of options or premium deal products. In the first half of 2009, this ratio stood at 68%.

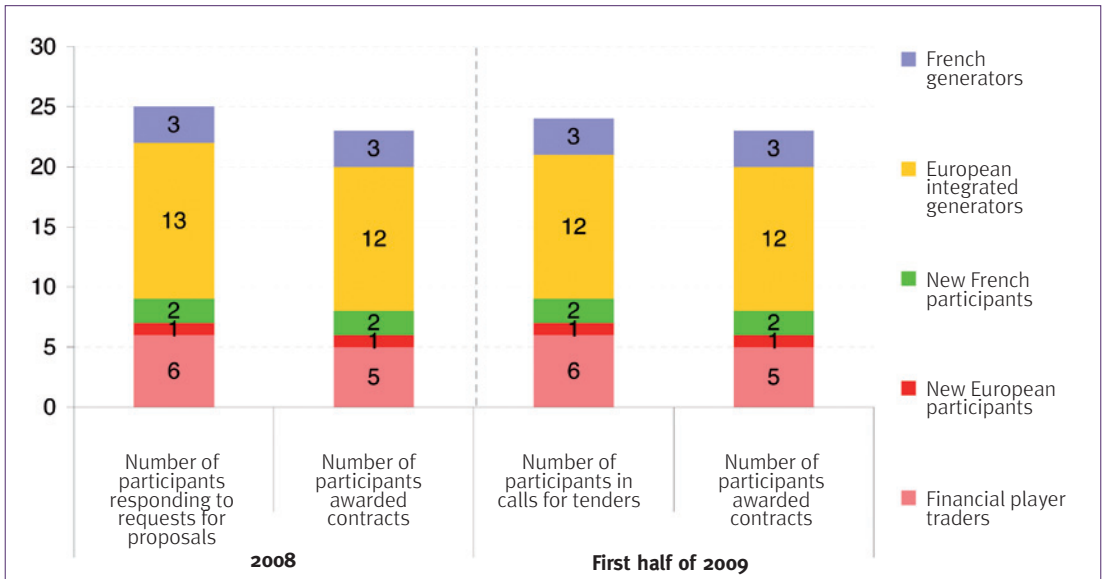
TABLE 4 – Volume of energy sold to grid operators to make up for losses

Volume in TWh	Firm products	Take or pay ⁵	Optional products	Swap
2007	22.0	17.0	18.0	
2008	18.5	15.0	20.5	
H1 2009	4.5	8.5	10.0	0.45 ⁶

Sources: RTE, ERDF; Analysis: CRE

The majority of participants responding to tenders and selected sellers are integrated generators. Nevertheless, compared with 2007, the number of integrated producers responding to calls for tenders has declined (-3) with an increase in the number of traders and a new French entrant taking part in sales of losses. However, sellers backed by a generation portfolio remain dominant (figures 5 and 6). While financial operators are present in the sale of firm or assimilated products, sales of options products are carried out exclusively by participants backed by generation assets. Only 6 participants were involved in sales of options products in 2008 and 4 in the first half of 2009. These are the same 4 participants as those identified in 2007. These participants with generation facilities are therefore more able to take positions on products which are higher risk than standard products.

FIGURE 5 – Number of participants in tenders

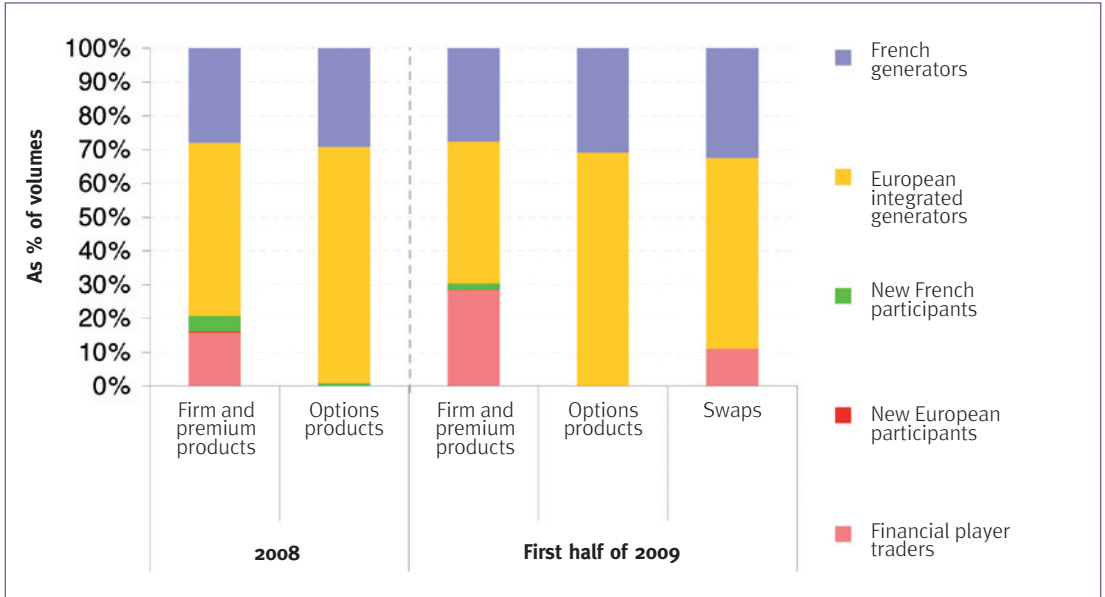


Data: RTE, ERDF; Analysis: CRE

5. Take or pay contracts deals involve products which are paid for by the grid manager at a contractual price, but which leave the possibility of not withdrawing the energy. In this case, the seller resells the energy on the spot market, receives the contractual price from the grid manager and pays the spot market price back to the latter. For the seller, premium deals are therefore similar to a firm product.

6. Buying and selling.

FIGURE 6 – Distribution of energy sold to grid operators



Data: RTE, ERDF; Analysis: CRE

*Assumption: to reason in energy equivalent terms, options products are used at 100% of capabilities

1.4. Virtual Power Plant auctions were almost entirely purchased by a diversified base of participants

Since 2001, EDF has been offering access to 5,400 MW of generation capability located in France in the form of quarterly auctions, 4,400 MW in the form of baseload products and 1,000 MW in the form of peakload products. “Baseload” products, whose strike price is low compared to the market price, can be assimilated to firm products. “Peakload” products, whose strike price is high compared with the market price, have an optionality value.

During these auctions, the most frequently bought products were baseload products with maturities of 12, 6, 3 and 24 months. Figure 7 summarises the maturities of the products sold during the auctions held in 2008 and the first half of 2009 and the strike prices of options products that were purchased. During auctions of products for delivery in 2008, only a very small part of this capacity was not bought (Figure 8), due to the auctions rules.

Analysis of the distribution of the VPPs owned by market participants at any given time shows that this market is not at all concentrated: the share of the actor owning the highest capacities per month does not exceed 15% between 2008 and the first half of 2009, and monthly HHIs range from 600 to 750.

Given the low-value of their optionality, “baseload” product prices are always aligned with market prices

“Baseload” products have a low strike price: between €9 and 10/MWh at the auctions held in 2008 and the first half of 2009. *Day-ahead* prices in France were above €10/MWh during 98% of the hours in 2008 and the first half of 2009. These products therefore have virtually a nil optionality value. Their price should thus theoretically be very close to the prices of equivalent base products quoted on the market. Analysis of the difference between auction prices and market prices confirms this statement (Figure 9).

Analysis of “peakload” products shows strong implicit volatility

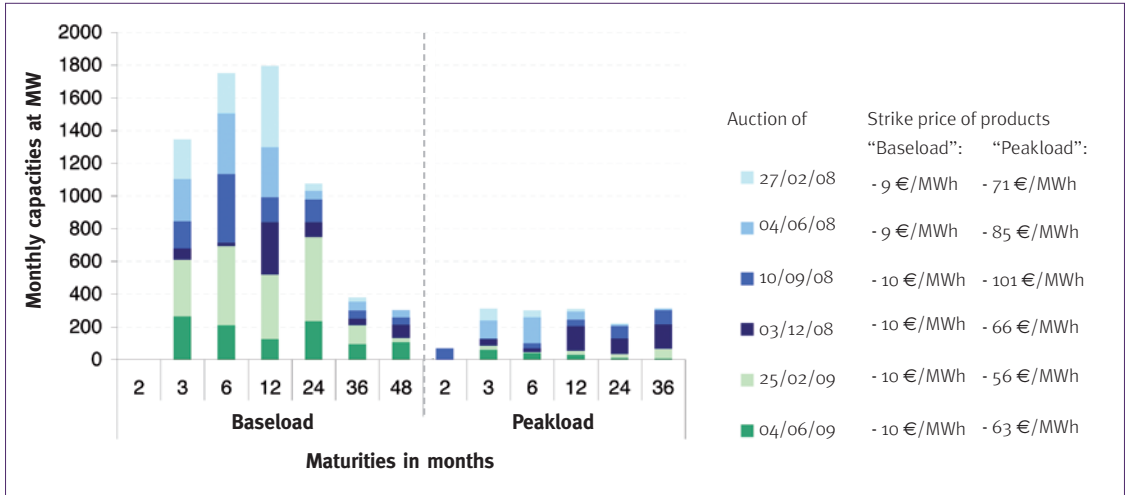
“Peakload” products had a high strike price: between €66 and 101/MWh at the 2008 auctions and €56 and 63/MWh in auctions during the first half of 2009. The value of these products thus depended on market participants’ anticipation in terms of *day-ahead* prices in the future.

Analysis of peakload product prices revealed in auctions shows that market participants were very strongly anticipating short-term volatility for the auctions of 2008 and the first half of 2009 (implicit hourly volatilities taken on a monthly basis of between 70 and 100%).

The volatility of hourly *day-ahead* prices taken on a monthly basis calculated retrospectively also proved to be very high (average volatility of daily prices taken on a monthly basis of around 100% between April 2008 and June 2009).

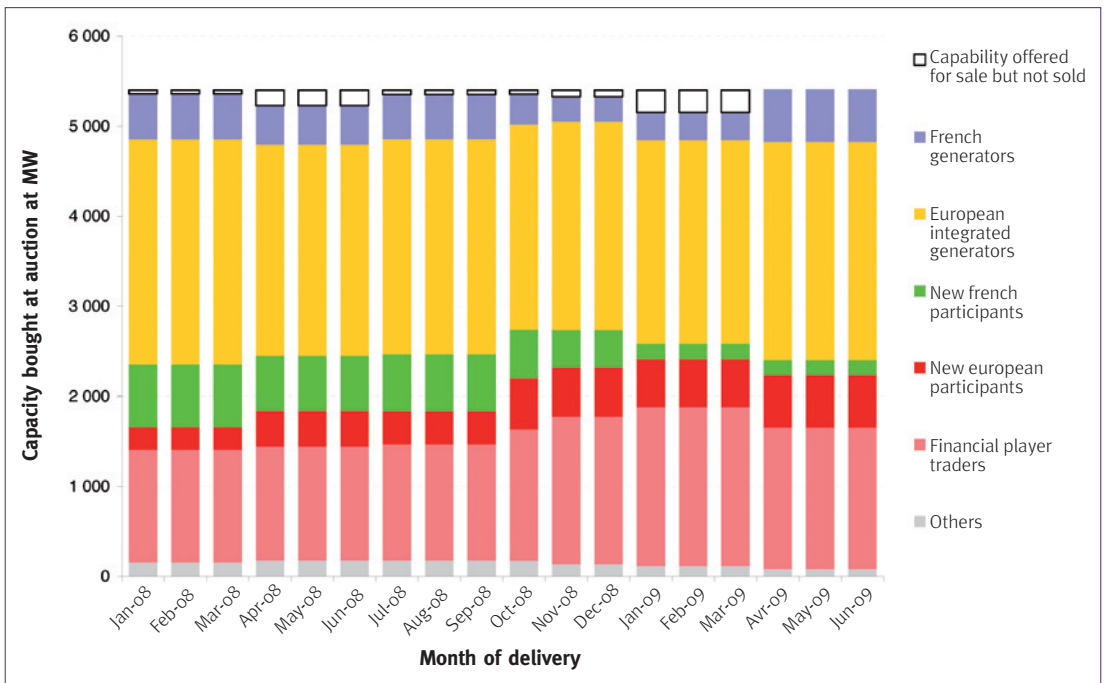


FIGURE 7 – Maturity of products sold during the auctions



Data: EDF

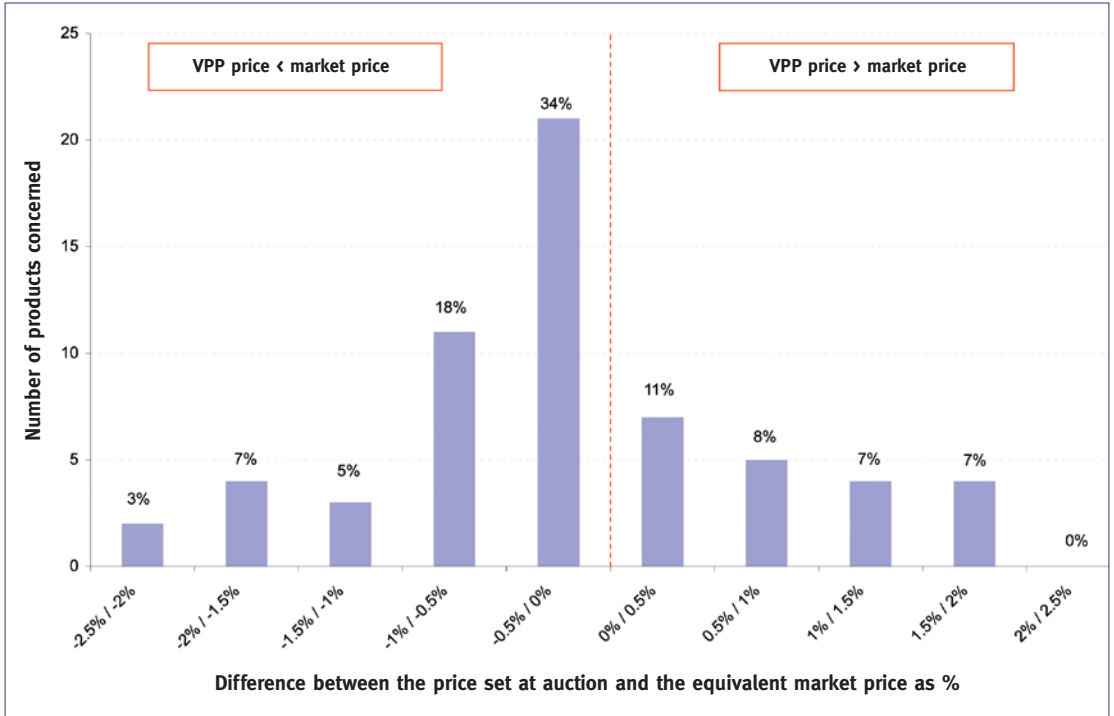
FIGURE 8 – Monthly capacities bought during auctions for delivery in 2008 and the first half of 2009



Data: EDF; Analysis: CRE



FIGURE 9 – Difference between the base VPP auction price and the prices of equivalent products quoted on EPD France



Data: EDF, EPD; Analysis: CRE

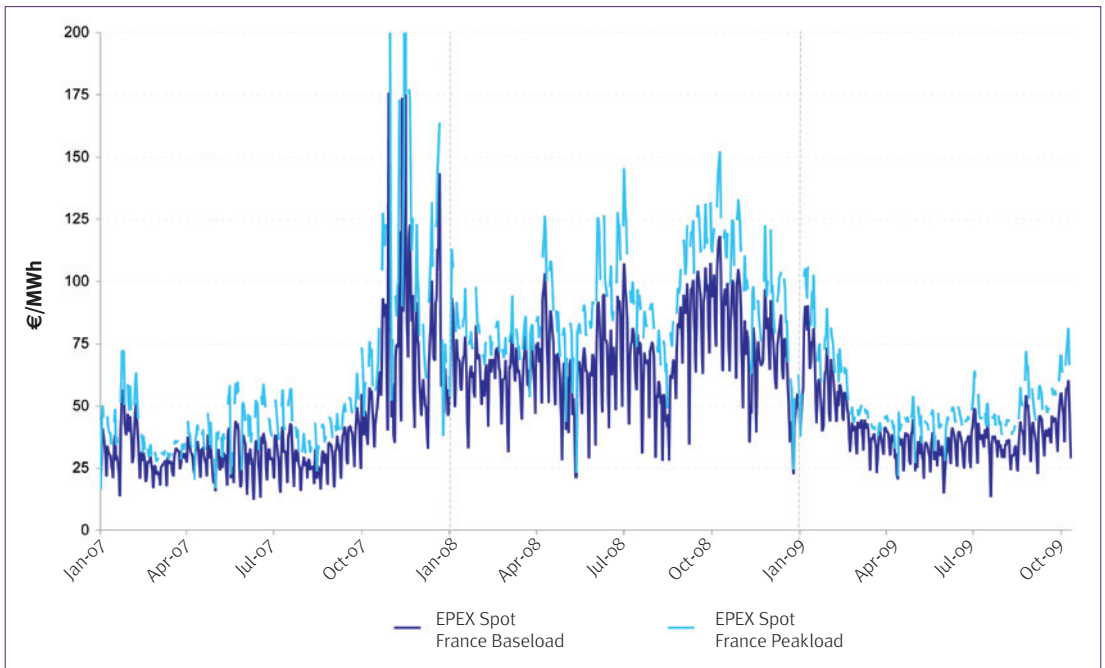
2. MONITORING OF PRICE FORMATION IN FRANCE IN TERMS OF FUNDAMENTALS AND IN COMPARISON WITH THE MAIN INTERCONNECTED EUROPEAN MARKETS

2.1. Changes in French prices are influenced by fundamentals

The balance between supply and demand and changes in fossil fuel prices are the key fundamental factors explaining changes in spot and futures prices on the French market. In general, the trends noted on these prices since the beginning of 2008 are consistent with these factors.

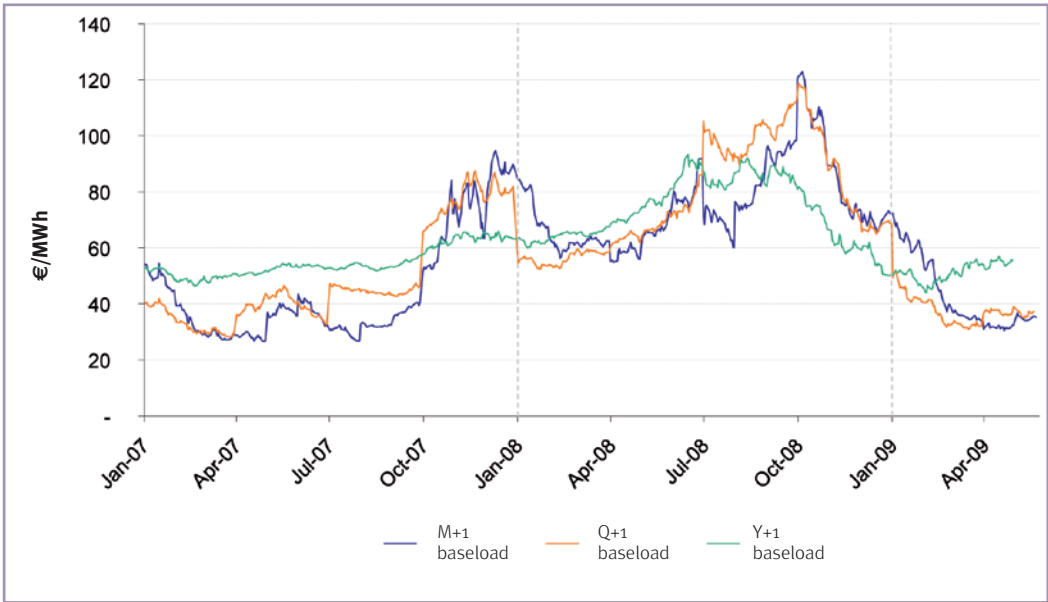
2008 shows two distinct phases, on both spot and futures markets. Initially, prices overall continued the upward phase of 2007, before recording a spectacular fall, in the wake of the downturn in fossil fuel prices and the onset of the economic and financial crisis (Figure 10 a and 10 b). From an average of €69/MWh in 2008, the *day-ahead* price dropped to €41/MWh in the first half of 2009, comparable to the average level in 2007. The case is similar for *futures* products. Prices of *futures* calendar products had already reached record highs in the summer of 2008. Y+1 products (calendar year 2009) were, for example, quoted mid-year at €93 /MWh for baseload products and €132 /MWh for peakload products (record reached on the 1st of July 2008). The drop which has since occurred is around 50%. As of the 30th of June 2009, Y+1 baseload prices, at less than €60/MWh, were back at early 2007 valuation levels. This trend can be found on all futures products, including monthly and quarterly products.

FIGURE 10.a – French spot prices
Day-ahead prices on EPEX Spot Auction France



Source: EPEX Spot Auction

FIGURE 10.b – Changes in French futures prices



Source: EPD France

Consistency between spot prices and pressure on the supply-demand balance

The balance in the electricity system depends on the difference between available generation capacity and forecasted demand. When available reserves are low, prices reflect pressure on the system, since operators have greater willingness to pay fearing they might not obtain the energy necessary to cover their needs.

Pressure on the supply-demand equilibrium is measured by an index expressed in MW, the margin index, which takes account of the power generation reserves which can effectively be brought into play on Day-1 by French generators, as well as the residual import margins at interconnections, for each hour of the year.

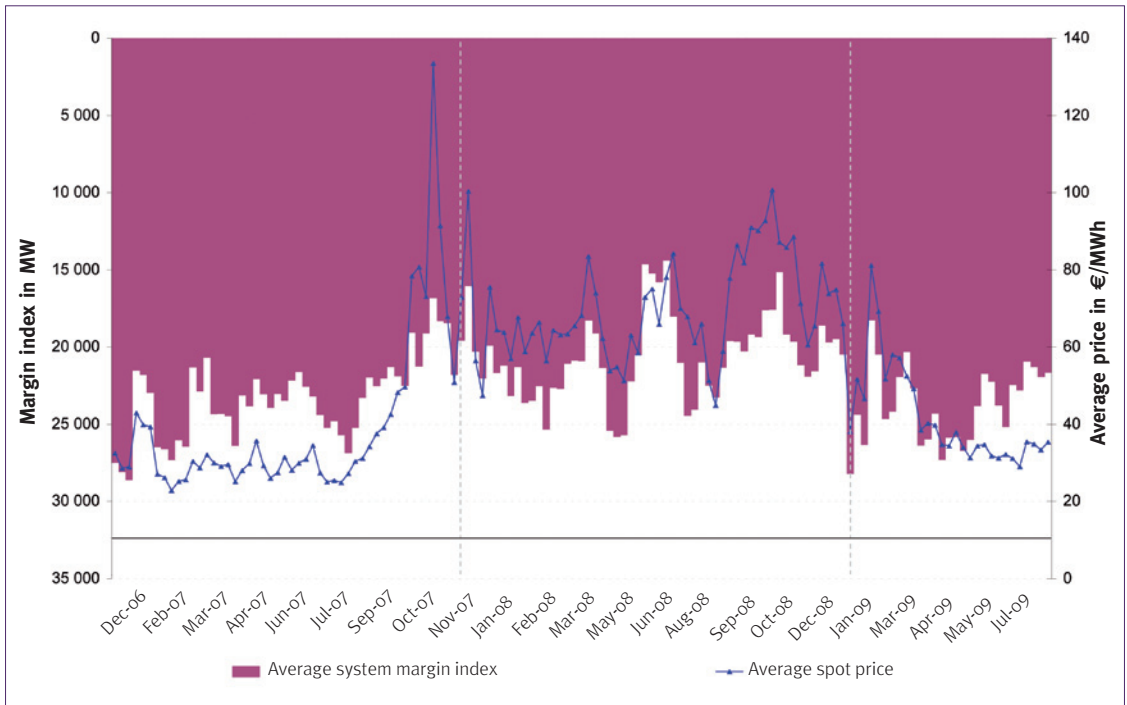


Figures 11 and 12 illustrate the trend in the margin level and spot prices since the beginning of 2007. In general, price fluctuations follow those of the index. It can be seen that prices and the margin index correlated well at weekly and daily level. When the margin index increased (or decreased) the price decreased (increased) respectively:

- in 72% of cases in the analyses at weekly level,
- in 65% of cases in the analyses at daily level.

In particular, it can be seen that the high prices in late 2007 and early 2008 are concomitant with a large reduction in the system margin. The extent of pressure on the system was on average higher in 2008 than 2007. However, in the latter months of 2008 and the first half of 2009, corresponding to the onset of the economic recession, the pressure on the system did relax, which was also reflected in spot prices. Nevertheless, it should be emphasized that this system margin index cannot explain all fluctuations, absolute levels of spot prices or the appearance of price spikes.

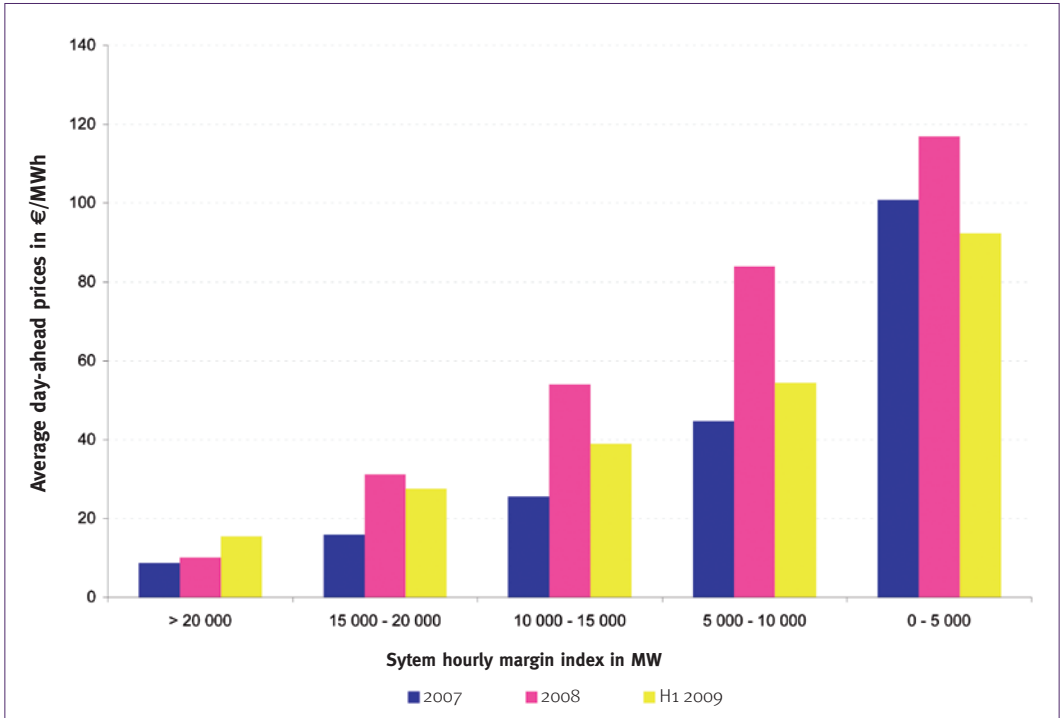
FIGURE 11 – Relation between margin index and price



Sources: RTE, EPEX; Analysis: CRE



FIGURE 12 – Average hourly prices as a function of the margin level



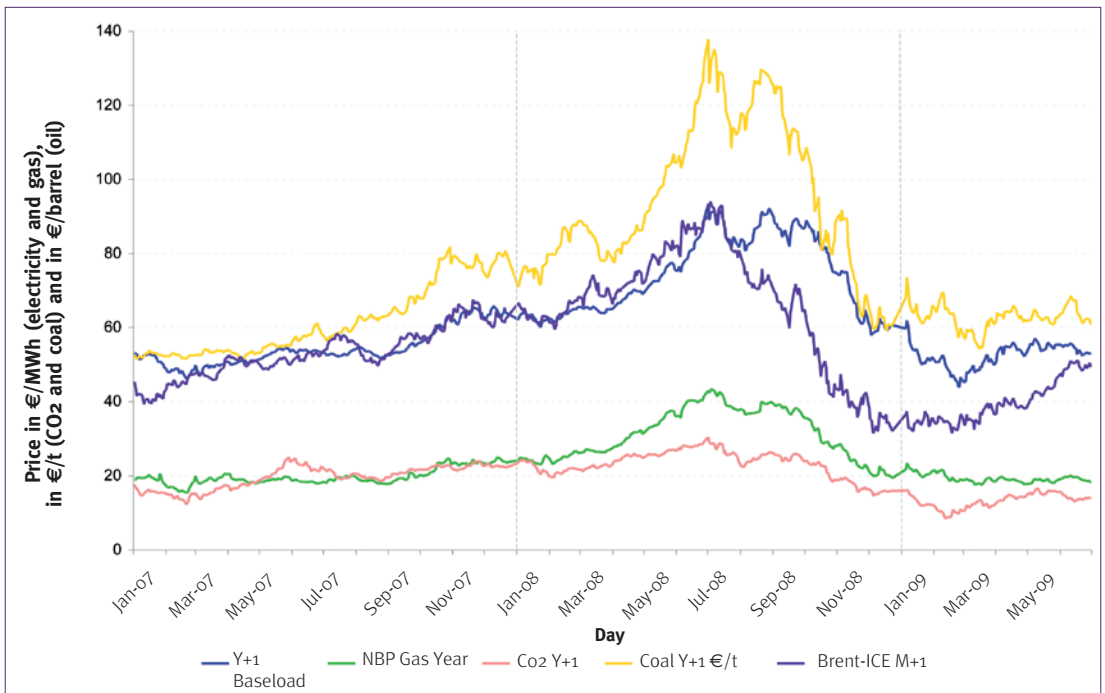
Sources: RTE, EPEX; Analysis: CRE



Link between futures prices and fossil fuel prices

Fossil fuels influence electricity *futures* prices through participants' anticipations of the changes in costs of the generation facilities necessary to meet demand. This conclusion is strengthened by analysis of the marginality of the different fuel types in France (see chapter 3: Analysis of generation and transparency). It is therefore to be expected that oil prices will also have at least an indirect effect on electricity prices. Comparison of changes in the price of Y+1 products and fossil fuel prices illustrates this link (figure 13). It can be seen in particular that the major upward then downward trend in oil, gas and coal is reflected in Y+1 product prices.

FIGURE 13 – Daily electricity prices and fuel prices



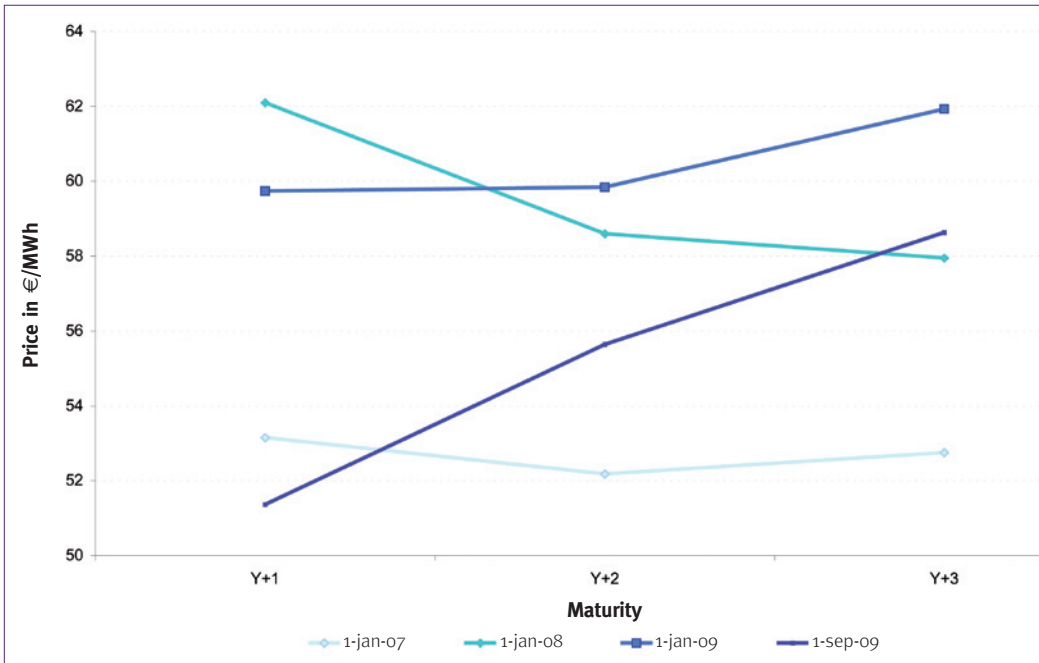
Data: EPD, Icis Heren, Bloomberg



The curve of futures prices now reflects anticipation of renewed price rises

A rising *futures* price curve (see figure 14) at different maturities (Y+1, Y+2 and Y+3) reflects anticipation of rises in electricity prices. A declining curve, on the other hand, reflects anticipation of a fall. The figure below illustrates the shape of the price curve at different key dates. The curve for the 1st of September 2009 illustrates that a rise in prices is now anticipated, due to the prospects of economic recovery.

FIGURE 14 – French future calendar prices



Data: EPD



2.2. Comparisons between French and European prices in some cases reflect the structure of the generation mix, but also reveal the high sensitivity of French consumption to temperature

Table 5 illustrates the price spreads between France and neighbouring countries on the *spot* and *futures* markets (Y+1). On the spot market, France is generally more expensive on average over the whole period 2007-June 2009 than Germany (+€2.74/MWh), Spain (+€2.88/MWh) and the Scandinavian region (+€15.88/MWh). On the other hand, prices are lower in France than in Great Britain (-€9.54/MWh), Italy (-€24.44/MWh) and Switzerland (-€5.64/MWh). Belgian prices are on average very close to those on the French market, given the coupling of the French, Belgian and Dutch markets.

TABLE 5 – Average price spreads between France and neighbouring countries

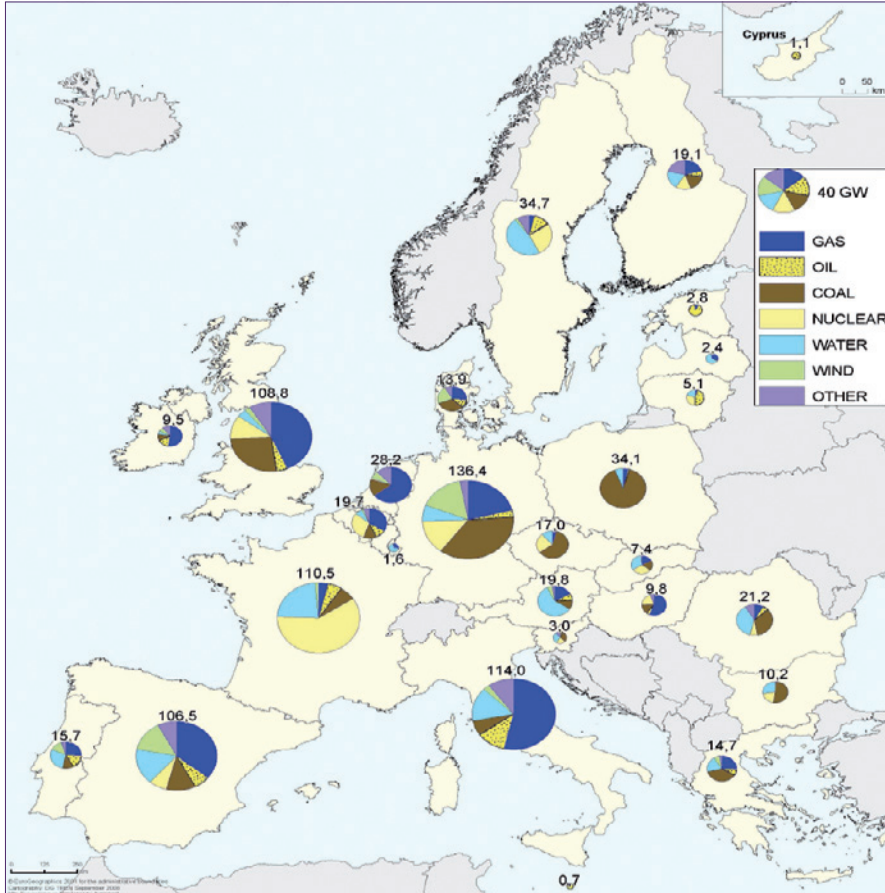
- Differences > 0: France more expensive -							
Year	France - Germany	France - Spain	France - Great Britain	France - Italy	France - Belgium	France - Switzerland	France - Nordpool
Spot product price spreads							
2007	2.8	1.7	-1.3	-30.1	-0.9	-5.1	12.9
2008	3.4	4.8	-21.1	-18.0	-1.5	-5.3	24.4
H1 2009	1.3	1.4	-2.9	-26.0	1.3	-7.4	4.8
Y+1 product price spreads							
2007	-1.5	-	-2.5	-	-	-	9.1
2008	3.8	-	-10.8	-	-	-	19.5
H1 2009	1.7	-	-0.2	-	-	-	16.3

Sources: EPEX Spot, OMEL, IPEX, Belpex

NB: (-) No quotation on this product

The structure of generation mix in each country explains some of these differences (figure 15). Among those countries where prices are lower than in France, the Scandinavian countries have a market which uses hydropower to meet demand. However, these countries are subject to water flow rate risk and in the first half of 2009, the low levels of dam reservoirs pushed up Scandinavian prices, reducing the spread with France on the spot market. In Spain, run-of-river hydropower and the random nature of wind generation facilities make a significant contribution to the Spanish market.

FIGURE 15 – European generation mix
 Generation capacity by technology

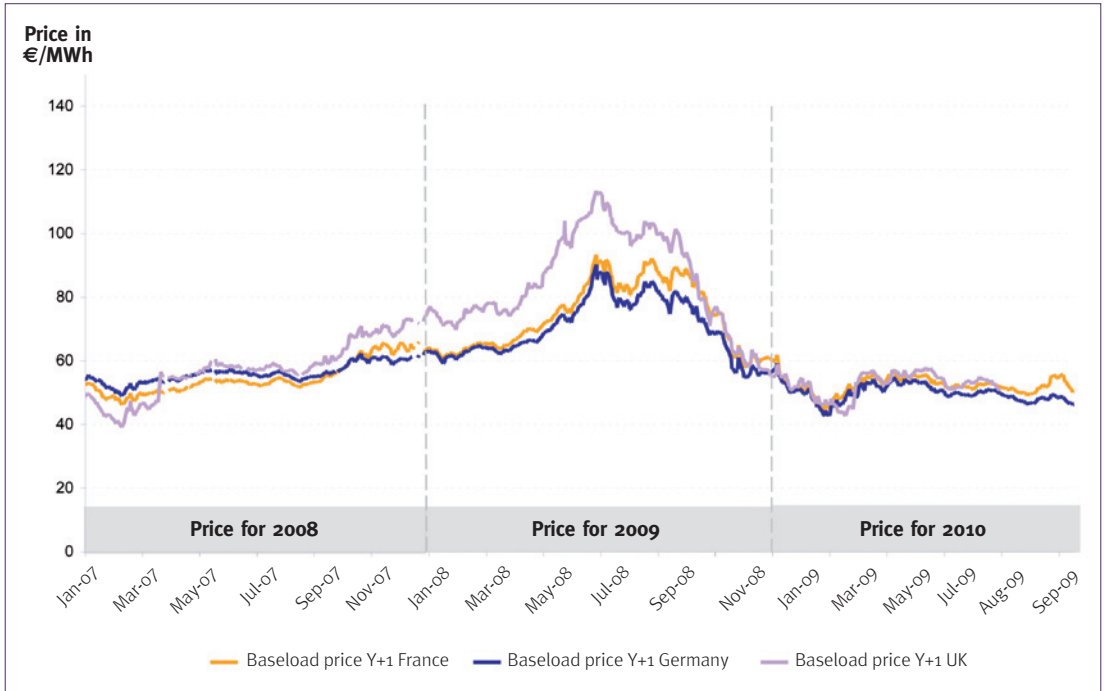


Source: DG Tren, 2007

In the United Kingdom, market prices follow gas and CO₂ prices, since generation facilities generally consist of combined gas cycles. The price rise on this market in 2008 widened the price spread with France. The spectacular fall in gas market prices (see gas section, chapter 2) observed since the last quarter of 2008 explains the noticeable drop in spot and *forward* electricity prices and a very marked reduction in the price spread with France. The spread on Y+1 products has now been virtually nil since the beginning of 2009 (see figure 16).

However, in the case of Italy, although conventional thermal technologies, gas and fuel oil, are preponderant, the price difference on the spot market tended to widen in 2009 compared with 2008.

FIGURE 16 – Futures prices France – Germany – United Kingdom



Sources: EPD, Icis Heren

In 2008, the France – Germany price spread became more pronounced on the spot market and exploded on calendar products; France remained more expensive than Germany in 2009, even though prices became a lot closer

While the price spread between France and Germany is generally positive for annual products, this is not the case for all quarterly *futures* products or spot price averages (EPEX Spot) between the different quarters of the year. The French *futures* price curve, established on the basis of quarterly prices, illustrates the difference between France and Germany at different periods of the year. In France, prices associated with the winter season (Q1 and Q4) are quoted on the markets at noticeably higher levels than German prices. The prices of quarterly products (Q2 and Q3) trade at lower levels or are aligned on German prices (figures 17 and 18).

One of the factors which can be mentioned to explain the price spreads observed on spot prices and the curve of *futures* prices between France and Germany is the greater temperature sensitivity of French consumption compared with German consumption. This leads to a more pronounced price volatility in France due to temperature changes. A drop in temperature of 1° Celsius caused a rise in electricity consumption of 1,500 MW in 2001, against 2,100 MW in 2008, due to the increased use of electric heating. The publication by RTE, in July 2008, of the long term supply-demand balance report up to 2013 showed growing temperature sensitivity in peak demand. Under these circumstances, it can be difficult for



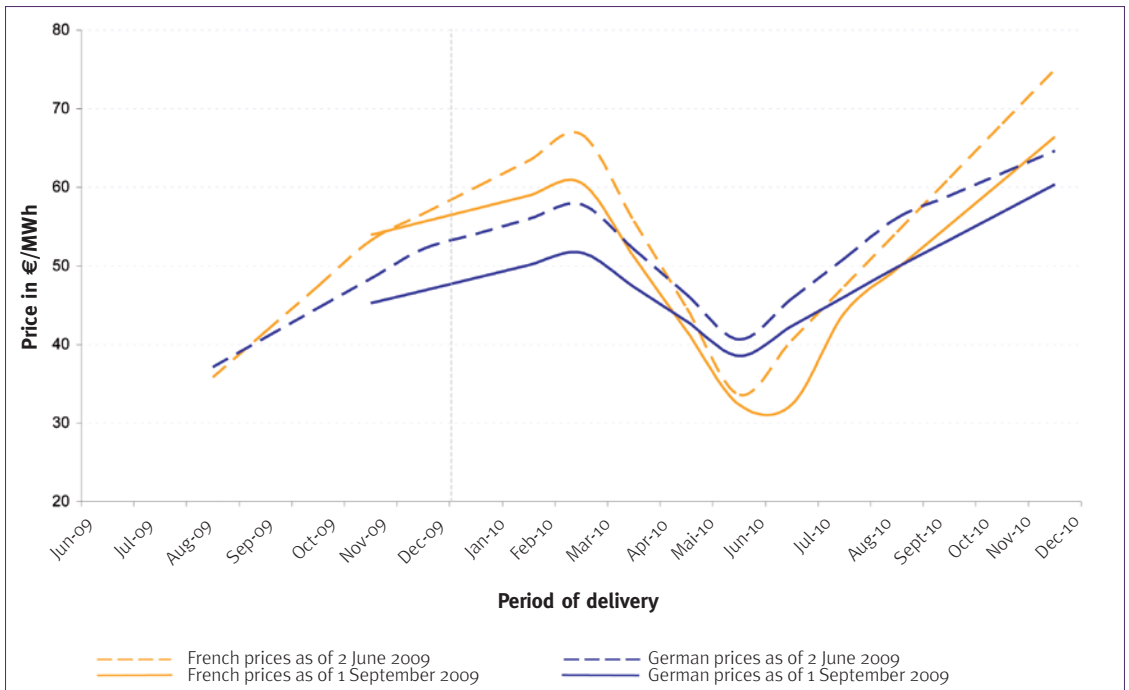
market participants to determine their price anticipation for the winter, resulting in an increased risk premium on quarterly winter products.

The price increase in these products had the effect of pushing up time spread product prices through tradeoffs between products. The difference between French and German Y+1 Base price recorded in 2008 thus culminated at €9.2/MWh in October 2008 (figure 19 below).

Constraints on large combustion plant emissions (with the European large combustion plant directive coming into force on the 1st of January 2008) can also be mentioned in explaining the price spread noted, since German plants had already made the necessary investments in the past.

Finally, the downward movement in prices since the autumn of 2008 has been accompanied by a gradual reduction in the France-Germany price spread due to a smaller risk of tightening the supply-demand balance of the French system.

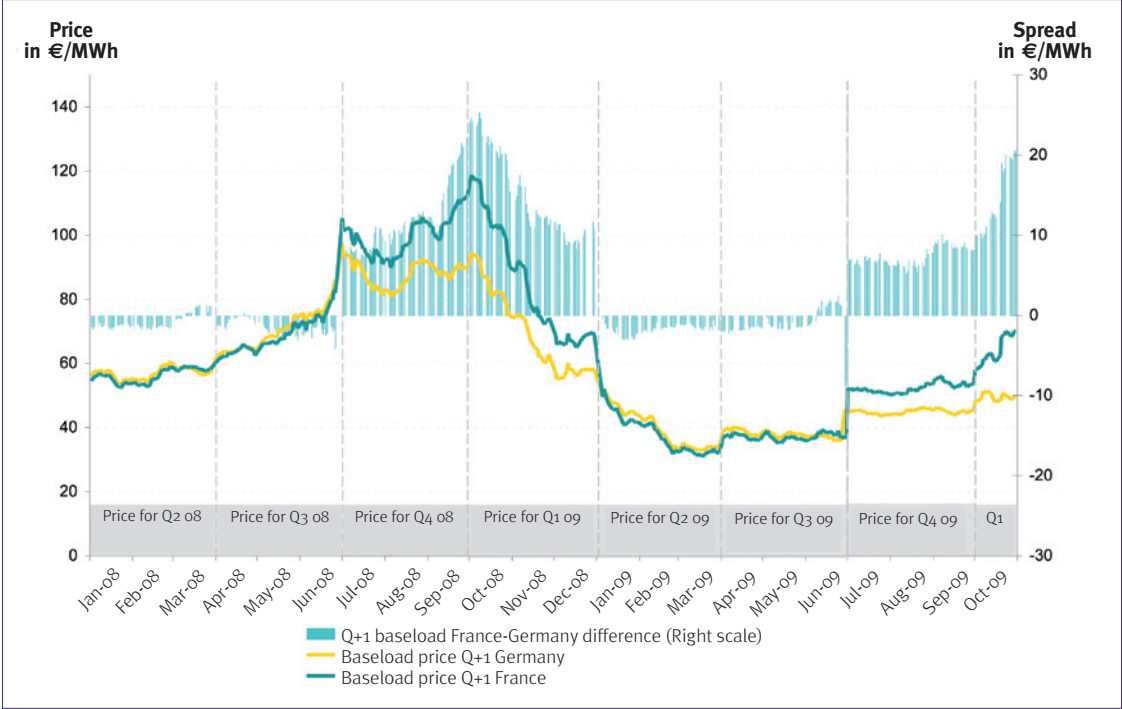
FIGURE 17 – Futures price curve
Prices of quarterly baseload products for delivery in France and Germany
- Values on the 2nd of June 2009 and the 1st of September 2009 -



Source: EPD

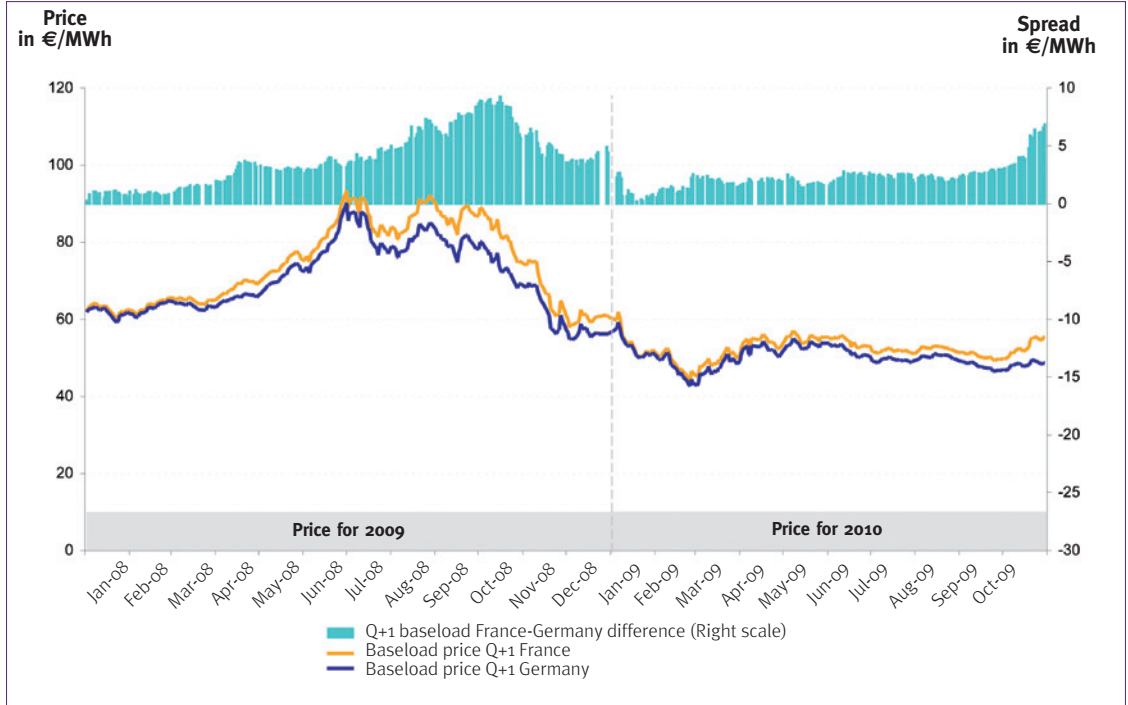


FIGURE 18 – Prices of quarterly Q1 products
Q+1 prices and France-Germany spread
- EPD daily settlement prices -



Source: EPD

FIGURE 19 – Prices of annual Y+1 products
 Changes in Y+1 base prices and the France-Germany spread
 - EPD daily settlement prices-



Source: EPD

2.3. Analysis of changes in futures prices with the approach of VPPs shows that they can be explained by price movements in fundamentals

In the 2007 surveillance report, price rises in certain *futures* products had been identified as the auctions approached. A study was therefore conducted to determine:

- if there was any link between the date chosen for the auction and the market context (prices/volumes),
- if *futures* prices systematically rose just before auctions,
- if *futures* price rises were justified, as auctions approached, by rises in fundamental factors (Co2, fuel oil, gas, coal and *day-ahead* prices).

As regards auction dates, it can be seen that auctions are generally held on Wednesdays, which is a day when the prices or volumes of trade are no higher than the average prices or average weekly volumes recorded between 2004 and 2008. Furthermore, the choice of holding auctions at the beginning of the month, rather than the end or middle of the month does not coincide with systematically higher prices or larger or smaller volumes at the beginning of the month.



For each of the auctions held in 2007 and 2008, analyses were carried out to determine whether there were periods of price rises followed by a period of price decreases on either side of auction dates (determining local maximum). Changes between the price levels of futures products recorded on the day of the auction, and their average calculated over periods subsequent to and prior to the auction date were calculated for each auction. Local maximums are rarely found to correspond to the auction date. On the other hand, it frequently happens that auctions are held during a period when the market is bullish (prices on the day of the auction are therefore higher than on previous days) or bearish (prices on the day of the auction are therefore higher than the following days).

In addition to these observations, price changes and their relation to fundamentals were examined. The price movements of electricity *futures* were compared with the price movements of the fundamentals for the auctions held in 2007 and 2008⁷, for products showing higher prices on the day of the auction than the previous and/or following days. The fundamentals used to explain *futures* price movements are oil (Brent M+1), gas (NBP Year), CO₂ (Y+1), coal (Y+1, source: EEX) and electricity *day-ahead* prices (daily averages).

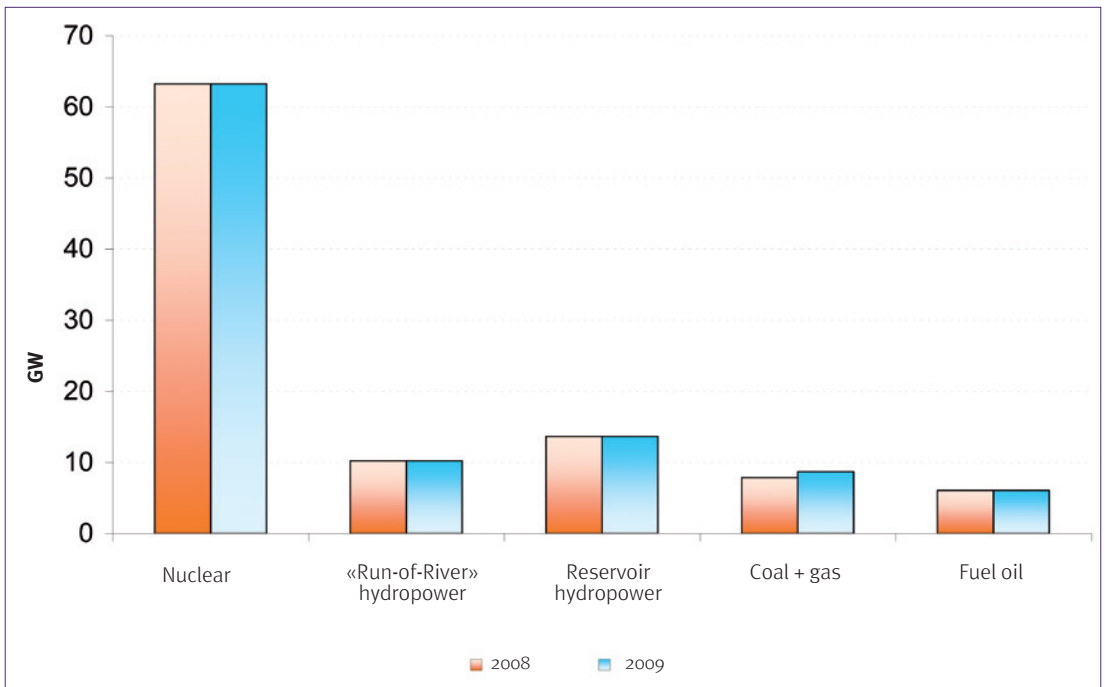
These price movements were compared over a period of 5 weeks for each auction. The statistical analyses show that there are strong linear relationships between electricity *futures* prices, electricity *day-ahead* prices and gas prices. For each of the auctions and each of the products, there is always at least one of the fundamentals which explains the movements observed.

7. A total of 8 auctions

3. ANALYSIS AND TRANSPARENCY OF GENERATION

In 2008, the generation facilities connected to RTE grid represented an installed capacity of 101 GW⁸. Nuclear plants are highly dominant in the generation mix. Installed nuclear capacity represents 63.1 GW. Thermal generation capacity, such as coal, gas and fuel oil-fired plants, totals 13.8 GW. Installed hydropower capacity is allocated between hydropower reservoir plant and “run-of-river” plant hydropower dependent on random water inflows. Reservoir capacity stands at 13.6 GW and “run-of-river” plant capacity at 10.2 GW (figure 20).

FIGURE 20 – French reference generation facilities
Levels of reference generation facilities – RTE



Source: RTE

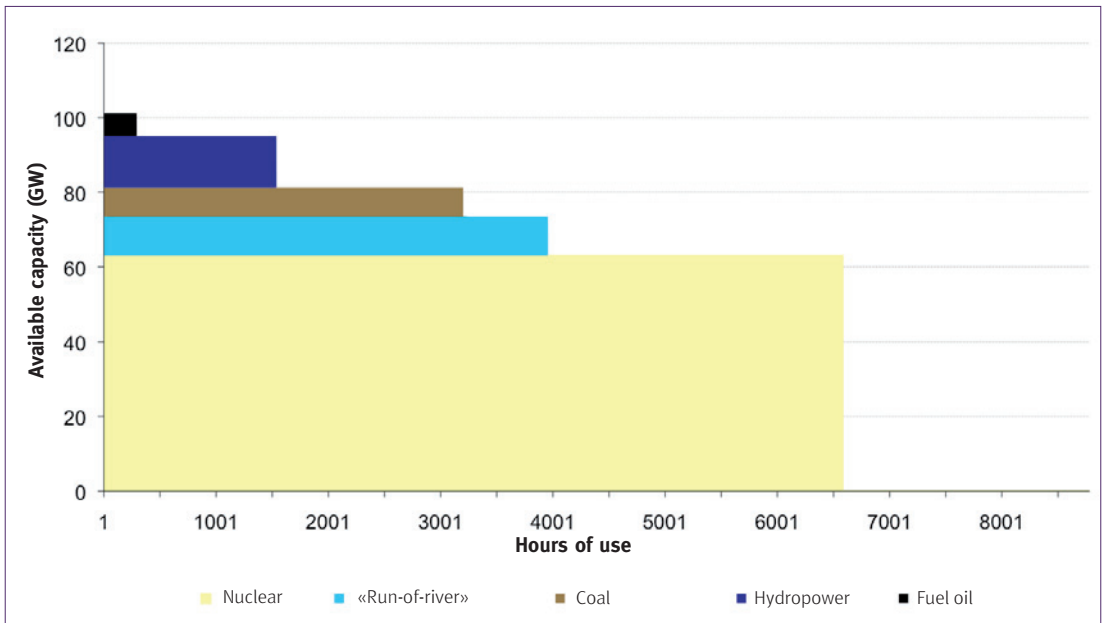
⁸. Source RTE: list of the plants included in the reference fleet status on 8/10/2008, plants of more than 20 MW

3.1. Load duration of each fuel type is consistent with their merit order

Figure 21 illustrates the load duration of each of the different fuel type within the French generation mix in 2008. The load duration is determined according to the power effectively generated compared with installed capacity for the . Nuclear power has the highest load duration, at 75% of the time, while fuel oil is used only 3.3% of the time and serves as an additional means of generation to meet spikes in demand.

Superimposing the different durations of use calculated at annual level shows the merit order of the different fuel types. The generation mix which has the lowest generation marginal costs (nuclear power) is that used during the vast majority of hours in 2008. Those with higher generation costs have short durations of use.

FIGURE 21 – Load duration of the French generation mix in 2008



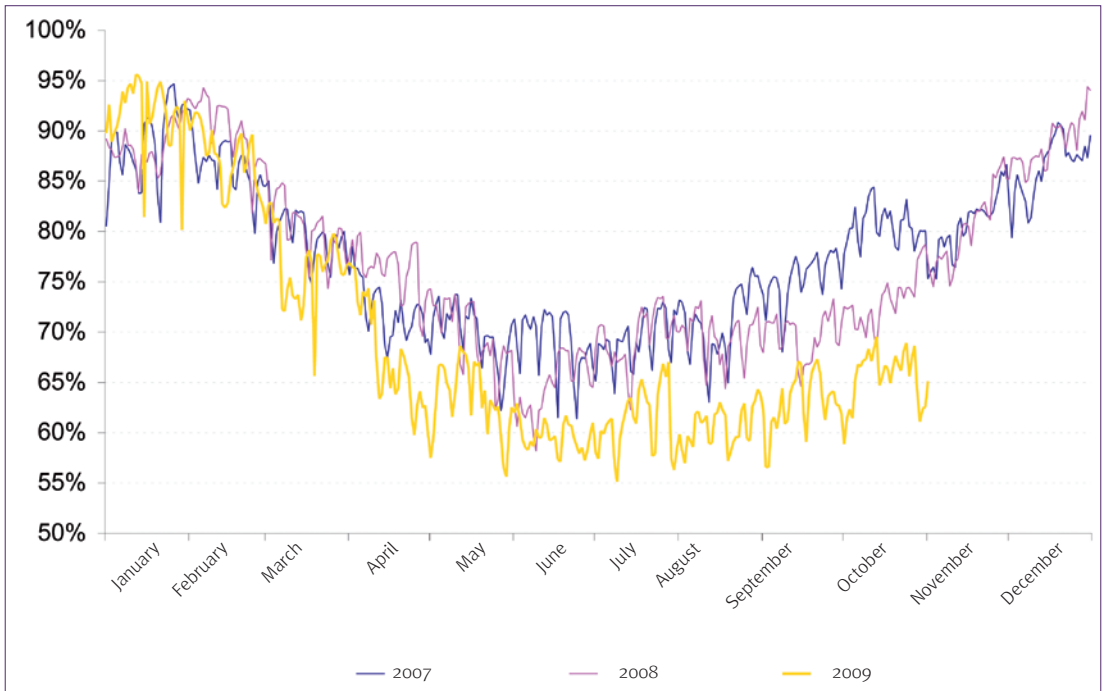
Source: RTE; Analysis: CRE

Nuclear power, with its marked seasonal variation, recorded a significant fall in 2009 compared with previous years

Generation by nuclear power plants varies according to seasonal demand. Nuclear power therefore helps to meet these seasonal variations. In particular, the scheduling of the majority of maintenance outages in summer enables winter demand to be met. In 2008, the minimum rate of generation of 58.2% was reached during June. The maximum rate was recorded in December 2008, with effective generation of 95.5% of installed capacity.

In the first quarter of 2009, power generated by nuclear plants was comparable to that generated in previous years. However, there was a significant falloff in nuclear generation in the second quarter of 2009 compared with previous years. This can be explained by the strikes in the spring of 2009 (figure 22).

FIGURE 22 – Nuclear generation 2007-2009
Nuclear generation results / Installed nuclear capacity



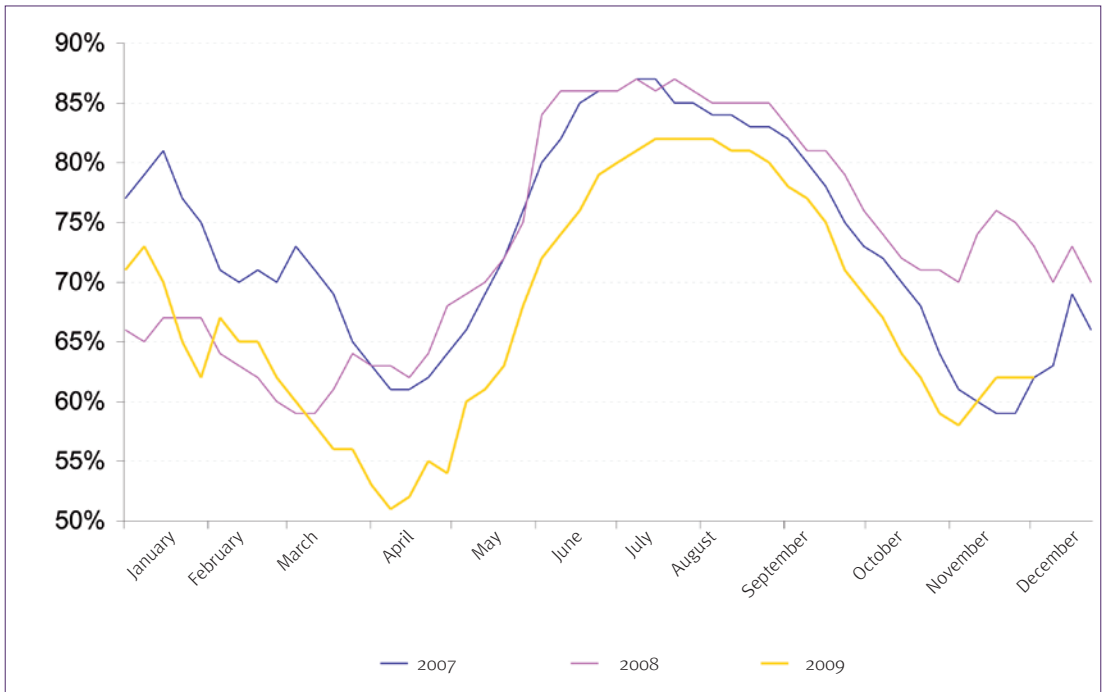
Source: RTE; Analysis: CRE



Large-scale use of hydraulic stocks in the early months of 2009 and less use of coal-fired plants

The figure below (figure 23) illustrates the trend in hydraulic storage for 2007, 2008 and the early months of 2009. A considerable decline in these stocks can be seen in the early months of 2009, putting them at particularly low levels compared with the same periods in previous years, in April and May particularly. Since then, they have not refilled to their levels in 2007 and 2008 at the start of winter.

FIGURE 23 – Hydraulic stocks



Source: RTE

In terms of generation by coal and gas-fired plants, the particularly low level in the second quarter of 2009 should be pointed out (table 6) under conditions favourable to market purchases. The average price of the most expensive hour on the organised market EPEX Spot in the second quarter of 2009 reached €48/MWh, against €107/MWh over the same period in 2008.

TABLE 6 – Average generation results – Coal and gas
Quarterly average 2007-2009

	2007	2008	2009
Q1	68%	68%	66%
Q2	57%	60%	39%
Q3	38%	47%	
Q4	65%	61%	

Source: RTE; Analysis: CRE

3.2. In 2008, the marginality of the nuclear power is below the 2007 level, while frontiers are more often marginal

This section analyses the duration of marginality of the different fuel types in 2008. A technology is referred to as marginal when it determines the market price. This marginality estimation is based on analysis of operation of the generation facilities scheduled for D-1, valuation of the power generated by each group, as well as the position of cross-border markets.

Several methods were presented in the first CRE surveillance report to determine the marginality of the different generation technology. The methodology chosen is that which applies a price criterion and a generation threshold criterion consecutively:

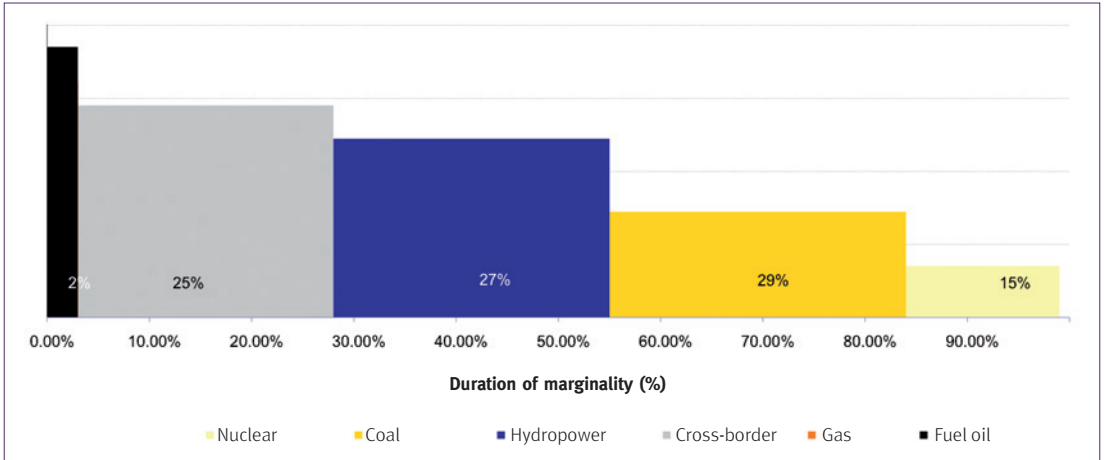
- the price criterion selects the plants for which the difference between the market price and the proportional cost does not exceed a certain threshold (set at €5/MWh).
- of those plants which fulfil the first criterion, the one which meets the constraint whereby the difference between demand and the plant’s maximum power is at least equal to a predefined threshold in MW (set at 200 MW).

The influence of border prices on French prices is deemed significant when the French price varies by more than €5/MWh from the marginal cost of the French facilities to line up with that of one or more borders.

The results of these estimates are summarised for 2007 and 2008 in the figures below, with the proviso that that these results depend on the methodological assumptions made.

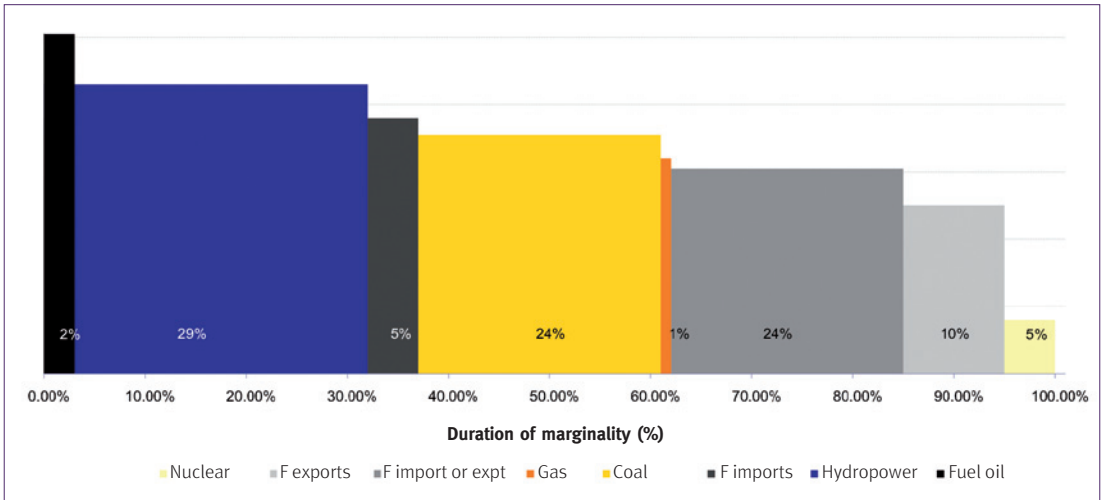


FIGURE 24 – Duration of marginality of the different fuel types in 2007



Source: CRE

FIGURE 25 – Duration of marginality of the different generation fuel types in 2008



Source: CRE
NB: F: Cross-border

Comparison of results between 2007 and 2008 illustrates:

- relative stability in the duration of marginality for fuel oil and hydropower,
- an estimated fall in the duration marginality for coal,
- a big drop in the case of nuclear power (from 15% in 2007 to 5% in 2008),
- and a corresponding increase in the influence of the borders (from 25% in 2007 to a total of nearly 40% in 2008).

The prices recorded during hours of marginality of fuel oil and coal-fired generation have significantly increased. This is consistent with the rise in fuel prices during 2008.

In 2008, gas-fired generation appears as a marginal means for the first time, although it is marginal in only 1% of hours.

Hydropower capacity also had an important role in price formation on the wholesale market in 2008, with generation by these facilities being marginal around 29% of the time. The prices recorded during these hours showed an increase. This price increase during the hours when hydro technology is marginal can be explained by the value in use of water. This is dependent on the valuation of fossil fuel generation for which hydropower capacity is substituted to meet peak demand. This valuation has been audited for the generator EDF, (see below).

In around 39% of the hours in 2008, cross-border markets determined prices. The duration of marginality at borders increased markedly in 2008 compared with the 2007 level (+14%).

In 2008, the border effect is divided between cases where prices in France, compared to border prices, are:

- higher, for 5% of the time, which leads to imports of electricity instead of generating it from inland costly plants,
- lower, for 10% of the time, which leads to exports of electricity generated more cheaply than abroad,
- within the range of different border prices, for 24% of the time.

3.3. The CRE audits of EDF's valuation methods for its nuclear and hydropower facilities do not call into question the valuation principles used

In its deliberation of the 8th of January 2009, the CRE stated that it was going to conduct audits on the method used by EDF to value its nuclear and hydropower fleet. These audits started in May 2009 and completed in December 2009. They were conducted with the assistance of outside consultants⁹.

⁹. Frontier Economics for the part concerning the nuclear fleet and LECG for hydropower and daily models.

The audits took place in a wider framework of the medium term models used by EDF to optimise its generation fleet while meeting the constraints of the supply-demand balance over its perimeter, and going as far as Day-1 optimisation and market trading decision-making models.

An interlinked modelling chain

Optimisation of the EDF generation assets is a complex problem where very large numbers of items of data and parameters must be considered and processed. Modelling and solving this problem of very large-scale optimisation entails breaking it down and therefore requires the use of several optimisation tools interacting with each other. EDF states that this optimisation chain, which is constantly being improved, must also meet industrial requirements in terms of speed of implementation, which means continually seeking the right balance between full information and achieving a processing time which is compatible with operational processes.

The valuation models audited are part of a modelling chain where the common starting point, crucial for all the models used, is the overall optimisation model of the EDF generation portfolio, over a multi-year timescale. This model, based on dynamic stochastic optimisation techniques, was historically developed by EDF prior to the opening of electricity markets to competition. It was then adapted to take account of markets and the restriction of demand by EDF on its own outlets, as well as the possibilities of purchase or sale of electricity on European electricity markets. It can deal with input data consisting of a large number of supply and demand curves related to temperature and water flow rate. The results obtained cover marginal costs curves and schedules for the different generation types, as well as scenarios of volumes of energy traded on markets. This model is generally used on a weekly basis.

These results are crucial for models specific to the nuclear facilities and hydraulic valleys (referred to as local models), in that their results are used as input data for these models.

In the case of the nuclear facilities, two main tools are used:

- a tool for optimising nuclear power plant outage scheduling,
- a tool for optimising fuel stock constraint management (management by an opportunity cost, see below).

In the case of hydropower facilities, the above-mentioned overall model provides initial optimisation at an aggregated level, taking account of the major categories, (“run-of-river”, reservoir and pondage facilities). More detailed optimisation is then carried out at valley level, taking into consideration the local characteristics of each hydraulic structure and the valley’s inherent constraints. A dedicated tool is used for this local optimisation, which leads to management by opportunity cost.

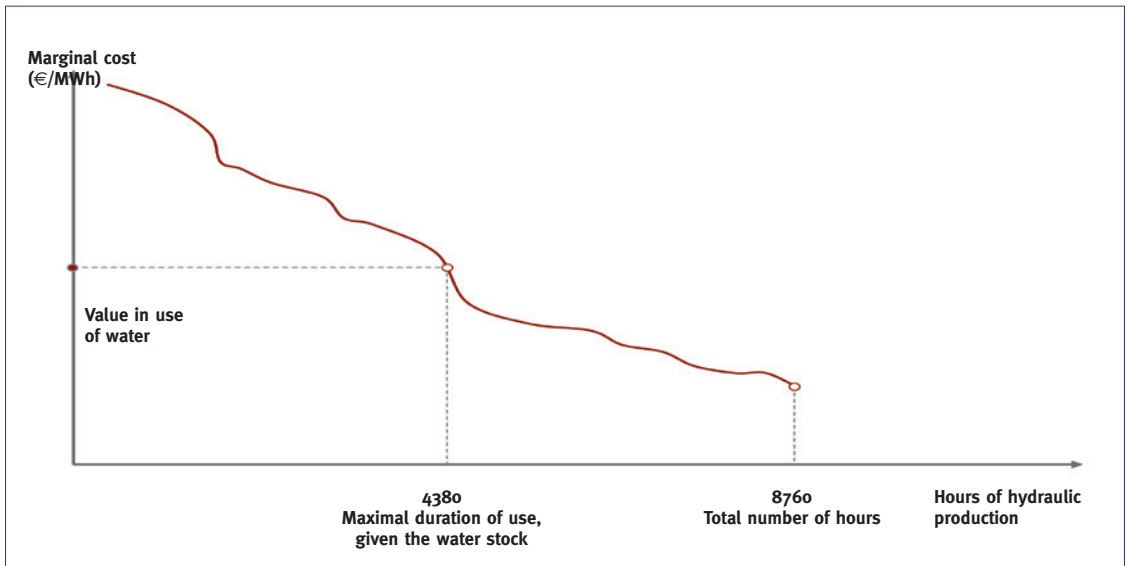
Finally, these different models are fed into EDF’s short-term decision-making models. The demand schedule sent to RTE can then be drawn up, the marginal costs of the system representing the costs necessary to meet demand of one additional unit calculated and EDF Trading’s market offerings put together.

The concept of management by an opportunity costs aims to optimise hydraulic or nuclear fuel stocks and does not raise any problems of principle

The concept of management by an opportunity cost is commonplace in managing power plants whose stock of nuclear or hydraulic fuel is limited. The aim of this method of management is to optimise the generation between the plants concerned, through a trade-off between immediate use and deferred use, as a substitute for more expensive generation units. It is implemented by estimating the opportunity cost of postponed use of the plant. The plant will therefore only be used if its valuation on markets exceeds the opportunity cost.

The figure below gives a simplified theoretical illustration of how to determine the value in use of a hydraulic stock whose duration of use is limited to 4,380 hours. Assuming the marginal costs of energy generation over the year are known deterministically, this plant will be valued at the price of the 4,380 hours of the year when the costs are the highest (figure 26).

FIGURE 26 – Monotone curve of marginal cost and water value



Source: LECG

In general, hydraulic plants with stocks are managed by the water value method. For nuclear plants, this is only the case for plants which cannot operate on baseload during their operating cycle (between two refuelling outages). In 2008, a maximum of 5 units, out of a total of 58 nuclear units, were managed simultaneously according to an opportunity cost approach.

This method, which consists of optimising income produced by the generation units concerned by minimising generation costs, does not raise any problems of principle.

However, some criticisms of the method of implementation of the model were made to EDF as a result of these audits. The box below summarizes the main criticisms where the CRE considers that EDF should make changes.

Market offerings generally consistent with marginal costs

The audits also covered the way EDF Trading operates on markets on the basis of daily optimisation tools. The daily models specify the volumes traded on markets, including the EPEX Spot (cost-volume figures), for different price levels. The consistency between these figures and the offerings on the EPEX Spot was verified.

A retrospective analysis of the system's marginal costs (see above) and spot prices was carried out on the basis of an estimate of the hours when EDF is assumed to be marginal.

A positive difference of around 6% is found over 2008 between the spot price and these costs. This can be explained partly by the fact that EDF Trading's market transactions are not limited to the Epex Spot. It also operates on other exchanges, in particular the German exchange whose closing time is different from the Epex Spot. EDF Trading's purchases or sales after Epex Spot closes are such as to affect the rise or fall of the system's marginal cost corresponding to the demand schedule sent to RTE. This difference is re-estimated at a 2% lower level, in situations where EDF Trading is assumed to be making sales at the close of EPEX Spot.

On the basis of these results, as well as foreign references provided by the outside consultants, the CRE finds that these differences are at levels which do not suggest that market power is being exercised. The difference between spot prices and marginal costs will be subject to regular, specific monitoring by the CRE.

BOX – Technical or methodological changes to be made

The main criticisms raised concern technical or methodological points of the models used by EDF:

- **Failure to consider discount rates in certain models.** The overall medium term model, the nuclear and hydraulic value in use calculation models and the outage scheduling optimisation model are, in fact, based on a rationale of inter-temporal trade-offs or take account of present or future cost assumptions, which requires consideration of a discount rate. It was not possible to measure this effect as a whole. Simulations carried out only on local nuclear and hydraulic value in use calculation models result in over-valuation of the nuclear plants managed by the value in use method, or in hydraulic values in use, of around €1/MWh. No impact on market prices is actually felt unless the plants concerned are marginal;

- **Differences found between the overall and local approach to hydro plant optimisation.** The overall optimisation model makes an aggregated simulation of forecast hydraulic generation. It combines structures with markedly different generation characteristics within the same stock. This leads to a loss of information on the exact characteristics of hydraulic constraints, which itself leads to an over or under-estimation of hydraulic generation in the overall model, which was assessed at an average of 3% over the year under review. As a result, generation by the other systems may be under or over-estimated by the overall model. Consequently, the marginal cost of the system determined by this model, on which value in use calculations within local models are based, can be affected. Value in use could be under-valued or over-valued in terms of the optimum and thus ultimately lead to non-optimal generation.

- **Lack of interaction between volumes of trading and market prices.** The overall model uses market price assumptions derived from futures prices, assumed to be independent of market participants' purchase or sell actions. In particular, the model does not take account of the impact of volumes traded by EDF on prices, except in the particular case when the quantities bought approach the maximum possible modelled. This finding could mean that EDF does not use the market optimally, in particular in situations of pressure, especially as the overall model is only simulated on a weekly basis.

- **Adjustments to be made on the basis of these findings**

The CRE considers that EDF should make adjustments to its optimisation models on the basis of these findings. In the short term, EDF should take account of a discount rate in its different optimisation models. More frequent updating of the overall model or its main indicators taking into account shorter term changes seems necessary as the first part of the response to dealing with the lack of interaction between EDF market transactions and market prices. However, this point requires further development, in order to take account of the consequences of market transactions, particularly in situations of pressure, at a sufficiently detailed level.

Finally, there should be an examination of the technical feasibility of specific developments to ensure that overall optimisation and local optimisation of the hydraulic facilities are as consistent as possible.

3.4. Forecast generation data is not yet sufficiently transparent or reliable, even though improvements have been made and others have also been announced

Under the French arrangements, data provided by generators does not enable the whole generation forecast to be updated on a daily basis

Since November 2006, the main French electricity generators, as UFE members, provide information aimed at increasing the transparency of generation data for market participants. This information concerns generation data and the forecasted available capacity. The data is aggregated according to the fuel type and published on the RTE web site. At present, this system covers 90% of French generation and includes facilities of 20 MW or more.

In the analyses of data transparency, the frequency of data on available capacity reported to the grid operator was analysed. In 2008 and the first half of 2009, on average, 88% of the information necessary for the transparency system was passed on to the grid operator. Although this is a high rate, all of the information necessary was only passed on in its entirety by all of the generators on 50% of days.



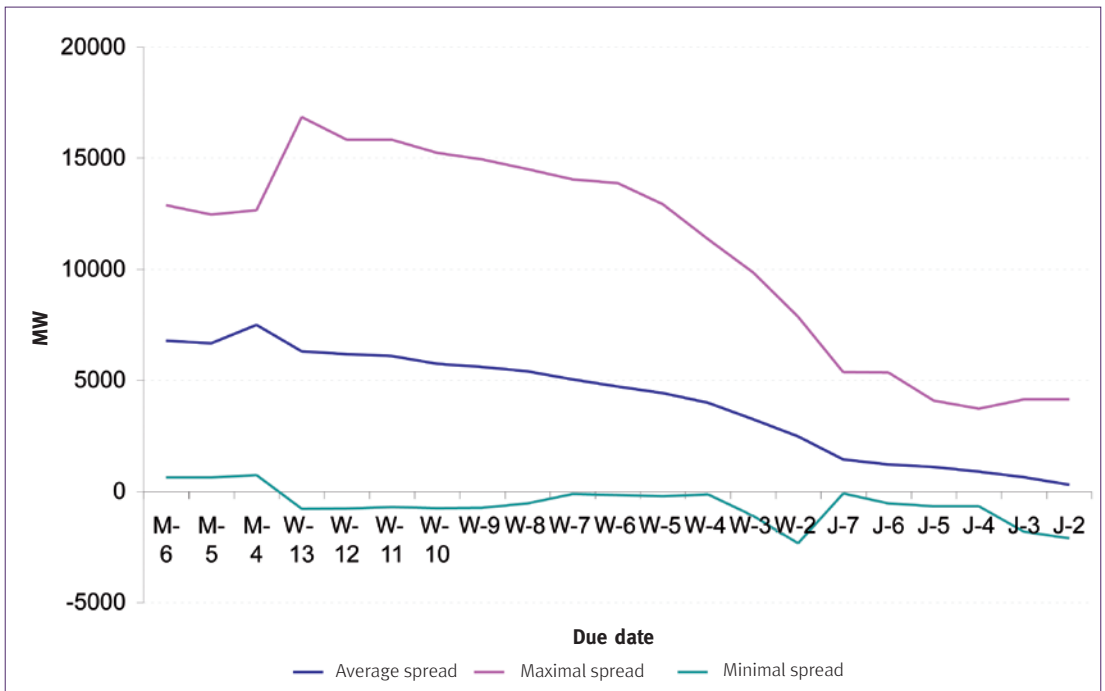
If RTE fails to receive data for a player or a generation system, the information as whole for each generation type cannot be updated. If data is not received from a generator for a technology on the required day, the latest data received from that generator is combined with the data supplied by other generators on the required day, to calculate data published for days D+1 to D+6.

Forecasted capacity data is overestimated, particularly for nuclear power

The analyses below aim to measure the quality of information provided by generators. They verify the consistency of the information provided at different terms (month, week and day) with the last availability forecast i.e. that provided the previous day for the next day.

In the case of nuclear power, there is on average a positive difference between the estimates of the power available at the different terms and the last forecast available (figure 27). This difference grows the longer forecast time scale. It even becomes strictly positive for forecast time scales beyond 4 months. This illustrates the need to improve the currently inadequate reliability of forecast data for the generation facilities, in the specific case of nuclear power.

FIGURE 27 – Difference between forecasts over different time scales and the last forecast of nuclear generation capacity



Source: RTE; Analysis: CRE

Since the 1st of July 2009, the publication of information on forecast availability, corrected for any loss of availability recorded, helps reduce the asymmetry of information for short term periods.

The differences between short term forecast data (less than 7 days) and the latest forecast data are, on average, 1.5%, compared with installed capability. However, in certain short-term cases, the daily variations in forecast nuclear power, compared with the latest available data, can reach 4,148 MW (table 8). Such a difference represents around 7% of installed nuclear capability.

In terms of long term forecast data (above 3 months), the difference averages 11% and the maximum difference recorded at these time scales is around 16 GW (table 9).

TABLE 7 – Differences between short term nuclear forecasts and the latest D-1 forecast

(MW)	D-7	D-6	D-5	D-4	D-3	D-2
Average	1439	1213	1109	891	639	304
Minimum	-912	-532	-666	-666	-1811	-2 116
Maximum	5 372	5 359	4 090	3 720	4 148	4 148

TABLE 8 – Difference between long term nuclear forecasts and the latest D-1 forecast

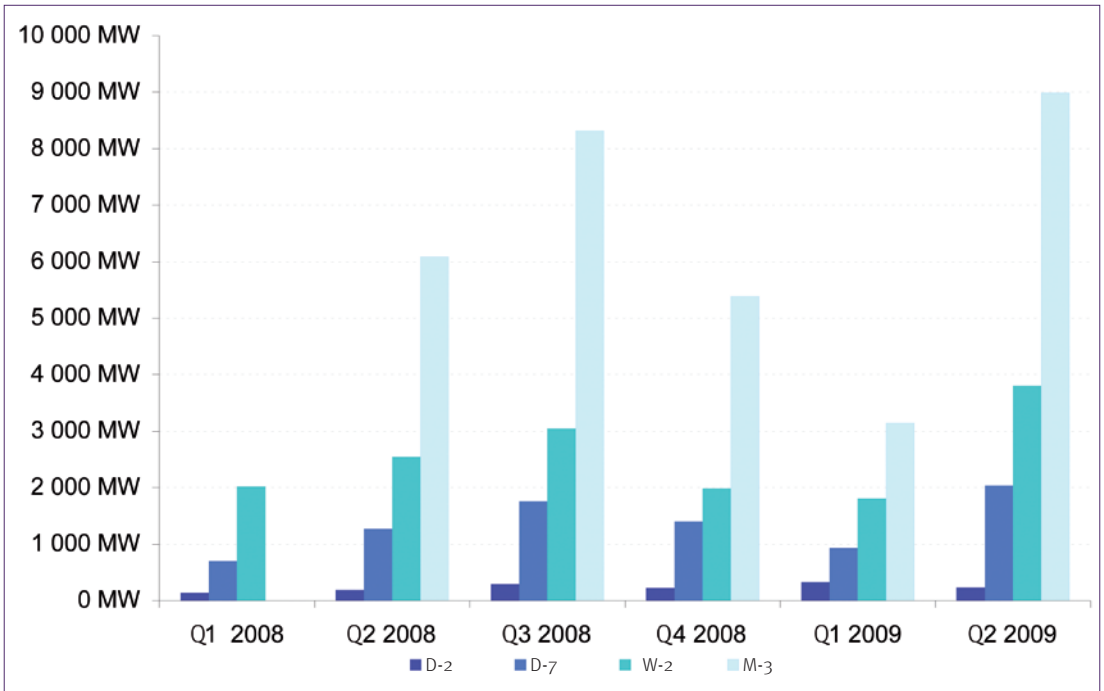
(MW)	M-6	M-5	M-4	W-13
Average	6 788	6 675	7 502	6 306
Minimum	623	3 071	732	-782
Maximum	12 881	12 461	12 668	16 852

Source: RTE; Analysis: CRE



As regards the trend in nuclear facilities' availability in 2008 and the first half of 2009, the differences between forecasts at 3 months and availability at D-1 reach over 10% of installed generation capacity in the third quarter of 2008 and the second quarter of 2009 (figure 28). These differences can be explained partly by unexpected weather conditions which can change the availability of reactors compared with expectations and also reflect the effects of strikes.

FIGURE 28 – Average of the differences between forecast availability at different time scales and D-1 availability (Nuclear 2008-2009)



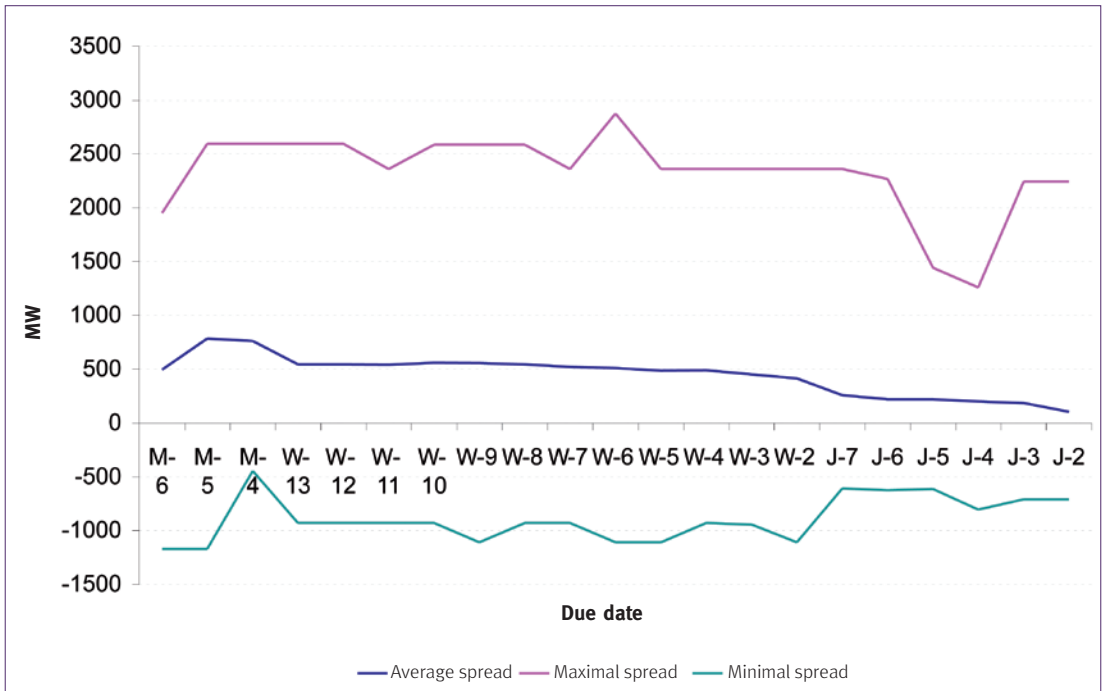
Source: RTE; Analysis: CRE

As regards the other means of thermal and reservoir hydraulic generation, the differences between the forecasts at different time scales and the latest information available are on average positive (figures 29 and 30). However, this finding is not verified for the availability of “run-of-river” and pondage hydraulic generation (figure 31).

For coal/gas fired generation, the differences for short time scales represent, on average, 200 MW, or 3% of installed capacity. Over medium time scales, this rate increases to over 10%, with an average difference of 700 MW recorded.

Finally, in terms of hydraulic capacity with reservoirs (lakes), forecasts show an average positive bias, for medium time scales, of 460 MW, or 4% of installed generation capacity. This bias is not systematically positive or negative at the different time scales.

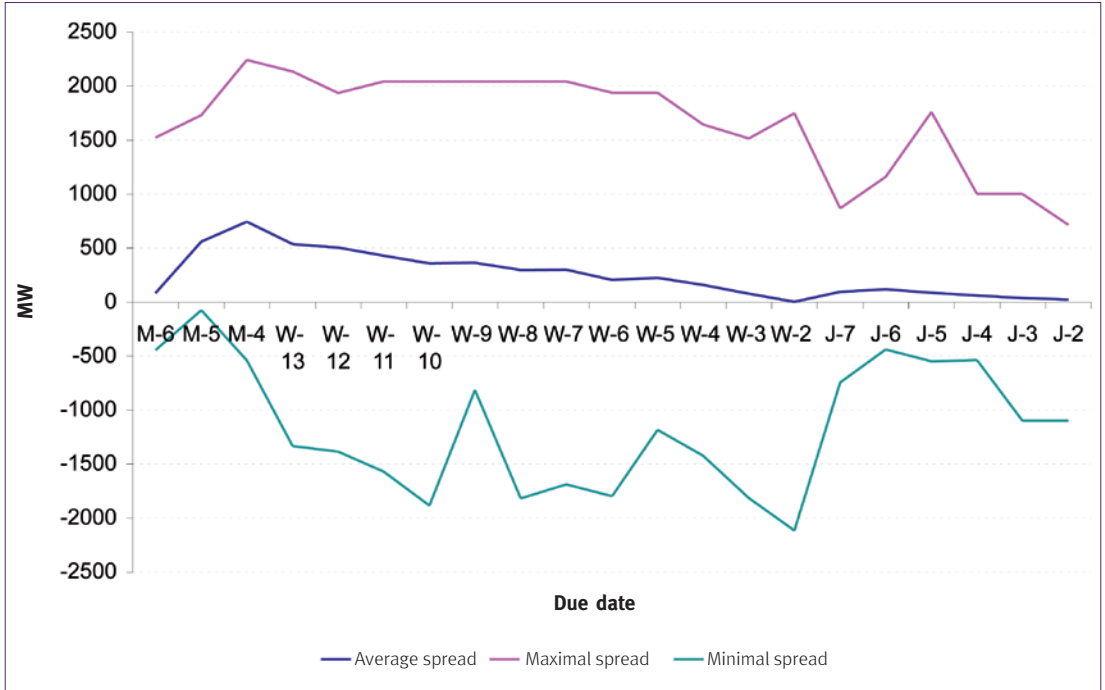
FIGURE 29 – Difference between forecasts at different time scales and latest forecast of coal/gas generation capacity



Source: RTE; Analysis: CRE

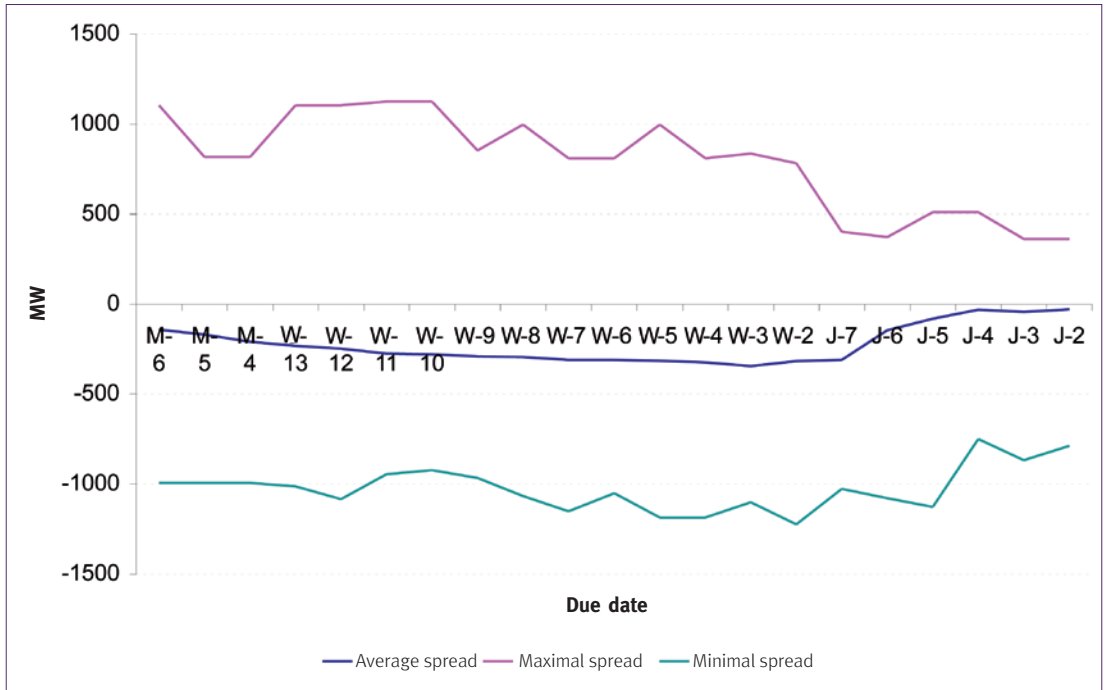


FIGURE 30 – Difference between forecasts with different time scales and the latest forecast of lake hydropower generation capacity



Source: RTE; Analysis: CRE

FIGURE 31 – Difference between forecasts with different time scales and the latest forecast of “run-of-river” hydropower generation capacity



Source: RTE; Analysis: CRE

Improvements have been made and others are announced by UFE by the end of 2010

In November 2008, a number of improvements were started, aimed at guaranteeing more responsive provision of information and history and transparency of sources of information.

However, in its public consultation of the 26th of March 2009, the CRE considered that the UFE system was not always satisfactory in anticipating changes in the supply-demand balance. It made the following recommendations:

- planned AND unplanned outages should be taken into account in the fleet availability forecasts published by UFE,
- availability data should be updated and published continuously,
- a record of available power forecasts should be published for each unit,
- in the event of an unplanned loss of availability for a plant, all known information likely to influence availability anticipation should be published promptly.

During 2009, UFE twice implemented measures designed to give a better overview of the generation fleet.

Since the 1st of July, the following data is now published on a daily basis:

- forecast available power for the previous day corrected for any unplanned capability loss factor recorded, allowing the effects of unplanned availability loss factor to be monitored in the short term. This updating reduces asymmetry of information between participants, over short-term periods;
- updated forecast short-term availability, for the generation fleet.

In its report of the 20th of November 2009, the CRE pointed out the importance of publishing unplanned outages for each plant. UFE, in its statement on the 23rd of November, announced changes planned for 2010:

- mid-2010, publication of the forecast available power in the short and medium term for units over 100 MW;
- at the end of 2010, publication of unplanned outages affecting these units, within 30 minutes.

The European context

› European law

The European Commission, national regulators and market participants consider that transparency is a priority in guaranteeing efficient market operation. Under pressure from regulators, the Commission made “Congestion Management Guidelines”¹⁰ binding, by the decision taken at its meeting of the 9th of November 2006. These guidelines are now part of Regulation (EC) 1228/2003 and are directly applicable in all European Union member states.

Article 5 of the annex to Regulation (EC) 1228/2003 sets out the information which must be disclosed by grid operators (ex-ante and ex-post data on demand, the grid, generation and adjustment). This text is binding and transmission system operators must comply with these provisions. This article is partly based on “Guidelines of Good Practice on Information Management and Transparency in Electricity Markets”¹¹ published by ERGEG in March 2006.

However, the provisions of Article 5 of the annex only provide a general framework of transparency needs. They do not set out the format, medium, language or time of publication. In addition, certain ambiguities also remain regarding the nature of the information requested.

¹⁰. Decision by the Commission amending the appendix of Regulation (EC) no. 1228/2003 concerning grid access conditions for cross-border electricity trade.

¹¹. Guidelines of Good practices on information management and transparency in electricity market” published 2 August 2006: <http://www.energy-regulators.eu/>

› Work carried out under regional initiatives

Under the regional initiative process, national regulators decided to draw up “Transparency” reports aimed at elaborating on and harmonising the interpretation by regulators of Article 5 of the annex to the regulation. To date, five out of the seven existing regions, had drafted, submitted for public consultation and published their “Transparency” reports in 2008 (North, Centre-West, Centre-East, South-West and Centre-South regions).

Although they are not binding as such, these reports form a solid basis for the harmonisation and implementation of transparency rules on wholesale markets within the regions. They set out the information which must be disclosed by transmission system operators or stock markets (when, where, how, etc.).

The reports drafted within the Centre-South and South-West regions are certainly the most comprehensive, in that they include, for the first time, transparency requirements concerning grid constraints limiting capacity at interconnections.

The actual implementation of these reports is monitored by regulators as part of the regional initiative process. In August 2008, the North region regulators published a report on the progress of the effective implementation of their report by transmission system operators. The Centre-West region regulators have also begun this monitoring work and will shortly publish a report on the progress of implementation of transparency reports.

› Work carried out by the ERGEG

As part of the ERGEG’s work, regulators have conducted a study designed to compare transparency reports published in the five regions. This study shows that, with the exception of publication of the constraints limiting interconnection capacity, the structure and contents chosen for these reports are, to a very great extent, perfectly identical.

In 2008, the CRE also contributed to the joint opinion given by the CESR and ERGEG¹² to the European Commission on topics related to market abuse and trading transparency needs. In this research, European financial and sector regulators point out that transparency needs are today a crucial issue for market supervision and the integrity of European markets.

The aim of this research is to amalgamate transparency needs with a view to making it legally binding to disclose identified needs.

¹² The CESR (Committee of European Securities Regulators) and ERGEG (European Regulators’ Group for Electricity and Gas) are European advisory bodies to the European Commission for financial markets and the electricity and gas markets.

4. THE ANALYSIS OF TRANSACTIONS

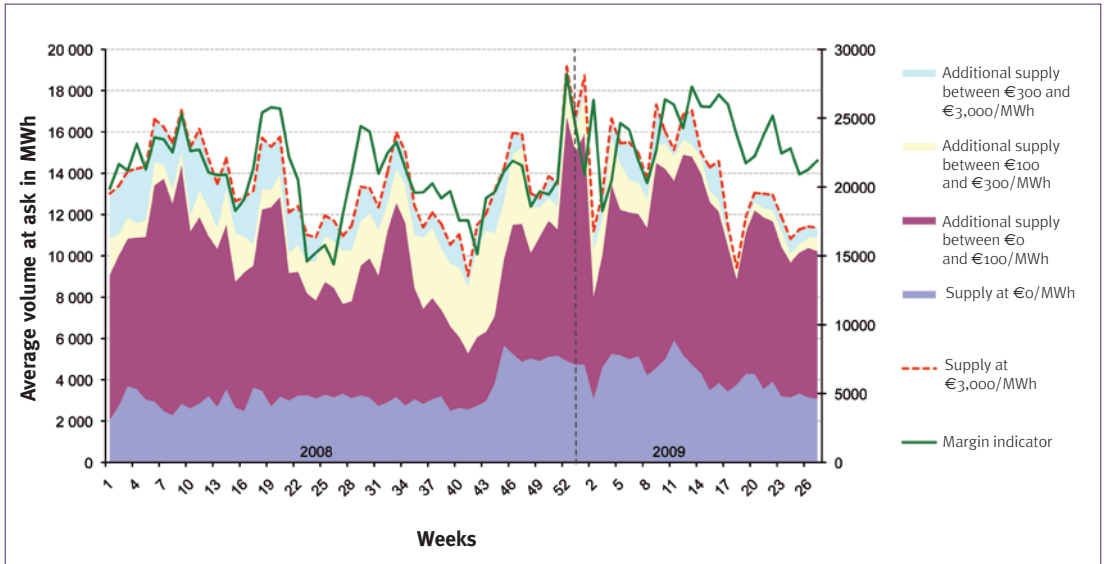
4.1. The order books on EPEX Spot Auction globally reflect the system’s balance.

The supply and demand curves communicated each day, for each hour, by the members of the EPEX Spot Auction France platform have been analysed.

The figure below (figure 32) shows the daily changes in the average volume of supply each hour at different price levels. The figure shows the relationship between the average volume of offers and the margin indicator¹³.

In 2008 and the first half of 2009, the hourly supply at all prices (for €0 MWh) was on average 3,618 MWh. This supply was higher at the end of 2008 and in 2009 compared to the level of the first half of 2008. The majority of volumes offered, in hourly blocks, are at price levels between €0 and 100 MWh, with an average volume supplied of 7,100 MWh. Above €100 MWh, the hourly average volume of supply increases by 1,334 MWh. Globally, there is a quite clear correlation between the margin indicator and the average volume of supply on EPEX Spot.

FIGURE 32 – Aggregated supply and margin indicator



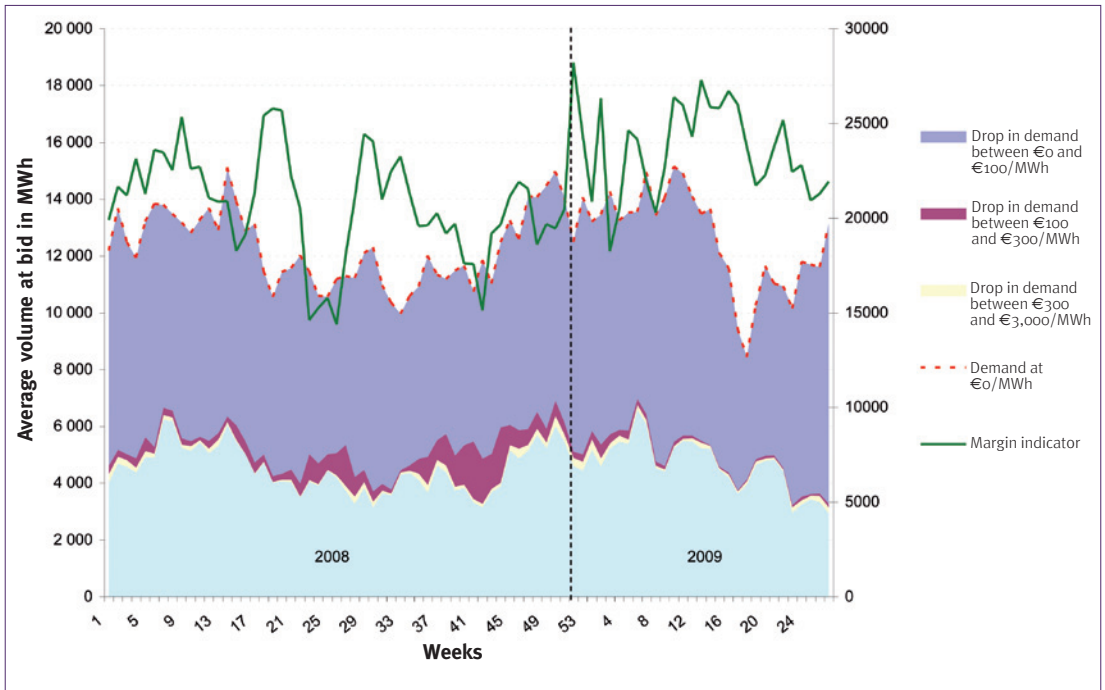
Source: EPEX Spot; Analysis: CRE

¹³. See Chapter 2: margin indicator.

59% of the aggregated demand is characterised by a willingness to pay between €0 and 100/MWh (figure 33). The hourly average volume demanded for a willingness to pay between €100/MWh and €300/MWh is relatively low (about 425 MWh). A notable exception occurred during the price increases of summer and autumn 2008, a period during which the participants were willing to acquire volumes at prices defined between €100 and 300/MWh. Simultaneously, they reduced their level of demand at any price (€3,000/MWh). This indicates a reduction in the propensity to pay of participants who wished to avoid finding themselves buyers at any price, when the market prices were high.

Finally, the hourly average volume of supply of the demand at any price in 2008 and H1 2009 represents 4,728 MWh.

FIGURE 33 – Aggregated demand and market price



Source : EPEX ; Analyse CRE

4.2. The activity on the bilateral wholesale market, excluding intra-group transactions, represents around 6% of the volumes negotiated in 2007 for the calendar products (Y+1 and Y+2)

In summer 2008, the CRE collected information about all of the transactions for Y+1 and Y+2 products concluded in 2007 by the participants on the French market. Table 10 summarises the main items of volume and liquidity information corresponding to these transactions.



TABLE 9 – Volumes and liquidity of the bilateral transactions collected

	EPD France	Brokers	Bilateral (Collect 2008)	French market*
Volumes (TWh)	34.83	177.32	34.36	246.52
No. of Transactions	883	3 672	538	5 093
% volumes	14.1%	71.9%	13.9%	100%
% transactions	17.3%	72.1%	10.6%	100%

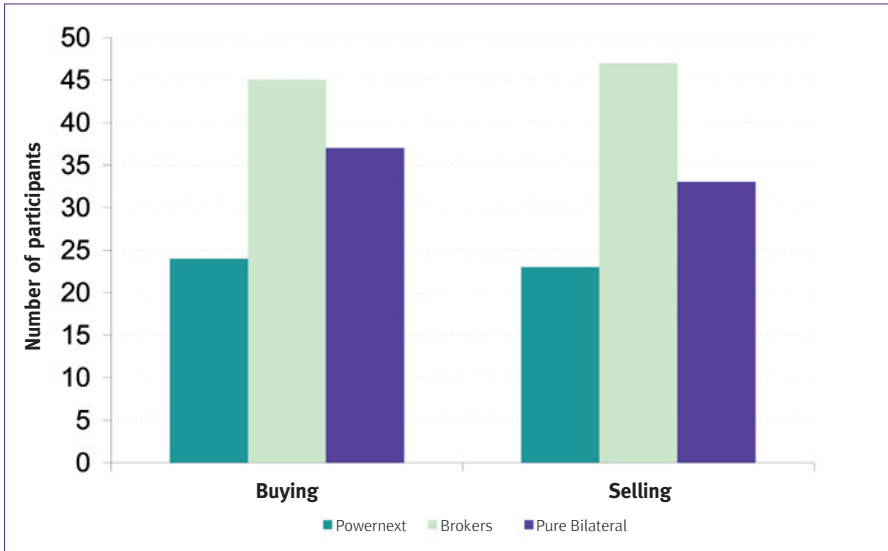
Sources: Powernext, brokers, participants on the French market

* including the bilateral market segment in 2007.

The volumes and liquidity observed on the bilateral market are slightly lower than those observed on the EPD organised market. They are significantly lower than those recorded on the brokerage platforms.

Out of the 47 companies that negotiated these products by means of a broker in 2008, 37 companies had negotiated bilaterally and 24 on the EPD market. Figure 34 shows the distribution of recourse to the different platforms for buying and selling energy.

FIGURE 34 – Number of participants on the different platforms
Number of participants active in 2007 for the Y+1 and Y+2 products



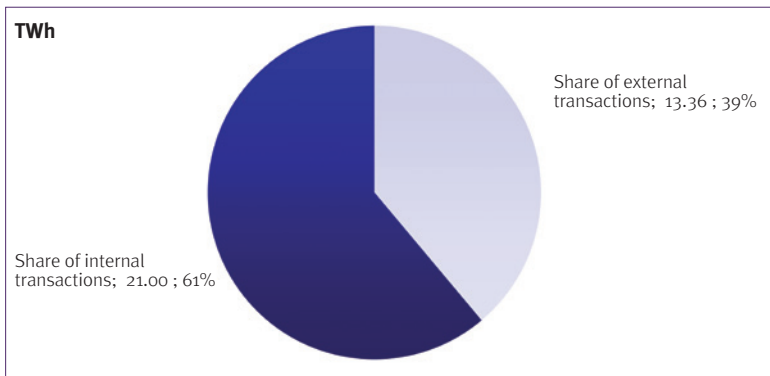
Sources: Powernext, brokers, participants on the French market

The majority of transactions negotiated in the bilateral market segment are intra-group transactions

The majority of transactions in the bilateral market concern operations between a company and its subsidiary. The prices of transactions carried out between the parent company and its trading branch are aligned on the average prices observed on the intermediated markets.

61% of the transactions negotiated on the bilateral market for Y+1 and Y+2 calendar products are transactions carried out within the same group (figure 35).

FIGURE 35 – Breakdown between internal and external transactions
Proportion of transactions between parent companies and subsidiaries for Y+1 and Y+2 products on the bilateral market in 2007



Sources: participants on the French market

With the exclusion of intra-group transactions, in 2007, the bilateral market represented about 5.9% of the volumes negotiated for the Y+1 and Y+2 calendar products (table 11).

TABLE 10 – Volumes of Y+1 and Y+2 transactions per platform, excluding internal transactions

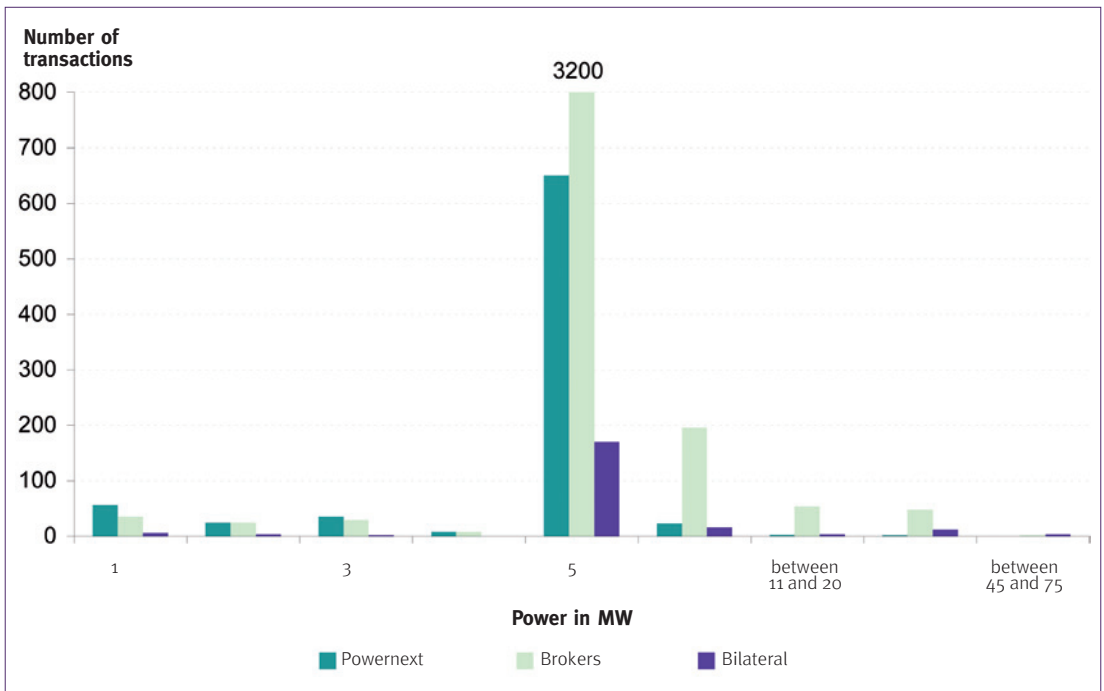
	Calendar products (Y+1, Y+ 2) TWh	In %
Bilateral	13.36	5.9%
Brokers	177.32	78.7%
EPD	34.83	15.4%
Total	225.51	100%

Sources: Powernext, brokers, participants on the French market; Analysis: CRE

The power covered by the contracts negotiated on the bilateral market is the same as that observed on the intermediated markets

Generally, the transactions on the bilateral market mainly concern 5MW and 10MW calendar products (figure 36). Therefore, the lots negotiated are of the same size as those on the intermediated market.

FIGURE 36 – Capacity size of negotiated contracts by platform in 2007 (Y+1 and Y+2 products)*



Sources: Powernext, brokers, participants on the French market; Analysis: CRE

*excluding the inter-group bilateral transactions

4.3. The nominations against the trend of daily capacities in 2008 and the 1st half of 2009 are linked in certain cases with the organisational characteristics of the markets

The participants buy daily transport capacities at the interconnections *day-ahead* at the start of the day and then nominate the quantities that they really want to use at the start of the afternoon, after the fixing of the European stock exchanges.

The individual use of daily interconnection capacities was analysed in two successive phases:

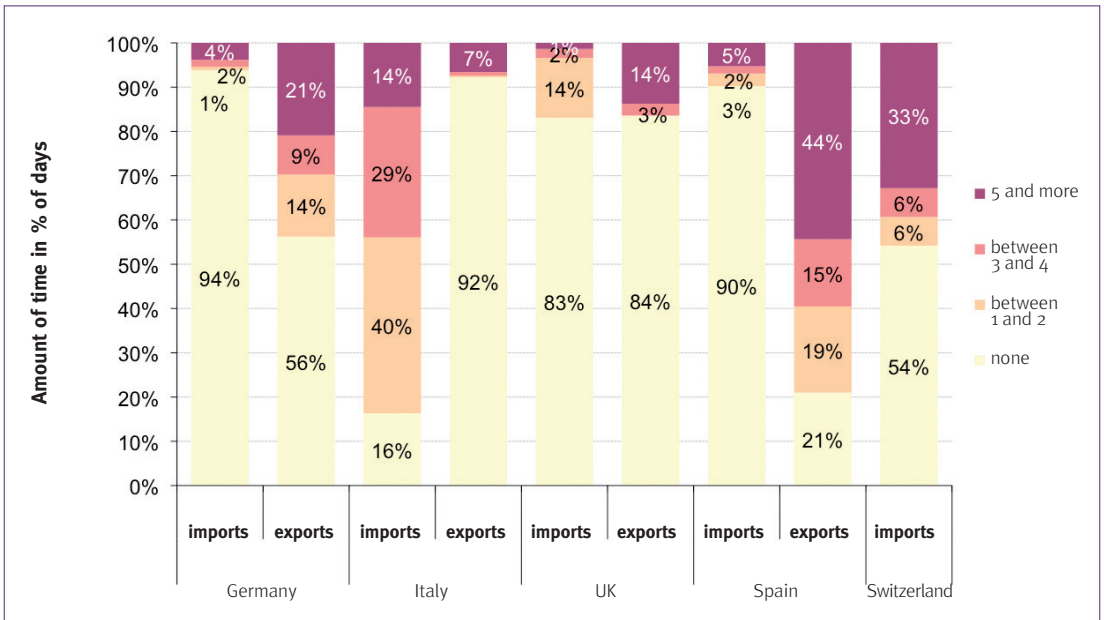
- in the first phase, the nomination decisions were examined according to the prices of OTC transactions completed before the closure of the Spot market, because, according to the participants, their nomination decisions are based, amongst other things, on their commitments linked to these transactions. The reference prices selected are the prices of peakload blocks and off-peak blocks.



- in the second phase, the nominations described as being against the trend at the end of the first phase were examined in the light of the price spreads at peakload and off-peak times observed on the Spot markets. The price spread observed on this market may prove to be different from that observed for the OTC transactions. This analysis was done to take into account any changes in the participants' expectations about the sign of the spread in relation to the initial expectations. In this case, their offers on the Spot market have integrated that change and the participants have consequently nominated as a function of the spread really observed on the Spot market.

The figures below show the percentage of days in the year during which nominations against the trend of the price spread were observed, as well as the number of participants responsible for these flows at each border and in which direction for the peakload and off-peak blocks.

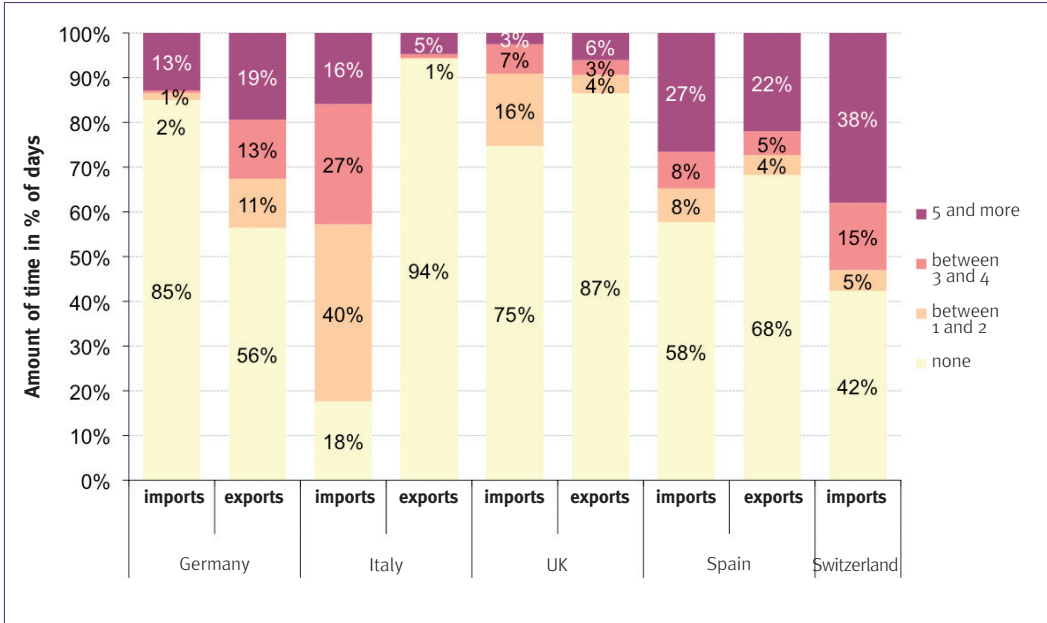
FIGURE 37 – Nominations against the trend during peakload times
 Percentage of days during which nominations against the trend during peakload times were made and number of participants who nominated against the trend in 2008



Source: RTE; Analysis: CRE

Note: No figure is given for the exports to Switzerland because there is no daily capacities allocation mechanism similar to that set up on the other borders.

FIGURE 38 – Nominations against the trend during off-peak times
 Percentage of days during which nominations against the trend during off-peak times were made and number of participants who nominated against the trend in 2008



Source: RTE; Analysis: CRE

This analysis showed that the nominations against the trend are important on some borders. On these borders, the reasons for nominations against the trend are varied:

On the Italian border, the way the Italian market is organised explains the level of these nominations against the trend. The morning closure of the Italian stock exchange and the lack of an intraday market reduce the opportunities open to the participants for exploiting all of the arbitrages between the markets, especially when the price spread reverses in relation to their initial expectations.

In the case of a second border, a player had previously mentioned (see the first monitoring report) physical reasons that forced it to nominate against the trend, due to the existence of a contract with a counterpart that required that the power was physically routed to the other side of the border.

Another reason also mentioned on another border is related to the trading of renewable energy certificates which imposes on participants the nomination of power against the trend whatever the price spread of electricity.

Section II

Wholesale Natural Gas Markets

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1. THE DEVELOPMENT OF GAS TRADING

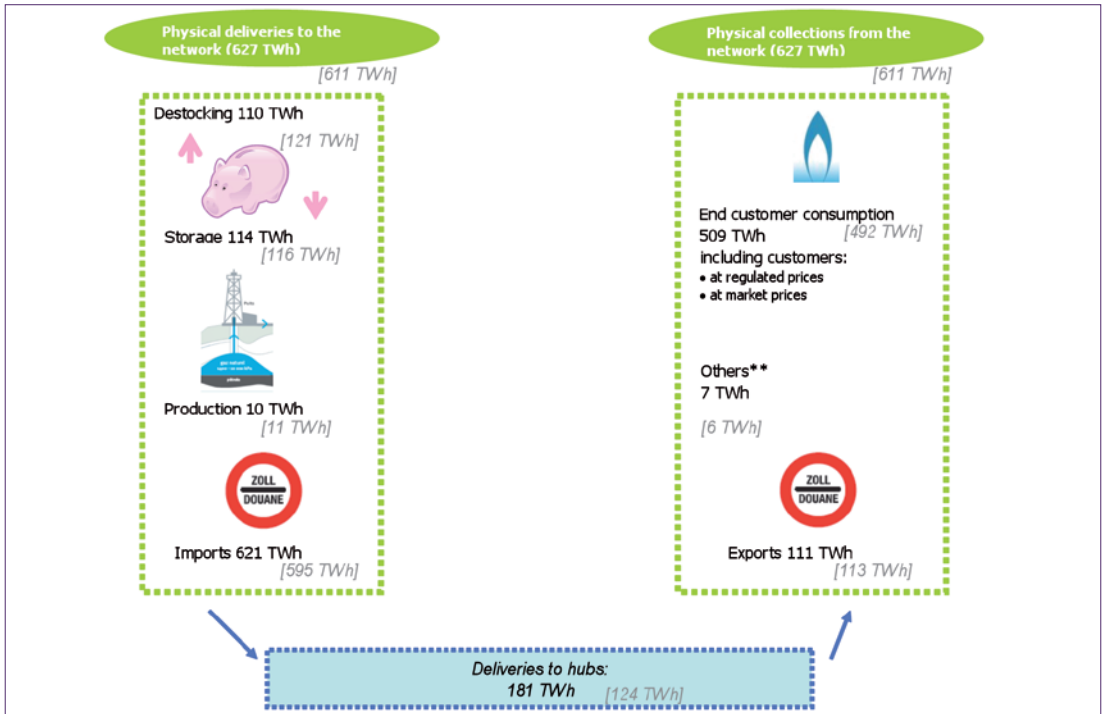
Imports provide for the main part of French gas consumption. The balance of gas flows on the French market between upstream and downstream is shown in the diagram below. Upstream, imports represented 621 TWh in 2008. Imports net of contractual exports represented 510 TWh, thus covering the consumption of final customers, evaluated at 509 TWh in 2008¹⁴. The movements related to storage and destocking are used to balance the regular flows of imports with the consumption of the residential and service sector, concentrated in the winter months. They form an important modulation tool for the participants in the gas market that is complementary to the flexibility of their supply and their transport and transit capacity.

Each shipper in France uses the wholesale market in accordance with its policy of optimising its supply portfolio and its outlets, to make use of the flexibility of the instruments it has available. This activity takes concrete form in the physical deliveries to the Gas Exchange Points (Points d'Echange de Gaz - PEG). The deliveries to the PEG can be used to assess the recourse to the wholesale market, whether it is purely bilateral or intermediated (*Powernext Gas* exchange since November 2008 or *broker* platform).

This chapter is dedicated to the analysis of changes in the deliveries to the PEGs (Gas Exchange Points) and of the exchanges on the intermediated market, in a context marked by several key events for the gas markets in France. These events are related to the international environment, with, in particular, the turnaround in oil price during summer 2008, the economic recession and the appearance of excess of gas in relation to world demand, or specific developments to the French market, the most determining being the merging into a single balancing zone of the three previous balancing zones in the North of France (Nord-H, Est and Ouest) on the 1st of January 2009.

¹⁴. The volume data given is gross, not corrected for climate.

FIGURE 1 – Supplies and outlets of participants in the French gas market in 2007* and 2008



Sources: GRTgaz, TIGF; Analysis: CRE

* 2007 data in brackets

** The "Others" item corresponds to the gas consumed by the TSO and DSO to ensure network functioning (own consumption, metering errors, losses...)

1.1. The volumes delivered to PEG Nord from the end of 2008 onwards are increasing strongly

The deliveries to the PEGs correspond to the sum of the net nominations of the shippers to the Gas Exchange Points (PEG Nord¹⁵, Nordt-B, Sud and Sud Ouest). These deliveries are the results of exchanges of various types: transactions or contracts between the participants on the wholesale market (operations on the market or brokerage platforms, bilateral operations, historic agreements, Gas release...), purchases or sales by network operators for their balancing requirements and coverage of purchases of gas by the network operators to ensure the working of the network and purchase by large industrial companies for their own consumption.

The deliveries at a given date reflect the net volume of all of the forward transactions concluded (short term, long term) on the different platforms or purely bilaterally and delivered on that date. Therefore, they are not representative of the transactions agreed on the market on that date. Thus, a volume of gas may be negotiated several times between two participants, but in the end a single delivery (corresponding to the netting of all of their transactions) will take place.

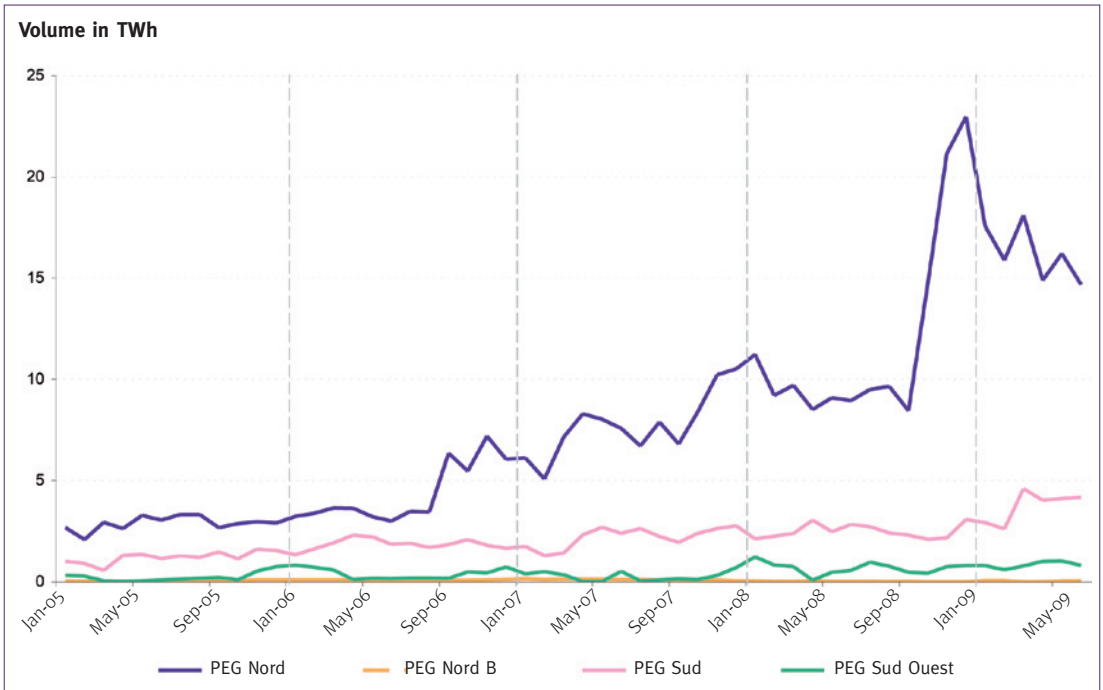
¹⁵. Before January 1st, 2009, PEG Nord-H, Est and Ouest data is aggregated for comparison purposes and is grouped together under the name PEG Nord or North zone.



The deliveries to PEG Nord increased strongly in autumn 2008 (figure 2) to culminate at 23 TWh in December. A regular growth in deliveries to this PEG can be observed since 2006 with, furthermore, a seasonal effect at the start of the gas season. However, the speeding up of the increase at the end of 2008 is of a different order from the movements of the preceding years. The average monthly volumes in the first half of 2009 (16.2 TWh) exceed those noted in 2008 (monthly average of 11.9 TWh) by almost 40%. Given that there are long term supply contracts with delivery to the PEGs, the increase in activity on the wholesale market is far greater than 40% (see section 1.2).

The changes observed on the other two zones (GRTgaz South and TIGF South west) are not comparable to those of PEG Nord. The volumes delivered to PEG Sud Ouest are still low, a monthly average of around 0.7 TWh since January 2008 (monthly average of 11.9 TWh) by almost 40%. Given that there are long term supply contracts with delivery to the PEGs, the increase in activity on the wholesale market is far greater than 40% (see section 1.2).

FIGURE 2 – Deliveries to the PEGs
- Monthly volume in TWh, 2007 – H1 2009 -



Sources: GRTgaz, TIGF

Economic and structural factors justify the changes observed in deliveries to PEG Nord

Several factors can be cited to explain the change in deliveries to PEG Nord since autumn 2008.

On the structural level, the merger of three zones located in the North of the country on the 1st of January 2009 gave PEG Nord four entry points (Dunkerque, Obergailbach, Taisnières and Montoir) and large storage capacities, which constitutes a positive factor for liquidity growth in the zone¹⁶. This merger has often been mentioned as a prerequisite to the emergence of a liquid market place in the zone. It also occurred in a context of rationalisation of transport zones in Germany (process of merging of zones in Germany between 2007 and 2009: for H-gas, from 12 zones to a large North zone and a large South zone on the 1st of October 2009 as well as a third small zone, destined to merge with one of the preceding ones) upstream of the French market. This fact illustrates the importance of gas infrastructures that work as harmoniously as possible and the need to diversify the sources and channels to facilitate the emergence of liquid market places.

Also note the birth of an organised gas market, launched by Powernext on the 26th of November 2008, called Powernext Gas, which provided shippers with the possibility of buying and selling gas at the PEG transparently and anonymously. The trading platform offers Spot contracts at the three PEG (Nord, Sud and Sud Ouest) and Futures (at PEG Nord) and thus enables the shippers to buy or sell volumes of gas for a period from less than a day to the next three gas seasons.

Respect of the Take or Pay¹⁷ clauses of long term supply contracts may force contract holders to take volumes of gas larger than required to cover their needs. However, it was probably the increased opportunities for arbitrages between these contracts and purchases on the markets at the end of 2008 that may have contributed to a peak of activity at PEG Nord at the end of 2008. In fact, the reversal in the price of oil products only made its effect felt in the usual indexing formulae of long term contracts, and therefore their price, with a delay of several months. This delay led to opportunities for arbitrages between these contracts and purchases of products available on the wholesale market, whose prices fell steeply from autumn 2008 onwards. Downstream, the level of regulated prices, also dictated by the formulae indexing them on oil products made the supply on the markets particularly interesting for the suppliers. In all, the specific context probably generated extra activity on the markets, which can be seen in the deliveries to the PEGs and the volumes negotiated on the intermediation platforms (see section 1.2).

¹⁶. Also see chapter 3 dedicated to the use of infrastructures

¹⁷. See the Glossary for the definition of Take or Pay contracts.



An increase in the number of shippers active at the PEGs

During 2008, 12 new shippers were active at a minimum of one PEG in France (table 1). Since January 2009, 5 new participants have started to nominate gas at the PEGs and 5 participants active in 2008 have not made nominations. In total, out of the 52 shippers with a valid transit contract with GRTgaz¹⁸, 42 made a delivery to and/or a withdrawal from a French PEG during the first half of 2009.

TABLE 1 – Number of shippers active withdrawing from and/or delivering to the PEGs

	2007	2008	H1 2009
Total number of active shippers	30	42	42
<i>Including Financial player traders</i>	2	5	6

Sources: GRTgaz, TIGF; Analysis: CRE

1.2. All maturity periods included, gas trading on the French intermediated market has grown strongly since 2008

Activity on the French intermediated wholesale market includes the transactions concluded on both the organised market and the intermediated OTC market (brokerage platforms). The exchanged volumes on these platforms, up by 156% compared to 2007 (table 2 and figures 3.a and 3.b), reached 66 TWh in 2008. In the same year, almost 9,800 transactions were agreed. Though the increase in gas volume traded in France concerns all market segments, there is higher growth for the day-ahead products, which represented 12% of the volume traded in 2008 as against 10% in 2007, and the seasonal products, which represented 39% of the volume traded in 2008 as against 34% in 2007.

The general increase in intermediated market accelerated in the first half of 2009 with the exchanged volumes rising to 69.3 TWh for a total of around 9,900 transactions, thus exceeding the volumes and number of transactions for the whole of 2008. Finally, we should emphasise the low proportion of the annual products (calendar or gas year) in the traded volumes.

¹⁸. Shippers using the GRTgaz network, list updated on the 29th of July 2009, accessible at: <http://www.grtgaz.com/>

TABLE 2 – Breakdown of the volume traded and number of transactions on the spot and futures intermediated market

Volume (TWh)	2007	2008	H1 2008	H1 2009
Spot market	4.72	14.15	5.34	14.16
<i>including Day-ahead products</i>	2.48	8.13	2.85	8.10
Futures market	20.97	51.66	21.85	55.15
<i>including monthly products</i>	7.66	15.28	4.49	17.83
<i>including seasonal products</i>	8.63	25.56	13.10	27.35
Total intermediated market	25.69	65.81	27.20	69.31

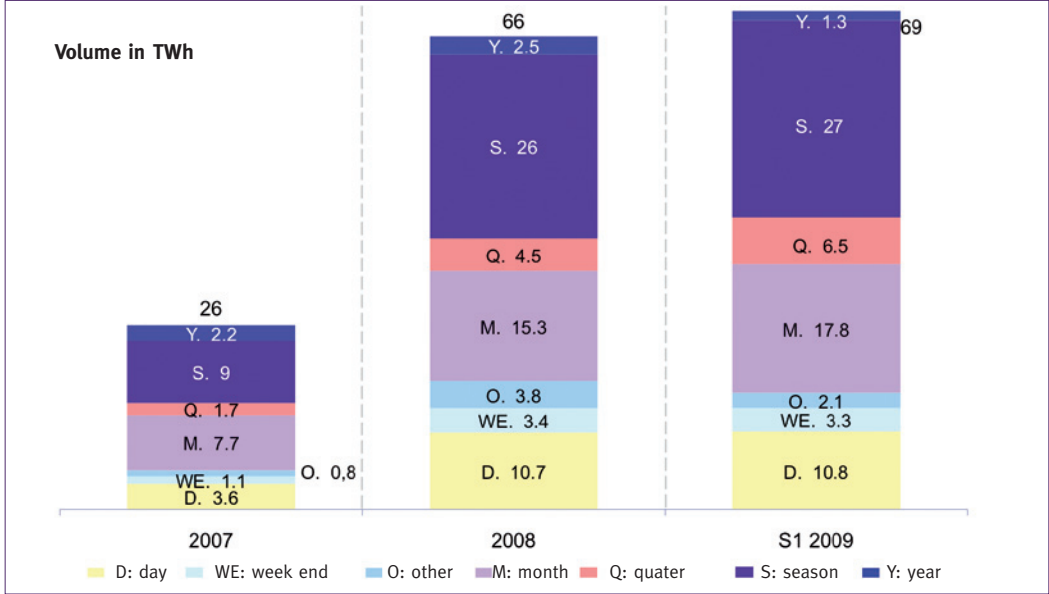
Number of transactions	2007	2008	H1 2008	H1 2009
Spot market	2 654	8 664	3 175	8 662
<i>including Day-ahead products</i>	1 462	5 566	1 836	5 594
Futures market	478	1 112	402	1 199
<i>including monthly products</i>	277	556	172	702
<i>including seasonal products</i>	57	175	87	178
Total intermediated market	3 132	9 776	3 577	9 861

Sources: Brokers, Powernext; Analysis: CRE

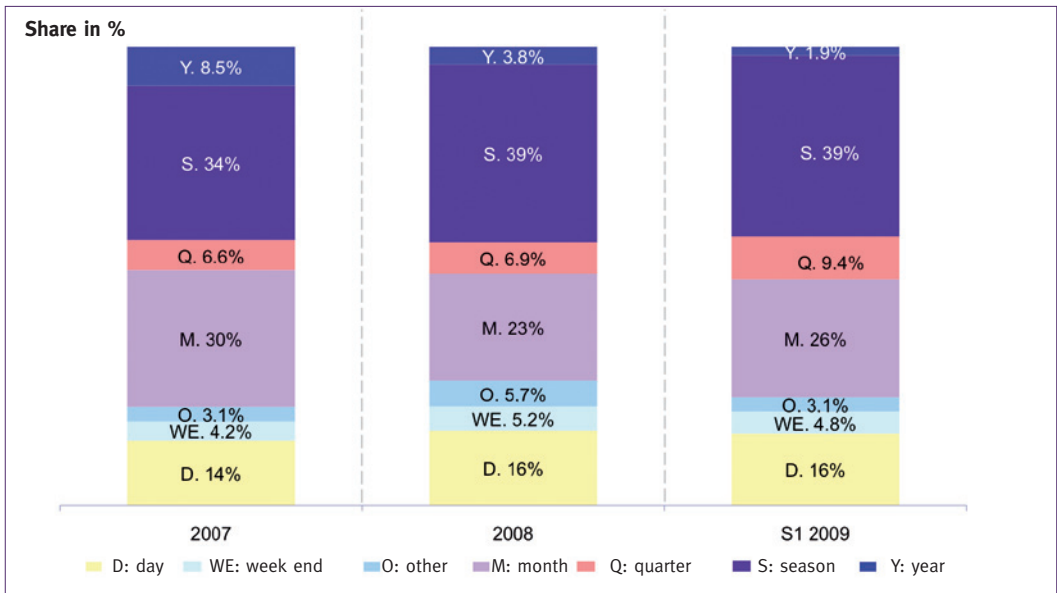


FIGURE 3 – Breakdown of the volume traded on the intermediated market by product

3.a In absolute value



3.b In percentage



Sources: Brokers, Powernext; Analysis: CRE

Methodological note: **Other**: several delivery days, covers the balance of the week or balance of the month and other deliver periods. **Day**: a maximum of one delivery day, covers the intraday, Day-ahead and day + x products with x between 2 and 7 days. **Year**: 365 delivery days, covers the gas and calendar year products

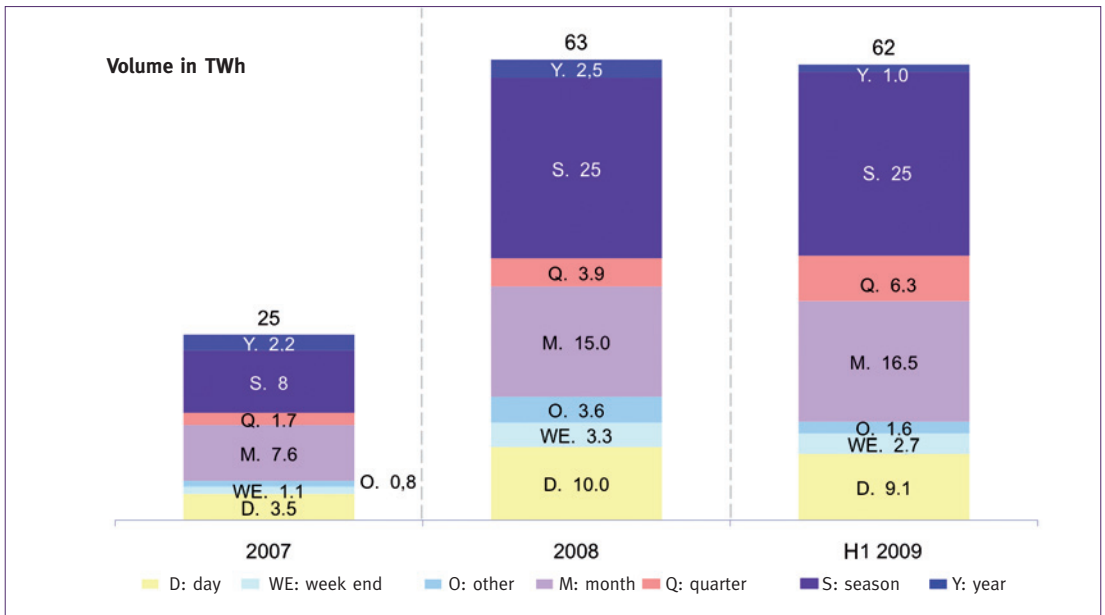


This strong growth in trading may be linked to the greater attractiveness of PEG Nord in France, as well as the context of increased arbitrage between contracts indexed on oil and market supply, factors mentioned previously.

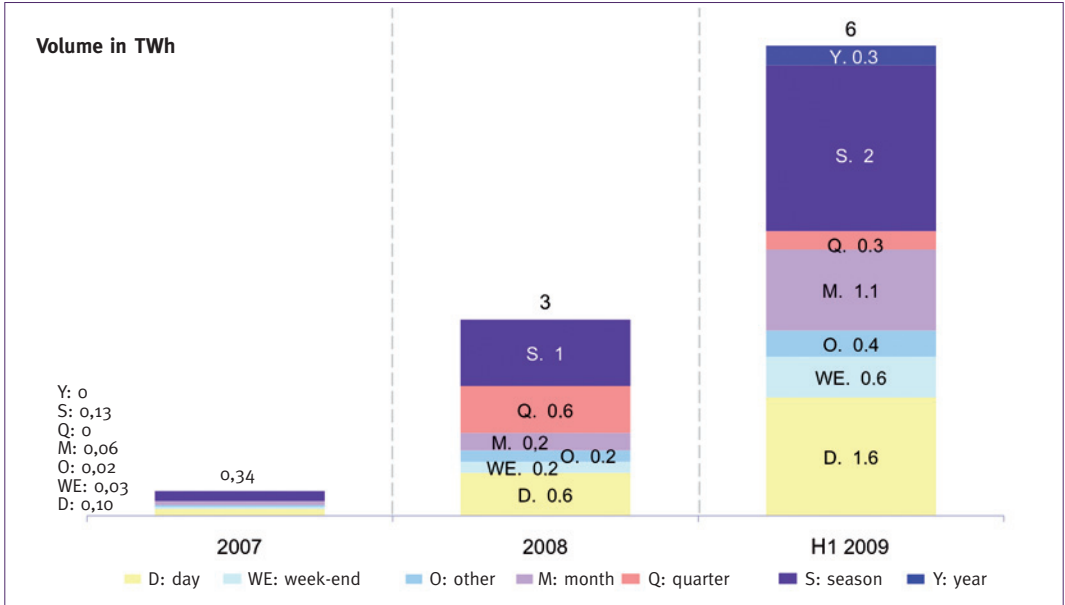
The North zone is still the zone in which trading is most developed

Similarly to the deliveries to the PEGs, the breakdown of the volumes traded by product (figure 4) according to the three zones shows the preponderance of trading at PEG Nord, which concentrates 91% of the volumes traded in 2008 whereas it only represented 57% of national consumption in 2008. The exchanged volume in the GRTgaz South zone also increased (6.5 TWh in the first half of 2009 as against 2.7 TWh over the whole of 2008). The South West zone (TIGF) also increased but is still not very liquid with 0.2% of the volume of transactions carried out in 2008 whereas it concentrates 7% of national consumption. The proportion of short term products is higher at PEG Sud and PEG Sud Ouest in relation to the French level. They represented 39% of the trade at PEG Sud and 54% at PEG Sud Ouest, as against 24% at national level (H1 2009).

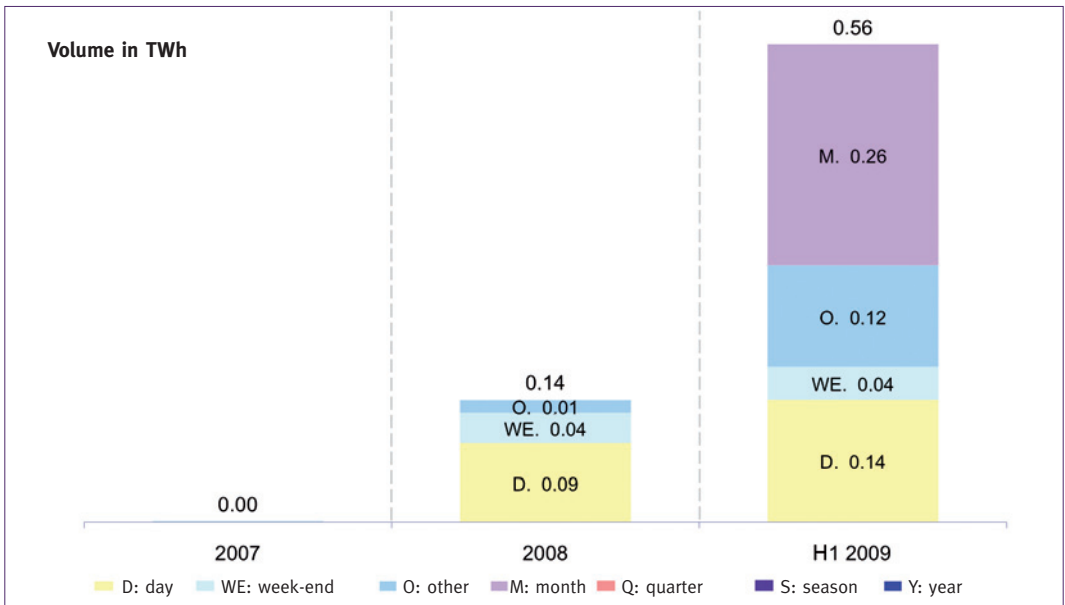
FIGURE 4 – Breakdown of the volume traded on the intermediated market by product and by PEG
4.a PEG Nord



4.b PEG Sud



4.c PEG Sud Ouest



Sources: Brokers, Powernext; Analysis: CRE

In the 1st half of 2009, PEG Nord counted 33 participants that had made a purchase and/or a sale on the intermediated market. PEG Sud is the market that has attracted the most new participants since the 1st of January 2009, with the appearance of 8 new participants (table 3).

TABLE 3 – Number of shippers active in selling and/or buying on the intermediated market

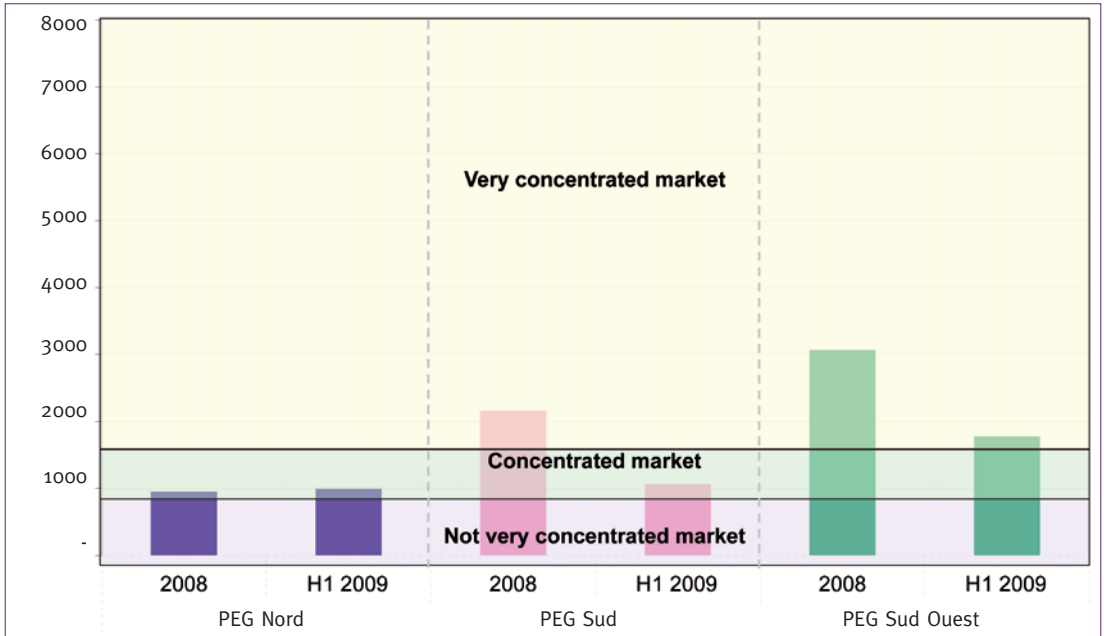
	PEG Nord		PEG Sud		PEG Sud Ouest	
	2008	H1 2009	2008	H1 2009	2008	H1 2009
Total number of active shippers	27	33	12	20	6	8
<i>Including Financial player traders</i>	3	4	0	2	0	1

Sources: Brokers, Powernext; Analysis: CRE

PEG Nord is still the least concentrated market place, both for buying and selling, on the spot and futures market (figure 5). Between 2008 and the 1st half of 2009, the HHI levels in this zone varied relatively little for selling but reduced for buying, illustrating the increase in the number of participants buying. At PEG Sud, the HHI levels decreased strongly between 2008 and the 1st half of 2009, a sign of the positive development of trading in that zone. In the South West zone, trade is still very concentrated, with an exception in the sales segment on the spot market.

FIGURE 5 – HHI¹⁹ for buying and selling on the short term and futures market - 2008 and H1 2009, by PEG -

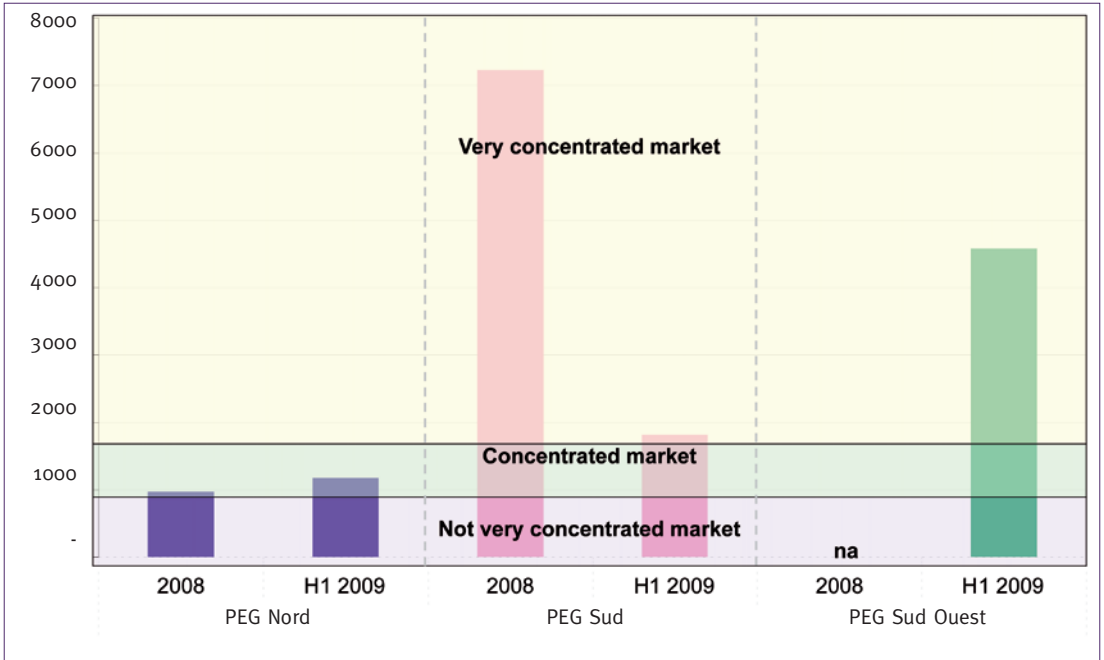
5.a HHI by PEG for selling on the short term market



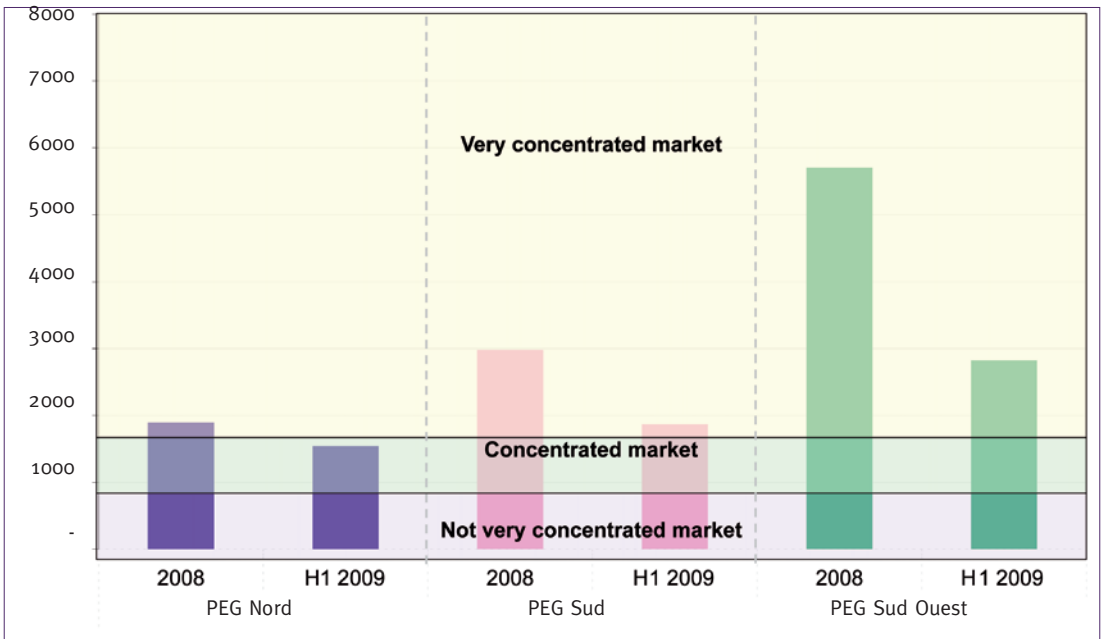
19. The Herfindahl-Hirschman Index equal to the sum of the squares of the participants' market shares and measures the market concentration (the higher it is the more concentrated the market). Generally, a market is reckoned not to be very concentrated if its HHI is less than 1,000, and to be very concentrated if it is greater than 1,800.



5.b HHI by PEG for selling on the futures market

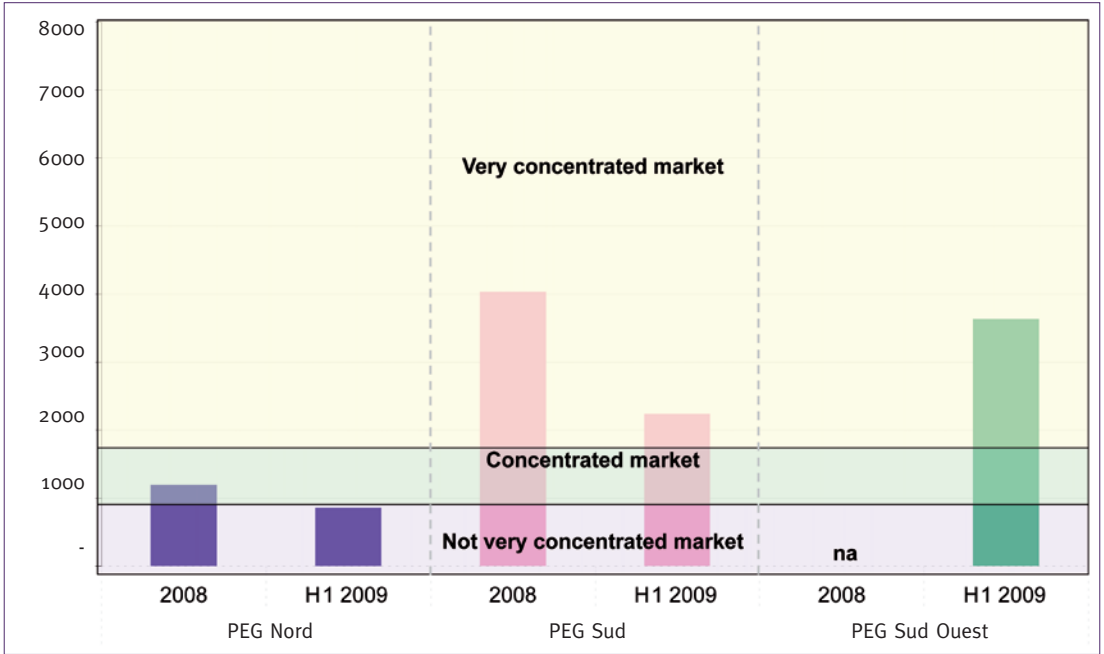


5.c HHI by PEG for buying on the short term market





5.d HHI by PEG for buying on the futures market



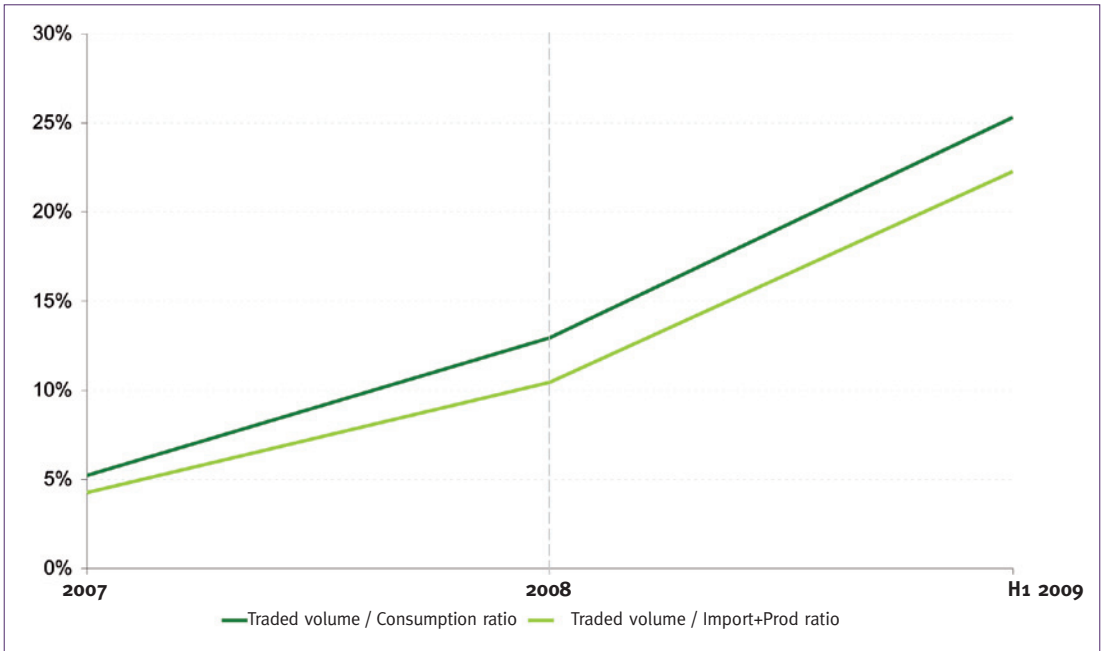
Sources: Brokers, Powernext; Analysis: CRE ;

Note: No futures transactions at PEG Sud Ouest in 2008



The figure below puts the growth of trading into perspective in relation to the size of the French market, illustrated by the consumption, imports and production. In the 1st half of 2009, the volume traded on the intermediated market represented the equivalent of 1/4 of the country's consumption (25.3%). In 2007, this ratio only reached 5.2%, which illustrates the growth of exchanges on the intermediated market since 2007.

FIGURE 6 – Trade indicators in relation to the macro-economic variables
- 2007 – H1 2009 -



Sources: Brokers, Powernext, GRTgaz, TIGF; Analysis: CRE

Note: Traded volumes only concern the intermediated market segment

Generally, the share of intermediated transactions (brokers, organised market) in the total of exchanges is growing strongly. This is a sign of the maturing of the French wholesale gas market, in which the most standard products are now dealt with on multilateral platforms, providing better conditions of visibility on prices and volumes.

2. THE PRICES OF GAS

The setting of prices on the wholesale gas markets depends on three main factors:

- the balance between supply and demand,
- the influence of the price of oil and its derivatives, for the countries where supply by contracts indexed on these products predominates,
- the correlation between the prices of different market places, depending on the possibility of arbitrages between those places.

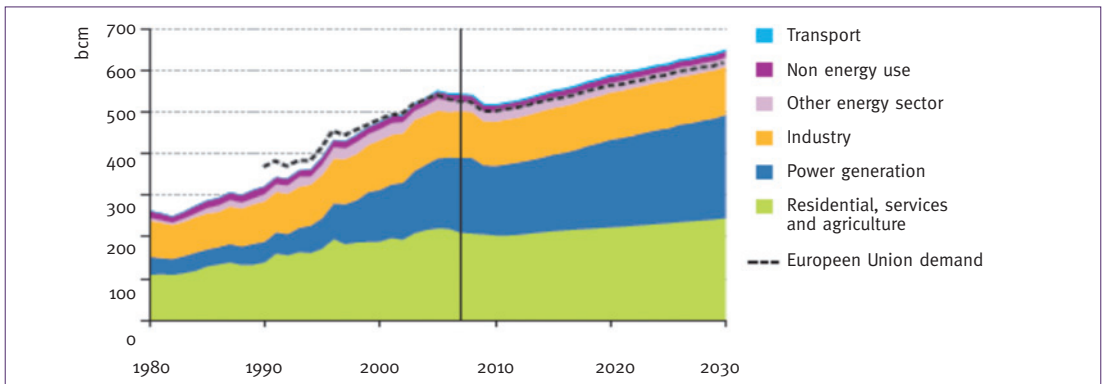
In continental Europe, the long term contracts historically negotiated according to the net back²⁰ principle and therefore indexed on the oil products, form the main source of gas supplies for the region. Therefore, the prices on the wholesale gas markets are subject to the price of these supply contracts and their movement is dictated by the fluctuations in the prices of oil derivatives.

The gas markets have experienced significant developments since the start of 2008, which have resulted in large scale movements in market prices worldwide, in Europe and in France:

- a heavy drop in the demand for gas as a consequence of the economic recession (figure 7),
- a sharp reversal of oil prices in autumn 2008, also in the wake of the recession,
- the appearance of excess gas supplies, particularly linked to the development of LNG and sources of non-conventional gas sources (especially in the United States).

Within this context, since the end of 2008, the French and European wholesale market prices have experienced strong downwards variations and, on average, have lost ground in relation to the prices of long term contracts. The phenomena became more pronounced during the 1st half of 2009. For example, the Day-ahead product's price at PEG Nord fell from an average of nearly €26 MWh in 2008 to an average of €15 MWh over the first six months of 2009.

FIGURE 7 – Natural gas consumption and development prospects in the European member countries of the OECD



Source: IEA World Energy Outlook 2009, reference scenario

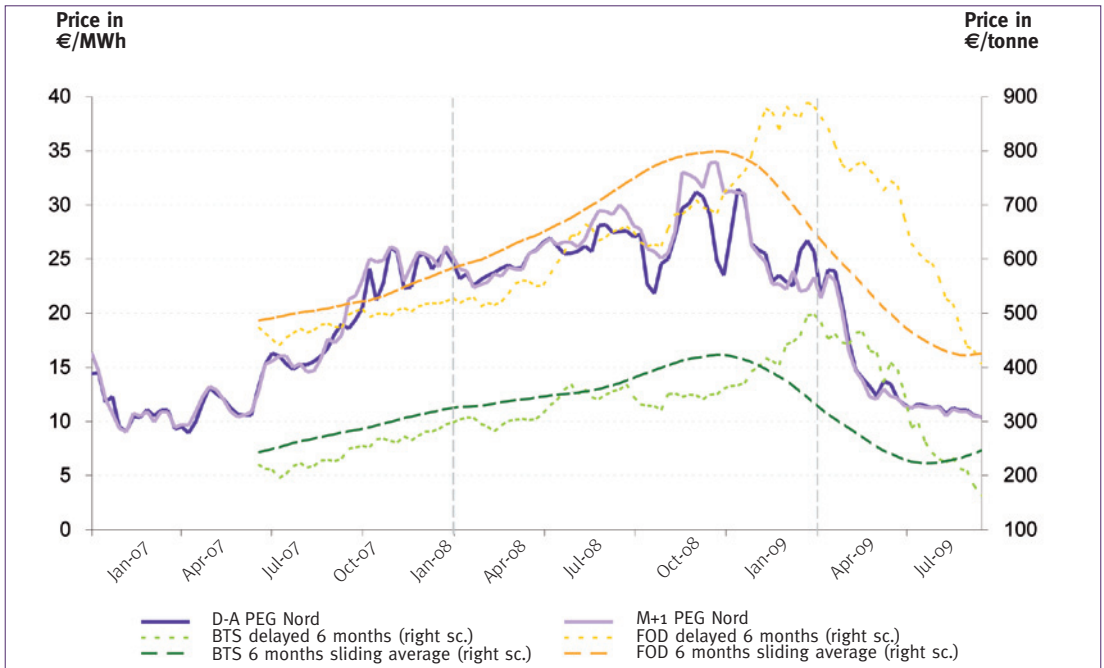
²⁰. See Glossary for the definition of net-back



2.1. For the major part of 2008, the wholesale gas prices in France followed an upwards trend linked to indexing on oil products, with a delay of several months. Their low levels in 2009 reflect the general context of weak demand in relation to the gas available on the international markets

Before the start of the recession, the fundamentals of the gas price on the wholesale markets in France remained linked to those of oil products, with, in general, a delay effect of around a few months, related to the usual indexing clauses of the long term supply contracts. Therefore, the long period of rising oil prices also caused an increase in the prices of long term contracts, indexed on the oil products, until the end of 2008. The sharp reversal in oil prices, starting in July 2008, only had an impact on the long term contracts from the beginning of 2009, after the delay period of several months allowed for in the indexing clauses of those contracts. The trend in market prices in France (Day-ahead, M+1 at PEG Nord), upwards for the major part of 2008, is consistent with these facts. Conversely, since the start of 2009, the spot prices in France have fallen strongly and have even fallen below €10 MWh for a few weeks (figures 8 and 9).

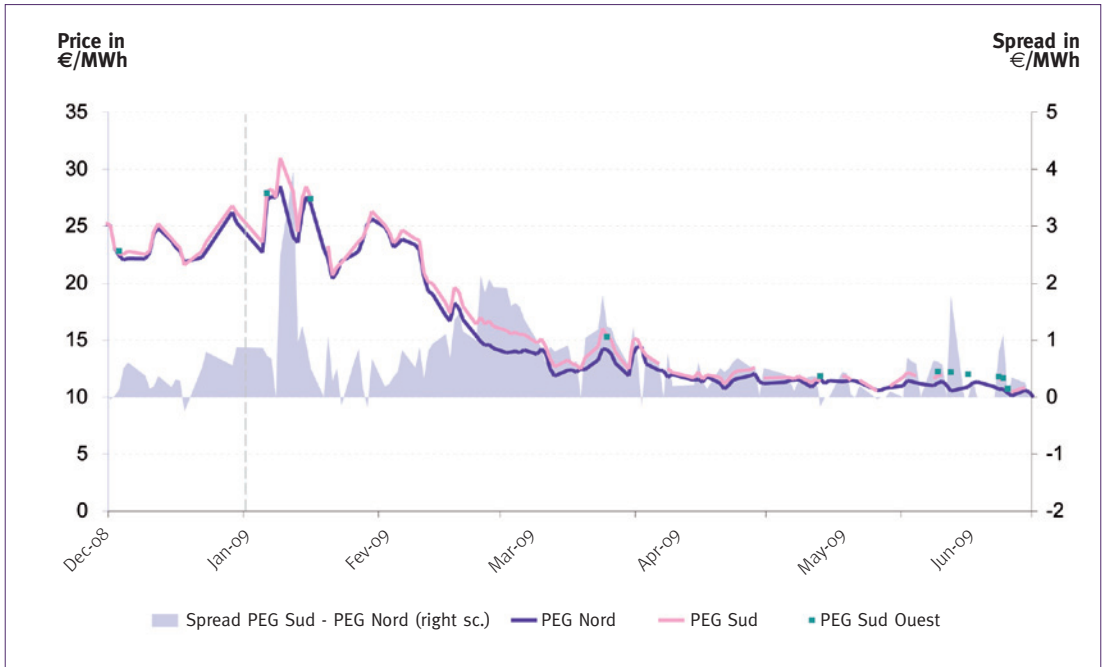
FIGURE 8 – Changes in the prices of oil products and market prices at PEG Nord
- weekly averages 2007 – June 2009 -



Sources: Argus, Powernext, Meeddat; Analysis: CRE

Note: FOB and BTS prices: average prices calculated throughout France, FOD data in €/hectolitres converted into €/ tonnes (density: 0.845kg/l). The market prices shown correspond to the prices applicable on working days.

FIGURE 9 – Day-ahead prices at PEG Nord and PEG Sud
 - daily prices Nov.2008 – June 2009 -



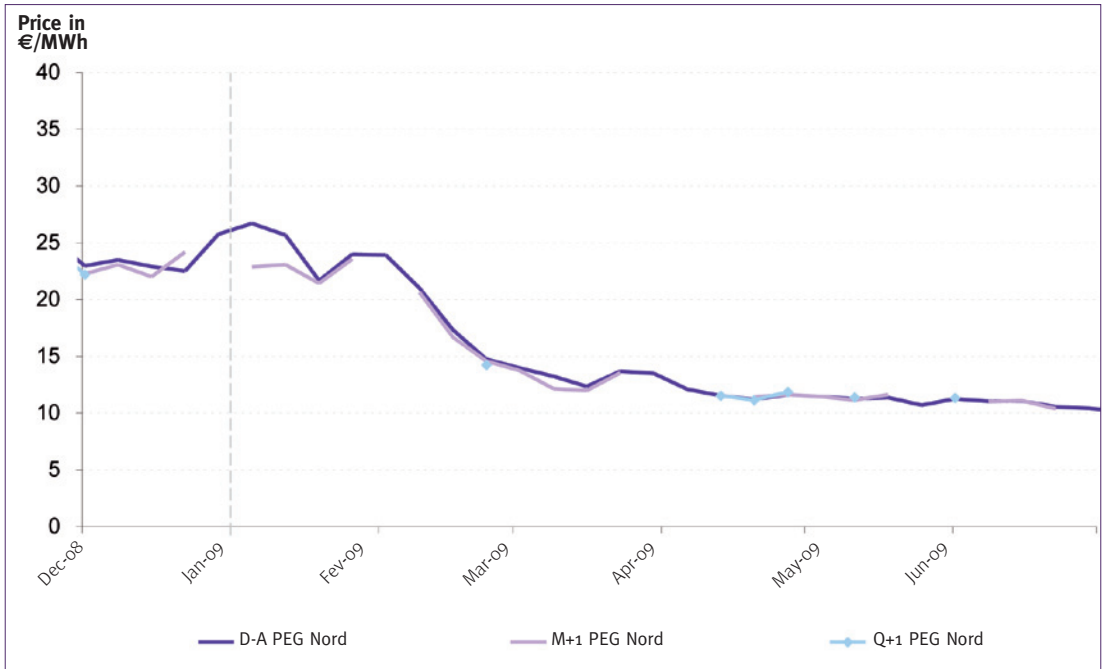
Sources: Argus, Powernext; Analysis: CRE

Therefore, the current levels of spot market prices in France seem to reflect the weak demand for gas in a growing way and are located well below the level of the long term prices indexed on oil. So, whereas the usual indicators of the underlying factors used in the indexing formulae have been divided by a factor of 2 between their high point in 2008 and their low point in 2009, the change in the spot prices shown is of the order of a reduction by three.

This configuration incites the holders of long term contracts to make maximum use of their Take or Pay clauses in order to increase their purchases on the markets. Furthermore, its effect is to seriously weaken the link between wholesale market prices and long term contracts, both in France and Europe, as long as the gas supply remains excessive in relation to world demand.

This trend can also be seen in the prices of future products, which have been trading at around €15 MWh since the 1st of January 2009 (€14.4 MWh on average during the 1st half of 2009 for the monthly products, €12.7 MWh for the quarterly products), thus presenting opportunities on the wholesale markets in France for the industrial consumers, the TSO and DSO.

FIGURE 10 – Spot and futures prices at PEG Nord
 - weekly averages Nov.2008 – June 2009 -



Source: Powernext; Analysis: CRE

2.2. The wholesale prices change in a similar manner in France and in Europe, even if they may occasionally become misaligned

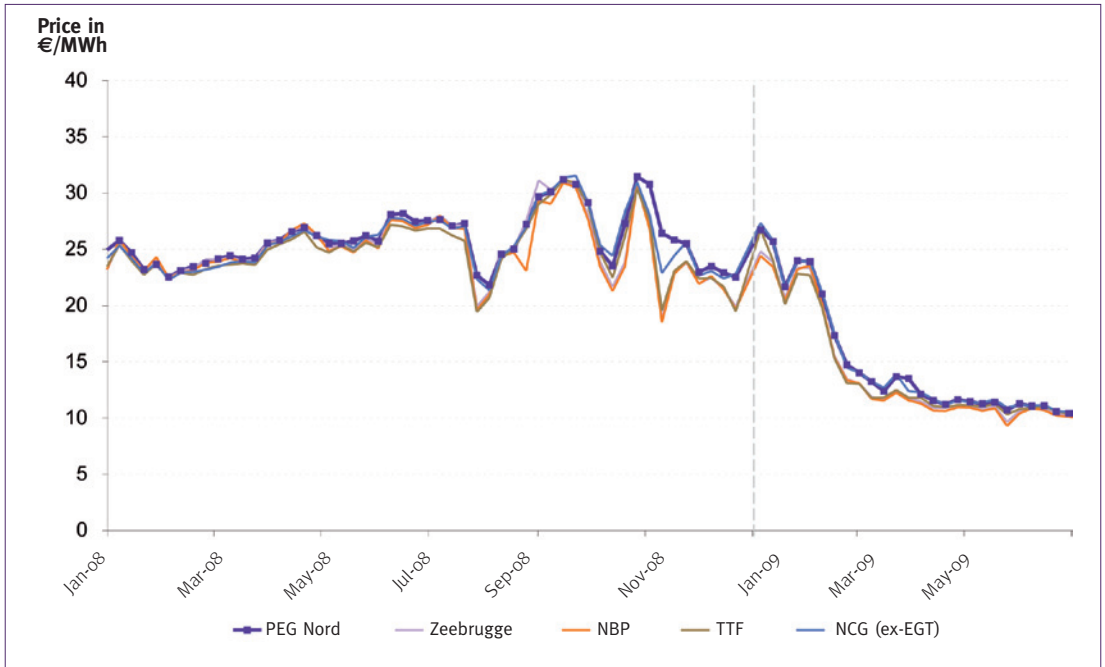
The GRTgaz North zone is connected to numerous sources of gas. It is supplied by North Sea gas and Russian gas, on the one hand, and it is connected to the Belgian and German markets on the other hand. The Belgian market is itself connected to the British market by the Interconnector, which can exchange gas in the 2 directions between the Belgian and British markets. Finally, the GRTgaz North zone receives LNG directly from the Montoir LNG terminal.



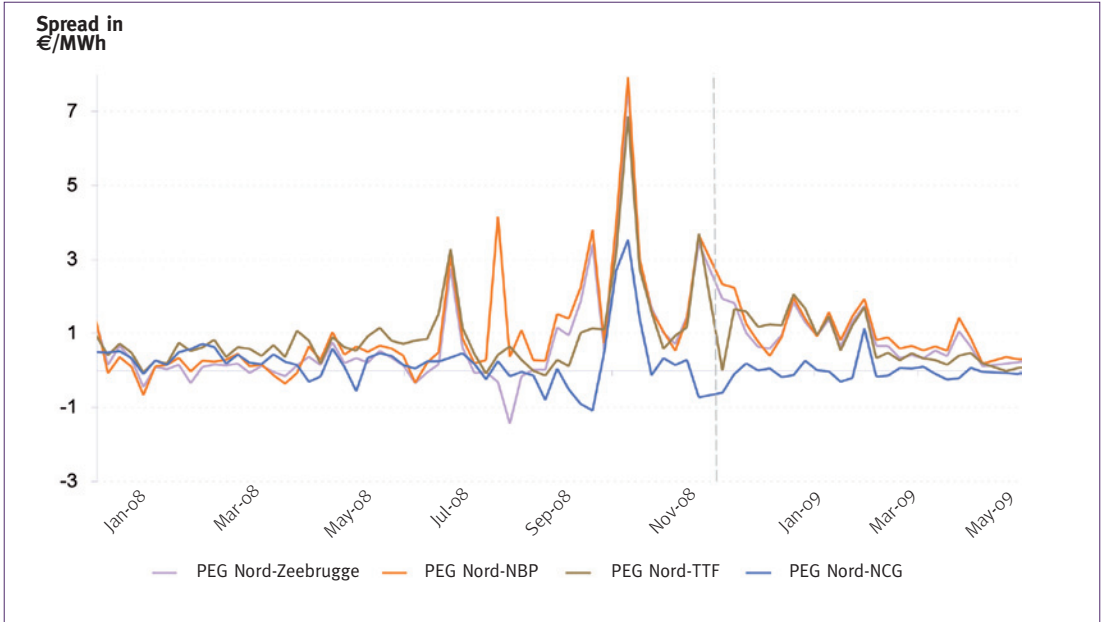
Therefore, there are arbitrage possibilities between the different sources of gas and the markets in Europe. Nevertheless, these possibilities are conditioned by the interconnection capacities available between transport networks and by the differences in the access conditions to these networks. So occasional disconnections between the prices of different markets can be observed, even if the trends followed have been close since the start of 2008 and the price spreads between countries are overall limited (figures 11 a and b and tables 4 a and b).

FIGURE 11 – Day-ahead price in France and on the European hubs
- 2008 – June 2009 -

11.a Day-ahead Price Level
France - Europe
- Weekly averages -



11.b Day-ahead Price spread
 France - Europe
 - Weekly averages



Sources: Argus, Heren, Powernext; Analysis: CRE

TABLE 4 – Price spread between France and the neighbouring countries

4.a On Spot prices (Day-ahead)

Average spread in €/MWh	2007	2008	H1 2009
Zeebrugge (B)	0.28	0.69	0.86
NBP (UK)	0.51	0.95	1.03
TTF (NL)	0.69	0.93	0.80
NCG (G)	Data not available	0.27	- 0.12

4.b On future prices (Month-ahead)

Average spread in €/MWh	2007	2008	H1 2009
Zeebrugge (B)	0.46	0.20	0.56
NBP (UK)	0.77	0.44	0.64
TTF (NL)	0.47	0.72	0.45
NCG (G)	Data not available	0.20	- 0.21

Sources: Argus, Heren, Powernext; Analysis: CRE

Note: average of daily difference (PEG Nord price – foreign price)



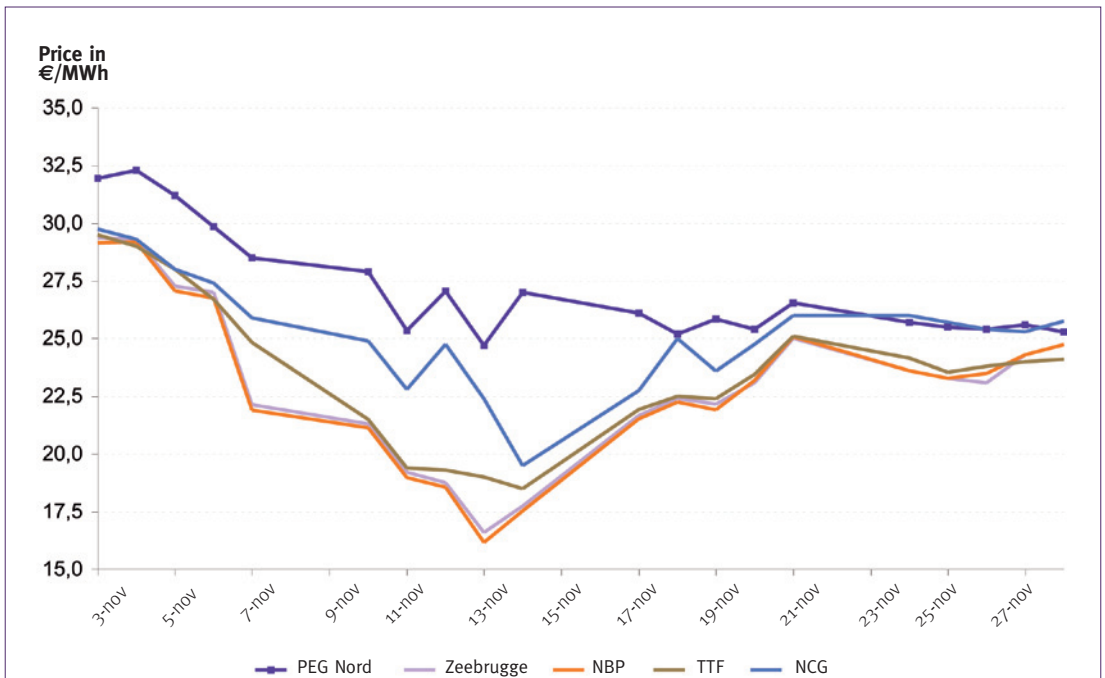
As table 4 indicates, the price differential is structurally positive in France and the bordering countries: the French price is on average always higher than the prices on the adjacent markets due to France's position at the end of the supply chain after Belgium and Germany. This situation may change in the future when gas arrives from the South of France (through the LNG terminals and the interconnections with Spain) and with increased possibilities of reversing the physical flows.

2.3. Specific investigations were carried out following the appearance of large spreads in the price of gas between PEG Nord and Zeebrugge in November 2008

Unusual price differences in November 2008 in relation to the historical averages

Although they had been very correlated for several years (see section 2.2), the Day-ahead prices at PEG Nord and Zeebrugge deviated significantly in November 2008. Whereas the average gap between the two prices was around €0.3 MWh over the first ten months of 2008, it settled at €4 MWh on average during November 2008 and approached €10 MWh on certain days. Over this period, the NBP and Zeebrugge markets saw their prices fall steeply at the start of the month, with a fall of €11 MWh between the 1st of November and the 13th of November. Conversely, the prices on PEG Nord and EGT markets recorded a much less marked fall (figure 12).

FIGURE 12 – Day-ahead prices of the European hubs
- Daily prices in November 2008 -



Sources: Argus, Powernext; Analysis: CRE

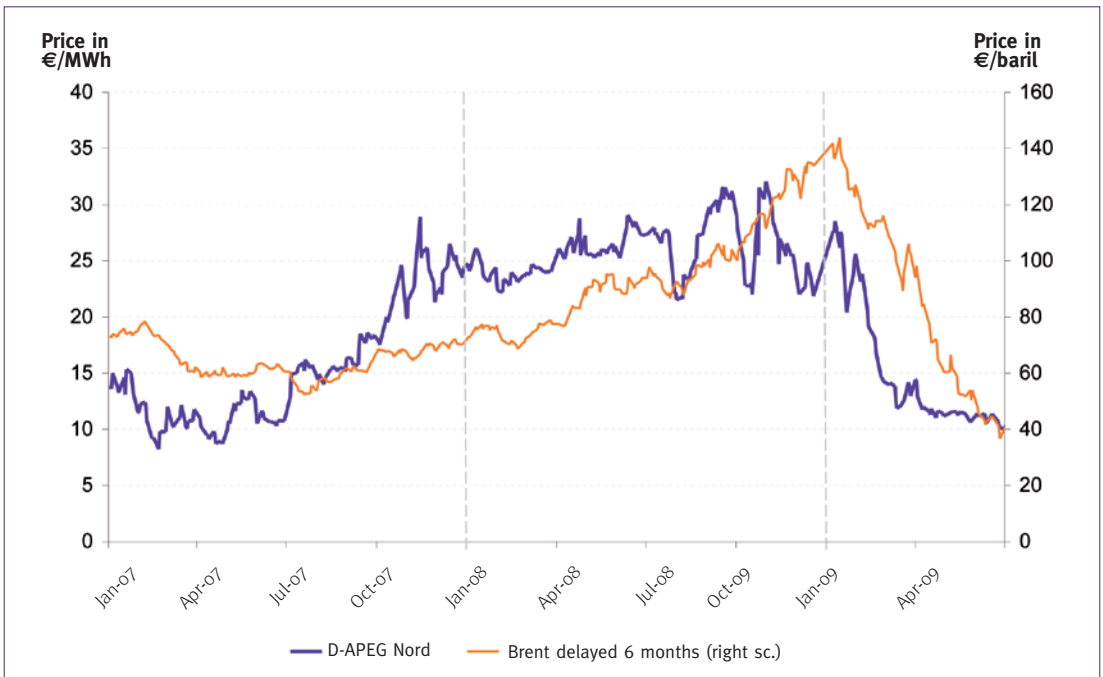


Some factors (well supplied system, clement temperatures and consumption lower than seasonal norms) may have led to a sharp variation downwards in the prices of gas on the NBP and Zeebrugge hubs during the first days of November that was corrected subsequently. Nevertheless, the CRE thought that it would be useful if it carried out investigation with GRTgaz and some shippers in order to identify the specific factors that may have contributed to this state of affairs and that may have impeded the setting of rapid arbitrages between the two Belgian and French markets.

A context favourable to arbitrage between long term supplies and short term purchases may have constituted a support factor for the market prices at PEG Nord

The sharp reversal in oil prices, which started in July 2008, was a major event for the economics of long term gas supply contracts indexed on oil products. As, in general, the indexing formulae include sliding averages calculated over several months, the fall in oil prices could not show up significantly in the different long term contracts until after this delay was taken into account (figure 13). Therefore, the effect of the flexibility clauses present in these contracts (possibility of reducing the volumes delivered within the limits of take or pay constraints) was to incite the participants supplied by long term contracts to minimise their withdrawals of gas under the terms of these contracts and satisfy their requirements by short term purchases at PEG Nord.

FIGURE 13 – PEG Nord Day-ahead price and price of oil with a 6 months offset
- Daily prices 2007 – June 2009 -



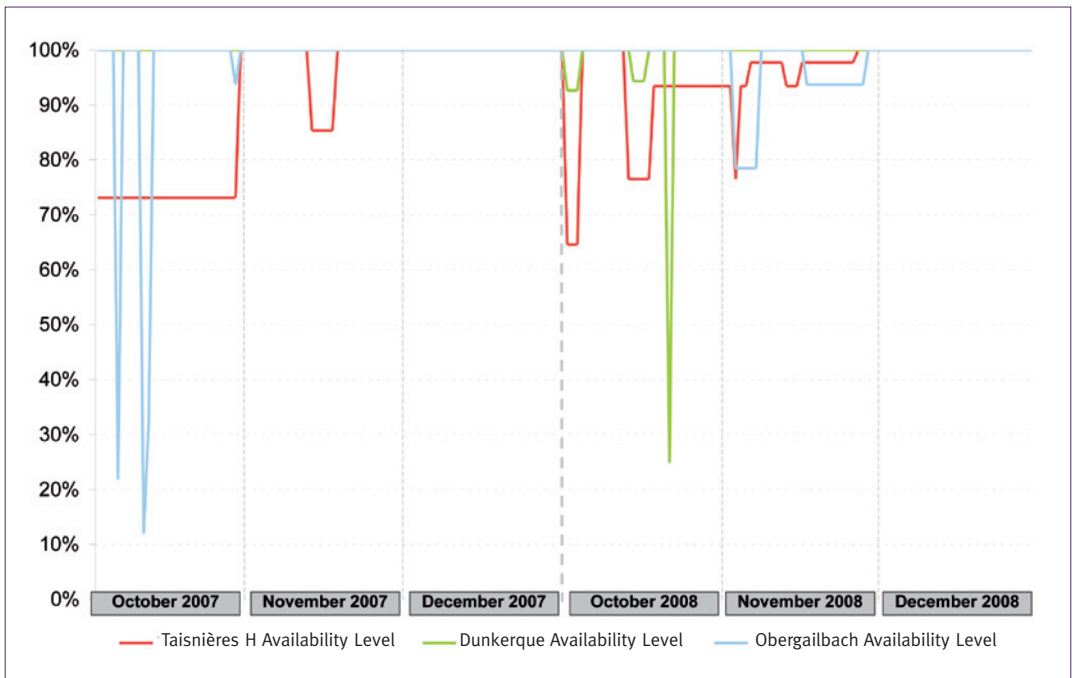
Sources: Argus, Powernext, Bloomberg

In fact, this configuration may be connected to the overall increase in the volumes delivered to the PEG over the last months of 2008 (see section 1.1).

Maintenance operations observed on the GRTgaz network and a lack of available short term capacities may have limited the possibilities of very short term arbitrage on the French side

November 2008 was a period during which maintenance operations on the GRTgaz network took place simultaneously at several network entry points (figure 14). The restrictions reached 50 GWh/j on average, split between Obergailbach and Taisnières H, around 4.7% of the maximum technical capacities at the two points. Even if the presence of maintenance operations is not unusual at this period and that simultaneous maintenance operations on several network entry points can be observed (especially in summer), this fact had consequences on the marketing of short term capacities.

FIGURE 14 – Availability levels of the Taisnières H, Dunkerque and Obergailbach entry points
 - 4th quarter 2007 and 4th quarter 2008 -
 Reduced capacity / technical capacity
 - Daily data -



Source: GRTgaz

Note: Reduced capacity: Planned or actual effective technical capacity given the work and interruptibility conditions (direct direction). Technical capacity: Theoretical maximum technical capacity (firm + interruptible)

A fine grain analysis was carried out of the information communicated to the market about these maintenance programmes and the marketing of short term capacities. It revealed that:

- the marketing of use-it-or-lose-it (UIOLI²¹) capacity was inapplicable in November 2008 in a period of capacity restrictions related to maintenance operations²²,
- certain marketable daily capacities were not marketed (26 GWh/j amounting to 4.4% of the maximum technical capacity over 8 days in November²³). GRTgaz identified the presence of operations that are still manual in the processing of the information system aimed at maximising the marketable capacities with the shippers as being at the origin of this difficulty. Renovation of the customer information system by 2011 with the aim of automating the marketing process should enable the company to eliminate these difficulties.

Note, however, that GRTgaz did not record any shipper complaints about a lack of available capacity during this period.

BOXED TEXT 1 – The operations realized by GDF Suez are globally consistent with these different findings

The CRE examined the operations performed by GDF Suez (including Gaselys), the main player at PEG Nord and for the deliveries at Taisnières. The analyses carried out revealed behaviour consistent with the points previously identified, i.e.:

- the import flows at Taisnières are in phase with the constraints at this entry point linked to i) the maintenance operation on the transport network and ii) upstream, on the transit network in Belgium,
- the collections on long term contracts at the North zone entry points were lower,
- a net buying situation every day in November on the Day-ahead products and more generally on the products for delivery in November at PEG Nord,
- a use of the entry capacities available to Gaselys at Taisnières during the month close to the maximum possible.

Setting up very short term arbitrages between France and Belgium is still structurally difficult

The mechanisms for marketing and allocating short term capacities in Belgium are not very suited to very short term arbitrage operations. In practice, there is no short term supply for transit capacities from Belgium to France. The only available capacities are offered by the Belgian network manager in monthly or annual blocks. These capacities are interruptible. Thus, there are still important differences between GRTgaz and Fluxys in the management and marketing of capacity at the Taisnières interconnection point. This difference may have proved a hindrance in November 2008.

²¹. See Glossary for the definition of the UIOLI

²². It is important to note that this rule changed on the 1st of January 2009 and that the marketing of UIOLI capacities is now operational even on maintenance days

²³. 9, 10, 11, 12, 16, 17, 18, 25, November 2008

Since November 2008, the following improvements have been made:

- the UIOLI mechanism now applies on the GRTgaz network even in maintenance periods,
- GRTgaz has made the process for determining the daily capacities available to shippers more reliable and is working on renovating its information system by 2011. This will contribute to greater reliability of published data,
- since the 1st of January 2009, GRTgaz has offered a multilateral capacity exchange platform on its network shared with Fluxys (Capsquare).

The price differences noted in November 2008 between PEG Nord and Zeebrugge have finally been reduced and no new episode of decoupling of prices has been observed since.

Improvement of the cooperation between transporters and regulators on either side of a border is one of the priority objectives of the North West Europe regional gas initiative under the authority of the ERGEG, which has notably resulted in the signing of a Memorandum of Understanding between the regulators of that region. In addition, the framework guidelines prescribed by the 3rd package will make the access conditions to the gas transport networks in Europe uniform and therefore make the exchanges between European gas hubs more fluid.

3. USE OF THE GAS INFRASTRUCTURE

Following several decades of growth in the consumption of gas in France, in 2009 the public authorities forecast, on the basis of the scenarios contained in the multi-annual indicative plan for gas that gas consumption will level off or rise slightly by 2020. Despite this, there is a growing need for investment in gas infrastructure. In the past, the development of this infrastructure was linked to the steady rise in the gas consumption. The main purpose of new infrastructure is to lift obstacles to the development of a real European internal gas market and strengthen of security of supply. These are investments whose aim is to make the transport of gas on the French network more fluid and to increase interconnection capacities with foreign gas sources and markets.

The emergence of a liquid wholesale market, which holds a large number of offers and demands from multiple participants, presupposes that market participants are able to make offers without being constrained by the size of the gas infrastructure or the network's contractual terms and conditions of use, such as the existence of multiple balancing zones. The setting up of the large GRTgaz North zone on the 1st of January 2009, made possible by capacity increases in this new zone, shows how these constraints can be lifted.

Investment in the gas transport networks in France rose from €526m to €736m between 2007 and 2009. Some of this increase is attributable to the tightening in regulations concerning safety and the environment. Nevertheless, more than half of the investment went to the development of the main transport network.

The increase in investment in gas infrastructure is set to continue: the ten-year investment plans presented by French operators in 2009 stood at €6.4bn for GRTgaz and €1.1bn for TIGF.

Alongside these investments, there has also been a rise in the number of French gas infrastructure users (table 5).

Table 5: Number of shippers that have reserved gas infrastructure capacity

		01/01/2007	01/01/2008	01/01/2009
Transport network	GRTgaz	25	37	50
	TIGF	8	13	19
Storage	Storengy (on 01/04)	16	22	23
	TIGF (on 01/04)	8	8	8
LNG terminals	Montoir terminal	3	4	5
	Fos Tonkin terminal	1	2	2

Sources: GRTgaz, TIGF, Storengy, Elengy

The GRTgaz North zone has benefited the most from this development while the zones in southern France (GRTgaz South and TIGF) have seen a slower rise in the number of shippers.

3.1. The conditions of use of the infrastructure in the GRTgaz North zone have been improved and the infrastructure has been used by a growing number of shippers

The GRTgaz North zone now concentrates around 90% of the country's gas import capacity: 2,150 GWh/day out of a total 2,405 GWh/day.

Significant improvement in access to the infrastructure in the GRTgaz North zone

The conditions of use of French gas infrastructure in the north of the country improved on the 1st of January 2009 with the introduction of a large North zone on the GRTgaz network following the merging of the former GRTgaz East, North and West zones. The merging of these zones, decided in 2005, required sizeable investments to guarantee the fluid movement of gas which is essential for the smooth running of such an extensive market area. This project gave rise to a market area of approximately 350 TWh (annual consumption) which is connected directly to the Belgian (Zeebrugge) and German (NCG) marketplaces. It also brought natural gas produced in Northern Europe into competition with gas produced in Russia, as well as liquefied natural gas. This increase in the number of possible sources of supply for shippers benefits security of supply and provides suppliers with access to a larger number of customers from the same entry point.

Greatly awaited by market participants, the implementation of this new zone was seamless.

An improvement in access to adjacent markets

The possibility of greater arbitrage transactions is bolstered by the improvement in network access conditions on networks upstream of the GRTgaz North zone. In Germany, the NetConnectGermany zone, which now forms a large southern area through which more than 50% of Germany's gas transits, is in the process of becoming one of continental Europe's most dynamic marketplaces. This zone is connected to the GRTgaz North zone at the Obergailbach interconnection point through the Megal gas pipeline. The emergence of this marketplace and its connection to the GRTgaz North zone was made possible thanks to several zone mergers which have taken place in Germany since 2007.

In Belgium, the North zone is connected to the Zeebrugge marketplace, one of continental Europe's most liquid gas hubs, through the Fluxys transport network.

Access to these marketplaces which are adjacent to the North zone is nevertheless still restricted by transport capacity access conditions which differ on either side of the border. While GRTgaz offers 20% of its entry capacities on a short-term basis (period of one year or less), the same does not apply on adjacent networks where firm capacity in its entirety is reserved over the long term.



A secondary capacity market that is struggling to get off the ground

The secondary capacity market should lead to an improvement in access to transport capacities. However, while the implementation of Capsquare by GRTgaz and Fluxys provides a tool dedicated to the exchange of capacity on transport networks between Zeebrugge and PEG Nord, it is still hardly used.

More widely distributed access to transport capacity among shippers in GRTgaz North zone

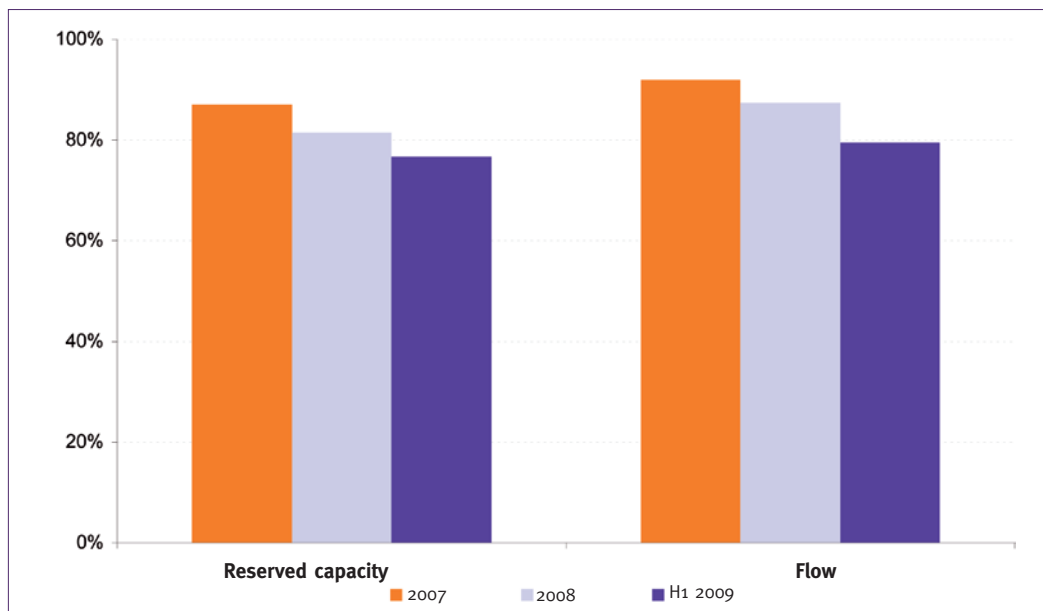
The improvement in infrastructure access conditions has resulted in a rise in the number of active shippers in the GRTgaz North zone.

The overall rise in the number of shippers concerns the North zone interconnection points. At Taisnières there were 22 active shippers in the first half of 2009 compared to 14 in 2007. The number of shippers has remained virtually stable at Obergailbach and Dunkirk. The Montoir terminal in the first half of 2009 had five users compared to three in 2007.

As shown in figure 15, the capacity reserved in the GRTgaz North zone by the three biggest shippers dropped between 2007 and 2009 at Taisnières and Dunkirk. At Taisnières, the share of capacity reserved by the three leading shippers dropped from 87% in 2007 to 77% in the first half of 2009. In contrast, this share rose at Obergailbach.

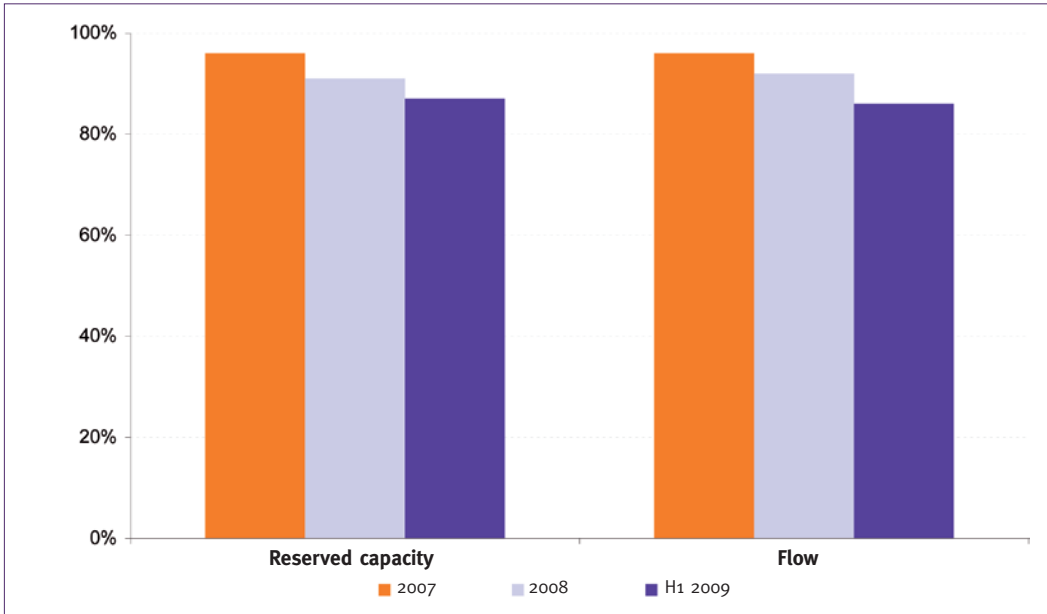
FIGURE 15 – Reservation and use of entry capacities by the three largest shippers
- as a %, 2007 – H1 2009 -

15.a Three largest shippers at Taisnières H

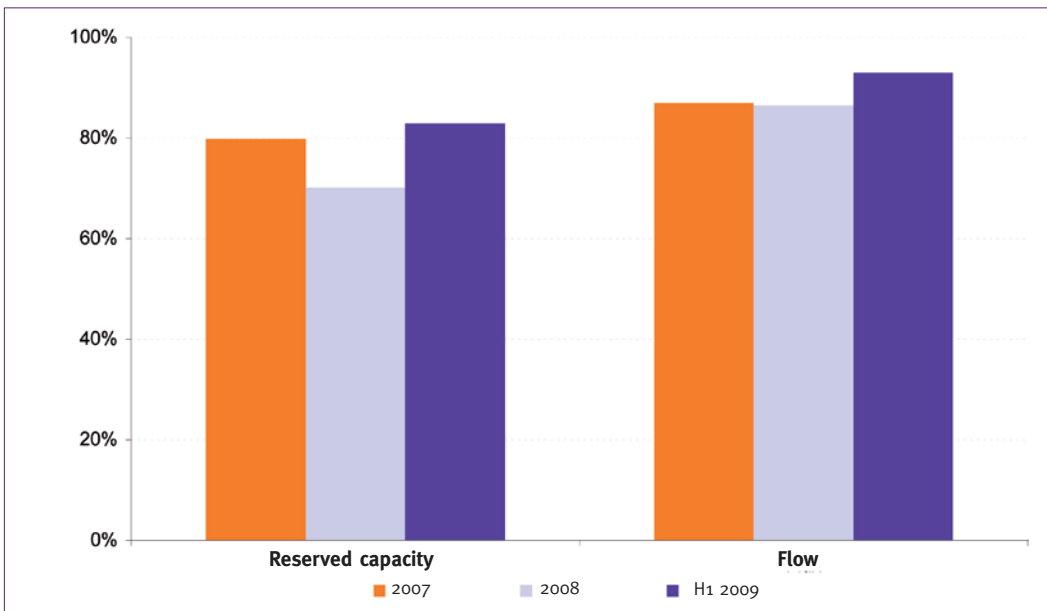




15.b Three largest shippers at Dunkirk



15.c Three largest shippers at Obergailbach



Source: GRTgaz; Analysis: CRE

The Montoir-de-Bretagne LNG terminal, the fourth gas entry point in the GRTgaz North zone, is also being used by a growing number of users (see above). The number of ‘uniform’ unloading operations reserved by shippers²⁴ (constant send-out to the network over 30 days) dropped from 15 in 2007 to 11 per year in 2008 and 2009. Meanwhile, the number of ‘uniform’ unloading operations rose from one in 2007 to two in 2008 and five in the first half of 2009.

Use of storage facilities shared between a growing number of shippers

The use of storage facilities has mirrored the trend in the use of the transport network in the GRTgaz North zone. The change in storage capacities reflects that of suppliers’ end customer portfolios. In France, storage rights are allocated each year by ministerial decree on the basis of this portfolio. In 2009, these storage rights represented around 89% of total storage capacity sold in France.

Between April 2008 and March 2009, storage capacity in the GRTgaz North zone was held by 22 shippers, the first three of which held 91.9% of this capacity. On the 1st of April 2009, 23 shippers held this storage capacity with the first three holding 91.3%.

On the 1st of November 2009, 26 shippers held this storage capacity. Among these 26 shippers, 7 shippers that did not have any storage rights were able to reserve capacity when Storengy and TIGF sold storage capacity which was not allocated through the storage right process.

A satisfactory use of storage facilities despite the difficult conditions

Storage infrastructure was in high demand in the winter of 2008-2009. A very cold winter combined with the Russia - Ukraine crisis meant particularly large volumes of gas were withdrawn, especially from saline storage facilities, in January 2009. On the 31st of March 2009, the quantity of gas in stock stood at 27.8 TWh, which is particularly low compared with other years. On the 1st of November 2009, French storage facilities were once again at very high levels, reaching 139.8 TWh or 99.8% of total storage capacity.

TABLE 6 – Level of gas in stock in France
- 2007 – 2009 -

Volume in TWh	31/03/2007	31/03/2008	01/11/2008	31/03/2009	01/11/2009
Storengy	26.9	38.8	110.4	20.7	111.2
TIGF	7.4	11.3	27.1	7.1	28.6
Total	34.3	50.1	137.5	27.8	139.8

Sources: TIGF, Storengy

24. ‘Uniform’ service: please see glossary

Boxed text 2: During the Russia - Ukraine crisis, maximum use was made of the infrastructure which continued to guarantee the supply of gas in France

The crisis between Russia and Ukraine in January 2009 coincided for France and north-west Europe with a significant rise in gas consumption due to a spell of cold weather.

Daily gas consumption between the 6th and 9th of January rose on average by 433 GWh/day, or 20%, compared with the previous seven days. Gas consumption then dropped to usual seasonal levels as from the 12th of January due to a gradual increase in temperature.

On Tuesday the 6th of January 2009, Russian gas imports into France at the Obergaibach entry point plummeted to 94 GWh/day, a drop of 76% compared with the average flow rates of the previous seven days. The flow of gas entering Obergaibach then levelled off between the 6th and 19th of January before returning to normal as from the 20th of January (268 GWh).

In France, the sudden drop in Russian gas supplies had a knock-on effect on the gas infrastructure. Nevertheless, use of the transport networks and storage groups meant that the supply to French end customers was not interrupted.

The shortage of Russian gas and the rise in consumption were largely offset through resorting to storage facilities (50% saline sites / 50% aquifers). In the first few days of the crisis, the Salins Sud storage facilities covered around 45% of the rise in the demand for gas. The Salins Sud storage group, which must enable the country to deal with any peak in cold weather at the end of the winter, returned to injection mode as from the 18th of January.

The TIGF zone, which had to supply customers located in its zone without any additional gas from the GRTgaz South zone, also contributed to balancing the French network as a whole.

Changes in the use of gas infrastructure in the GRTgaz North zone has resulted in greater liquidity at PEG Nord

As a consequence of the development of transport infrastructure in the GRTgaz North zone and the use of this infrastructure, a growing number of shippers are able to deliver and take delivery of gas in the north of France. Liquidity in the exchanges of gas at PEG Nord has risen significantly since 2007 (see chapter 1).

A recent development should also contribute to improving liquidity in the North zone: on the 1st of December 2009, GRTgaz started to use the Powernext platform to cover a share of its balancing requirements, which had previously been done through a dedicated platform. This concentration of liquidity on one single platform should contribute to the emergence of a reference price in the North zone.



3.2. The conditions of use of infrastructure in the south of France have been simplified, but there is still room for improvement

Supply to the south of France was placed under particular strain in 2009, as shown by the very high rate of use for its two main entry points in the first half of 2009: 96% for the connection between GRTgaz North and GRTgaz South and 84% for the Fos Tonkin LNG terminal. Under these exceptional circumstances, the market mechanisms at the North-South connection point worked well. Even though more than 20 shippers hold North-South capacities, the capacity available was almost entirely used and the shippers managed to comply with the balancing requirements. Such strain is attributable to the high level of consumption in the first quarter of 2009 due to the cold weather and the use of storage facilities. Subsequently, the filling of the storage facilities, which were very low at the end of the winter, placed a lot of pressure on the infrastructure.

Constrained supply in the south of France

For its supply, the GRTgaz South zone has the Fos Tonkin LNG terminal which has a regasification capacity of 7 Gm³ per year, or around 250 GWh/day. The import capacity of the TIGF zone is marginal: the Biriadou interconnection point has a capacity of 5 GWh/day and only virtual reverse flows are possible at Larrau. Production at Lacq represents around 30 GWh/day.

To cover their daily average consumption, the two zones in the south of France rely on gas which comes from the GRTgaz North zone. Risks to the supply of this zone are therefore greater than for the GRTgaz North zone.

While, over the entire GRTgaz network, the number of active shippers rose significantly in 2008, the Fos Tonkin terminal (managed by Elengy) remains reserved and used by a very small number of shippers (see above). Significant use was made of this terminal in 2009.

TABLE 7 – Rate of use of the Fos Tonkin terminal
- 2007 – H1 2009 -

2007	2008	H1 2009
72%	71%	84%

Source: GRTgaz; Analysis: CRE

In the TIGF zone, Biriadou's import capacity was only used by one user in 2007, four in 2008 and three in the first half of 2009. Larrau's reverse capacity was reserved by three users in 2007, four in 2008 and three in the first half of 2009 for flow rates which were slightly higher than those that passed through Biriadou.

A constraint on the North-South connection attenuated thanks to an effective short-term UIOLI mechanism

The connection between the GRTgaz North and GRTgaz South zones is vital both for the supply of gas to the south of France and for the functioning of the market as most suppliers can only access customers in the south of France through this connection.

At the time of the allocation of North-South connection capacity at the end of 2007, 21 shippers obtained capacity as from the 1st of January 2009 for periods of two, three or four years, thereby doubling the number of shippers that are likely to gain access to the GRTgaz South zone.

The figure below shows the great extent to which this interconnection is used: in the first half of 2009, it was used on average at a rate of 96%.

FIGURE 16 – Use of the North-South connection
- in GWh/day, January - June 2009 -



Source: GRTgaz; Analysis: CRE

NB: **gas transported**: total of quantities allocated to shippers (direction North-South). **Daily available quantity**: Actual technical capacity in light of work and interruptibility conditions (direction North-South)

Maximum use of the North-South connection was possible thanks to the implementation of nominations at this point, thereby enabling the use of the interruptible and short-term UIOLI (Use-it-or-lose-it) mechanism. This mechanism allows shippers to nominate greater quantities than those which have been reserved. In the event some shippers nominate quantities below those which they have reserved, GRTgaz reallocates non-nominated capacities to shippers that have nominated more than what they have reserved. This reallocated capacity can be interrupted with the original owner retaining the right to change its nomination during the day.

This mechanism optimises the use of the North-South connection by redistributing capacity among shippers in accordance with their needs.

Optimisation of the use of the North-South connection and the correct functioning of the short-term UIOLI mechanism probably explain the absence of a peak price in the south of France despite the strain placed on supply. In 2009, the difference

in price between PEG Sud and PEG Nord remained at a level similar to or lower than the firm capacity price.

The filling of the storage facilities in the south of France was very satisfactory: the facilities were full at the start of the winter despite having been very low at the beginning of the summer.

No visible constraint between the TIGF and GRTgaz South zones

While the supply of gas to the south of France is particularly strained, the connection between the GRTgaz South and TIGF zones does not appear to be under any pressure. The development of capacity at the interface between GRTgaz South and TIGF and the simplification of capacity products sold on the 1st of January 2009 have improved access to the TIGF zone. In the first half of 2009, 14 shippers reserved capacity from GRTgaz South to TIGF while nine shippers reserved capacity in the opposite direction.

In the same period, use of the connection from GRTgaz South to TIGF stood at 40% while in the opposite direction it was 13%.

FIGURE 17 – Use of capacity at the Midi Network Interconnection Point from GRTgaz South to TIGF - in GWh/day, January - June 2009 -



Source: GRTgaz; Analysis: CRE

Use of this connection is therefore under a lot less pressure than the use of the North-South connection.

Future developments to resolve supply constraints and enable the emergence of a wholesale market in southern France

While the supply of southern France is currently being carried out in a satisfactory manner, it is nevertheless subject to significant pressure given that this zone's entry capacities let it only just cover its consumption requirements and the flow quantities linked to gas injections in the storage facilities.

This situation is set to improve as soon as the Fos Cavaou terminal becomes fully operational. The terminal is currently being tested and has recently received temporary authorisation to operate at 20% of its capacity.

The creation of firm import capacities, even limited to 1 Gm³/year, at the Larrau interconnection point in November 2010 will relieve the South zone's supply constraint a little. Subsequently, in around 2013, following the Open Season which took place in September 2009, capacity at the Larrau interconnection point will increase to 5.5 Gm³/year in both directions.

As was the case for the GRTgaz North zone, this increase in entry capacity is needed to enable a liquid wholesale market to emerge.

The existence of two marketplaces is holding back the emergence of a liquid wholesale market in southern France

Sufficient entry capacities alone do not guarantee the emergence of an effective wholesale market. Such a market also requires a sufficient volume of exchanges and a sufficient number of participants, without which the necessary liquidity and size of exchanges will remain lacking. The existence of two marketplaces in southern France, PEG Sud and PEG Sud Ouest, segments the volume of exchanges and isolates the participants in these two markets.

Conclusion: an encouraging change in the use of the infrastructure in the north of France with tangible results in the wholesale market...

Recent developments in the access to and use of the infrastructure in the North zone have endowed this zone with most of the characteristics to become an efficient marketplace on which natural gas suppliers can rely to balance their needs and resources. Nevertheless, several points still need to be improved including the harmonisation of network access conditions between the GRTgaz North zone and adjacent markets, the emergence of a real secondary capacity market, and the possibility of making physical flows from France to Belgium and Germany.

...while the South must continue to make progress

In the south of France, there are still obstacles to the market's development: supply constrained by the current size of entry capacities and the existence of two different marketplaces. Nevertheless, the conditions of access to the south of France should improve with the commissioning of Fos Cavaou and the development of interconnections with Spain.

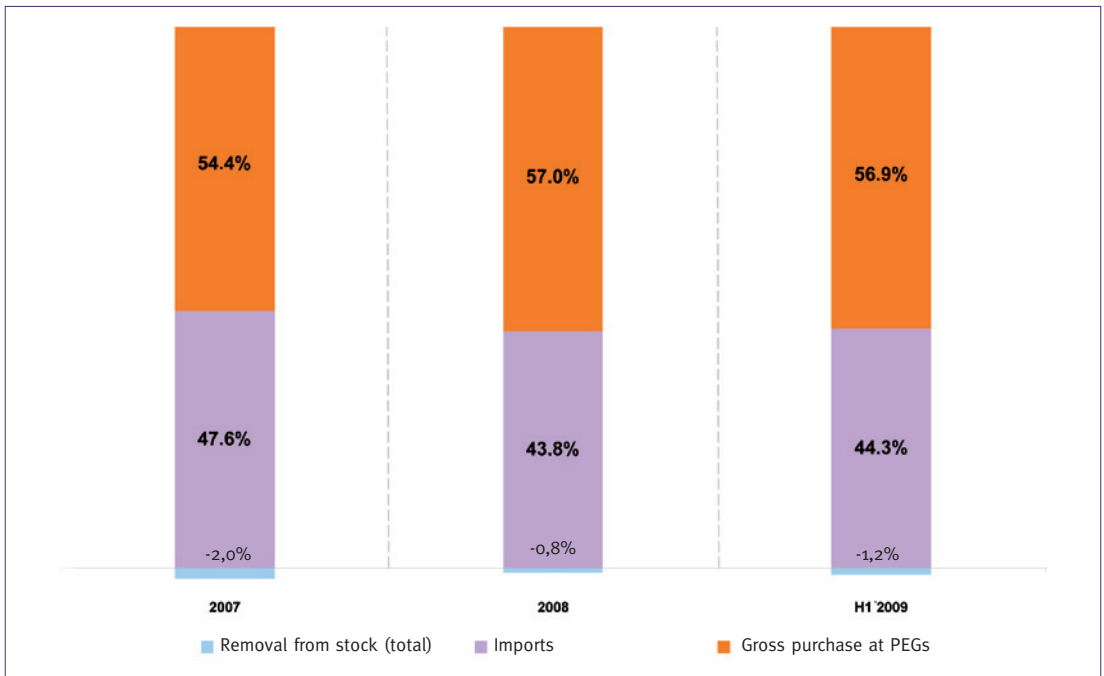
4. PARTICIPANTS' SOURCES OF SUPPLY

This last section analyses the structure of sources for active participants in the French gas market. Specific attention is given to the supply of alternative suppliers²⁵ in the South and South-west zones. A global analysis of data collected in 2008 for seasonal and annual products for delivery in 2008 and 2009 is included.

4.1. There is a balance between imports and purchases at the PEG for the new entrants in France

Figure 18 illustrates the structure of supplies of new entrants as a percentage over the entire country. While the vast majority of imports are carried out by French incumbent suppliers, these suppliers resale a part of the imported gas to the PEGs, which constitute the main source of supply for new entrants. The new entrants' supply structure has been stable over time. Their level of activity has made constant progress: in 2008, 13.5% of deliveries to end customers in France were made by new entrants compared to 12.1% in 2007 and 7.8% in 2006. Shipper supplies are used to provide gas to their end customers while some of the supplies are also exported and sold to the PEGs.

FIGURE 18 – Supplies of new entrants in France by source
- as a %, 2007 – H1 2009 -



Sources: GRTgaz, TIGF; Analysis: CRE

²⁵ The terms 'alternative suppliers' or 'new entrants' are used to refer to shippers which are not incumbent suppliers in France.

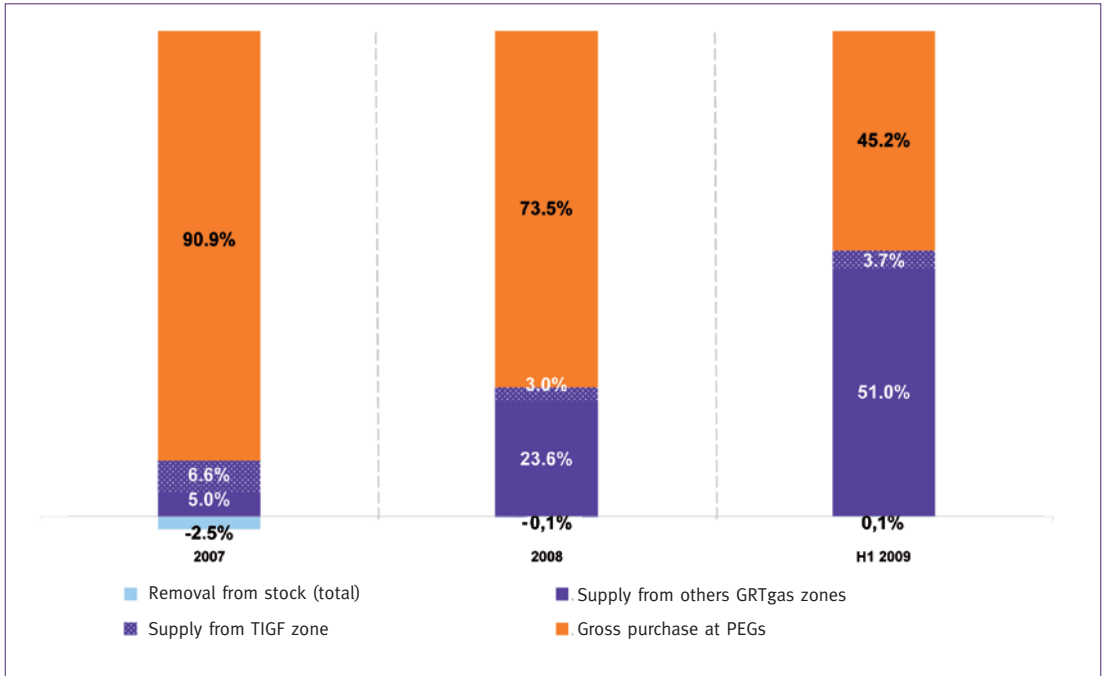
4.2. An increase in the use of the North-South connection to supply the South zone

The specific characteristics of the South zone condition the level and structure of the new entrants' supplies:

- There is only one border entry point: the Fos Tonkin LNG terminal which supplies around a third of the gas consumed in the zone but which is mainly used by the new entrants.
- Trade volumes at the PEG are not very developed in comparison with the zone's consumption level (deliveries to PEG Sud represented the equivalent of 22% of the consumption of the zone's end customers compared to a national level of 36% in 2008).
- Until the end of 2008: the West-South connection, which was used to transport gas from the entry points in the North or from Montoir, was hardly accessible to new entrants: less than 1% of the capacities sold were held by new entrants in 2008.
- Until the end of 2008: the East-South connection, which was used to transport gas from the entry points in the North and East, was the only gas pipeline source of supply for new entrants. In 2008, new entrants held 10% of the capacities sold.
- Since the 1st of January 2009, the formation of a large North zone through the merging of three GRTgaz balancing zones has enabled the sale of a unique product for the North-South connection.

Figure 19 illustrates the supply structure in the South zone for the new entrants. This gas was, above all, used for the consumption of final customers and resale to the PEG. Some of the gas was also sent to the South-west zone (8% of supplies in 2008).

FIGURE 19 – New entrants’ supplies in the South zone by source
 - as a %, 2007 – S1 2009 -



Sources: GRTgaz, TIGF; Analysis: CRE

NB: the flow of gas from the South zone to other GRTgaz zones has not been included; this flow represented 1923 GWh in 2008, all shippers combined.

Those participants without any import capacity in the South zone transport gas from other balancing zones and purchase the rest of their supplies from the South PEG. This is due to difficult supply conditions, as mentioned earlier (see section 3.b).

In 2004, a step was taken to provide a partial response to the problem of competitive access to the South zone: the gas release programme. The release of gas began in January 2005 and ended in December 2008. The gas release programme provided suppliers with gas in the South zone at prices similar to the supply costs of suppliers with long-term contracts (indexed on heavy fuel and domestic heating oil).

As from January 2008, gas release deliveries began to decline as beneficiaries turned towards alternative sources of supply: as shown in figure 19, suppliers replaced their gas release supply by reserving North-South capacities (East-South and West-South until the 1st of January 2009 and then North-South since this date). In order to analyse the effect of the end of this programme, information was collected in the summer of 2008 on the transactions concluded in 2007 for 2008 and 2009 of calendar and seasonal products. The main findings are summarised in the boxed text below.

BOXED TEXT 3 – Data collected on seasonal and annual products for delivery in 2008 and 2009

The following table shows data on the volume and liquidity of specific forward transactions concluded in 2007 between French gas market participants. This data was collected by CRE in the summer of 2008. At the time of purchase, seven companies traded bilaterally while nine used brokers. At the time of selling these products, ten companies negotiated bilaterally while 11 used the service of a broker.

TABLE 8 – Main characteristics of the transactions collected

Products	Bilateral (OTC direct)			French market*		
	Summer	Winter	Y	Summer	Winter	Y
Volume (TWh)	4.3	0.1	2.8	7.8	3.7	5.0
Number of transactions	16	1	8	36	26	10
Part in volume	55%	2%	57%	100%		
Part in number of transactions	44%	4%	80%			

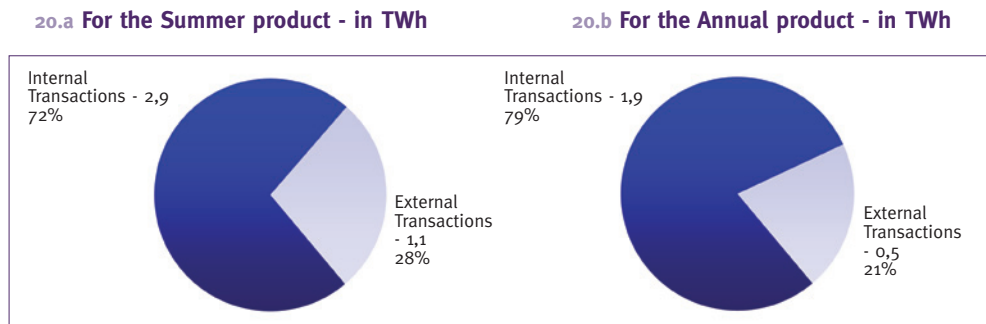
Sources: Brokers, French market participants

* made up of bilateral transactions and transactions through brokers.

Transactions dominated by intra-group exchanges

In the bilateral market segment, and among the transactions performed on seasonal and annual products in 2007 for delivery in 2008 and 2009, a large share of transactions were operations between parent companies and their trading subsidiaries. These transactions reflect a strategy of optimising the firm’s portfolio. The subsidiary therefore acts as a go-between on behalf of the parent company. The volume share of these transactions for Summer 2008 and Calendar 2008 products in 2007 was 75% and 78%, respectively. These specific transactions concern all types of daily quantities, with a predominance of 750 MWh/day products. Certain operations can also include products that reach as much as 3,000 MWh/day.

FIGURE 20 – Share of internal transactions by product



Source: CRE, on the basis of data collected in 2008

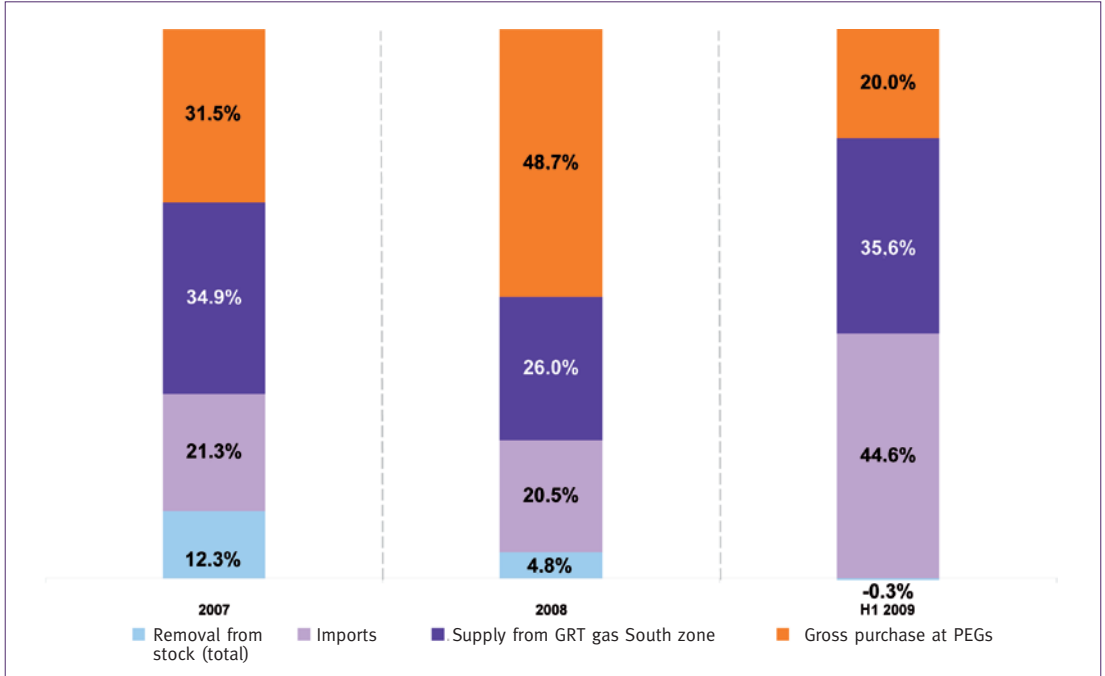
4.3. South-west gas supplies split between PEG purchases and supplies from the South zone and Spain

The South-west zone’s specific characteristics condition the level and structure of new entrants’ supplies:

- There are two physical border points connected to Spain: Biriadou and Larrau which supplied 5,8% of the gas consumed in the zone in 2008. These two points are mostly used by the new entrants, which were the recipients of 77% of the volumes imported into the South-West zone in 2008.
- Trade volumes at the PEG are not very developed in comparison with the zone’s consumption level (deliveries to PEG Sud Ouest represented the equivalent of 22% of the consumption of the zone’s end customers compared to a national level of 36% in 2008).
- The South-South-west interzone connection (formerly South-South-west and West-South-west) is used to transport gas from entry points located in the GRTgaz zone: in 2008, around 5% of sold capacities were held by a shipper which was not an incumbent French shipper.

Figure 21 illustrates the structure of the supply of gas to new entrants in the South-west zone. This gas was used for resale to the PEG, final customer consumption and exports to Spain and GRTgaz zones (24% of supplies in 2008).

FIGURE 21 – Supplies to new entrants in the South-west zone by source
 - as a %, 2007 – S1 2009 -

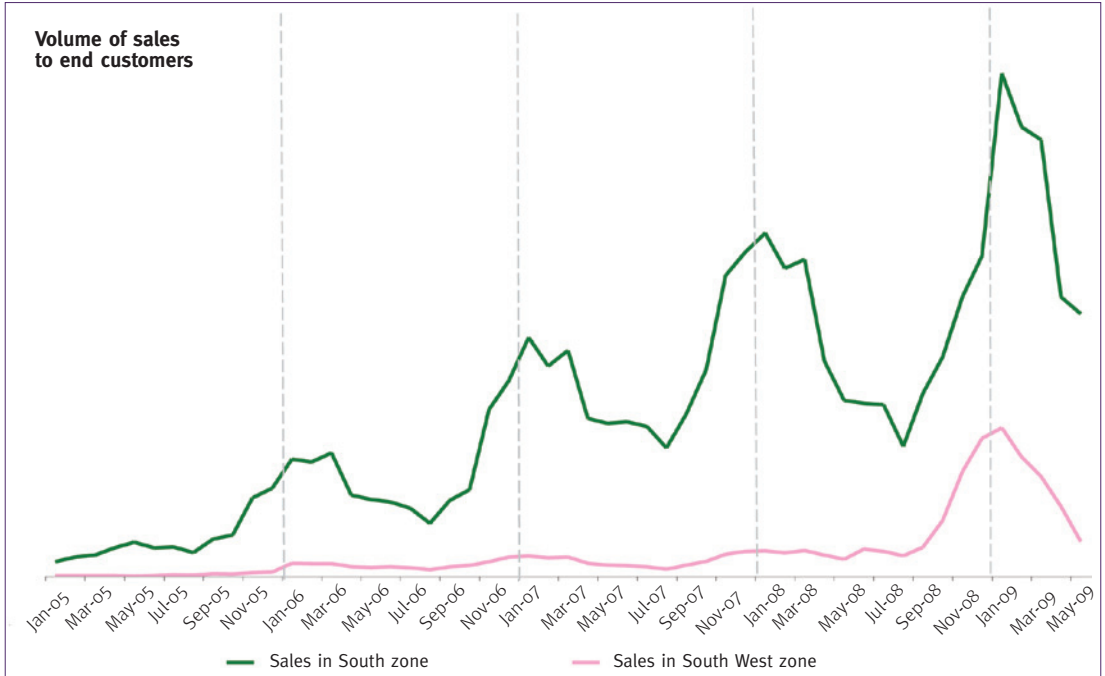


Sources: GRTgaz, TIGF; Analysis: CRE



Finally, changes to supply conditions have enabled alternative suppliers to develop their activity in the South and South-west zones as shown in figure 22. In the first half of 2009, alternative suppliers made 14.3% of the deliveries to end customers in the South zone and 11.8% in the South-west zone, which is a comparable to the national level (14%).

FIGURE 22 – Monthly sales of alternative suppliers to end customers in the South and South-west zones
- 2005 – S1 2009 -



Source: GRTgaz, TIGF

NB: Sales to end customers connected to the transport and distribution networks



Section III

Appendices

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1. GLOSSARY

OTC market: Over the Counter market in which trade is bilateral. It may be *mediated*, when purchase and sale orders pass through brokers to enable the taking up of offers, or *pure*, in the case of transactions occurring directly between operators.

1.1. Wholesale electricity market

Main electricity power exchanges in Europe: (organised markets):

APX: Dutch exchange - Amsterdam Power Exchange - mandatory for importing into and exporting from The Netherlands (www.apx.nl).

EPEX Spot France: French non mandatory exchange (www.powernext.fr).

EPEX Spot Germany: German non mandatory exchange (www.eex.de).

NordPool: Scandinavian non mandatory exchange (www.nordpool.no).

Omel: Spanish pool, almost mandatory (www.omel.es).

Wholesale products:

Base: 24 hours a day, seven days a week.

Day-ahead: contract signed the day before for delivery the next day

Future or Forward: a standard contract signed for delivery of a given quantity at a given price over a given period; it requires the payment of a premium and a deposit. The time periods offered vary in line with the organised markets (week, month, quarter, half-year, year). The period, Y+1, corresponds to the calendar year based on the year in progress.

Peak (continental Europe): from 8.00 a.m. to 8.00 p.m., from Monday to Friday.

Wholesale market segments:

VPP: ‘Virtual Power Plant’ or capacity auctions set up by EDF following a European Commission decision (see DG COMP/M.1853 - EDF/ENBW).
<http://encherescapacites.edf.com/accueil-com-fr/encheres-de-capacite/presentation-114005.html>)

VPP base: products which reflect a power plant running in base mode. Bidders pay a fixed premium (in euros/MW) each month to reserve available capacity. The bidders regularly send EDF a schedule for using these capacities. They then pay an exercise price per MWh taken off, which is similar to the marginal cost of EDF's nuclear power plants. The price structure is therefore 'fixed cost + variable cost'.

VPP peak: products which reflect a power plant running in peak mode. The principle is the same as for VPP base. However, the price paid for each MWh taken off is an estimate of the marginal cost of EDF's peak power plants. Due to the high variable cost, the fixed premium paid by bidders is lower than that for VPP base.

Wholesale purchases and sales (OTC): block trading notifications, i.e. quantities selected by RTE the previous day for the day after, excluding trading via Powernext

Imports and exports:

Final consumption: sales to sites as a balancing responsible entity or under block trading

http://clients.rte-france.com/lang/fr/clients_traders_fournisseurs/vie/bilan_annu.jsp

Sales to network operators to compensate for their losses:

http://clients.rte-france.com/lang/fr/clients_traders_fournisseurs/vie/vie_perte_RPT.jsp

<http://www.erdfdistribution.fr/electricite-reseau-distribution-france/fournisseurs-d-electricite/compensation-des-pertes-130105.html>

1.2. Gas wholesale market

Day-ahead product: contract signed the day before for delivery the next day.

DHO: Domestic heating oil

EREG (European Regulators Group for Electricity and Gas): established by the European Commission as part of the implementation of 2003 directives, its role is to advise and assist the Commission in consolidating an internal energy market by contributing to the comprehensive implementation of European directives and regulations and the preparation of future legislation in the fields of electricity and gas. EREG is made up of the European Commission and the independent regulators of the European Union's 27 member states. European Economic Area member states and EU candidate countries are welcomed as observers. To fulfil its aims, which are also the subject of a public works programme, EREG's structure is comparable to that of the Council of European Energy Regulators (CEER). Furthermore, EREG holds extensive consultations with energy sector participants on issues on which it has to give an opinion. These opinions also involve the European Commission which may then make them mandatory through the community comitology process.

Flexibility clause: provision contained in long-term import contracts allowing the purchaser to reduce or increase the volumes collected within previously defined limits.



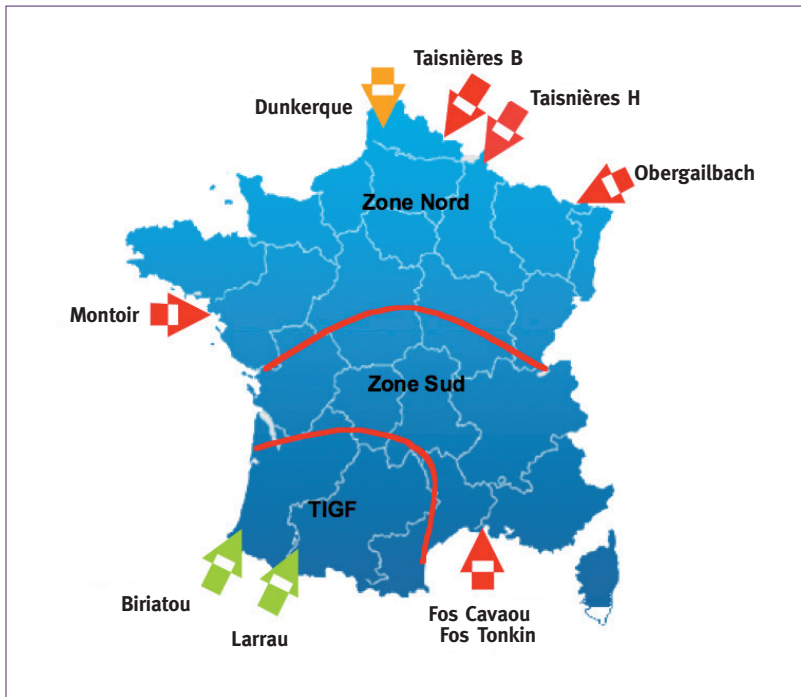
Forward product: contract signed for the delivery of a given quantity at a given price over a given period.

Future product: a forward contract negotiated in an exchange (organised market). The time periods offered vary in line with the organised market (week, month, quarter, half-year, year). The period, Y+1, corresponds to the calendar year based on the year in progress (delivery from 1st January to 31 December).

Gas Exchange Point (PEG): notional points on the French gas transport network where shippers can exchange gas volumes. There is one PEG in each of the French network's balancing zones.

Gas release: obligation placed on a supplier to release, for a given period, some of its gas resources to other suppliers. The general purpose of this operation is to enable the development of competition by offering the alternative suppliers the chance to secure supplies without having to negotiate bilaterally with an incumbent supplier.

Gaz Zone



Herfindahl-Hirschmann Index (HHI): is equal to the sum of the squares of the market shares of all firms, and thereby measures market concentration. The higher the index, the more concentrated the market. In general, market concentration is considered to be low when HHI is below 1000 and high when above 1800.

Intra-day: market comprising contracts signed on one day for delivery the same day or the day after if the transaction occurs after the main activity period of the day-ahead market.

LSHF: low sulphur heavy fuel (<1%)

NBP (National Balancing Point): UK gas hub. Due to the large volumes exchanged on this notional hub, the prices at this hub are an important reference for wholesale gas exchanges in Europe.

Netback: a mechanism to fix gas purchase contract prices over the long term which is based on pricing in relation to energy sources which compete with gas and consideration of the costs of transporting the gas from the producer to the consuming country.

Nomination: the quantity of energy, expressed as kWh (PCS 25°C), notified by the shipper to GRT on a daily basis whenever the shipper asks GRT to take off, transport or deliver gas. The verb, ‘to nominate’, therefore relates to the action of notifying GRT of a nomination.

Reverse capacity: Capacity on the Main Network enabling the Shipper to make nominations in the direction opposed to the dominant direction of flow when the gas can only flow in one direction. It can only be used on a given day if the overall flow resulting from all nominations of the shippers is in the dominant flow direction.

Short term: the short-term market comprises the following products: Day-ahead, Week end, Week and Others.

Spot: short-term market including operations for deliveries with tight deadlines. The spot market includes intra-day and day-ahead products.

Take-or-pay: gas or electricity supply contract clause in which the seller guarantees the provision of gas to a buyer, which guarantees in return the payment of a minimum quantity of energy whether the buyer takes delivery of it or not.

Uniform service: the continuous regasification of a cargo of LNG is provided over 30 days.

Use-it-or-lose-it: this rule forces those holding interconnection capacity physical rights to firmly nominate the corresponding amount of energy sufficiently in advance with the network operators.

Firm nomination has three purposes:

- to reduce the risk of capacity being withheld by market participants,
- to allow network operators to reallocate capacity which has been awarded but not used to the market,
- and finally, to enable network operators to consider firmly nominated commercial flows in both directions in order to release additional capacity which can be made available to the market.



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