COMMISSION
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Market

The French wholesale electricity and natural gas markets

2009-2010 Report

October 2010

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Contents

Introduction

The wholesale energy markets were characterised early 2009 by sharp decreases in electricity and gas prices in the wake of a generalised decrease in other fuels (oil, coal) and emission quotas prices. This evolution occurred against the backdrop of the financial crisis and the resulting recession.

In this context, gas market prices and import contracts prices, indexed to oil, evolved in disconnected ways. While this disconnection was partly reduced with the recent rise in gas prices, it represented a valuable opportunity for the diversification of procurements for suppliers and consumers. It was also a catalyst for the development of trading on the gas markets in France and in particular the North PEG (Gas Exchange Point), which has shown an increasing price correlation with the Dutch (TTF) and German (NCG) markets.

On the electricity market, there have been some price fluctuations. In particular, a price spike occurred in October 2009 when the sales offers on the Spot market were unable to meet the purchase offers over a period of four hours during which the price was €3,000/MWh, which is the technical ceiling of the EPEX Spot market. A smaller price spike was also seen in January 2010.

As part of its mission of monitoring the wholesale electricity and gas markets, CRE carried out investigations into these market episodes, presented in this report. This work also involved examination of the models for valuation and intervention on the markets of EDF and EDF Trading.

CRE considers that it is particularly important to improve the transparency of fundamental data, electricity generation data in particular. The transparency system implemented by UFE was improved in 2009 and again in 2010 and should progress further by the end of the year with the publication of unplanned outages for each plant. This publication should be a significant step forward for the market, since this information could have a significant impact on prices.

Information regarding electricity generation plants, the correct use of these plants in the light of market conditions and, more generally, the fundamentals of the electricity and gas sectors (generation facilities, infrastructures, etc.) are the keystone for the proper functioning of the wholesale energy markets. Once it has been completed, the work in progress on the European level should allow for the implementation of a European legislative framework covering the notions of market abuse, particularly in conjunction with the notion of privileged information. This work involves both the revision of the current Market Abuse Directive [1] and the implementation of specific measures for the transparency and integrity of the wholesale electricity and gas markets [2].

On 15 September 2010, the European Commission also announced regulation and transparency measures for OTC derivatives. These measures are the result of commitments made within the framework of the G20 as a result of the financial crisis.

(1) Public consultation of 25 June 2010 on the revision of the market abuse directive, DG Market.
(2) Public consultation of 31 May 2010 on the measures of transparency and integrity of the wholesale electricity and gas markets, DG ENER.

The architecture for monitoring the wholesale energy markets thus continues to be determined on the European level. The third energy package includes plans to generalize the supervision of the wholesale markets by national regulators, and by ACER. The directives of the third package also establish a cooperation principle between the sector and financial regulators.

On the national level, this principle of cooperation is already provided for by the banking and financial regulation law (Loi sur la régulation bancaire et financière), adopted by the National Assembly on 11 October 2010. Several of the provisions of this law are the result of the work of the commission chaired by Michel Prada to which CRE contributed. The conclusions of this work, on which there was a consensus, were presented in April 2010. As for the monitoring of the CO_2 [3] market, the Prada Commission recommended the implementation on the European level of a harmonised monitoring architecture, giving authority to the financial regulators on all of the CO_2 markets and broadening the field of authority of the energy regulators to the analysis of the fundamentals and the interactions between the CO_2 market and the energy markets.

The banking and financial regulation law implements these recommendations at the national level. This law:

- gives authority to the French Financial Market Authority (AMF - Autorité des marchés financiers) on the CO_2 Spot market;
- extends CRE's mission to include analysis of the consistency between the fundamentals of the energy markets and the transactions made on the CO_2 market;
- establishes the principle of broad cooperation between AMF and CRE.

AMF and CRE are expected to finalise a cooperation agreement to apply the main provisions of this law. The agreement should promote the complementarity of sector expertise and financial approach to the benefit of the regulation of the energy markets, and of the CO_2 quotas, which are particularly representative of a market closely linked to both energy and financial markets.

In terms of the comprehensive monitoring architecture, such provisions will take on their full meaning when they are extended to all European countries, as the underlying markets (electricity, gas, and emission quotas) are themselves traded at the European level.

(3) In 2009 there was substantial VAT fraud on the European CO_2 markets. The VAT reverse charge procedure should reduce this risk. However attention was paid to the risks of propagation of these types of fraud on the European electricity and gas markets. Awareness and vigilance measures were adopted by the stakeholders (regulators, administrative and legal authorities, exchanges, network operators) on both the national and European levels.

Summary of the report

ELECTRICITY

Electricity prices and trading

The wholesale market continued growing in 2009 with a total volume traded close to 750 TWh. This is an increase of nearly 15% compared with the previous year, despite a decrease in physical injections observed on the network. This growth in traded volumes is mainly due to the increase in trade on the Futures market, particularly over the first quarter of 2009, in a context of prices lower than in 2008.

2009 also showed a sharp drop in the French electricity net export balance, which continued in the first half of 2010. This deterioration in the exchange balance was mainly due to the particularly low availability of nuclear facilities during this period. There was a clear upturn in exports as of June 2010 however, due to the improved nuclear availability.

With an average Spot price of €43.01/MWh in 2009, the French price for electricity was lower than in 2008 (-38%). A similar decrease was observed for Futures prices (-30%) and for all energy products prices (oil, gas, coal, CO_2) after the record levels reached in 2008. The persistence of a positive margin between the German and French Futures prices for electricity could reflect the integration by the market of a risk premium on the annual product for delivery in France, particularly because of the substantial thermo-sensitivity of electricity demand [(4)] and the lower liquidity of the French market.

The French Spot market was marked by the occurrence of price spikes in winter 2009-2010. A spike occurred on 19 October 2009, when the Spot price reached €3,000/MWh over a period of 4 hours, and was the subject of a CRE deliberation on 20 November 2009. This event led to a request from CRE that EDF implement the means necessary to improve the accuracy of generation availability forecasts. UFE was also asked to improve transparency. New measures to improve the degree of transparency on the French wholesale electricity market were implemented by UFE in June 2010 and additional ones were announced for the end of 2010.

A second price spike of lesser magnitude occurred on 12 January 2010. The investigations made by CRE on this occasion revealed that EDF did not systematically offer some load shedding volumes in the bids sent to EPEX Spot. EDF stated that some of the load shedding capacities is already systematically offered to the market and informed CRE that this practice was to be extended to the EJP Nord load shedding and to some industrial facilities. CRE considers that these operational measures will improve the functioning of the French wholesale electricity market and acknowledged EDF's commitment to implementing these decisions rapidly.

Analysis and transparency of generation

The analysis of generation data for each unit shows that in 2009, the duration of use of the

(4) A temperature drop of 1°C led to an increase in electricity consumption of 2,100 MW in France in 2008, because of the substantial use of electrical heating.

various generation types were consistent with the marginal generation costs of each of them. It also revealed that in 2009 the borders were marginal less often than in 2008, while the marginality of the nuclear sector increased slightly, although it remained below 10%.

The comparison of EDF marginal costs and Spot prices from the EPEX auction shows that, for the periods of time when EDF Trading was assumed to be marginal, the price-cost difference in 2009 was 6.5% on average. Excluding data of 19 October 2009 price spike and the sometimes negative occurrences of the optimisation models, the price-cost difference for 2009 was 3.3%.

On the basis of these results CRE considers that, for 2009, the Spread between prices and marginal costs is at levels that do not represent abuse of a dominant position.

EDF's risk management policy received special examination. The optimisation of EDF's position on the markets is done by EDF Trading which, as part of this policy, observes the "1% risk" criterion at 4pm. To this end, a margin of uncertainty on the volumes available for sale is taken into account to cover the unforeseen events that could affect EDF's supply and demand equilibrium between the auction and 4pm. CRE considers that this margin does not have an impact when there is no tension on the French Spot market and when EDF is the buyer. However, CRE has raised the issue of the possible impact of this margin in case of tensions on the Spot market for electricity, with no real physical tightness on the electrical system. In such cases the market price could be set at levels that exceed those that would have resulted from the offer for sale of all or part of this margin, depending on the offer price. EDF informed CRE that, pending in-depth studies of the operational impacts, the procedures for the application of the risk policy would be modified by the end of 2010, so that the 1% risk level would be met at the time of the submission of the offers on EPEX Spot and no longer at 4pm. Thus the risk should be borne by EDF, including during the period between the auction and 4pm.

While awaiting the results of these studies, CRE considers that this sort of change could help clarify the roles and responsibilities shared between EDF and EDF Trading and would improve the company's procedures for intervention on the wholesale electricity markets.

With regard to the transparency of generation data, UFE's transparency system was reinforced in 2009 and 2010, particularly with the publication since 1 July 2010 of availability forecasts for each unit of generation with a power level greater than 100 MW. UFE also announced that unplanned outages of these units would be published within 30 minutes as of the end of 2010.

Despite this progress, the reliability of the forecast data can be improved. The analysis of the forecasts, published so far in aggregate form for the various sectors, shows a statistical overestimation in the short- and medium-term. In the case of the nuclear sector, the actual availability is thus statistically below the forecasts published on D-1. These differences will be monitored regularly and a more precise analysis will help explain their amplitude.

Analysis of the transactions

This section of the report analyses the offers submitted by the various market actors on the EPEX Spot Auction platform for France. A closer look at the evolution of the order books following the price spike of 19 October 2009 has shown that offers at any price only decreased for a period of about ten days after the price spike.

The daily nominations at the borders were analysed against the Day-ahead price differentials to identify nominations in the opposite direction to the border price differentials. Between 2008 and 2009, the number of actors nominating daily capacities in the opposite direction to the price differentials increased, mainly on the German border for importing, the Spanish border for exporting, and the UK border in both directions. Some of the actors involved were questioned. The explanations given mostly point to the inefficiency of certain exchange mechanisms, the sequence of the market auctions, and the insufficient liquidity of the French Day-ahead market or adjacent markets.

GAS

Gas prices and trading

2009 was a positive year for the development of trade on the wholesale gas markets. Supplies were abundant on the world markets because of the production of unconventional gas in the United States and the deliveries of large volumes of LNG. In the face of demand which has remained depressed due to the recession, particularly in Europe and in France, the wholesale prices seen on the main European markets reached low points in 2009 and were significantly lower with respect to the prices of the long-term supply contracts indexed to oil products. In this context, the wholesale gas markets constituted an attractive source of supplies for the suppliers of end users and represented, for producers, an outlet for volumes of gas not sold within the framework of take-or-pay clauses of long-term contracts.

The volumes delivered to the PEGs thus increased by 90 TWh, a clear reflection of the growth in trade on the wholesale markets in a context of declining consumption: in 2009 deliveries to the PEGs represented almost half of the total volume of physical deliveries, versus 29% in 2008. The North zone still receives most of the deliveries.

The transaction volumes more than doubled for almost all products, both on the Spot market and

on the Futures market. This growth in volumes was only marginally reflected in the size of the market due to the spectacular drop in gas prices in 2009: 2.2 billion euros in transactions were concluded in 2009, up 13% compared with 2008.

The evolution of wholesale prices on the gas markets was characterised, throughout 2009 and in the first months of 2010, by a clear disconnection of the price references from long-term contracts indexed to oil. This disconnection was the result of the gas surpluses on the world markets in a context of low demand, even though there were signs of a recovery in 2010.

The market prices dropped sharply in 2009, before starting an upward movement, which has accelerated since spring 2010. This trend, observed in the main markets in Europe, reduced the difference between the market price and the prices of the long-term contracts indexed to oil, although this difference is still significant.

It was in this context that CRE carried out an audit of the GDF SUEZ procurement formula, the conclusions of which were made public on 31 August 2010.

The use of infrastructures

The conditions of access to gas infrastructures continued to improve in 2009, allowing a growing number of participants to intervene on the market: the number of users is rising constantly on the transport network and storage facilities.

GDF SUEZ's commitment to limit its share of import capacities in France to 50% constitutes a major element for the opening up of the markets. They allowed alternative suppliers to reserve entry capacities in France for significant volumes as of October 2010. These commitments were accompanied by a certain number of investments aimed at increasing the entry capacities in France.

Access to infrastructure in the South zone was still very limited in 2009 and the entry capacities were just barely sufficient to cover consumption and storage: the rate of use of the North-South link was 96%. The recent commissioning of Fos-Cavaou significantly improved the supplying of the South zone, which should continue with the medium-term commissioning of additional entry capacities from Spain.

The procurement of new arrivals

The alternative suppliers get their supplies chiefly from PEGs and imports. While the procurement structure remains relatively balanced between these two sources, the share of procurements from PEGs has increased slightly since 2008, rising from 57% to 59% in 2009.

This trend can be observed in the North and also, more recently, in the South and South West zones. After the end of the gas release programme in 2008, the use of the PEGs initially declined before rising again rapidly at the beginning of 2010.

Section 1

The wholesale electricity markets

1. THE DEVELOPMENT OF THE MAIN SEGMENTS OF THE WHOLESALE MARKET

In 2009, the reduced availability of French generation facilities and the social movements that affected these facilities had a significant impact on the volumes produced, i.e. 518 TWh, down 5.5% compared with the volumes observed in 2008 (549 TWh).

To a lesser extent, domestic consumption fell to 486 TWh (end customer consumption without pumping and losses of network operators), a decrease of 9 TWh compared with the 2008 consumption. This fall in consumption took place in a context of economic and financial crisis. To satisfy domestic consumption in this context of declining generation, net exports decreased by 21 TWh. This drop was due to both a decline in gross exports (-13 TWh) and more imports, up 8 TWh from the previous year.

Moreover, there were significant price movements in 2009. The drop in prices in the first quarter gave the actors inexpensive purchasing opportunities, a factor that generated liquidity on the wholesale markets. The high price volatility seen in the last quarter also contributed to increase trading between the actors, who were concerned about reducing their exposure to price risk in a context of low availability of facilities. In the last quarter of 2009 there was also a price spike at €3,000/MWh on 19 October.

In this context the volume of trade reached 750 TWh on the intermediated wholesale markets, up 15% compared with 2008. This rise mostly involved trading Futures products.

Physical deliveries between actors on the OTC markets (intermediated and bilateral) amounted to 342 TWh in 2009, a 2.7% increase (+9 TWh) from 2008.

Graph 1 displays a simplified view of these various movements for 2009 and 2008 (figures in brackets).

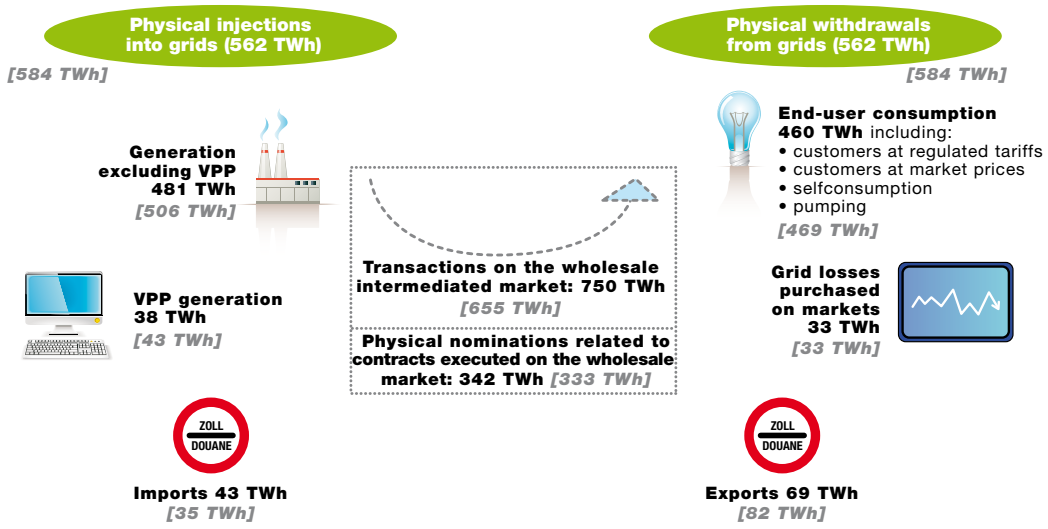
The purpose of this chapter is to detail developments on the intermediated wholesale market and the three main segments of the physical wholesale market, i.e. cross-border trade, EDF's VPP sales and loss purchases by French grid operators.

1.1. The sustained growth of the intermediated wholesale market in 2009 was mainly driven by the Futures market, while Spot market activity stagnated

Activity on the French intermediated wholesale market includes transactions concluded on the organized markets and on the intermediated OTC (brokerage platforms). This covers most of the activity on the French wholesale electricity market.

The volume traded on the wholesale market was close to 750 TWh (Table 1) in 2009, up by 15% compared with 2008. In terms of macro-economic data, the trading of electricity represented about 160% of French consumption in 2009, or an increase of nearly 20 points compared with 2008.

GRAPH 1 - Energy flows between French wholesale market upstream and downstream segments in 2009 (2009 [2008])



Source: RTE - Analysis: CRE

TABLE 1 - Transactions

a - Transaction volumes

Volumes (TWh)	2008	2009	H1 2009	H1 2010
Intraday	0.78	1.05	0.48	0.57
Day-ahead continuous	20.31	17.92	8.34	10.16
Day-ahead auction	51.63	51.46	26.34	26.28
Futures market	582.12	678.77	337.56	328.01
Total	**654.84**	**749.2**	**372.72**	**365.02**

Sources: Brokers, EPEX Spot France, EPD France - Analysis: CRE

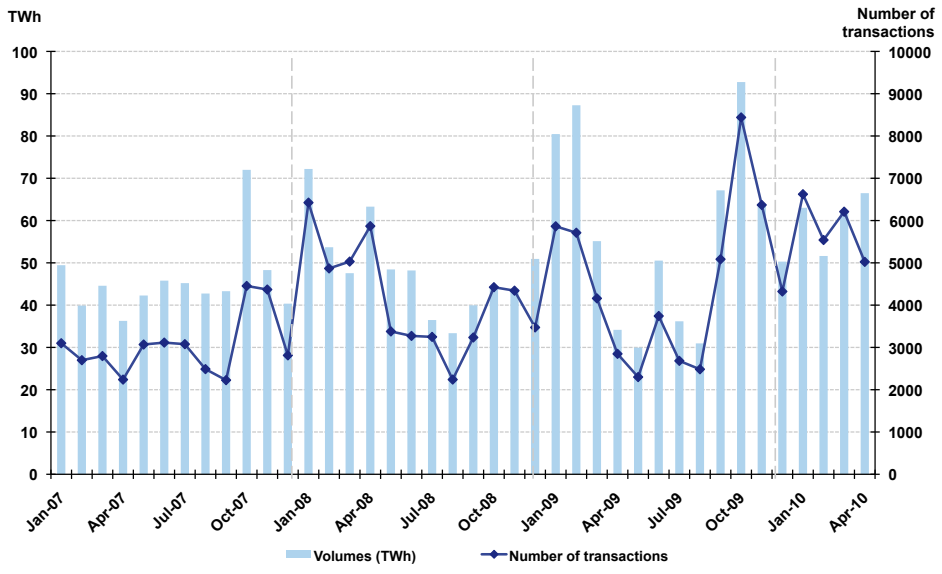
b - Number of transactions

Number of transactions	2008	2009	H1 2009	H1 2010
Intraday	29,491	34,875	15,556	16,948
Day-ahead continuous	36,272	37,452	15,767	21,788
Day-ahead auction	n.a.	n.a.	n.a.	n.a.
Futures market	49,803	54,007	24,626	30,302
Total	**115,566**	**126,334**	**55,949**	**69,038**

Sources: Brokers, EPEX Spot France, EPD France - Analysis: CRE

While the decrease in the volumes traded on Spot products (Intraday, Day-ahead continuous and Day-ahead auction) remained moderate (-3.1%), the Futures market pulled up the volumes traded in 2009. The growth of this market segment was supported by transactions that took place during the first and last quarters of 2009 (Graph 2).

GRAPH 2 - Monthly changes in volumes and number of transactions on the intermediated Futures market



Sources: Brokers, EPD France - Analysis: CRE

Table 2 details the quarterly evolution of trading by type of product (monthly, quarterly, annual) comparing 2009 with 2008. During the first quarter of 2009, the growth in trading was borne by Y+1 products (+28 TWh), and Q+1 products. This growth occurred in a context of decreasing electricity prices along with a decrease in the Spot and Futures prices of fossil fuels such as coal and gas (see chapter 2).

Over the second and third quarters of 2009, social movements and many outages that affected French generation facilities during this period can partially explain the changes in volumes traded on the Futures markets. Some producers had volumes to offer on the markets that were lower than those usually associated with their production portfolio. This decrease can also be seen in the second quarter in the drop in "Other", which includes short-term products such as weekly products (-20.5 TWh). In addition, in light of the numerous outages during this period, the participants turned to the market to cover their consumption needs, especially as winter approached. So in the third quarter, 24 TWh of Q+1 product, for delivery between October and December 2009, was traded.

Finally, in the last quarter of 2009, the increase in volumes traded was mainly borne by monthly products, up significantly compared with the last quarter of 2008 (+24.9 TWh), and to a lesser extent by Q+1 and Y+1 products, which increased respectively by 15 TWh and 15.5 TWh from the same period the previous year. This can be explained by the participants wanting to manage their exposure to price risk, in a context of high volatility of prices during this period and low availability of generation facilities.

TABLE 2 - Quarterly breakdown of volumes traded by products (in TWh, 2009 (2008))

Maturity	Q1 2009	Q1 2008	Q2 2009	Q2 2008	Q3 2009	Q3 2008	Q4 2009	Q4 2008	2009	2008
M+1	19.3	*21.7*	19.8	*18.7*	17.3	*13.2*	37.2	*12.3*	**93.6**	***65.9***
M+2	7.5	*10.3*	4.0	*7.2*	6.4	*3.8*	12.0	*3.7*	**29.9**	***24.9***
M+3	3.4	*4.3*	3.8	*4.0*	2.8	*2. 6*	1.7	*1.2*	**11.6**	***12.0***
Q+1	20.6	*12.9*	13.1	*11.3*	23.8	*10.7*	27.1	*12.1*	**84.6**	***46.9***
Q+2	16.7	*11.5*	8.5	*17.0*	11.7	*7.0*	6.0	*4.8*	**42.9**	***40.2***
Q+3	13.5	*7.8*	4.9	*4.2*	2.2	*1.7*	6.7	*6.1*	**27.3**	***19.7***
Q+4	8.3	*6.9*	0.6	*3.2*	2.3	*3.6*	11.1	*6.5*	**22.3**	***20.1***
Y+1	71.7	*43.7*	33.6	*39.8*	36.2	*37.8*	59.2	*45.6*	**200.7**	***166.9***
Y+2	18.4	*14.8*	8.4	*16.2*	12.2	*12.5*	14.9	*20.3*	**53.8**	***63.7***
Other	43.5	*39.7*	17.9	*38.4*	19.4	*16.9*	31.3	*26.5*	**112.1**	***121.5***
Total	**222.8**	***173.4***	**114.6**	***159.9***	**134.3**	***109.8***	**207.0**	***138.9***	**678.7**	***582.1***

Sources: Brokers, EPD France - Analysis: CRE

- *The number of balancing entities active on the French market decreased in 2009*

The number of balancing responsible entities (BRE) active on the French market declined in 2009, driven in particular by the decrease in the number of financial actors (Table 3). New entities on the French market were mostly integrated European producers and new European entrants. However, the decrease in the number of active balancing entities did not prevent the general increase in the volumes traded on the intermediated French electricity market.

TABLE 3 - Balancing responsible entities active on the French market

Classification	Number of active BREs			
	2007	2008	2009	H1 2010
Integrated European generators	34	34	37	33
Financial traders	24	31	23	25
New European entrants	13	16	18	20
French generators	8	9	8	8
New French entrants	5	6	6	6
Industrial companies	5	6	4	5
ELD (5)	5	4	4	4
Other	3	4	4	4
Total	**97**	**110**	**100**	**105**

Source: RTE - Analysis: CRE

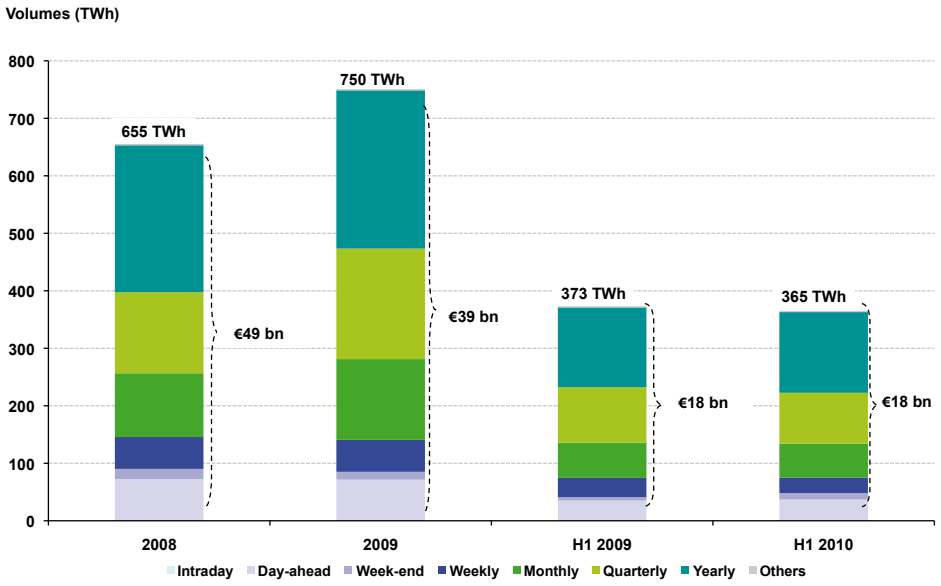
- *The French electricity market represented €40 bn in 2009*

Trade on the French electricity market amounted to 39 billion euros, a decrease of 10 billion compared to 2008 (Graph 3). This decrease in value occurred while the overall volume in TWh increased by about 94 TWh. At the same time prices of Futures and Forward products fell between the two years. This was also observed on products with shorter terms, the Day-ahead products. The decrease in the value of the market is thus due to the combination of a price effect and a volume effect, with the negative price effect being dominant.

Because of their higher volume, transactions of Forward products account for 92% of the total value traded on the markets. Moreover, most of the trade is by mutual agreement, with the OTC trading platforms handling about 86% of the value traded on the market, with the remaining 14% traded on the organised markets (Graph 4).

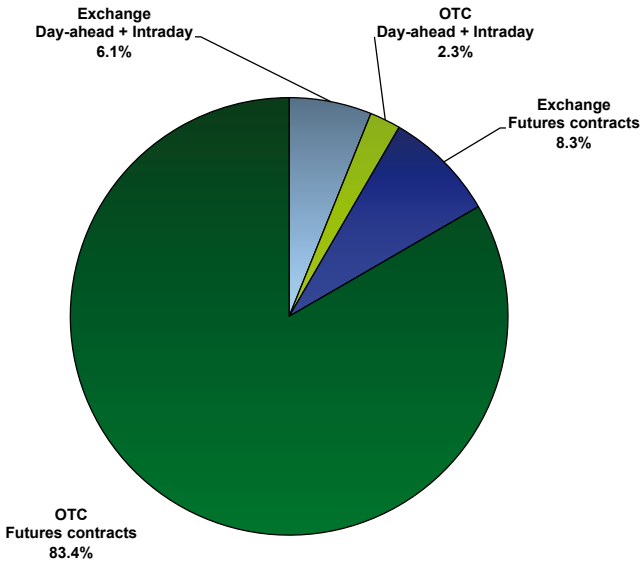
(5) Local Distribution Companies.

GRAPH 3 - Volume and valuation of trade by product (€ bn)



Sources: Brokers, EPEX Spot France, EPD France - Analysis: CRE

GRAPH 4 - Trade broken down by platform and by term (%), 2009



Sources: Brokers, EPEX Spot France, EPD France - Analysis: CRE

1.2. The economic environment in 2009 and the first half of 2010 weighted on the deterioration of net exports

- *A downward trend for French net exports since 2007 and a significant deterioration of this balance in a context of low nuclear availability, but some signs of an upturn in the second half of 2010*

Table 4 gives estimates of the interconnection capacity on the various borders for winter 2009. The interconnection capacities between France and neighbouring countries represent about 13% of the installed generation capacities in France in terms of exports and 9% in terms of import. This is in compliance with the criterion published in the conclusions of the European Council of Barcelona of March 2002 aiming at setting the level of country-interconnection at 10% of the installed capacity.

In 2009, cross-border trade was 67.9 TWh in exports and 43.4 TWh in imports (Table 5). Net exports are down sharply to 24.6 TWh compared with 46.7 TWh in 2008. This drop occurred in a context of a substantial increase in the volumes imported, from 34.7 TWh in 2008 to more than 43 TWh in 2009, together with a substantial decrease in the volumes exported. However, while this trend continued in the first months

TABLE 4 - Import and export capacities between France and neighbouring countries in 2009 (in MW)

	United Kingdom	Belgium	Germany	Switzer-land	Italy	Spain	Total
Import	2,000	2,300	3,050	2,300	995	500	**11,145**
In % of French installed facilities	1.70%	1.9%	2.5%	1.9%	0.8%	0.4%	**9.3%**
Export	2,000	3,400	2,500	3,200	2,650	1,300	**15,050**
In % of French installed facilities	1.7%	2.8%	2.1%	2.7%	2.2%	1.1%	**12.5%**

Source: RTE - Analysis: CRE

TABLE 5 - Cross-border trade flows

	Germany			Belgium			United Kingdom			Spain			Italy			Switzerland			Total		
In TWh	Imp.	Exp.	Net	Imp.	Exp.	Net	Imp.	Exp.	Net	Imp.	Exp.	Net	Imp.	Exp.	Net	Imp.	Exp.	Net	Imp.	Exp.	Net
2007	16.2	8.0	-8.2	1.6	11.8	10.2	3.3	9.7	6.4	1.9	7.3	5.4	0.3	20.7	20.4	4.3	26.1	21.8	27.6	83.6	**56.0**
2008	19.0	6.4	-12.6	1.9	10.9	9.0	1.4	12.7	11.3	3.0	5.8	2.8	1.8	19.6	17.8	7.7	26.1	18.4	34.7	81.4	**46.7**
2009	19.2	7.2	-12.0	5.8	3.0	-2.8	4.2	7.4	3.2	3.8	5.3	1.5	1.2	19.3	18.1	9.2	25.7	16.5	43.4	67.9	**24.6**
H1 2009	8.3	3.7	-4.6	2.7	2.4	-0.3	1.2	4.7	3.5	1.7	3.0	1.3	0.3	10.3	10.0	4.0	13.2	9.2	18.1	37.3	**19.2**
H1 2010	8.6	4.4	-4.2	2.7	1.7	-1.0	3.2	3.1	-0.1	2.1	0.6	-1.5	0.3	9.2	8.9	2.5	12.4	9.9	19.4	31.4	**12.0**

Source: RTE - Analysis: CRE

of 2010, net exports improved significantly from May, associated with greater nuclear availability (see part 3).

The flows from Belgium, the United Kingdom and Switzerland explain the growth in imports. On the Belgian border, imports rose from 1.8 TWh in 2008 to 5.8 TWh in 2009, with France becoming a net importer from Belgium. An increase in imports was also seen to a lesser extent from Germany and Spain.

The net export balance was down compared with the 2008 levels at the borders with Belgium, Spain, Switzerland and especially the United Kingdom. For the UK, the decrease is related to the nature of English generation, characterised by many gas plants, for which the fuel costs decreased substantially in 2009. At the end of 2009 and the beginning of 2010, France was even a net importer of electricity from the United Kingdom.

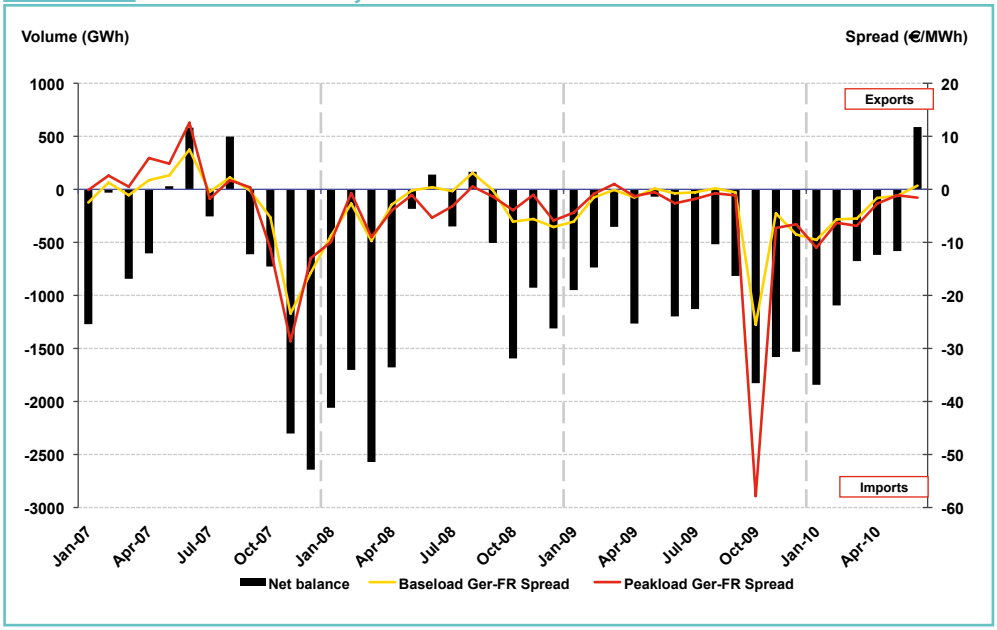
Trade with Italy is the only notable exception. Net exports to Italy increased slightly between 2008 and 2009.

- *Cross-border flows consistent with the price differentials between countries*

Overall the monthly changes of the net trade balances at the borders are correlated with the changes in price differentials, with this correlation being particularly clear with Germany and the UK (Graph 5): the trade balances observed on all of the borders are consistent with the direction of the average price differentials with France (Day-ahead, base). The overall consistency of the cross-border flows with the price differentials does not necessarily mean that all individual transactions are consistent. The actors' behaviour when nominating on interconnections at the individual company level is analysed in section 4.2 of the report.

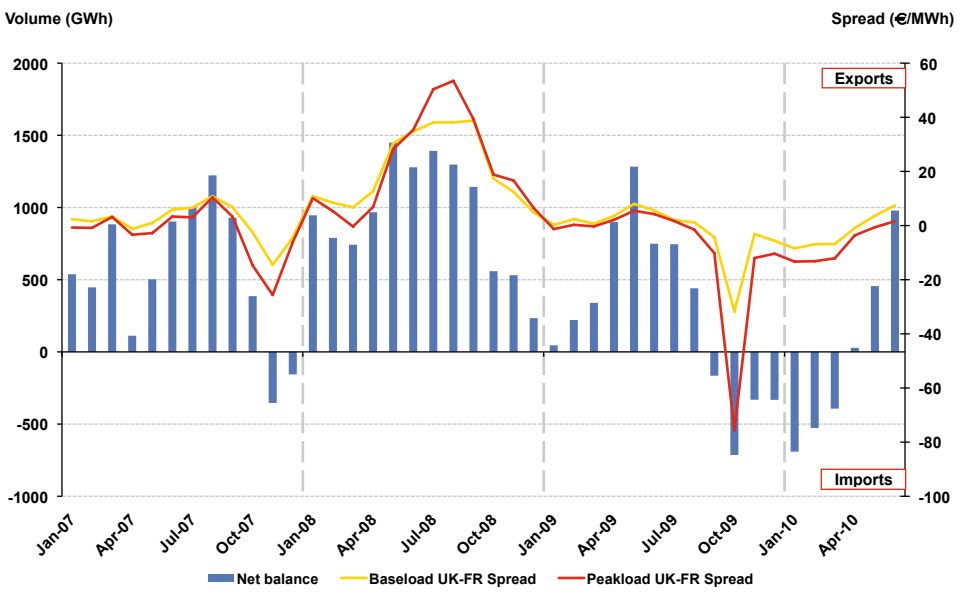
GRAPH 5 - Net exports and price differential with neighbouring countries

a - France – Germany



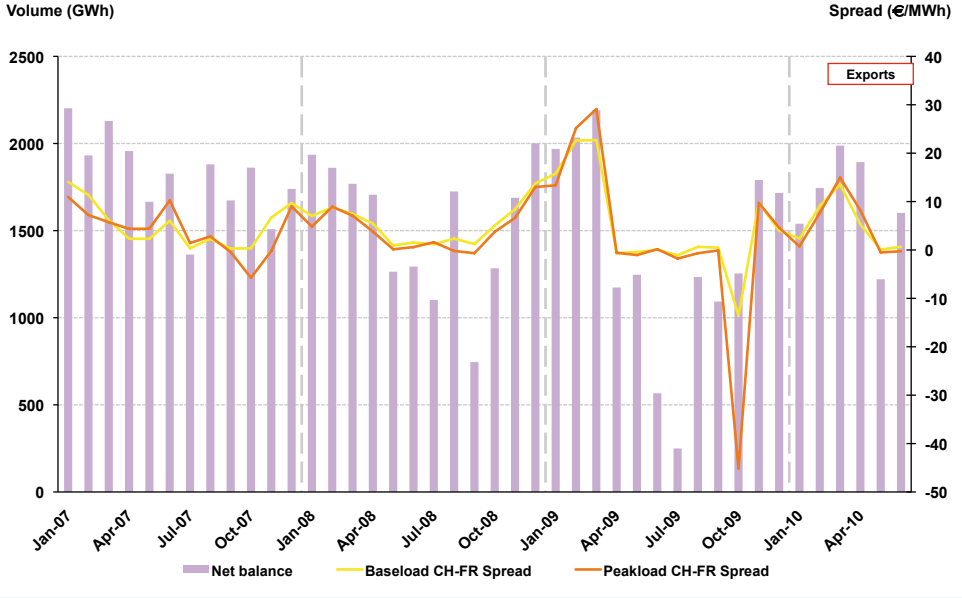
Sources: RTE, EPEX Spot - Analysis: CRE

b - France – United Kingdom



Sources: RTE, EPEX Spot - Analysis: CRE

c - France – Switzerland



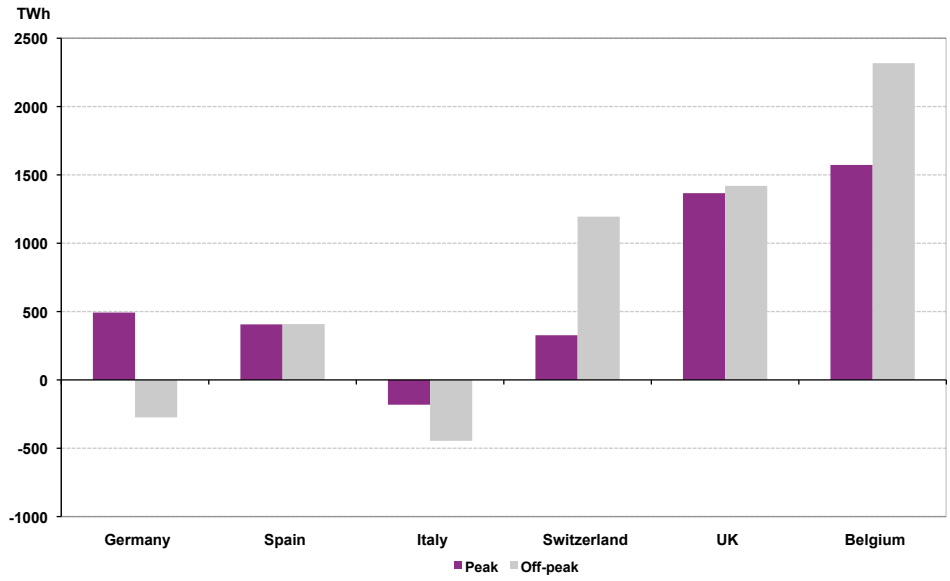
Sources: RTE, EPEX Spot - Analysis: CRE

- *During 2009, import needs generalised beyond peak products*

2009 imports were up by about 8 TWh compared with 2008. Imports increased during peak as well as off-peak times: 54% of the increase can thus be associated with imports during off-peak hours (Graph 6).

This increase can be explained mainly by the increase in off-peak imports from the United Kingdom, Belgium and Switzerland, due to an increase in the number of days when the price differential for off-peak hours with these countries was favourable to imports.

GRAPH 6 - Change in cross-border imports between 2008 and 2009



Source: RTE - Analysis: CRE

1.3. The volume of losses purchased by network operators has remained stable from one year to another

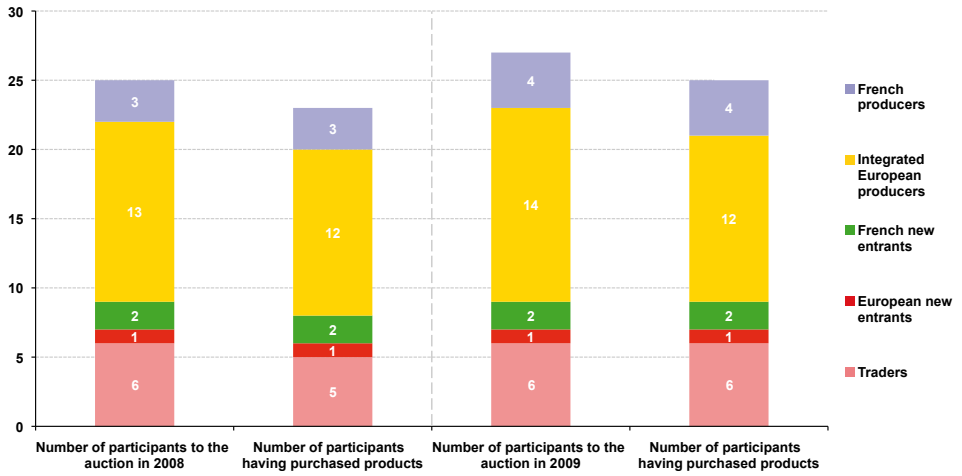
Volumes purchased by the grid operators RTE and ERDF to offset their losses amounted to 33 TWh in 2009. This figure is the same as in 2008 (33 TWh).

These purchases were made during consultations organised several times a month by the network operators. In 2009, 105 tender offers were organized by the two grid operators; 45 were organized in the first half of 2010. By way of comparison, 112 tender offers were organised in 2008. Graph 7 (p.20) displays the number of participants in these consultations.

During the 2009 tenders, the grid operators bought products covering various delivery horizons, including monthly (from M+1 to M+22), quarterly (from T+1 to T+5) and annual deliveries (from Y+1 to Y+4).

RTE and ERDF operate differently to cover their needs. ERDF covers all of its needs buying annual products and then exchanges products from one period to another to adjust its energy purchases to the demand curve. RTE builds its curve with annual products, then quarterly and monthly products. Both grid operators activate options and premiums on D-2 to adjust their purchases to their needs. Since early 2009, RTE has also been covering some of its needs on the EPEX Spot market and on EPD since June 2010.

GRAPH 7 - Number of participants in the consultations



Sources: RTE, ERDF - Analysis: CRE

1.4. The virtual power plants auctions illustrate the high degree of atomicity of this market segment and that demand comes from all types of market participants

VPPs, which represent 5,400 MW of generation capacity in France, are sold by EDF at quarterly auctions. This capacity is made up of 4,400 MW corresponding to baseload generation and 1,000 MW corresponding to peaking power plants. Base products, whose strike price is low compared with the market price, can be considered as firm products. Peak products, whose strike price is higher, are more like options.

Graph 8 shows the products sold depending on their maturity and the strike prices associated with option products. Base products of 6, 12, 24, and 3 months maturity (in this order) are most purchased.

Analysis of VPP capacities held by each participant shows that this market is not highly concentrated (Graph 9, p. 22). From January 2009

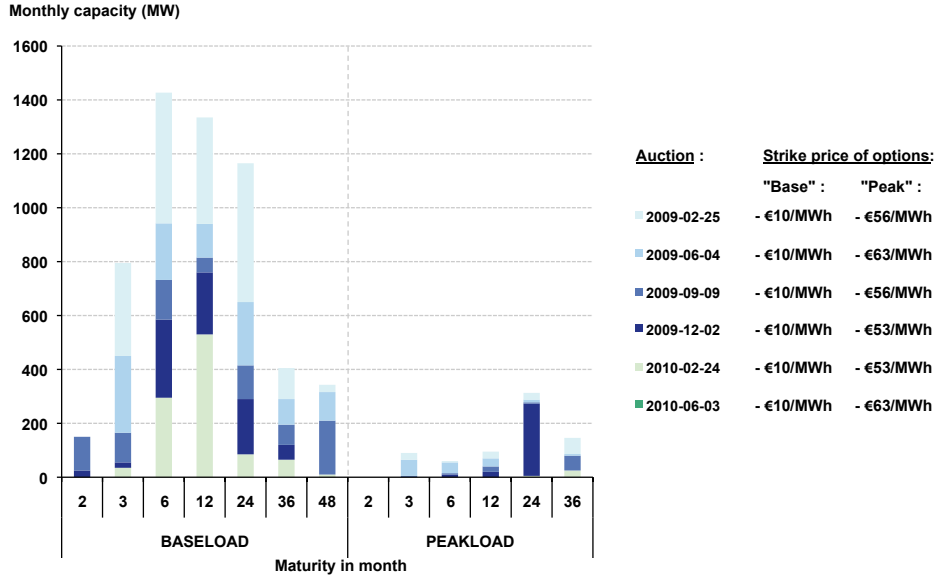
to July 2010 the market share of the dominant player never exceeded 7% for the base product and 17% for the peak product. Moreover, highest values for the monthly HHI indices recorded during this period were 519 for the peak product and 172 for the base product, which also underlines how open this market segment is.

Because of their very low strike prices, between €9 and €10/MWh for the auctions held in 2009 and in the first half of 2010, the optionality of VPP Baseload products is rarely used. The Day-ahead prices in France were greater than €10/MWh during 97.8% of the hours in 2009 and in the first half of 2010. The optionality value of these products is therefore almost zero and we can expect that they will be sold at prices very close to the prices of products with similar maturity. The analysis of the difference between the auction prices and the market prices confirms this observation (Graph 10, p. 22): the difference between the auction value and the Futures prices is 0.03% on average with a standard deviation of 1.3%.

"Peak" products had a high strike price: between €56 and €101/MWh at the 2009 auctions, and €56 and €63/MWh at the auctions in the first half of 2010. The value of these products was strongly linked to the level and the anticipated volatility of the Day-ahead prices.

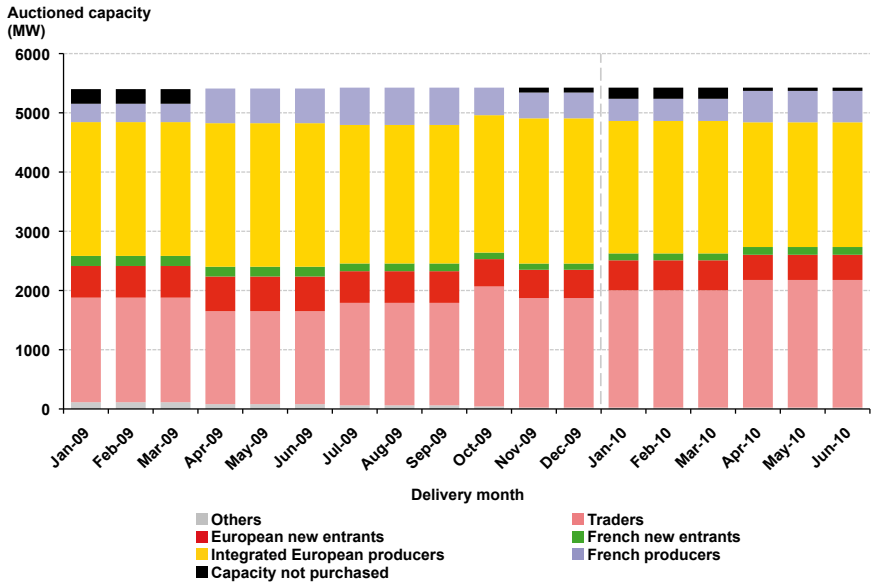
A simplified modelling of the Spot price centred on the actual Futures prices can be used to estimate the implicit volatility of the auction prices that is anticipated by the market. It results in an average volatility of daily price of 200% for the Spot product.

GRAPH 8 - Maturity of the products sold at the auctions



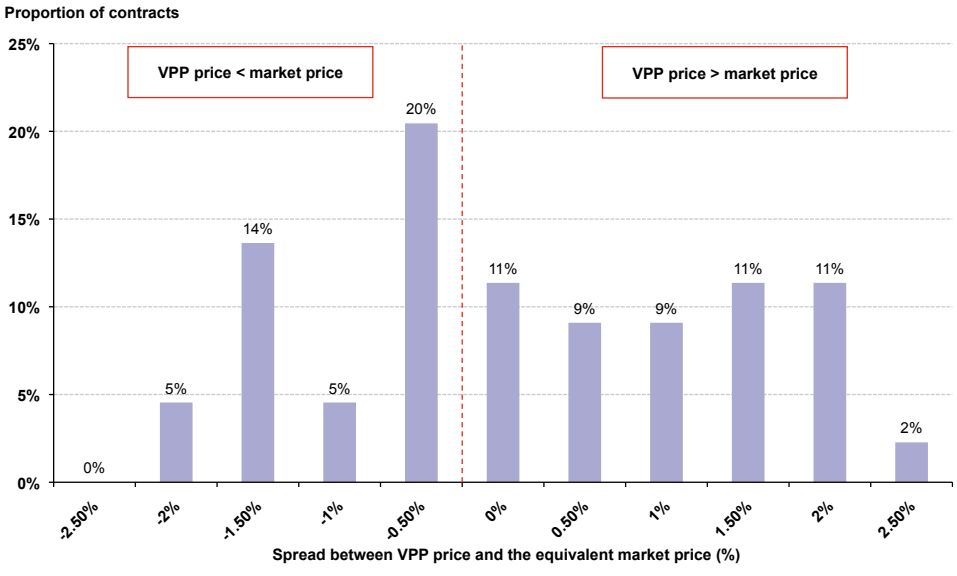
Source: EDF - Analysis: CRE

GRAPH 9 - Monthly capacities purchased at auctions for delivery (2009 and H1 2010)



Source: EDF - Analysis: CRE

GRAPH 10 - Difference between the auction price of the base VPP and the prices of equivalent products quoted on EPD France



Sources: EDF, EPD - Analysis: CRE

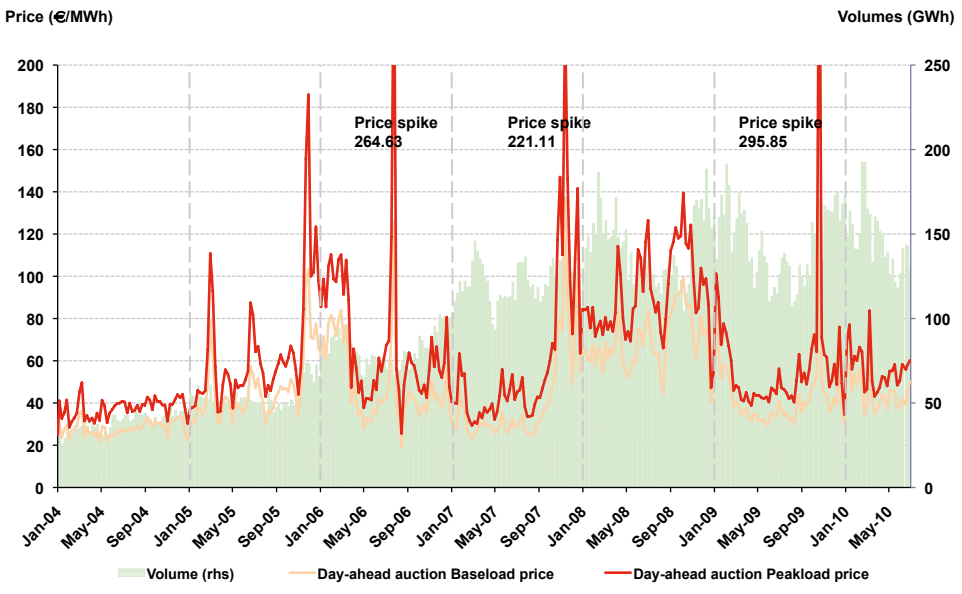
2. ELECTRICITY PRICES

2.1. While French Spot prices fell at the beginning of 2009, like all prices for energy products, there were price spikes during the winter 2009-2010

In the wake of the decrease in fuel prices observed since the end of 2008, the decrease in the Spot market prices for electricity continued in the first quarter of 2009 (€49.96/MWh versus €63.50/MWh in 2008). The Spot market prices remained steady during the summer at €35.23/MWh, clearly down compared with the previous year at the same period (Graph 11).

As winter approached and in a context of reduced availability of generation facilities, prices on the French electricity market fluctuated substantially, particularly with the price spikes during the last quarter of 2009 and the first half of 2010.

GRAPH 11 - Spot prices in France (weekly average prices and volumes)



Source: EPEX - Analysis: CRE

• *The 19 October 2009 price spike*

On 19 October, the electricity price on the French Spot market reached €612.8/MWh for the Baseload product and €1,146.6/MWh for the Peakload product. The hourly prices were €3,000/MWh between 8am and 12am. This price was actually the technical ceiling of €3,000/MWh, as set within the framework of the EPEX Spot auctions.

During these four hours, volumes for sale were not sufficient to cover the purchase orders, and an average of nearly 1,000 MW was lacking every hour after the TLC trilateral coupling process.

CRE conducted an investigation following this price spike. It analysed in particular the sequence within the EPEX Spot market auction, as well as the fundamentals of the French electricity system that determine the participants' interventions: consumption, availability of facilities, flows at the interconnections.

In its deliberation of 20 November 2009, CRE indicated that the sudden tightness of the system (generation fundamentals and forecasts of the balance between supply and demand) on the eve of 19 October were the factors that generated the price spike observed the next day. In a context of reduced availability of the generation facilities, particularly due to the scheduled or unplanned outages of nuclear plants, this tension resulted from a combination of two factors:

- an upward revision from Friday to Sunday of the consumption estimates for Monday 19 October (+3,000 MW) and a consumption peak recorded on 19 October;
- a downward revision from Friday to Sunday of the availability estimates for Monday 19 October (-4,100 MW), mainly due to unplanned outages of nuclear plants and of the Grand-Maison peakload hydroelectric plant on Sunday morning. The latter was put back in service at the end of the day on 18 October.

These significant differences, from Friday to Sunday, for Monday 19 October, between the consumption and the availability estimates, had a cumulative effect of more than 7,000 MW, which suddenly modified the anticipations of the participants and their interventions on the markets on Sunday morning. In the particular case of EDF Trading, this translated into purchase interventions on the markets following the application of its in-house risk management criteria, and also into a lower selling capacity on the French market on Sunday morning 18 October.

Consequently, CRE asked EDF to implement measures to reinforce the insufficient reliability of generation forecasts. It also asked UFE to improve the forecasts transparency, emphasizing the importance of the publication of unplanned outages for each plant. UFE then announced for the end of 2010 new measures aiming at improving the degree of transparency on the French wholesale electricity market. These are detailed in section 3.3 of this report.

With regard to EPEX, market participants criticized the electricity exchange market operator for not launching a second auction that could have brought in additional sales offers when the insufficiency of these offers was observed. EPEX justified this situation in terms of its in-house procedures, in the particular operational context of the morning of Sunday 18 October. CRE considered that it was difficult, after the event, to state that a second auction could have resolved the imbalance between the purchase and sale offers.

On 23th October 2009, EPEX Spot modified its procedures 1) by accelerating the procedure for second auctions or Request for Quotes (RFQ) on the Swiss auction, which should allow for the publication of the results at 10:55 and 2) by implementing a test on the French market at 11:03 at the latest, regardless of the representative nature of the order book, in order to issue an RFQ at 11:05 at the latest. CRE then observed that this new procedure maintained the constraint of a deadline at 11:05 for launching a second auction. It recommended that EPEX examine, in conjunction with its members and with its TLC partners, measures that might introduce more flexibility. On 9 July 2010, EPEX announced the implementation of an additional period of 3 minutes automatically granted if a member has technical communication problems. Furthermore, in order to avoid triggering a superfluous RFQ from algorithms for an isolated market,

the Epex Spot France, APX-Endex and Belpex markets decided to leave the possibility of an RFQ after the calculation of the prices of trilateral market (TLC) coupling (taking into account the cross-border flows between Belgium, France and the Netherlands), in the event that the results of the auction prices go beyond a predefined range. In France, this threshold was set at €500/MWh.

- *The 12 January 2010 price spike*

During January 2010 an hour-long price spike occurred for the auction of 12th January on EPEX Spot. It required the triggering of an RFQ procedure, which resulted in prices of €196 for hour 10 and €180 for hour 11.

Following this event, CRE again conducted investigations, focusing in particular on the modifications of the offer matrices sent to EPEX Spot after the launching of this RFQ. EDF, in particular, was able to increase its sales offers for a volume of a few hundred additional MW on the time periods involved, by integrating in its offer matrix the possibility of activating certain load shedding volumes for which the exercise price was theoretically off the market or that presented specific exercising conditions and which therefore had not been considered during the preparation of the offer sent for the initial auction (i.e. before the RFQ). This episode thus revealed that EDF did not automatically offer certain volumes linked to load shedding in the offer matrices sent to EPEX Spot.

The non-inclusion in the offers sent to EPEX Spot of these curtailment capacities carries the risk of higher price levels or disturbances in the operational auction procedure on the Spot market, compared with a situation in which these capacities would be offered systematically at appropriate valuation levels.

EDF stated that some of the load shedding volumes representing more than 3000 MW are already systematically offered to the market. EDF also informed CRE that this practice was to be extended to the EJP Nord curtailments and to certain industrial load shedding, for an additional total volume currently evaluated at about 1300 MW, as of winter 2010-2011. EDF specified that these curtailments could also be offered on markets other than the EPEX Spot, on the OTC market for example.

CRE considers that these operational measures represent a positive change for the functioning of the French wholesale electricity market and it acknowledged EDF's commitment to the rapid implementation of these decisions. With regard to the trade-off between the sale of these volumes on the Spot market or on other markets, CRE considers, in general, that these trade-offs constitute a standard practice. However, it also considers that these trade-offs should not penalize the liquidity and the quality of the signal sent by the French Spot market price. This latter observation has particular importance in the context of the expected changes linked to the implementation of the NOME law (Nouvelle Organisation des Marchés de l'Electricité – new organisation of electricity markets).

2.2. Despite the occurrence of spikes, Spot prices generally remain consistent with the tightness in the electricity system

The equilibrium price of electricity determined for each hour of the day highly depends on the differential between the available generation capacity and the forecast consumption for the time in question. When the margin between the generation capacity and the forecast consumption is high, only the cheapest generation units are called on, hence a low marginal cost of the system, and similarly for the Spot price. Conversely, in the event of tightness in the electricity system, more expensive means of peak load generation are called on, which has an impact on the price resulting from the daily auction.

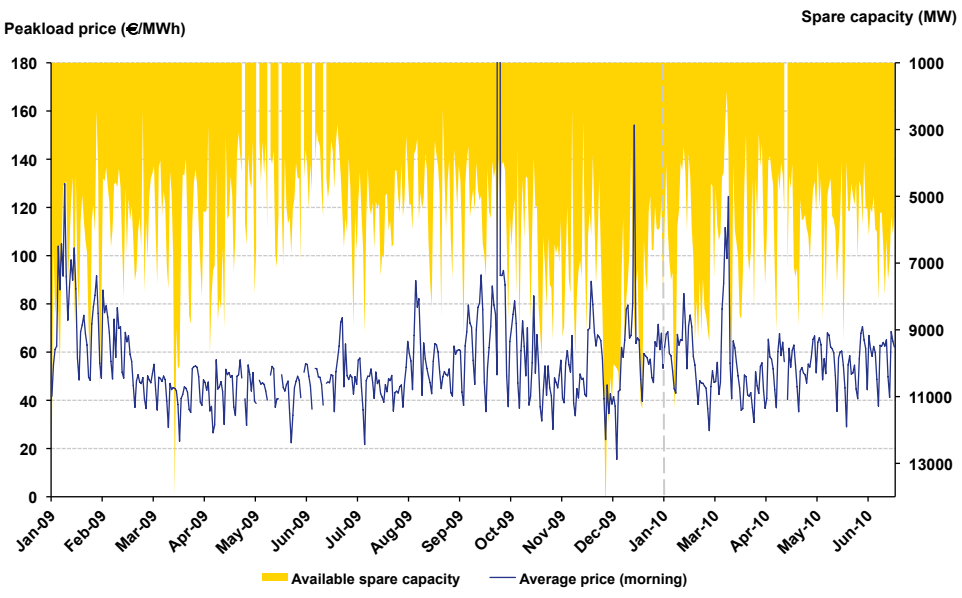
For each day, RTE publishes the margin level of the French electricity system for the morning and evening peaks (the times of which are variable). Comparison of these margins at the average Spot price observed during these peaks reveals the link expected between the level of tightness of the French electrical system and the prices set at the daily auction.

Graph 12 shows that the fluctuations of the Spot prices mostly follow those of the margin available at the morning peak published by RTE. In 2009, when the margin indicator increases (or decreases), the price decreases (or increases) in 64% of the cases. The figure is 69% for the first six months of 2010.

Since July 2009, RTE has also been publishing on its website actual availability for generation units with power levels greater than 20 MW. This new data is used to calculate the hourly real margin of the French electricity system defined as the actual availability of all plants minus actual consumption for a given hour. Unlike the margin at the peak calculated by RTE which was used previously, this indicator does not take into account cross-borders electricity transactions nor hydroelectric generation whose actual availability data was frequently unreported in 2009. It can thus take negative values, which correspond to cases where France is a net importer and where prices are highest. Here too, a negative correlation with the Spot price is expected. This is shown in Graph 13 in which each point is a system margin / hourly Spot price pair.

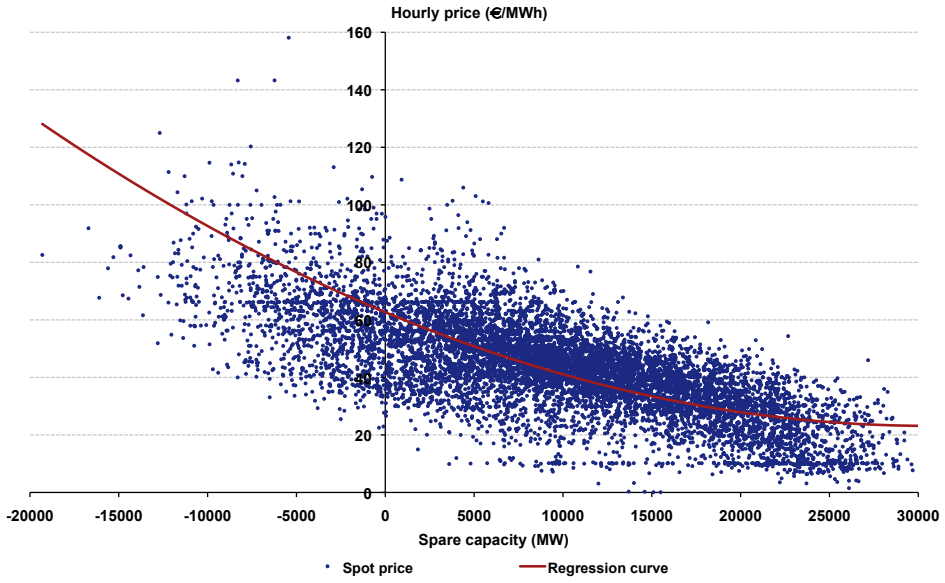
Lastly, as for the daily grid, the fluctuations of the hourly Spot prices also generally follow those of the margin indicator (Graph 14). We thus see during the period analysed (July 09 - June 10) that when the margin indicator increases (or decreases), the price decreases (or increases) in 69% of cases.

GRAPH 12 - Spot price and RTE margin (morning Peakload)



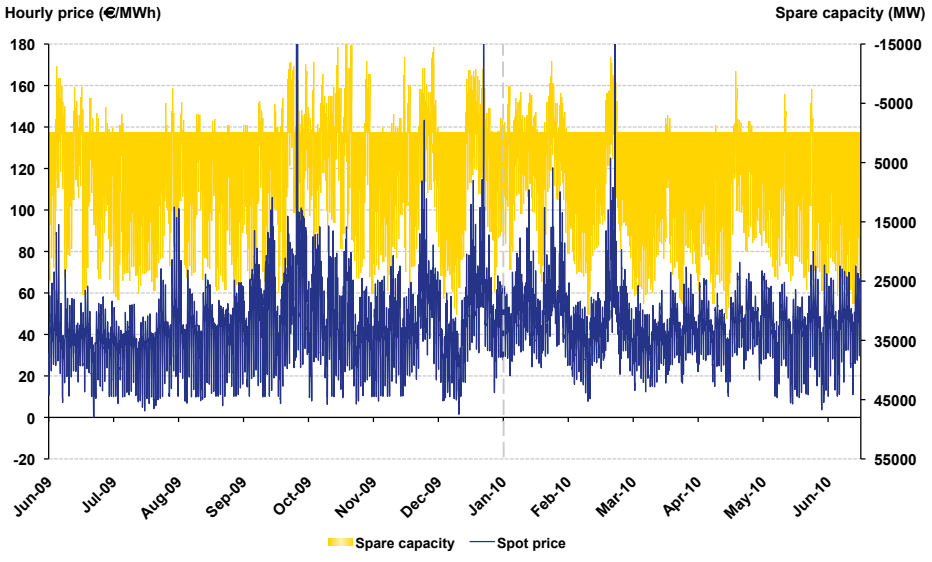
Source: RTE - Analysis: CRE

GRAPH 13 - Hourly Spot price and margin of the French electrical system



Sources: Producers - Analysis: CRE

GRAPH 14 - Hourly Spot price and margin



Sources: Producers - Analysis: CRE

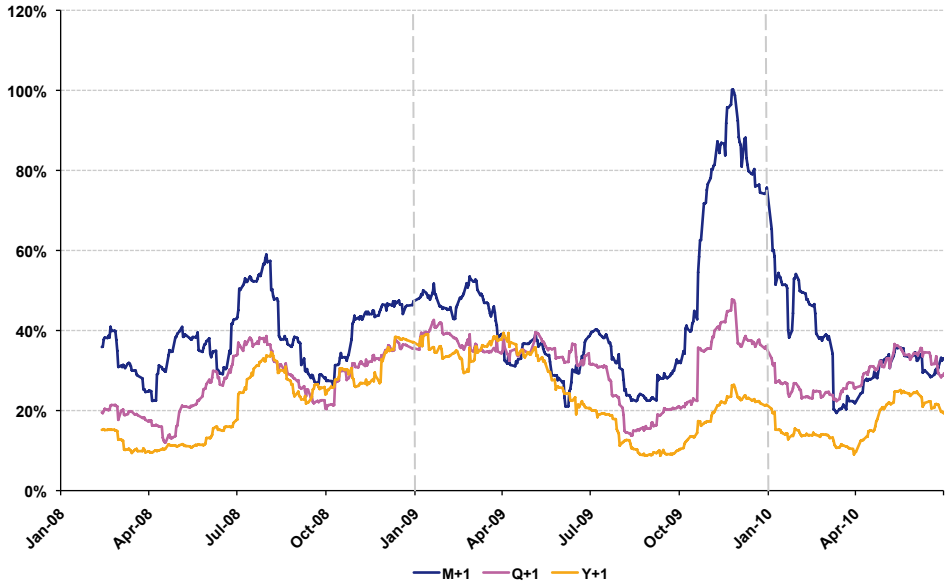
2.3. The period of volatility of Futures prices on the French market is marked by the price spike of October 2009

Unlike 2008 when the prices of Futures products had reached record levels in the summer before they fell sharply, the price of the Y+1 product remained very stable in 2009 and at the beginning of 2010, around a little less than €51/MWh (Graph 15). Average prices observed for calendar products M+1 and Q+1 (which show seasonality) are slightly lower, around €46/MWh. Analysis of their average volatility leads to think that the 19 October 2009 price spike on the Spot market had an impact on the Futures markets with increased volatility during the period immediately following the peak. Graph 16, which shows the average volatilities observed in a 30 working days window, reveals a sudden increase as of 19 October, which is all the greater because the maturity of the product and its duration are short. The decreasing trend of the volatilities along the price curve is also revealed by Graph 17 which shows the historical volatilities annualised for Futures products of different maturities.

GRAPH 15 - Futures prices in France

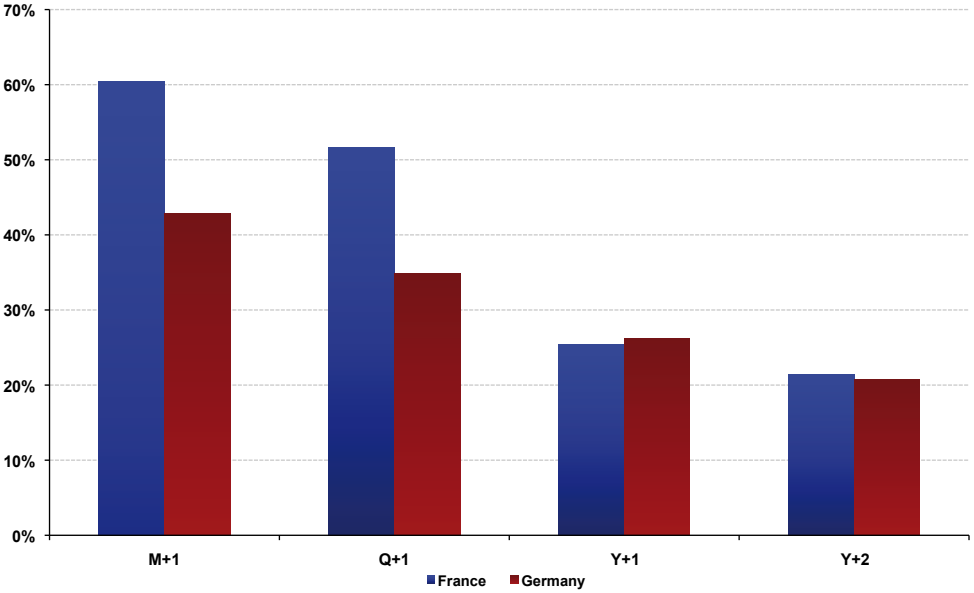
Source: EPD - Analysis: CRE

GRAPH 16 - Moving volatility (30 days) of Futures prices in France



Source: EPD - Analysis: CRE

GRAPH 17 - Decrease in historical volatility (annualised historic volatility of Futures products, from 01/01/09 to 30/06/10)

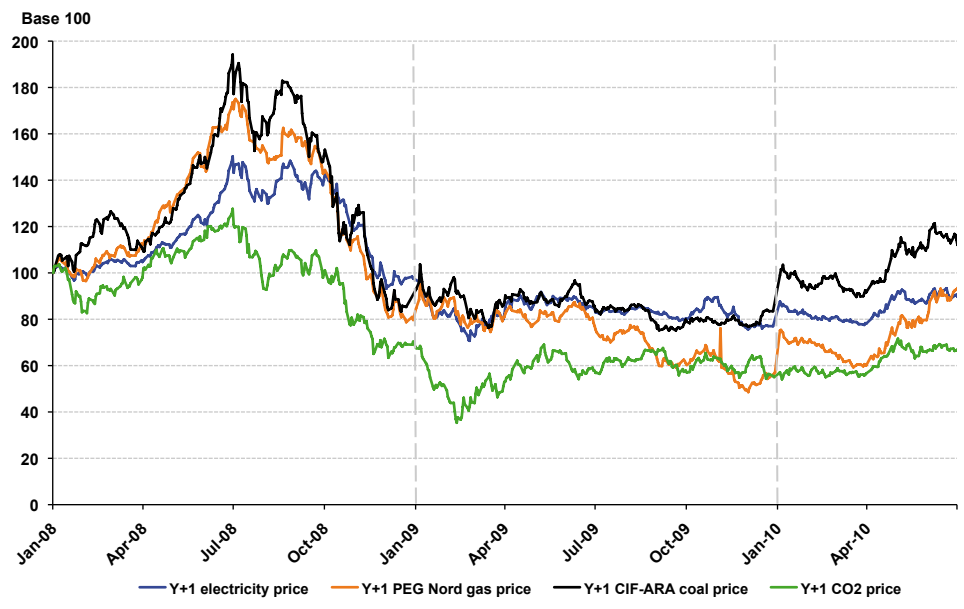


Source: EPD - Analysis: CRE

2.4. Common trends between electricity Futures prices and fossil fuel prices

Futures electricity prices are influenced by participants' anticipations of the costs of the generation facilities needed to meet the demand, and thus by their anticipations of fuel prices. This observation is reinforced by the analysis of the marginality of generation technologies in France (see chapter 3). Consequently, fossil fuels prices are expected to have at least an indirect influence on electricity prices. The comparison of the changes in the price of the Y+1 product and the prices of fossil fuels illustrates this link (Graph 18). In particular, the upward and then downward trend for oil, gas and coal is seen in Y+1 product prices.

GRAPH 18 - Electricity Futures (Y+1) and fuels prices expressed in € (base 100 at 1 January 2008)



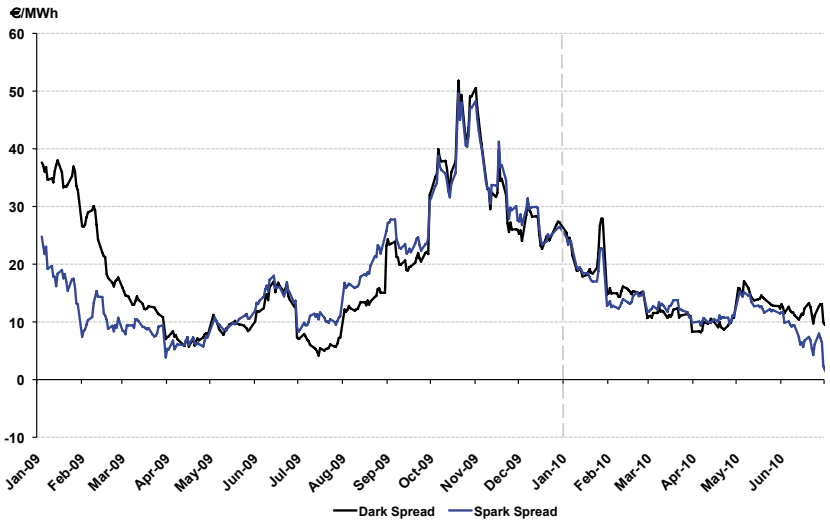
Sources: EPD, Platts, Bloomberg - Analysis: CRE

Graph 19a shows the changes in the comparative advantage of generation using coal over generation using gas in terms of marginal generation cost (clean dark Spreads and clean spark Spreads [6]). While the theoretical profit of a coal-fired plant was much higher at the beginning of 2009, this advantage completely disappeared during the year (until it was reversed from July to October), to remain very low thereafter and finally reappear from June 2010 onward. The theoretical price of CO_2, based on the trade-off between gas and coal-fired generation, and its market price, are illustrated on Graph 19b.

(6) The clean dark Spreads and clean spark Spreads represent the theoretical profit made by the respective holders of coal and gas plants. A sustained disconnection of one of these values with respect to the other indicates a loss of competitiveness of one of the production sectors and the absence of trade-offs between the two types of production via the CO_2 market, and thus a major difference between the CO_2 quota price and its theoretical equilibrium price.

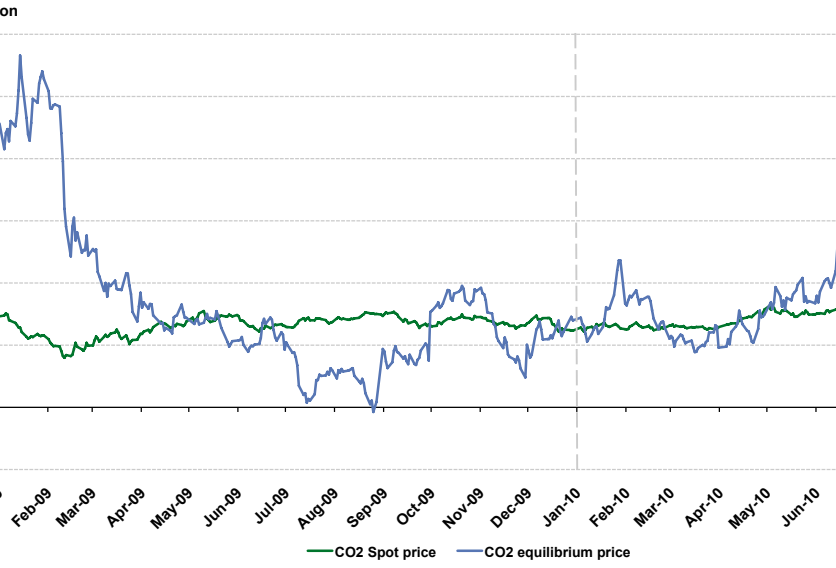
GRAPH 19 - Carbon price

a - Clean dark & spark Spreads - Theoretical revenues of coal and gas plants, based on the Futures prices M+1



Sources: EPD, Platts, Bloomberg - Analysis: CRE

b - Carbon Spot price and theoretical price equalizing the comparative advantage of coal or gas



Sources: EPD, Platts, Bloomberg - Analysis: CRE

2.5. A close correlation between prices on the French market and on the German, Belgian and Swiss markets despite the disturbance of the price spike of October 2009

Table 6 shows the Spot price correlations between France and neighbouring countries. The correlations measured for 2009 appear to be much lower than those observed in the previous years. This was largely due to the price spike of 19 October 2009 which saw the French Spot price reach more than €600/MWh on a daily average. Excluding this day from the range of data, the correlations measured appear more in line with those usually observed.

When the October 2009 price spike is excluded, there is a strong correlation (94%) between French and Belgian prices, a consequence of the trilateral coupling, and with the German and Swiss prices (81% in both cases). However, the price correlation between France and Germany decreased in 2009 compared with 2008. According to these criteria, the French, Belgian, German and Swiss markets can be considered closely linked.

TABLE 6 - Price correlations between France and neighbouring countries

Spot market: Correlations of Base product prices

Year	Germany - France (EEX - Powernext)	Spain - France (Omel - Powernext)	United Kingdom - France (Platts - Powernext)	Italy - France (IPEX - Powernext)	Belgium - France (Belpex - Powernext)	Switzerland - France (Swissix - Powernext)
2004	91%	61%	53%	50%		
2005	89%	69%	84%	53%		
2006	80%	53%	72%	64%		
2007	80%	53%	86%	61%	91%	87%
2008	88%	36%	56%	67%	88%	91%
2009	40%	23%	27%	26%	45%	40%
2009*	81%	52%	70%	51%	94%	81%

** Not including the price spike of 19/10/09*

Sources: Platts, OMEL, IPEX, EEX, and Belpex figures - Analysis: CRE

- *Price differences that are justified by differences in the generation mix, with French demand also being characterized by high sensitivity to temperature changes*

Table 7 illustrates the price differences between France and the countries connected on the Spot markets. In general, France is on average for the whole period 2007-June 2010 more expensive than Germany (+€3.49/MWh) and Spain (+€5.67/MWh). French prices are however lower than in the United Kingdom (-€5.31/MWh), Italy (-€22.02/MWh) and Switzerland (-€5.04/MWh). The Belgian prices are very close to those of the French market on average, given the coupling of the French, Belgian and Dutch markets.

TABLE 7 - Average price difference between France and neighbouring countries

Spot product (D+1) Base: average price difference (in €/MWh)

Year	Germany - France (EEX - Powernext)	Spain - France (Omel - Powernext)	United Kingdom - France (Platts - Powernext)	Italy - France (IPEX - Powernext)	Belgium - France (Belpex - Powernext)	Switzerland - France (Swissix - Powernext)
2004	0.4	-0.2	4.7	10.6		
2005	-0.7	7.0	8.6	11.8		
2006	1.5	1.2	9.4	25.0		
2007	-2.8	-1.7	1.3	30.1	0.9	5.1
2008	-3.4	-4.8	20.3	18.0	1.5	5.1
2009	-4.2	-6.1	-2.1	20.7	-3.7	4.9
H1 2010	-3.8	-14.9	-2.2	19.2	-2.1	5.1

Future product (Y+1) Base: average price difference (in €/MWh)

2004	1.1	n.a	8.1	n.a	n.a	n.a
2005	-1.0	n.a	19.6	n.a	n.a	n.a
2006	-1.4	n.a	14.9	n.a	n.a	n.a
2007	1.5	n.a	2.5	n.a	n.a	n.a
2008	-3.8	n.a	10.8	n.a	n.a	n.a
2009	-2.6	n.a	-1.3	n.a	n.a	n.a
H1 2010	-2.5	n.a	-4.2	n.a	n.a	n.a

Sources: OMEL, IPEX, EEX, Belpex, Powernext - Analysis: CRE

Nevertheless, price differentials on the Spot market generally rose in 2009 compared with the previous year. The 19 October price spike partly explains this deterioration because it led to an average increase of nearly €2/MWh on the average French price.

The structure of the generation mix by country also explains some of the differences. Among the countries where prices are lower than in France, Spain is characterized by large contributions of "unavoidable" hydraulic and wind generation.

In the case of Italy, although the conventional thermal technologies (gas and fuel oil) are preponderant, the price differential on the Spot market tended to grow in 2009 compared with 2008.

The highest variation of the average price difference took place at the English border for which the price differential for Spot products fell from €20.3/MWh to -€2.1/MWh between 2008 and 2009. In the United Kingdom, market prices follow gas and CO_2 prices, as generation facilities mostly consist of gas-fired plants. While the

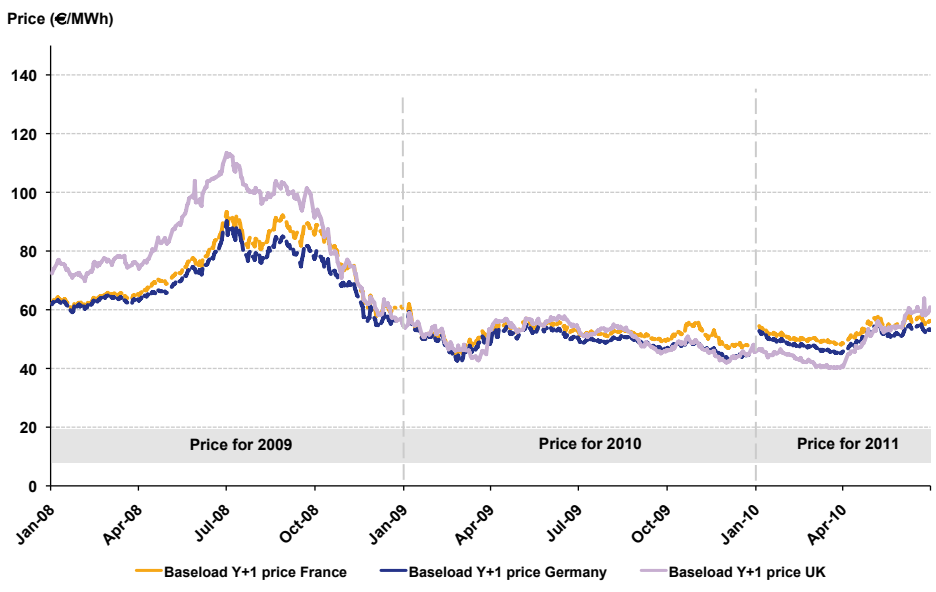
price rise on this market in 2008 increased the price differential with France, the spectacular drop in the gas market prices (see chapter 2) observed since the last quarter of 2008 explains the significant decrease in the Spot and Forward electricity prices and the very clear reduction of the price difference with France (Graph 20).

This decrease in the British electricity prices is also noticed on the Futures market where the average difference between French and British prices decreased by more than €12/MWh. This situation can mostly be explained by participants' anticipations of a sharp decrease in the generation costs of plants using gas, which characterise the British generation mix.

Lastly, the persistence of a positive margin between German and French electricity prices (Graph 21 and 22) also reflects the integration by the market of a risk premium on the annual product for delivery in France, due particularly to the greater volatility of the price in France, the greater temperature sensitivity of French electricity demand [7] and the low level of liquidity on the French market.

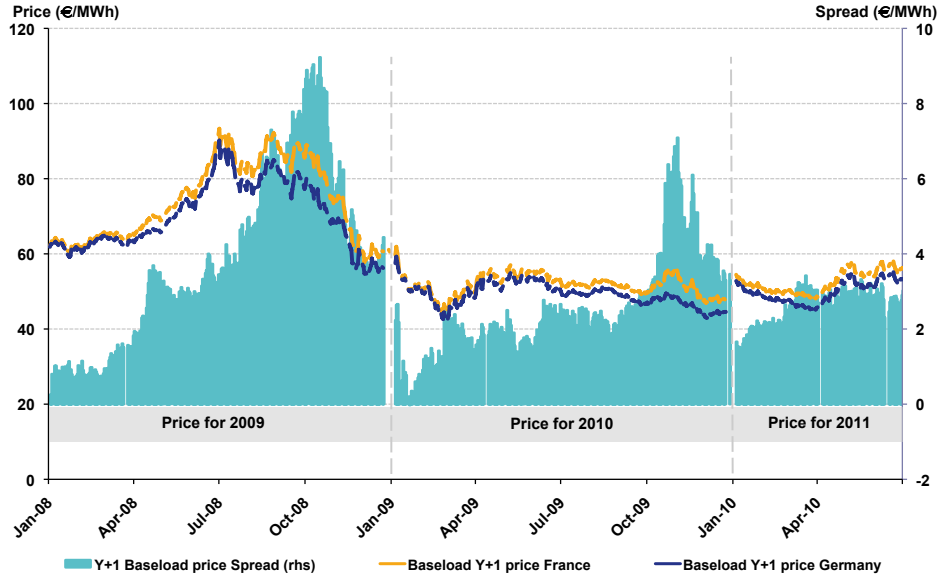
(7) The drop in temperature of 1°C led to an increase in electricity consumption of 2,100 MW in 2008, due to the substantial use of electric heating.

GRAPH 20 - Futures prices France - Germany - United Kingdom



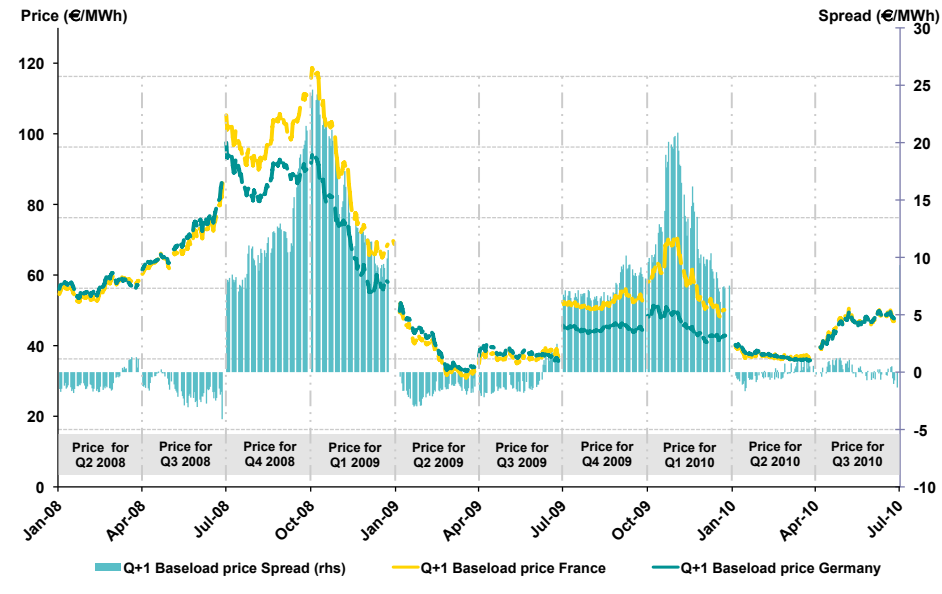
Sources: EPD, Platts, Bloomberg - Analysis: CRE

GRAPH 21 - Average price difference between France and Germany (Y+1)



Sources: EPD, Platts, Bloomberg - Analysis: CRE

GRAPH 22 - Q+1 prices in France and in Germany



Sources: EPD, Platts, Bloomberg - Analysis: CRE

3. ANALYSIS OF GENERATION AND ITS TRANSPARENCY

According to RTE [8], the installed capacity in France was 120.4 GW in 2009, versus 117.6 GW in 2008, an increase of 2.1%. The breakdown between the various fuel types is shown in graph 23.

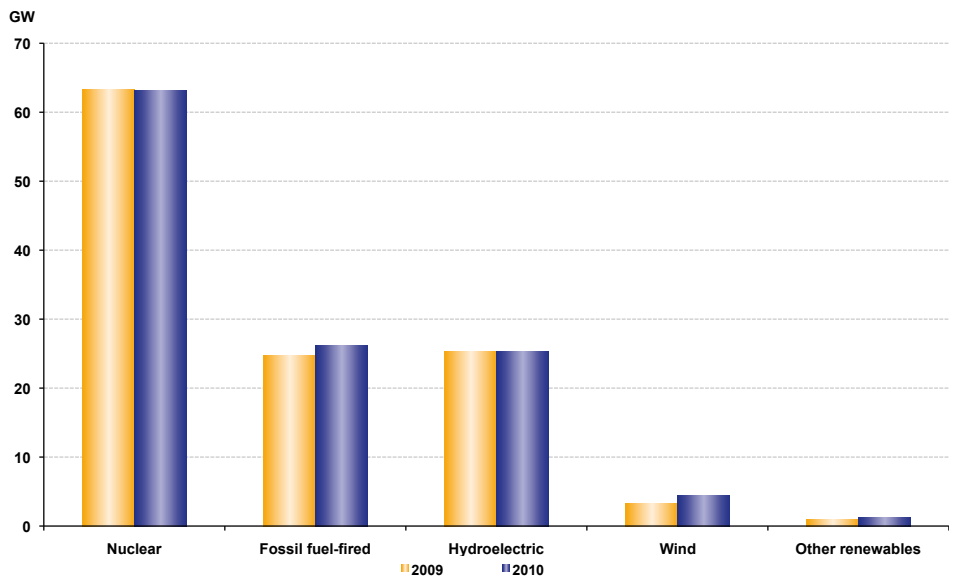
The reference facilities connected to the RTE network represent an installed capacity of 111 GW. These facilities are characterised by a strong dominance of nuclear capacity which totals 57% of the installed power with 63.1 GW. Next come hydraulic generation capacities (23.8 GW or 21.5%) which are divided into pondage type generation units, managed as a function of stocks of water kept in barrier lakes, and those called "run-of-river", which depend on unpredictable hydraulic input. Lastly, the fossil fuel-fired facilities, composed of plants using coal, gas and oil, represent 20.8% of the reference facilities with close to 23.0 GW installed.

Alongside EDF which concentrates about 90% of the installed power of the reference facilities, the other two significant producers are:

- GDF SUEZ which, through CNR, SHEM, the generation assets and holdings in nuclear facilities, uses 6% of the installed power;
- E.On France (SNET, E.On group), which holds 3% of the installed power.

(8) Electrical Energy Statistics in France 2009, RTE.

GRAPH 23 - French generation facilities (levels of the various facilities)



Source: RTE - Analysis: CRE

These three producers hold a total of 99% of the installed power. Electricity generation in France thus remains a highly concentrated market.

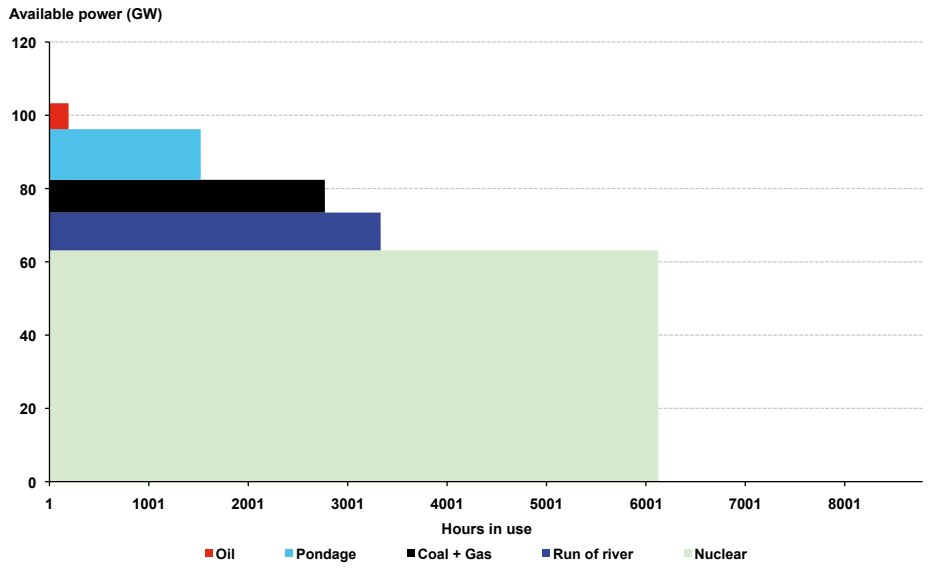
In September 2009, Poweo, a new comer in the generation sector, commissioned its combined cycle gas-fired plant in Pont-sur-Sambre. The commissioning of new units scheduled in 2010 should make it possible to increase the fossil fuel-fired generation capacity by more than 770 MW, including 420 MW for gas and 350 MW for peak oil-fired generation.

3.1. The average equivalent use durations reflect the uses of the various fuel types

Graph 24 illustrates the equivalent durations of use of the different technologies in 2009. These durations are defined as the ratio between the total energy generated during the year and the total installed power. They thus reflect the rate of use and the availability of the various facilities. The highest equivalent use duration is that of the nuclear facilities, used for baseload generation, which was 70% of the time versus 75% in 2008, a decrease linked to a lower rate of availability. The oil-fired plants, which handle peakload generation, are only used with an equivalent duration of 2% of time.

Excluding "unavoidable" generation (run-of-river hydraulics), comparison of the equivalent use durations allows to show the order of merit of the various technologies. Those with the lowest equivalent durations therefore correspond to those for which the marginal generation cost (or the value in use) is the higher.

GRAPH 24 - Use durations of the various generation types in 2009



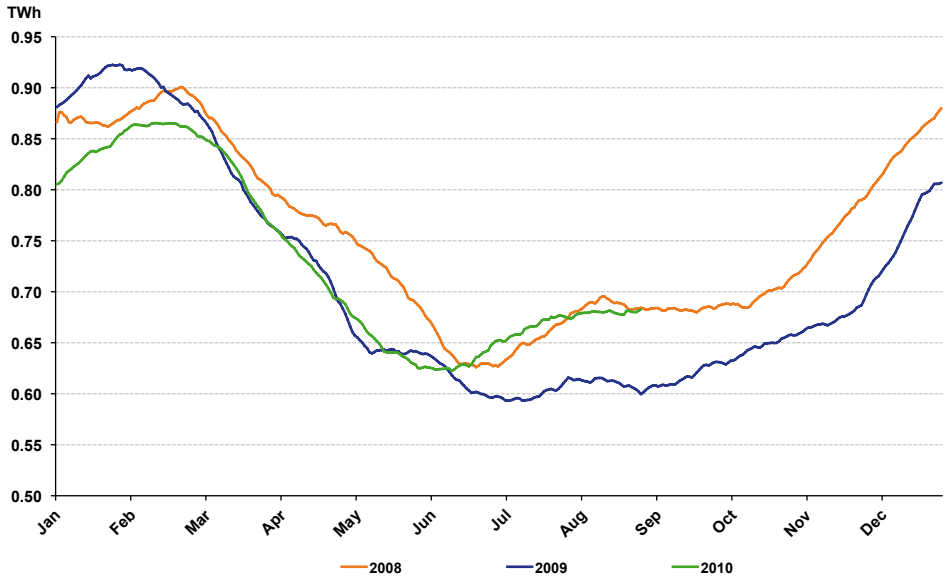
Source: RTE - Analysis: CRE

- *A sharp drop in the nuclear generation rate in 2009, but with signs of an upturn in 2010*

In 2009, nuclear generation, characterised by high seasonality linked to the demand for electricity, had its maximum generation rate in January with effective generation representing 95.6% of the installed capacity (Graph 25). The minimum generation rate was recorded at 55.1% in July, when there were a lot of scheduled maintenance shutdowns.

In the second semester of 2009 there was a very significant drop in the nuclear generation rate. The average rate recorded for this period was 66.7% versus 73.8% in 2008. For the year, the average generation rate was 70.5% as against 75.4% in 2008. However, the situation seems to have been improving in 2010 (H1) with a generation rate of 73.8% comparable to the levels recorded in previous years for the same period. As a visible consequence of this improvement in the availability of the nuclear facilities, the French export balance improved in 2010 starting in May until it returned to a level close to that of 2008 (Graph 26).

GRAPH 25 - Nuclear generation rate 2007-2009 (nuclear generation realised / installed nuclear capacity - moving average over 30 days)

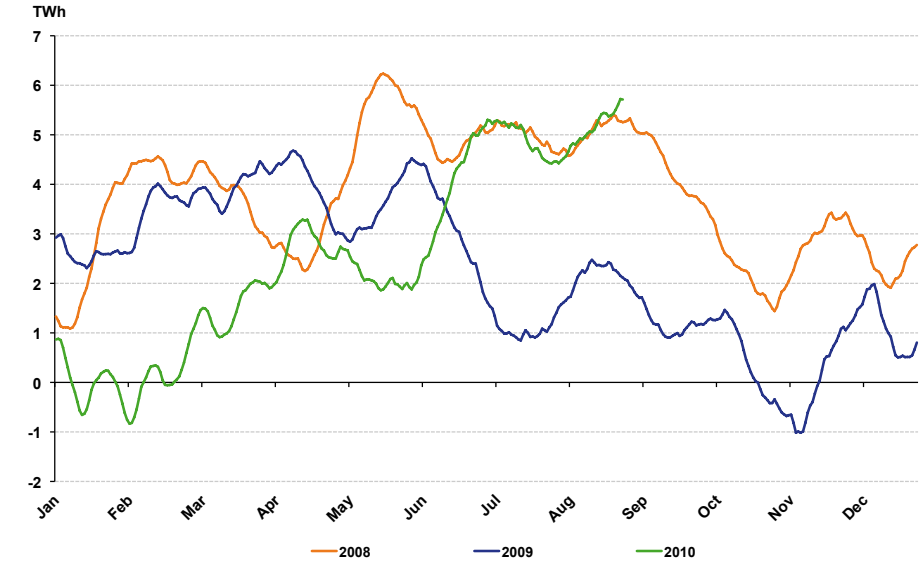


Sources: RTE - Analysis: CRE

- *An increasing use of coal-fired plants and water reserves during winter 2009-2010*

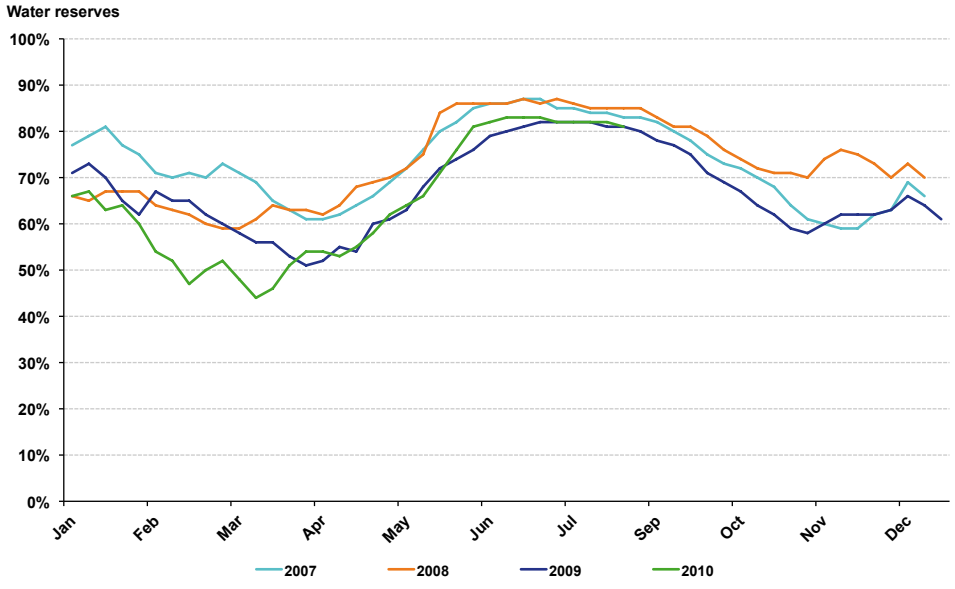
In 2009 as in 2010, there was a steep fall in water reserves. As Graph 27 demonstrates, the first months of the year brought water reserves to particularly low levels compared with preceding years with a minimum of 50% observed in March 2009 and even 43% in March 2010. However, these reserves were rebuilt during the summer which brought their level back to values similar to those seen in preceding years.

GRAPH 26 - Monthly export balance 2007-2009 (moving average over 30 days)



Sources: RTE - Analysis: CRE

GRAPH 27 - Water reserves



Sources: RTE - Analysis: CRE

In a context of lower price levels in 2009 compared with the previous year, it should be noted that there was a particularly low rate of use of coal and gas plants in the second quarter of 2009 (Table 8). However, the generation rate improved significantly as of the third quarter to reach, and even exceed in the first quarter of 2010, the rates observed in the preceding years. This increased use of traditional thermal power plants was probably linked to the reduced availability of the nuclear facilities during this period.

TABLE 8 - Coal-gas generation rate 2007-2009

	2007	2008	2009	2010
Q1	39%	44%	48%	52%
Q2	36%	34%	22%	33%
Q3	28%	25%	29%	
Q4	53%	42%	46%	

Source: RTE - Analysis: CRE

3.2. While the borders were marginal less often in 2009, the marginality of nuclear plants remained under 10%

A generation technology is considered marginal when it determines the market price, i.e. when the most expensive plant functioning to meet the demand uses this technology. This section analyses the marginality of the various generation technologies in France in 2009. The marginality calculation is based on the comparison between the marginal costs of each generation unit for each of the hours of the year and the hourly price on the Day-ahead market.

Analysis of marginality depends quite a lot on the calculation method chosen. The one used here takes into account both a price criterion and a criterion of use of the unit:

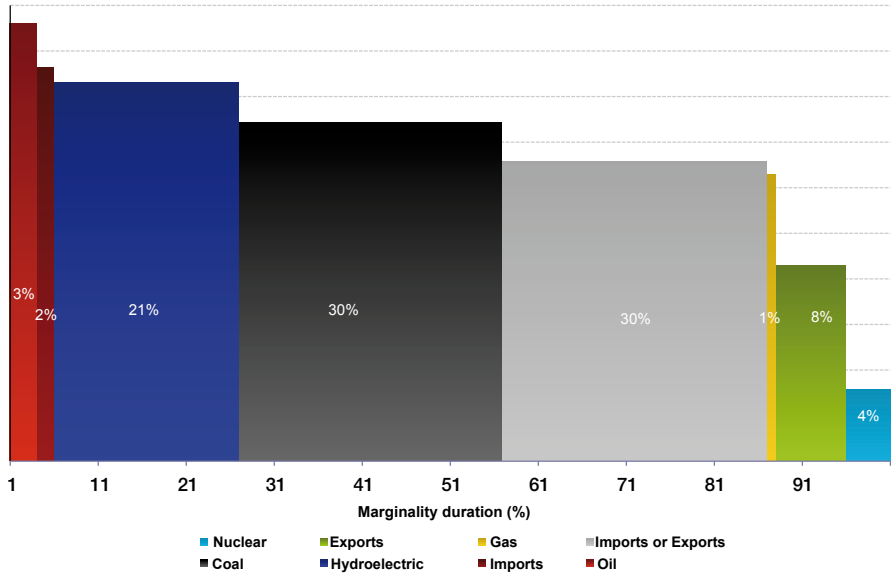
- the price criterion selects the plants for which the difference between the market price and the generation cost does not exceed a certain threshold (set at €5/MWh);
- for the plants for which the marginal cost satisfies this first criterion, generation must be between 15% and 85% of the theoretical maximum capacity [9];
- the unit considered as marginal is then the one that respects the preceding criteria and for which the cost is closest to the market price.

If no generation unit meets these various criteria, the price level on the French market is then assumed to be explained by the influence of the diverse interconnections. Borders are then considered marginal.

The results of these estimations are summarized, for 2008 and 2009, in graphs 28 and 29, keeping in mind that these results depend on the methodological hypotheses that are used.

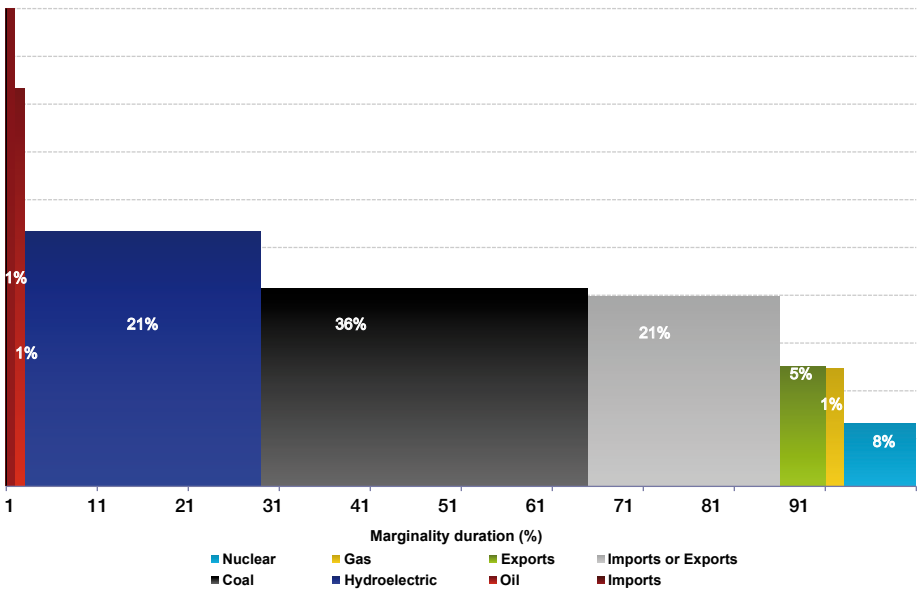
(9) The analyses presented in the 2008-2009 surveillance report took into account an absolute criterion rather than a relative criterion. This methodological difference explains the slight variation between the figures obtained here and those published last year for 2008.

GRAPH 28 - Duration of marginality of the various generation technologies in 2008



Source: CRE

GRAPH 29 - Duration of marginality of the various generation technologies in 2009



Source: CRE

Looking at the results obtained in both 2008 and 2009 reveals:

- an increase in the duration of marginality for the nuclear generation, which nonetheless in 2009 determined the price in only 8% of cases (while nuclear generation represented 80% of the total generation);
- a rise in the duration of marginality of the coal-fired and hydraulic generation;
- a sharp drop in the duration of marginality of the borders, which fell from 40% in 2008 to 27% in 2009.

The prices observed during the hours of marginality of all of the technologies decreased significantly. These observations are consistent with the fall in fuel prices in 2008. A decrease was also observed for nuclear generation.

The prices observed during the hours of marginality of hydraulic generation were also lower in 2009. This is also coherent since only "lake" type units (dams) can be marginal unlike "run of river" units for which the generation is "unavoidable" and is sold at any price. Because of the optimisation of the hydraulic facilities, the value in use of the hydraulic means of generation involved is strongly linked to the marginal cost of replacement of these units by thermal power plants. It is consequently logical to see in 2009 an average price that is lower during the periods of hydraulic marginality, because of the decrease in fossil fuels prices and thus the decrease in the marginal generation cost of thermal power plants.

In 2009, the border markets determined French prices for 27% of time, less than in 2008.

The impact of the borders can be divided into three categories according to the assumed direction of the exchanges relative to neighbouring countries. The border is considered to be marginal in the exporting direction when the French price is less than the minimum of the prices observed at the borders, and in the importing direction if it is greater than the maximum. In the remainder of the cases, the direction is considered to be undetermined.

For 2009, French prices were:

- higher 1% of time, or an importing situation with substitution of more expensive means;
- lower 5% of time, or a situation of exporting electricity less expensive than anywhere else;
- defined by different border prices, 21% of time.

3.3. UFE is still developing its transparency system with improvements adopted in July 2009 and June 2010 and planned for the end of 2010. Despite this progress, the reliability of the forecast publications remains perfectible

- *A transparency system supplemented by UFE in 2009 and 2010*

The transparency of generation data is an important condition for the proper functioning of the wholesale electricity market. The UFE system, implemented in November 2006, collects from its members information about the generation realised and the forecast availability of the generation facilities, and organises this transparency on the French market. This system now covers 90% of French generation and takes into account facilities from 20 MW. This data is

published via the RTE website where it is presented in aggregate form by fuel type.

In 2009, UFE enriched its system by implementing several measures aiming to increase the degree of transparency on the French market.

Since 1 July 2009, the following are also published daily:

- the actual daily availabilities;
- the update of daily availability forecast in the short-term for all of the facilities.

New improvements were also made in 2010 with, starting on 1 July, the publication of the forecast power availability, in the short- and medium-term, for each generation unit with power greater than 100 MW. Lastly, the publication for these same units of unplanned shutdowns within 30 minutes has also been announced for the end of 2010.

- *The forecast availability of the thermal and nuclear generation units is statistically over-estimated*

The efficiency of the transparency system is based on systematic transmission of the availability data for publication. This still seemed to be inadequate in 2009 despite a slight improvement. In 2009, an average of 80.2% of the information needed for the transparency system was transmitted to the network manager versus 77.7% in 2008. Weighting with the installed capacity taken into account for each of the forecasts, the rate of transmission is higher, at 92% in 2009 versus 85% for the preceding year. However, since until then RTE had been publishing the forecast availabilities in aggregate form by generation technology, the rate of publication of exhaustive forecasts, i.e. taking into account the forecast availabilities when all of the producers sent in all of the necessary information, is lower (Table 9).

TABLE 9 - Availability forecasts of the various fuel types

Type / Data	Coal	Hydraulic run of river	Fuel oil	Gas	Nuclear	Hydraulic lake
Rate of exhaustive forecasts*	73%	54%	92%	49%	92%	57%
Average statistical deviation at 7 days	315 MW	-299 MW	280 MW	10 MW	1,733 MW	82 MW
Average statistical deviation (D-7) in % of facilities	4.6%	-3.0%	3.9%	0.1%	2.7%	0.6%
Average statistical deviation (D-7) in 2008	3.4%	-3.8%	3.3%	0.0%	2.5%	0%

** The rate of exhaustive forecasts is the ratio between the number of exhaustive forecasts received and the total number of forecasts expected for the daily (D-1 to D-7) and weekly forecasts (W-1 to W-12). A forecast is considered to be exhaustive when all of the market participants involved in this generation technology have provided a forecast for the date and maturity in question.*

Analysis: CRE, according to transparency data published by RTE

The analyses below aim to measure the quality of the information sent by the producers. They check the consistency of the information sent at the various terms (months, weeks, days) with the latest availability forecast, i.e. the D-1 forecast.

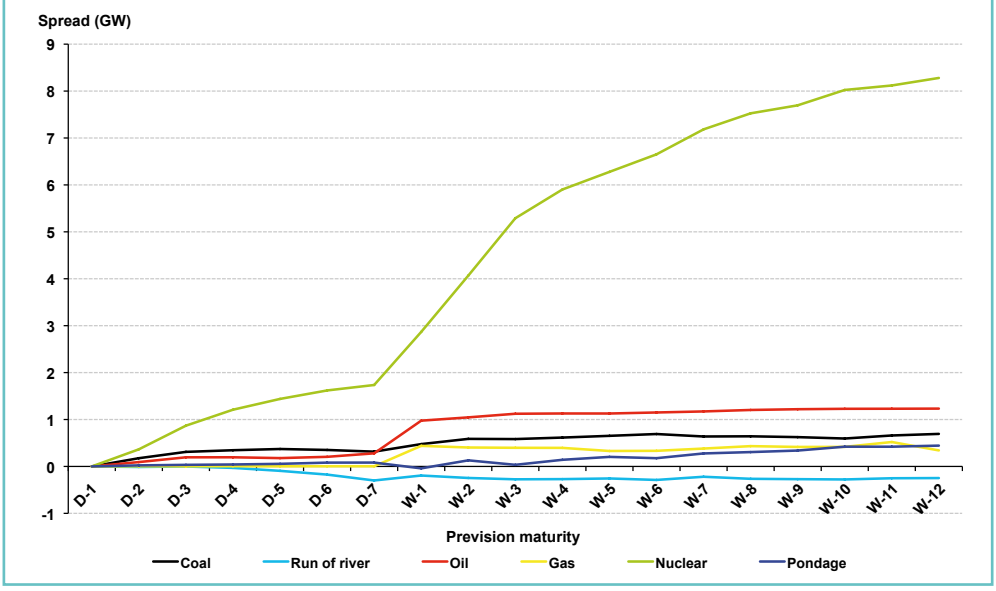
Graph 30 shows, for terms of less than 12 weeks, the average differences observed between the availability forecasts published and the D-1 forecasts, last known forecast.

The transparency of the generation data appears to be satisfactory in the case of nuclear and oil-fired plants (which involve only one player). The rate of publication is down for the other technologies, from 67% and 62% respectively for the lake and run-of-river hydraulic generation in 2008 to 57% and 54% in 2009. It is higher on the other hand for the gas and coal-fired power plants, with a rate of publication rising from 48% to 49% for gas and 53% to 73% for coal.

With regard to the differences between the various availability forecasts and the last forecast recorded (D-1), there is a slight statistical over-evaluation of the availability forecasts for the nuclear plants with a bias that worsened compared with 2008. The accuracy of the forecasts appears to be good for the hydroelectric generation, but poorer for the fossil fuel-fired plants.

The dispersion of the forecasts around their average appears to be low for the hydroelectric (run-of-river and lake) and nuclear generation with an average standard deviation of the forecast bias representing respectively 3.1%, 3.0% and 3.8% of the installed capacities over the

GRAPH 30 - Average difference between the availability forecasts and the latest forecast (D-1) (10)



Source: RTE - Analysis: CRE

(10) The growth of the discrepancy of the forecast with its maturity is the result of the rules defined by the producers regarding the transmission of availability forecasts. The UFE "transparency" specifications, in II.e, stipulate that "the available power forecast published on a given date only takes into account outages that are certain; it does not include any evaluation of the risk of unplanned outages". This precise definition thus excludes any evaluation of the incapacity of a facility to maintain its availability or to become available again.

period but high for the coal, oil and gas generation (8.0%, 15.5% and 8.1%).

The actual availability is statistically lower than the forecasts published on D-1 for the nuclear sector

Since 1 July 2009, RTE has been publishing the daily availabilities realised for each generation technology. The comparison of the predicted availabilities on D-1 and the actual availability reveals a statistical over-estimation of the forecast availabilities made public within the framework of the transparency system. Across all types of plants, this is evaluated at close to 1100 MW, including more than 800 MW for nuclear plants alone (Graph 31).

EDF, the only operator of nuclear facilities, was questioned regarding the causes of such a bias. EDF sent CRE explanatory elements in the cases of the largest discrepancies. In most cases these are linked:

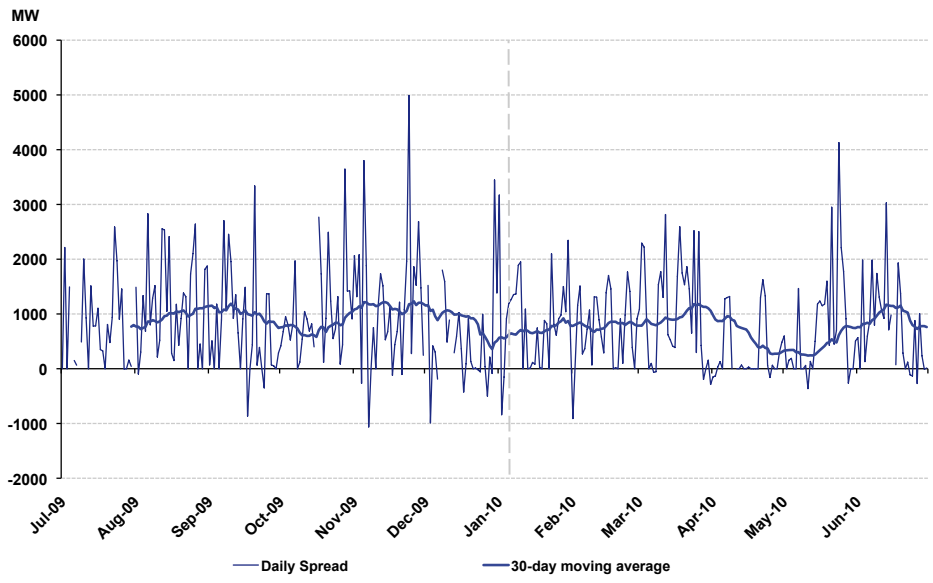
- to unplanned shutdowns of plants;
- to prolonged outages, due to the extending of inspections or shutdowns.

These differences will be monitored regularly with a more precise analysis to explain their amplitude.

- *The information published by RTE is a key element in the transparency system*

The RTE website, which publishes all of the data collected for the transparency system, is the keystone of UFE system. Since 1 July 2010, it has also been possible to view in real time and by intervals of 15 minutes the French electricity consumption of the current day. The RTE website also allows for access to an estimation of the CO_2 emissions created by electricity generation, calculated as a function of the generation technologies used in France and their average CO_2 emissions estimated by RTE.

GRAPH 31 - Average difference between actual and forecast (D-1) nuclear availability



Source: RTE - Analysis: CRE

Own-consumption of generation units that are shut down

The analyses carried out on the data published within the framework of the Transparency system have revealed that the data published could contain inconsistencies related to the own-consumption of the generation units during shutdowns. The consumption forecasts published by RTE are prepared on the basis of a statistical model, based on the various estimations of daily consumption in real time. These estimations in real time do not take into account the consumption of generation units, whether they are shut down or in operation. The same is true for the forecasts.

The availability forecasts published by producers may not be consistent with the reporting of the consumption, because the own-consumption of a generation unit is only taken into account in the availability forecasts and the generation data when this unit is functionning.

Based on this observation, RTE now specifies on its website the extent to which the various data and generation and consumption forecasts take own-consumption into account.

Operational incident of 10 March in the publication by RTE of the consumption forecasts

On 10 March 2010, the RTE platform for the publication of the forecast consumption on D-1 was unavailable in the morning. RTE was questioned about the causes of this incident. It appeared that this was caused by an operational incident during the online publication of the data with a low probability of occurrence. CRE considers that the very low frequency of occurrences of this type of incident does not, at this stage, call for the implementation of a redundant emergency procedure beyond the means already implemented by RTE. However CRE will, more generally, analyse the duration, the quality and the reliability of the operational processes implemented by the various parties involved in the transparency system.

3.4. The audit of EDF's valuation methods shows that in 2009 the market offers were generally consistent with the marginal costs of the EDF system. The risk management policy received particular attention

- *Offers on the markets generally consistent with the marginal costs*

In its preceding report on the functioning of the wholesale markets released in December 2009, an audit of the EDF and EDF Trading optimisation models was carried out. An ex-post analysis of the difference between the marginal costs of the EDF system and the Spot prices in particular was done for 2008. For the hours when EDF was assumed to be marginal, this difference was around 6%. Based on these results and foreign references, CRE had concluded that the extent of these differences did not reflect the exercising of market power.

CRE also indicated in its previous report that the differences between the Spot prices and the marginal costs of the EDF system would be monitored regularly and specifically by CRE.

This monitoring has been set up and EDF now gives CRE, on a monthly basis, the results of its daily optimisation models, allowing for regular monitoring of the price-cost difference. The difference is measured on an hourly time scale.

For 2009, the average difference observed between the Spot prices and the marginal costs was 6.5%. It is partly linked to the values recorded during the price spike of 19 October 2009. Reprocessing the abnormal values of 19 October, the resulting difference is 4%. Moreover, the optimi-

sation model can, in some cases, yield negative marginal cost values, while the offers transmitted to EPEX Spot must be greater than zero. Correcting this bias, and taking out the values linked to the spike of 19 October, the average difference for 2009 is 3.3%. In the configurations where the price on EPEX Spot is less than the price on the German EEX market, the price-cost difference is also negative, in accordance with the expected impact of the exchanges at the borders.

Beyond the previous overall observation for 2009, certain occurrences can correspond to high price-cost difference levels or, in a related fashion, to the use of generation units below the capacity expected given the market price levels.

CRE questioned EDF regarding the particular cases representative of such situations. EDF was able to justify these cases chiefly with the following reasons:

- the consequences of the social movements of 2009 on the use of generation facilities;
- the fixed start-up costs that made the use of some thermal flame plants unprofitable;
- the materialising of unpredictable factors impacting the supply-demand equilibrium on the EDF perimeter, after the auction on the French Spot market.

In the end, CRE considers that, for 2009, the differences between the prices and marginal costs are at levels that do not constitute an abuse of EDF's dominant position.

The risk management policy received special attention

EDF optimises its generation facilities and manages its interventions on the markets, taking into account a "1% risk" criterion. This criterion is used to evaluate, for the EDF portfolio, the margin necessary to bring to 1% the risk, for the company, of having to use very costly or exceptional generation means in order to maintain the supply and demand equilibrium on its perimeter of responsibility.

The optimisation of EDF's position on the markets is the responsibility of EDF Trading which, within the framework of this policy, respects this "1% risk" criterion at 4pm. To this end, a margin of uncertainty on the volumes available for sale is taken into account to cover the uncertainties that could affect EDF's supply and demand equilibrium between the auction and 4pm. This margin of uncertainty which is therefore not offered to the market is calibrated from the risk of failure of a nuclear unit between 12 noon and 4pm.

CRE considers that this margin does not have an impact in situations without tension on the French Spot market and in situations where EDF is the buyer.

However, CRE has raised the issue of the potential impact of this margin in the case of tensions on the Spot market for electricity, with no real physical tension on the electricity system. In this case the market price could be set at levels that exceed those that would have resulted from the offer for sale of all or part of this margin, according to its offer price.

EDF informed CRE that, pending in-depth studies of the operational impacts, a modification of the procedures for the application of the risk policy would be implemented by the end of 2010, so that the 1% risk level would be met at the time of the submission of the offers on EPEX Spot and no longer at 4pm, and thus the risk should be borne by EDF including during the period between the Spot auction and 4pm.

While awaiting the results of these studies, CRE considers that such a change would help clarify the sharing of the roles and responsibilities between EDF and EDF Trading and would improve the group's intervention procedures on the wholesale electricity markets.

4. ANALYSIS OF TRANSACTIONS

4.1. The offer on the Spot market reflects the state of the electricity system

This section analyses the offers submitted by the different market players on the EPEX Spot Auction for France.

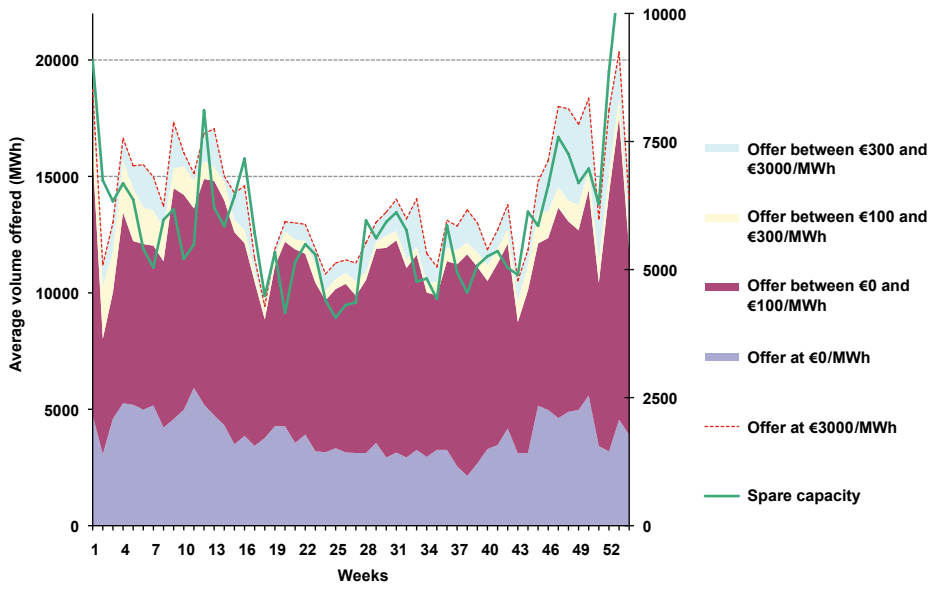
Graph 32 shows the relationship between the ask order book (volumes offered at the different prices) and the margin indicator, i.e. the excess capacity available which thus reflects the state of tension of the French electricity system.

In 2009, the offers at any price (for €0/MWh) were on average 3,920 MWh, 300MWh more than in 2008. On average, 57% of the volumes are offered at price between €0 and €100/MWh, with an average volume offered of around 11,800 MWh. Above €100/MWh, the average volume offered increases by 6000 MWh. Globally, there is a quite clear correlation between the margin indicator and the total volume offered on EPEX Spot.

61% of aggregate demand is characterised by a willingness to pay between 0 and €100/MWh (Graph 33). The average demand between €100/MWh and €300/MWh is relatively low (around 215 MWh).

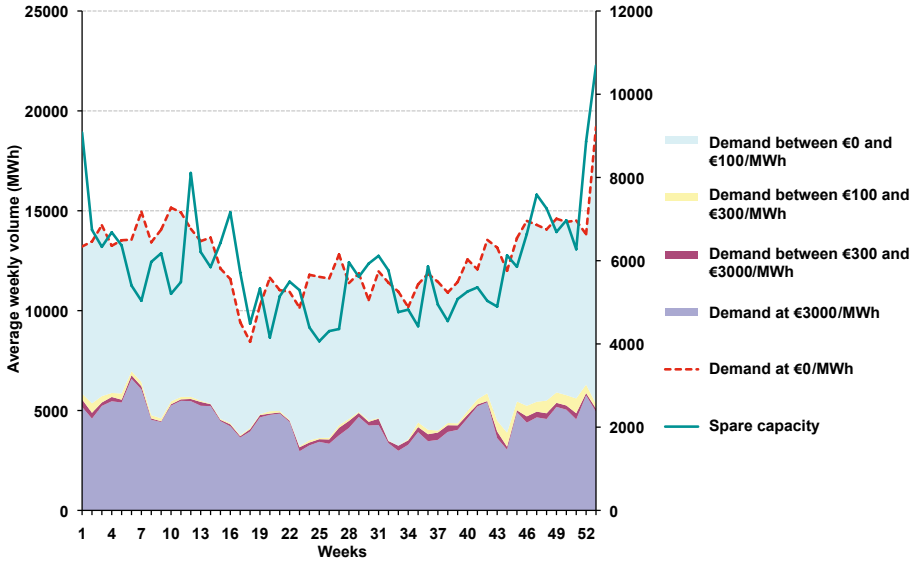
The average volume of the demand at any price represented 4,470 MWh in 2009.

GRAPH 32 - Aggregate offer and margin indicator, 2009



Source: EPEX - Analysis: CRE

GRAPH 33 - Aggregate demand and margin indicator, 2009



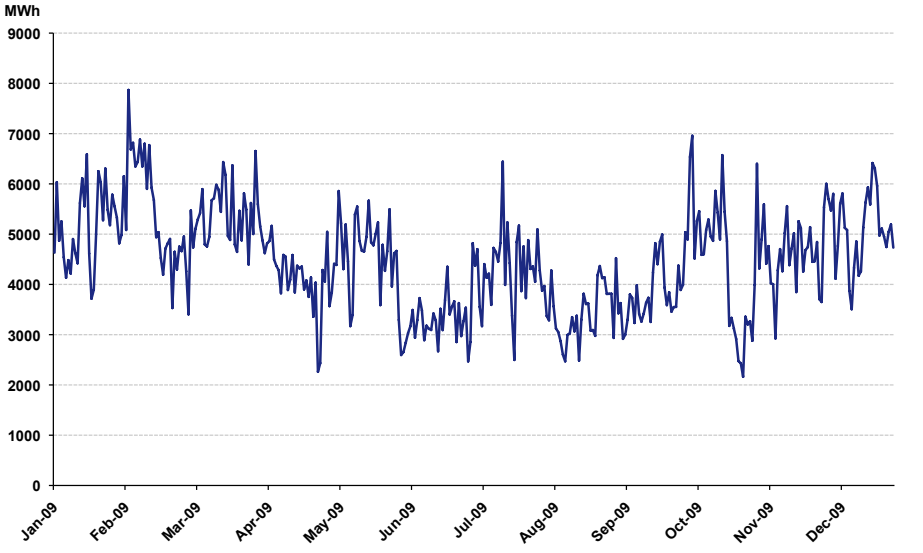
Source: EPEX - Analysis: CRE

- *The offers at any price only decreased for ten days or so after the price spike of 19 October 2009*

In Graph 34, the demand at any price at €3,000/MWh only dropped over approximately ten days after the price spike of 19 October 2009. After that, it returned to its normal level.

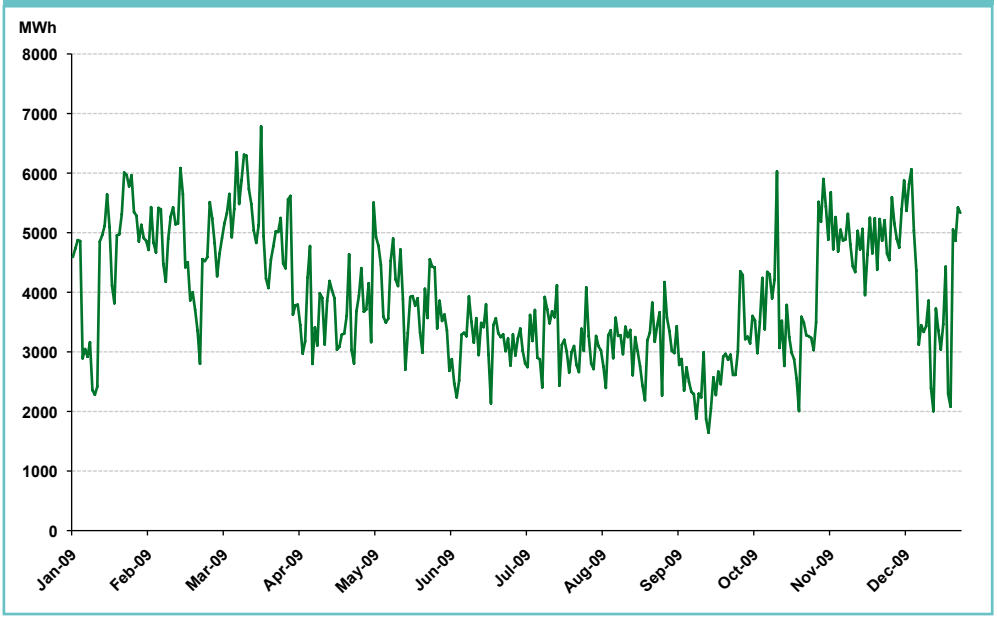
Similarly, the offer at any price fell for 10 days after the price spike of 19 October 2009 (Graph 35, p. 50).

GRAPH 34 - Demand at any price



Source: EPEX - Analysis: CRE

GRAPH 35 - Offer at any price



Source: EPEX - Analysis: CRE

4.2. Nominations of daily capacities in the opposite direction to the price differentials tended to increase between 2008 and 2009

A nomination of energy in the opposite direction occurs when a participant imports or exports energy in the opposite direction to the price Spread between the two countries. For example, a participant imports when the Day-ahead price is lower in France.

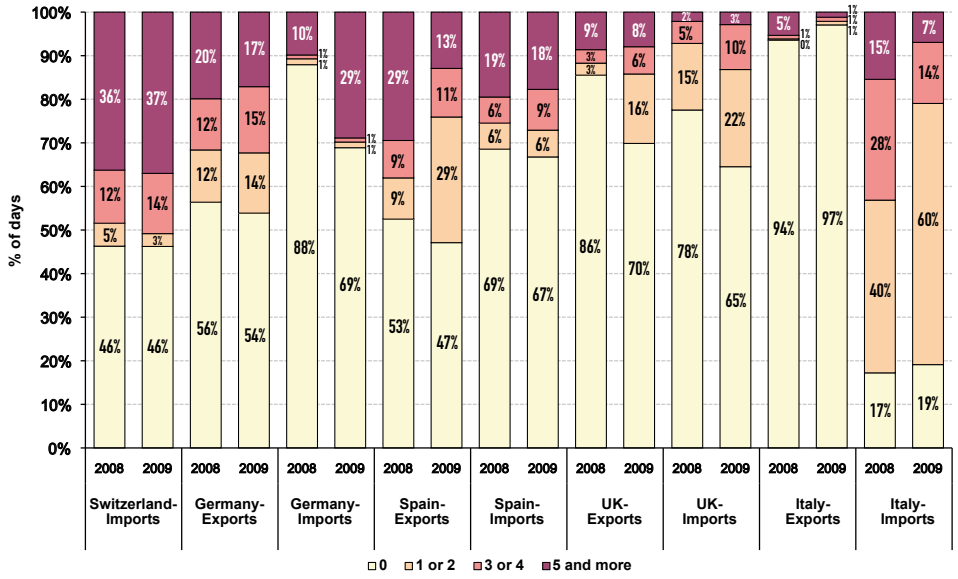
The analysis is carried out on the basis of the price Spreads between peak blocks and off-peak blocks, using first price references by participants, then OTC prices and in the last instance exchange prices.

Graph 36 shows that, between 2008 and 2009, the number of actors nominating daily capacities in the opposite direction mainly increased on the German border for imports, the Spanish border for exports and the British border for both.

The participants most often involved in opposite nominations of daily capacities were questioned. They gave several reasons to explain these nominations of daily capacities in the opposite direction to the price Spreads.

Many of them indicated that their analyses of price Spreads were done on an hourly basis and not by peak and off-peak blocks. Although some players anticipate prices on an hourly basis others limit themselves to doing it by peak and off-peak blocks.

GRAPH 36 - Nominations in the opposite direction to the price differentials (number of participants who nominated in the opposite direction and % of days with opposite nominations in 2008 and 2009)



Note: No figures are given for exports to Switzerland because there is no mechanism for allocating daily capacities on that border.

Source: RTE - Analysis: CRE

Another reason given by the players to explain nominations of daily capacities in the opposite direction to the price Spreads was an insufficient liquidity on the French and neighbouring Day-ahead markets.

A final structural explanation of nominations of daily capacities in the opposite direction to the price Spreads was based on 1) the ineffectiveness of certain energy exchange mechanisms currently in place at the borders, and 2) the sequence of market auctions, which may lead participants to make their offers on the basis of expected prices and volumes. The fact that these expectations are often subject to uncertainty explains why the nomination strategies on the Day-ahead market are not necessarily consistent with the prices observed.

The improvement of the interconnection capacities allocation mechanisms should reduce these imperfections, in particular the market coupling in the Centre-West region.

Section II

The wholesale gas markets

1. THE DEVELOPMENT OF GAS TRADING

2009 was propitious for the development of exchanges on the gas wholesale markets. The offer on world markets was abundant due to the production of unconventional gas in the United States and deliveries of large volumes of LNG. Faced with a decreasing level of demand due to economic recession, especially in Europe and France, the wholesale prices observed on the main market places reached low points in 2009 and were significantly lower than prices of long term supply contracts indexed on petroleum products. In this context, the wholesale gas markets were an attractive source of supply for suppliers of final users. For producers, it represented an outlet for the unsold volumes in the context of take-or-pay clauses of long-term contracts.

The global balance of gas flows in France (Graph 37) emphasizes this context. In 2009, 599 TWh of gas were physically injected into the whole of the French gas network, a reduction of 28 TWh (-4.4%) compared to 2008. In the context of declining economic activity, this drop is linked to a net reduction of the consumption of end users (489 TWh, a drop of 20 TWh or 4% compared to 2008).

Almost all of the deliveries were covered by imports. They represented 603 TWh in 2009 as against 621 TWh in 2008. The physical movements linked to storage injections and withdrawals were used to balance the regular flow of imports with the large seasonal variations in consumption, concentrated in winter. There were more storage injections/ withdrawals operations in 2009 than in 2008 and resulted in net volumes stored of 13 TWh in 2009, as against 6 TWh in 2008, reflecting a replenish of gas stocks in low price conditions.

The exchanges on the French wholesale gas markets take the form of physical deliveries and withdrawals of quantities of gas at the gas exchange points (Points d'Echange de Gaz PEG). The deliveries to the PEGs increased by more than 49% compared to 2008, reaching 271 TWh in 2009. If this development is looked at in the light of the decrease in imports and consumption, it clearly reflects the growth of exchanges on the wholesale markets.

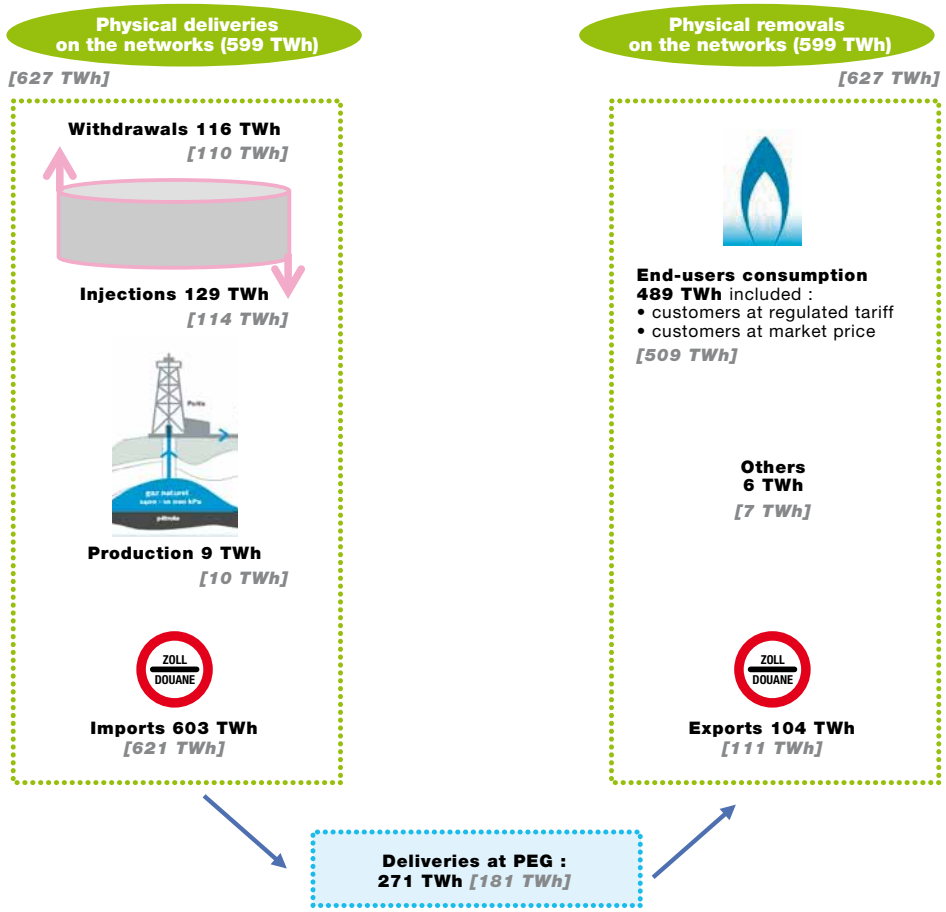
1.1. A strong growth in deliveries to the PEGs during 2009, mainly concentrated on PEG Nord

The deliveries to the PEGs represent the sum of the net shipper nominations to the different French PEGs (Nord, Nord B, Sud and Sud Ouest). These deliveries are the result of exchanges between the different participants on the wholesale market and can be used to assess the recourse to this market, whether it is purely bilateral or intermediated (Powernext Gas Exchange since November 2008 or broker platforms). These deliveries also include the purchases or sales of the system operators to cover their balancing and fuel gas needs.

The deliveries for a given period reflect all of the transactions concluded on the Spot and Futures markets and delivered during that period. This volume does not represent the volume of transactions concluded between players at that date, because a given volume of gas for a specific period can be negotiated several times but a single net delivery will result from these exchanges.

2009 was characterised by higher levels of deliveries to the PEGs than in 2008 (+ 90 TWh).

GRAPH 37 - Supplies and outlets in the French gas markets (2009 [2008])



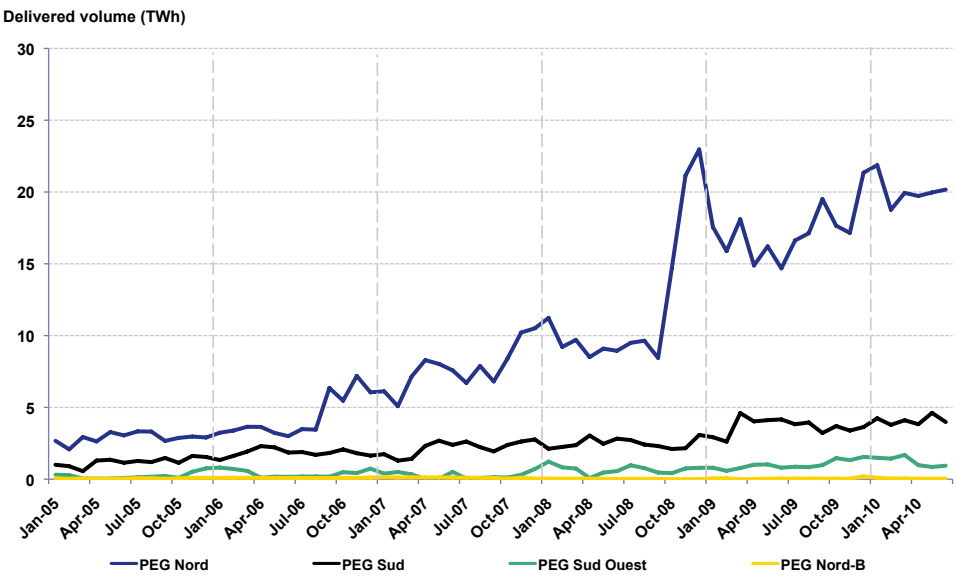
** The 'Others' item corresponds to the gas consumed by the TSO and DSO to ensure network functioning (own consumption, metering errors, losses...).*

Sources: GRTgaz, TIGF - Analysis: CRE

After their strong growth at the end of 2008, the volumes delivered to the PEGs developed erratically in 2009 but remained at a higher level than in 2008. Since summer 2009, the deliveries have gradually grown again to reach the level of 25 TWh in June 2010. The volumes delivered were assessed at 271 TWh in 2009, as against 181 TWh in 2008. In the first half of 2010, the average monthly deliveries were 25.4, as against 20.9 TWh in the first half of 2009.

The growth in the volumes delivered was observed in the three French zones (Nord, Sud and Sud Ouest), but remained modest in PEG Sud and PEG Sud Ouest. It is mainly related to the growth of deliveries to the PEG Nord (Graph 38). The emergence of a large North zone on 1 January has undeniably been a major structural factor favouring the growth of exchanges. Thus, the conditions favourable to exchanges on the gas market have been created in the North zone. The purchases made on the wholesale markets and the reallocation of quantities of gas not bought by long-term contracts on the markets [11], led to a net growth of deliveries to PEG Nord in 2009 compared to 2008.

GRAPH 38 - Deliveries to the PEGs (monthly data)



Sources: GRTgaz, TIGF - Analysis: CRE

- *Ever more numerous shippers*

During the first half of 2010, 61 shippers were active on at least one PEG in France, as against 50 in 2009 and 42 in 2008 (Table 10). Amongst the new entrants in 2009, there was one supplier of end users and five shippers acting for their own needs (Transmission System Operators and industrial companies [12]). Since 1 December 2009, GRTgaz has made purchases on Powernext Gas Spot for its balancing needs. Furthermore, nine active shippers on the PEGs today are backed by known financial players.

(11) The deliveries bought linked to long term contracts do not result in physical deliveries to the PEGs.
(12) GRTgaz and TIGF for the transmission network; GrDF and local distribution companies for the distribution network.

TABLE 10 - Number of active shippers in withdrawals from or deliveries to the PEGs

	2008	2009	H1 2010
Total number of active shippers	**42**	**50**	**61**
Of which financial players	5	8	9

Sources: GRTgaz, TIGF - Analysis: CRE

1.2. Gas trading on the intermediated market more than doubled in 2009 in relation to 2008 and a net acceleration in exchanges of Futures products has been observed since the start of 2010

Activity on the intermediated French wholesale market covers transactions concluded on the organised market (Powernext) and on the intermediated over-the-counter market (brokers). This activity is mainly concentrated at PEG Nord.

During 2009, the volumes exchanged on these markets grew by 126% in relation to their 2008 level and reached 149 TWh, as against 66 TWh. This volume represents more than 22,000 transactions concluded in 2009, growing strongly when compared to the 2008 level (Table 11 a and b, p. 58). This upward trend was observed for all of the volumes negotiated, whether it was for Day-ahead products (+113%) or for Futures products (+131%). Amongst the latter, the growth in trading of monthly products (+187%) was stronger than that in seasonal products, with later due dates (+84%).

The data for the first months of 2010 confirms the growth of exchanges. Thus, during the first half of 2010, the upward trend in the volumes negotiated continued, totalling 122 TWh (Table 11 and Graph 39, p. 58-59). Trading in seasonal products represented 52 TWh in the first half of 2010, exceeding the level exchanged for these products during the whole of 2009 (Graph 40, p. 59). In a context of strengthened liquidity for this type of product, the average size of transactions for seasonal products grew from 154 GWh in the first quarter of 2009 to 207 GWh in 2010 (Table 11 c, p. 58).

Undoubtedly, the structural factors already mentioned have been a driving force behind this increased liquidity of the wholesale markets (trade-off between supply by means of contracts indexed on petroleum products and cheaper purchases on the market, reallocation of quantities not taken from these contracts). To that should also be added the GRTgaz operations on the gas exchange since 1 December 2009. A seasonal factor linked to the allocation of storage capacities also contributes to the growth observed in Futures products during the first months of 2010. These allocations made in February for the period from April 2010 to March 2011 give the players the visibility necessary for Futures operations.

TABLE 11 - Transactions on the intermediate Spot and Futures market

a - Volume negotiated in TWh

Volume (TWh)	2008	2009	H1 2009	H1 2010
Spot market	18	38	16	33
Day-ahead	10	21	10	18
Futures market	48	111	53	89
Monthly products	15	44	18	21
Seasonal products	26	47	27	52
Total	**66**	**149**	**69**	**122**

b - Number of transactions

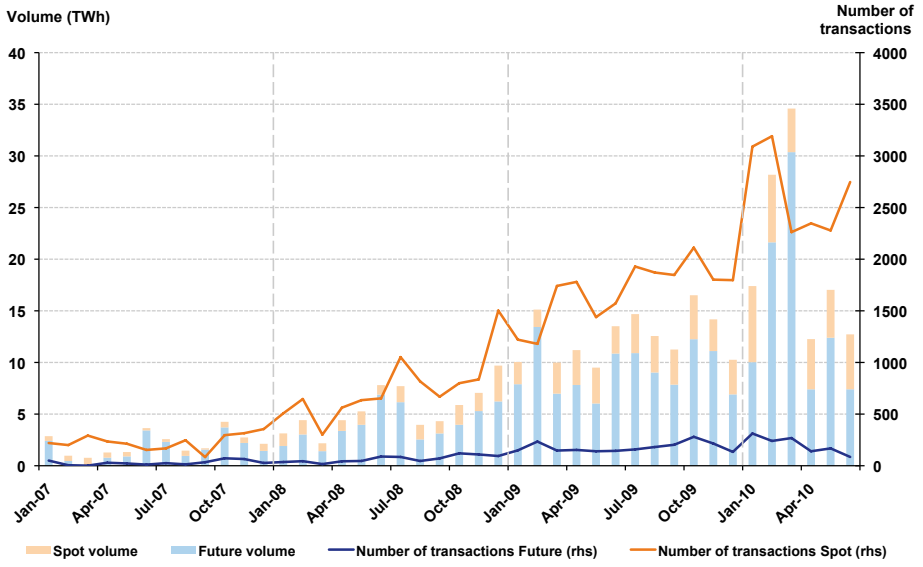
Number of transactions	2008	2009	H1 2009	H1 2010
Spot market	8,977	20,291	8,933	15,915
Day-ahead	6,702	14,692	6,507	11,225
Futures market	799	2,138	967	1,213
Monthly products	556	1,608	702	859
Seasonal products	175	298	178	251
Total	**9,776**	**22,429**	**9,900**	**17,128**

c - Average size of transactions

Average Volume (GWh) per transaction	2008	2009	H1 2009	H1 2010
Spot market	2.0	1.9	1.8	2.1
Day-ahead	1.5	1.4	1.5	1.6
Futures market	59.9	51.9	54.8	73.5
Monthly products	27.5	27.3	25.4	24.2
Seasonal products	146.0	158.4	153.7	206.9
Total	**6.7**	**6.6**	**7.0**	**7.1**

Sources: Brokers, Powernext - Analysis: CRE

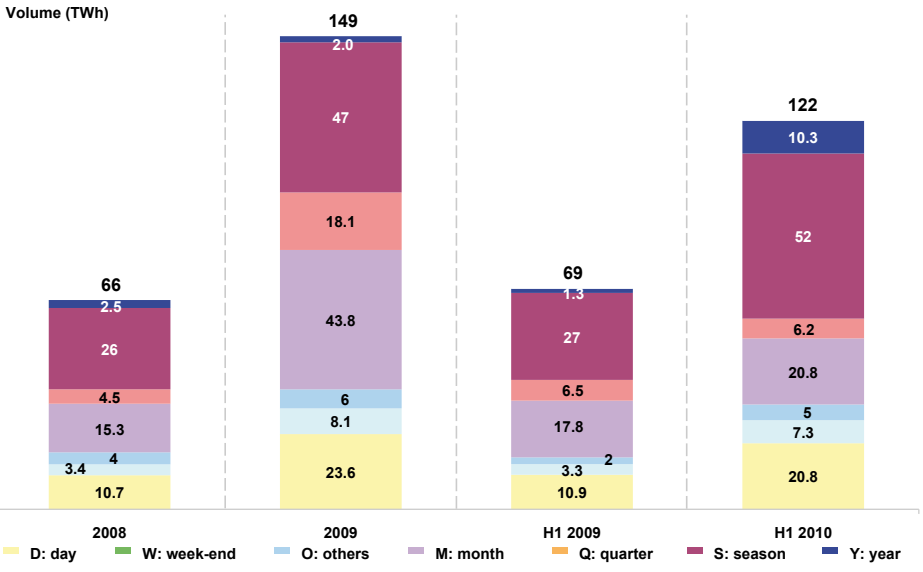
GRAPH 39 - Growth in volumes negotiated and number of transactions (Spot and Futures markets)



Sources: Brokers, Powernext - Analysis: CRE

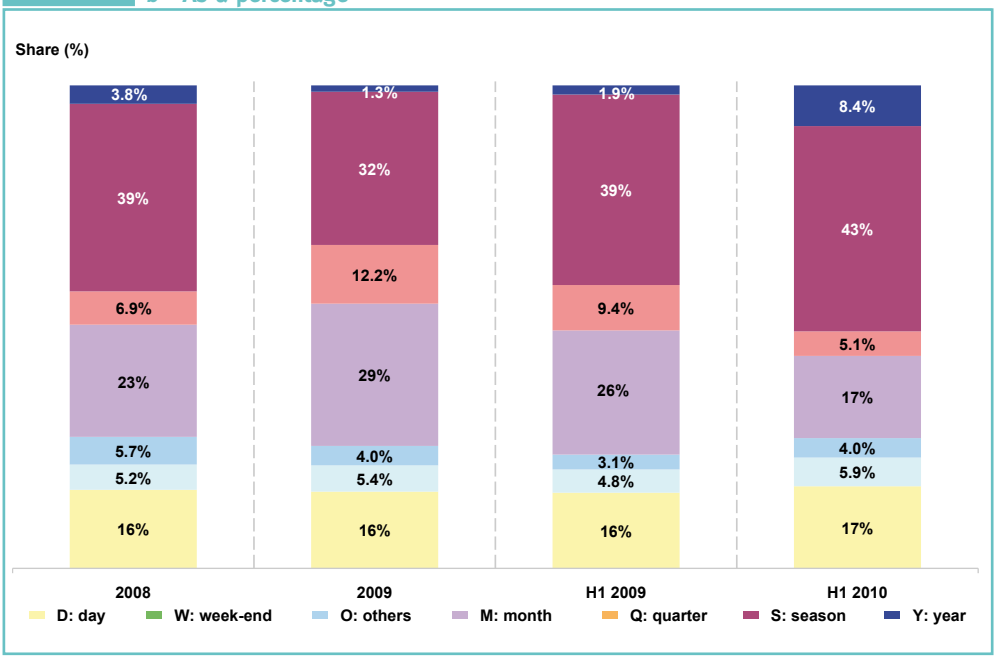
GRAPH 40 - Breakdown of volumes negotiated by products

a - In TWh



Sources: Brokers, Powernext - Analysis: CRE

b - As a percentage



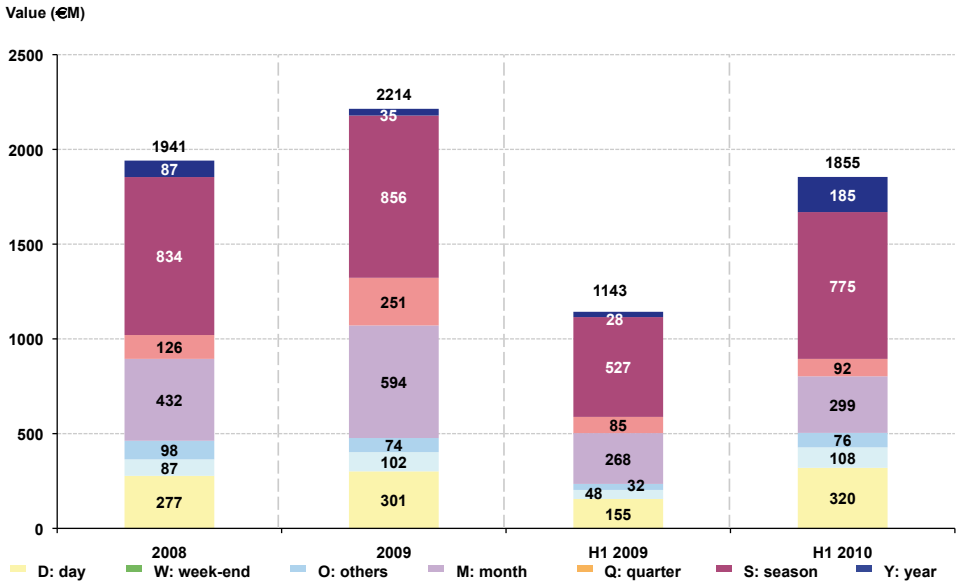
Sources: Brokers, Powernext - Analysis: CRE

- *The size of the wholesale gas market in France rose to €2.2 bn in 2009*

The value of the exchanges made on the market reached €2.2 billion in 2009, i.e. a growth of 13% compared to the value in 2008. The growth in the negotiated values is low in the light of the growth in the volumes exchanged due to the fall in the price of gas over the period in question (-50%). This negative "value effect" continued at the start of 2010 but has started to attenuate with the recent rise in gas prices on the market (Graph 41).

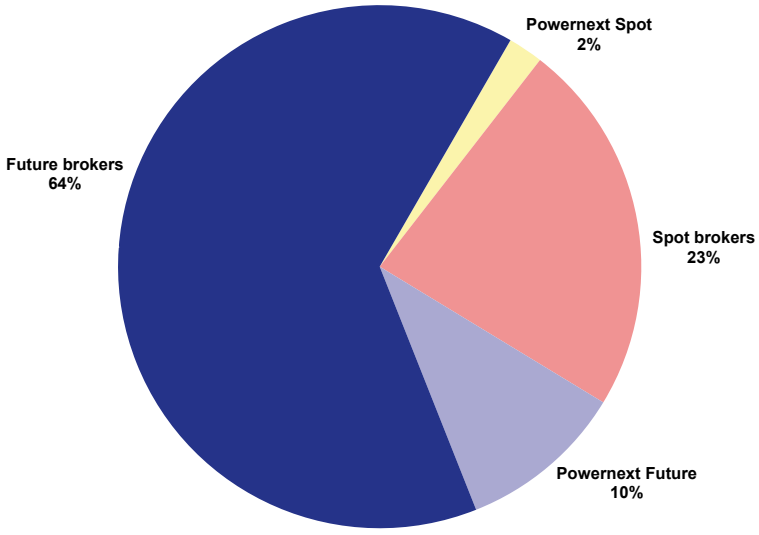
87% of traded volumes are negotiated on the intermediated platforms (Brokers), the remaining 13% are negotiated on the organised market (Graph 42).

GRAPH 41 - Value of the volumes negotiated (in €M)



Sources: Brokers, Powernext - Analysis: CRE

GRAPH 42 - Breakdown of the Spot and Futures volumes negotiated at the PEGs and type of intermediation, 2009



Sources: Brokers, Powernext - Analysis: CRE

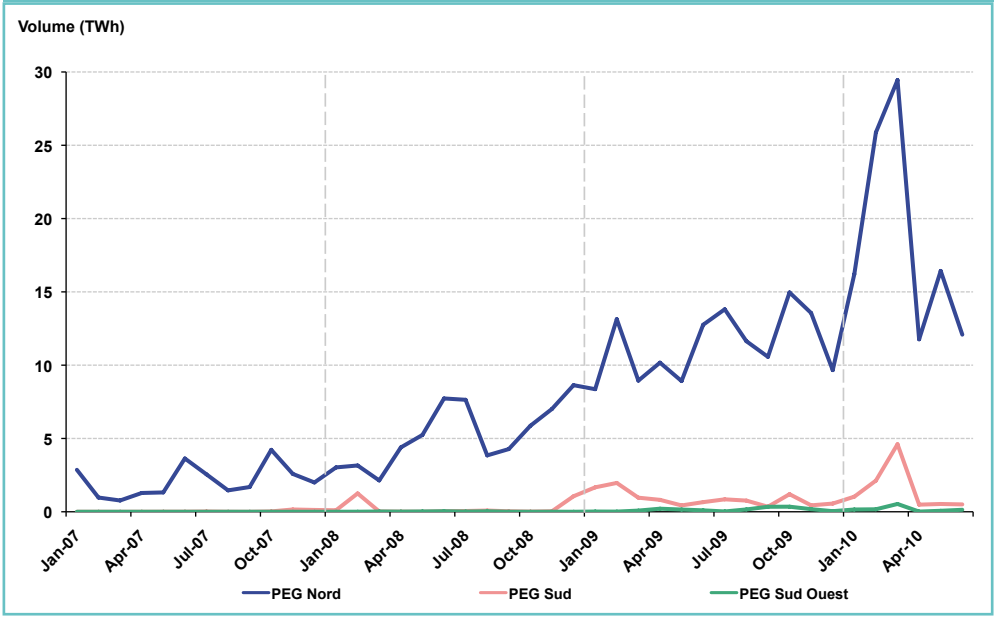
- *The North zone is still the zone where trading is most developed*

Similarly to the deliveries to the PEGs, the breakdown of volumes negotiated according to the three zones shows the preponderance of trading at PEG Nord. It accounts for about 93% of the volumes negotiated in 2009.

The volumes exchanged at the PEG Sud, which accounts for 26% of national consumption, also grew during 2009 (7.8 TWh in the first half of 2009 as against 4.3 TWh over the same period of the previous year). The liquidity of PEG Sud Ouest (TIGF) is still low, with a volume exchanged of less than 1 TWh, whereas it accounts for around 7% of national consumption.

During the first half of 2010, a strong growth in transactions for the Y+1 product at PEG Nord and PEG Sud (Graph 44) can be observed.

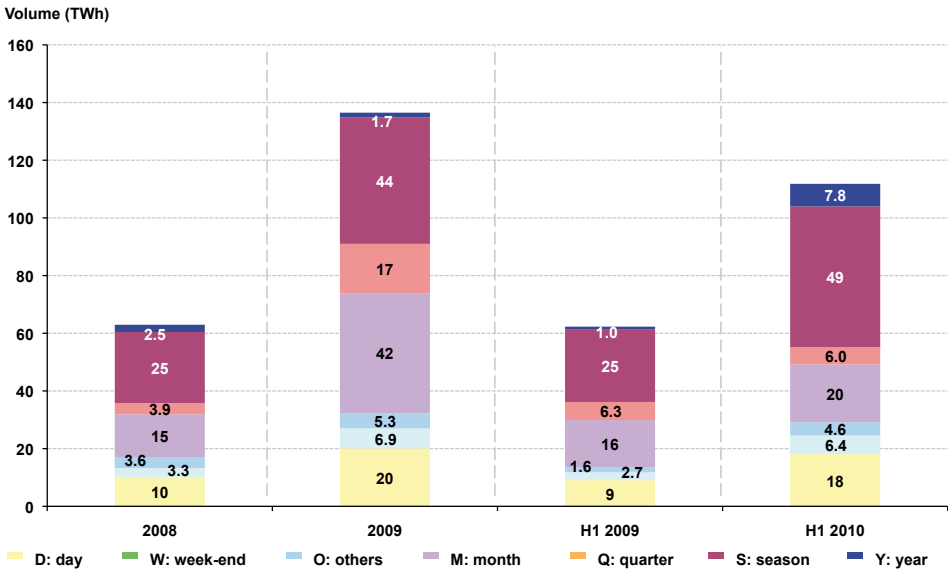
GRAPH 43 - Volume negotiated by PEG (monthly data)



Sources: TIGF, GRTgaz - Analysis: CRE

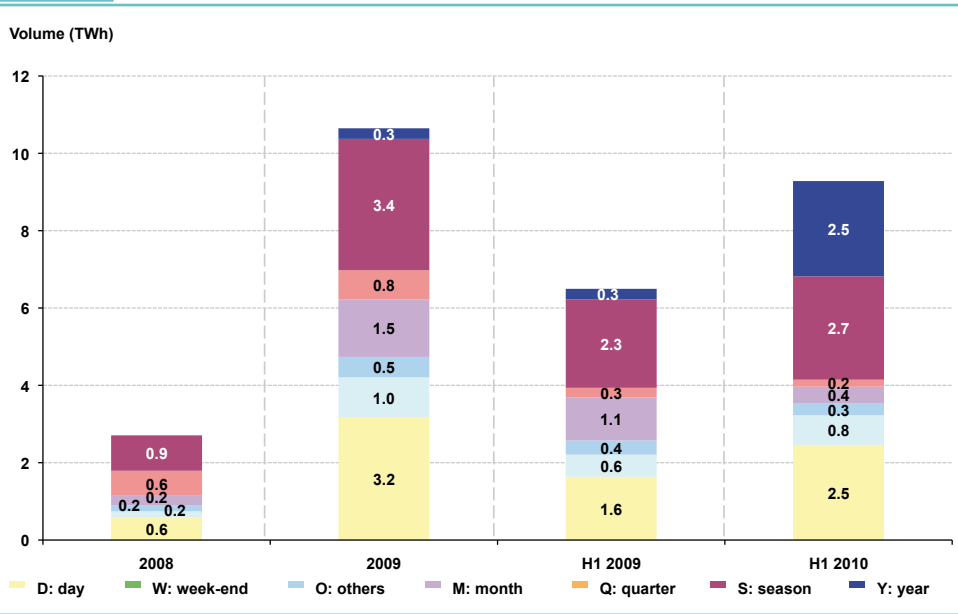
GRAPH 44 - Breakdown of volumes negotiated by product and by PEG

a - PEG Nord 2009



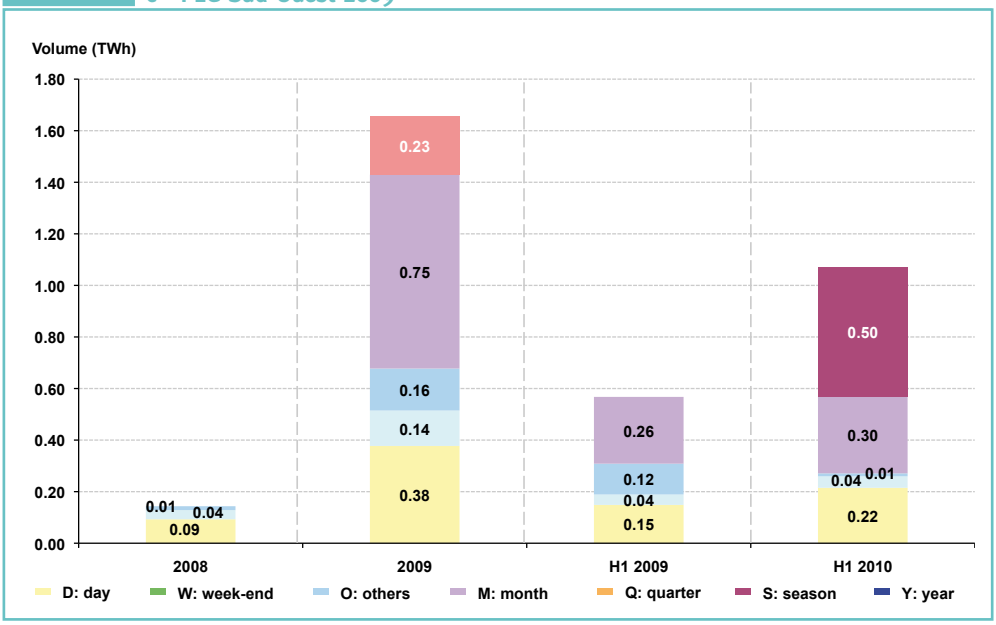
Sources: Brokers, Powernext - Analysis: CRE

b - PEG Sud



Sources: Brokers, Powernext - Analysis: CRE

c - PEG Sud Ouest 2009



Sources: Brokers, Powernext - Analysis: CRE

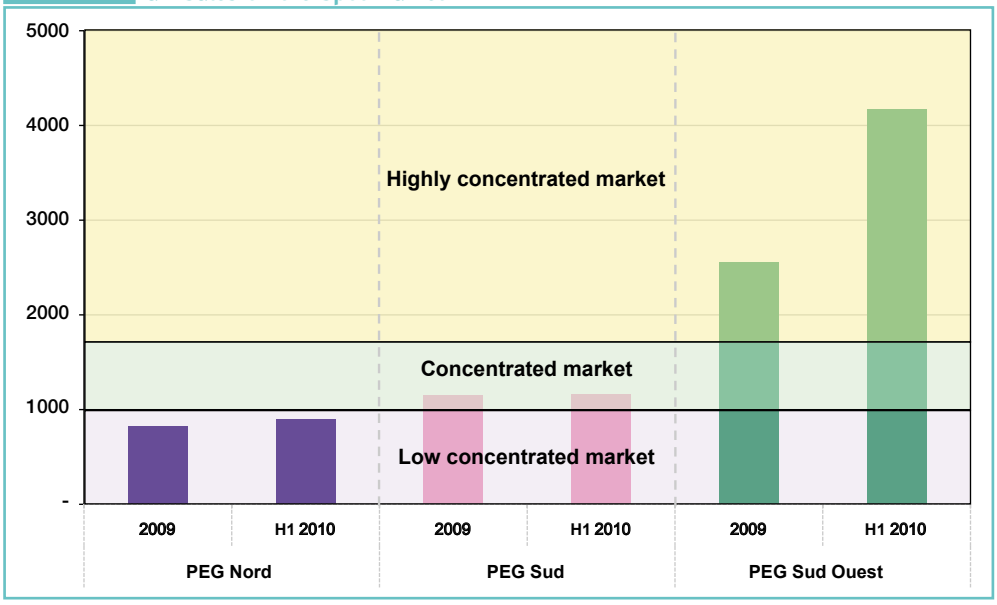
- *An increasingly liquid PEG Nord due to a large number of active buyers, the two other zones remain concentrated*

Graph 45 shows the degree of concentration of the North, South and South West zones. The North zone corresponds to HHI indexes representative of a not very concentrated market for both buying and selling all products. This finding also applies to the changes in market share. The total market shares of the three largest players at PEG Nord have shrunk continuously since 2007, both in terms of withdrawals and deliveries and in terms of transactions (Graph 46, p. 67). In the first half of 2010, the three largest players represented a 30% market share for withdrawals-deliveries (40% for purchases-sales).

Conversely, the South West zone is still very concentrated whereas the South zone is in an intermediate situation, where the market share of the three largest players has shrunk since 2009 and dipped below 50% in the first half of 2010.

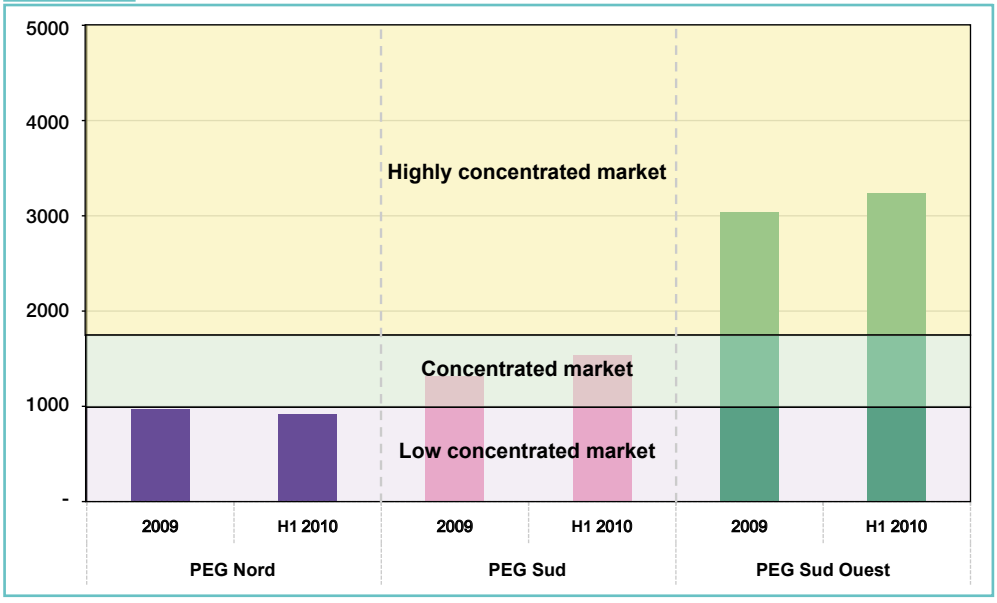
GRAPH 45 - HHI indexes on the different markets, 2009 and H1 2010, by PEG

a - Sales on the Spot market



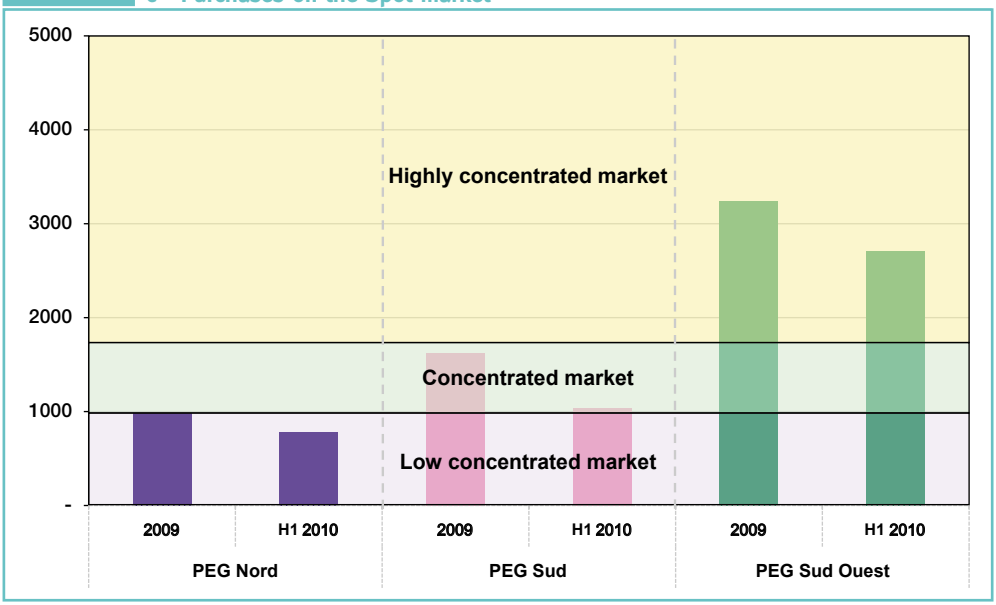
Sources: Brokers, Powernext - Analysis: CRE

b - Sales on the Futures market



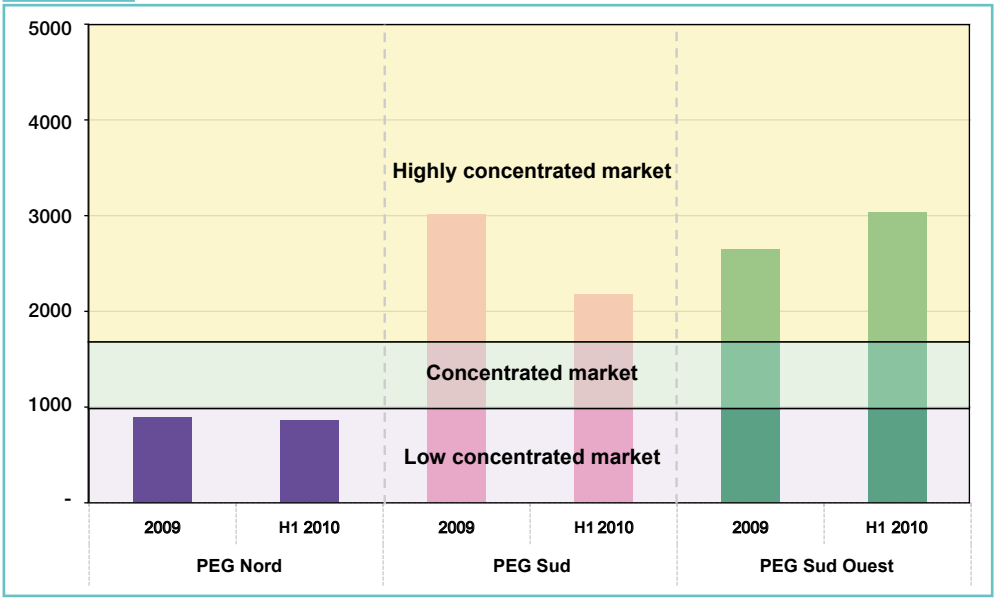
Sources: Brokers, Powernext - Analysis: CRE

c - Purchases on the Spot market



Sources: Brokers, Powernext - Analysis: CRE

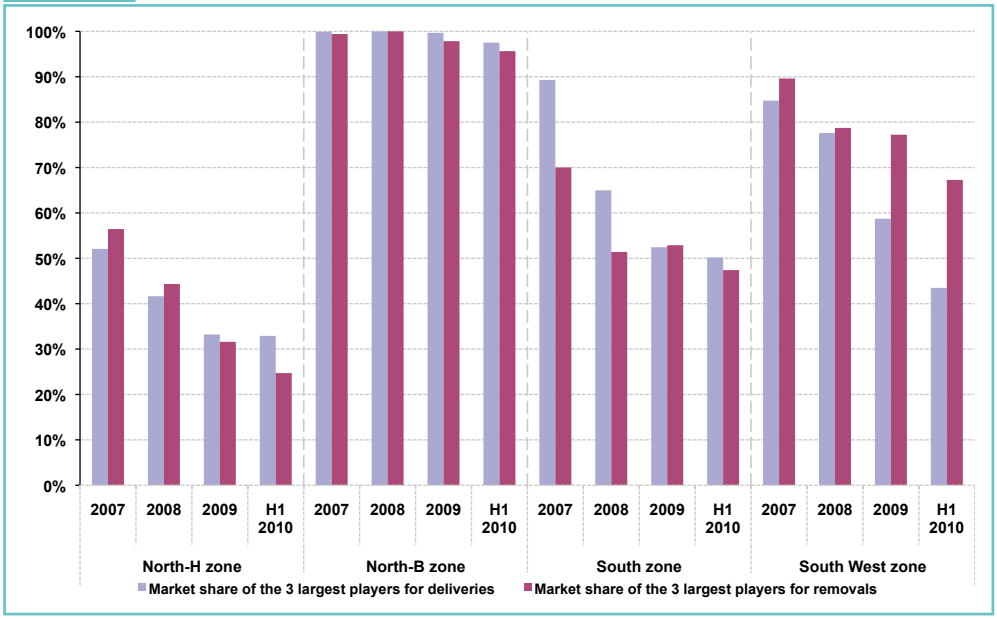
d - Purchases on the Futures market



Sources: Brokers, Powernext - Analysis: CRE

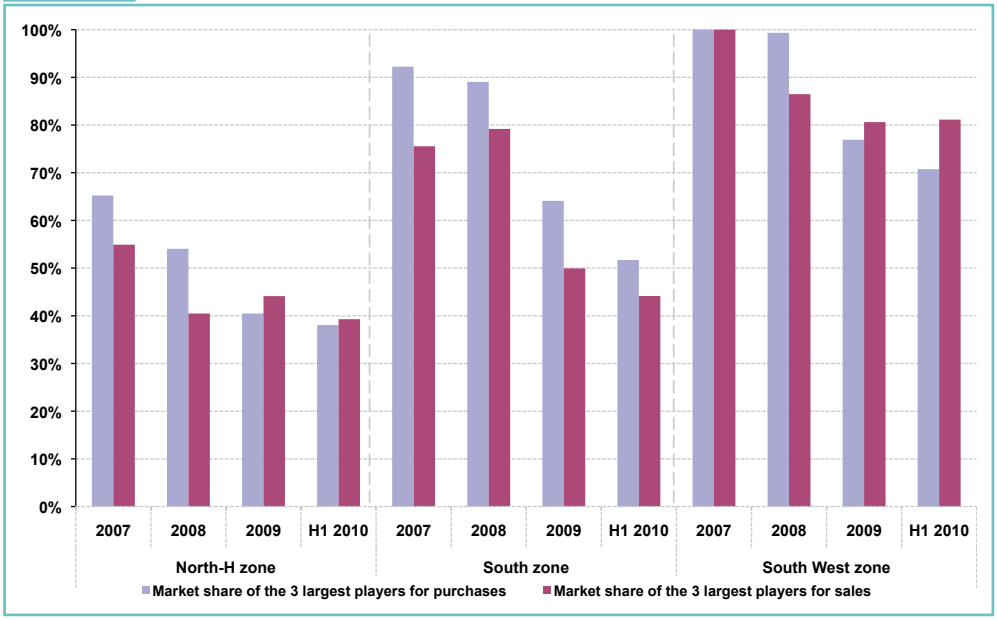
GRAPH 46 - Total market shares of the 3 largest players by PEG

a - Withdrawals and deliveries



Sources: Brokers, Powernext - Analysis: CRE

b - Purchases and sales



Sources: Brokers, Powernext - Analysis: CRE

2. GAS PRICES

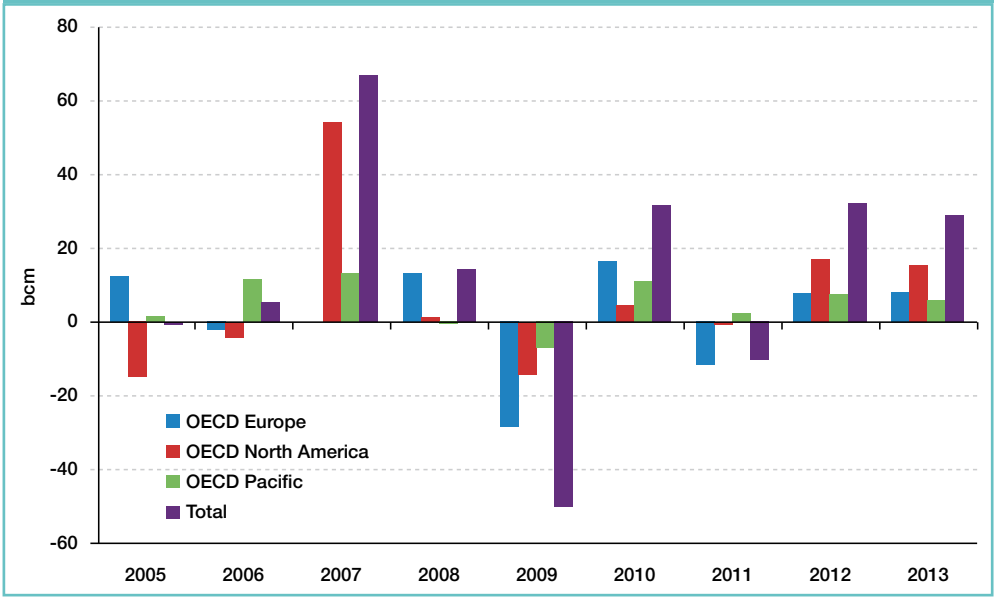
Throughout 2009 and in the first months of 2010 the changes in wholesale prices on the gas markets were marked by a clear disconnection from the reference prices taken from long-term contracts indexed on petroleum products. This disconnection was the consequence of excesses of gas on the world markets, which were the result of the combination of the growth in gas production, including the very rapid expansion of unconventional production, and a context of reduced demand. The data published by the IEA in June 2010 illustrates, in particular, the net reduction in European demand during 2009 (Graph 47), even if signs of recovery were observed in the first months of 2010 and are forecast for the medium term.

Within this context, market prices reached particularly low levels in 2009, before starting on an upward movement, which shows signs of accelerating since the spring of 2010. This trend, observed on the main European market places, has reduced the gap between the market price and that of long-term contracts indexed on petroleum products, even though this gap remains significant.

2.1. A spectacular fall in wholesale gas prices in France in 2009 but a rise which is accelerating since spring 2010

After a volatile start to 2009, due, especially, to the tensions related to the Russo-Ukrainian crisis, wholesale prices on the French market recorded a spectacular fall. At their lowest, prices at PEG Nord dipped below €10/MWh between July and September 2009 (Graph 48). However, gas prices rebounded in the autumn of 2009 and the first

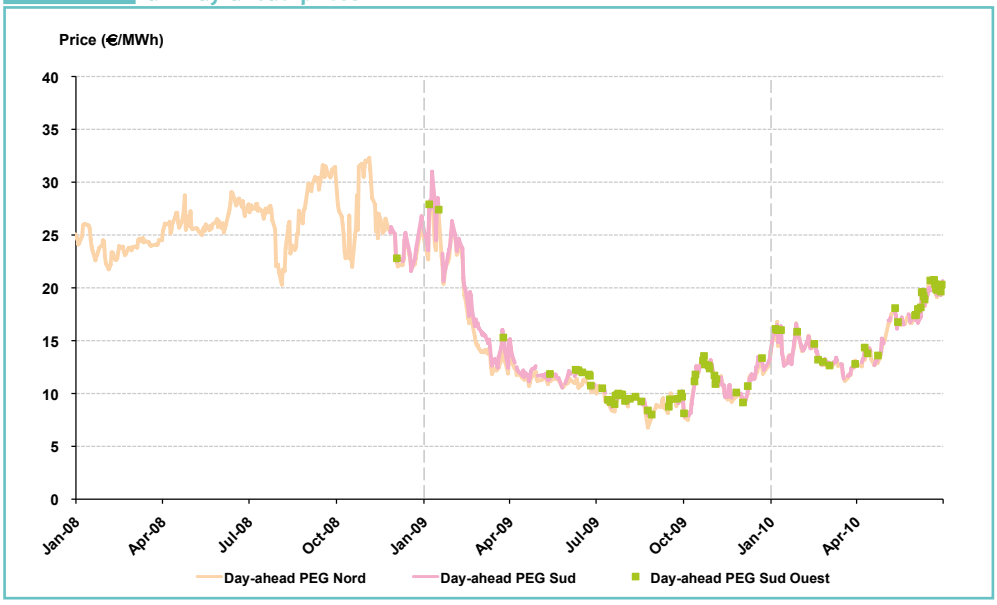
GRAPH 47 - Demand for gas in the OECD (actual and forecast data published by the IEA)



Source: IEA

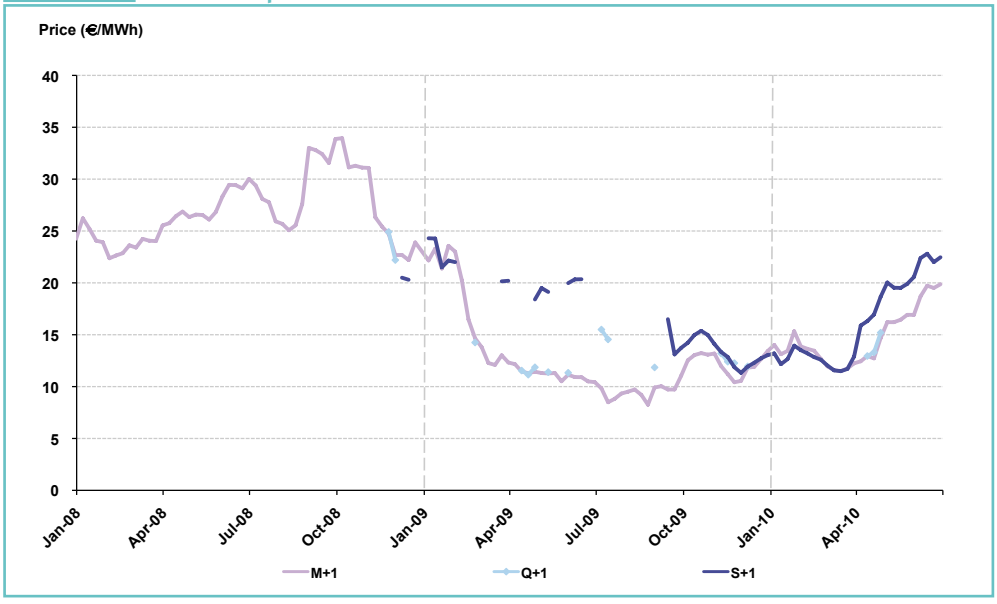
GRAPH 48 - Changes in prices on the French market (daily data)

a - Day-ahead prices



Sources: Argus, Heren - Analysis: CRE

b - Futures prices at the North PEG



Sources: Argus, Heren - Analysis: CRE

months of 2010. Several factors justify the upward trend observed since the end of 2009:

- the increase in the demand for gas in Europe, after the significant fall in 2009: the growth in demand in France and Europe since the end of 2009 is linked to the improvement in the economic situation and a long cold winter;
- the rise in the price of oil, even though the disconnection between the market prices and the prices indexed on petroleum products remained significant during the first months of 2010 (see 2.3).

The rise from the low points of 2009 shows signs of accelerating since March 2010. Between March and June 2010, the wholesale prices on the Spot market rose from around €12/MWh to nearly €20/MWh, the winter product quoted at PEG Nord even exceeded this threshold at the end of the first half of 2010.

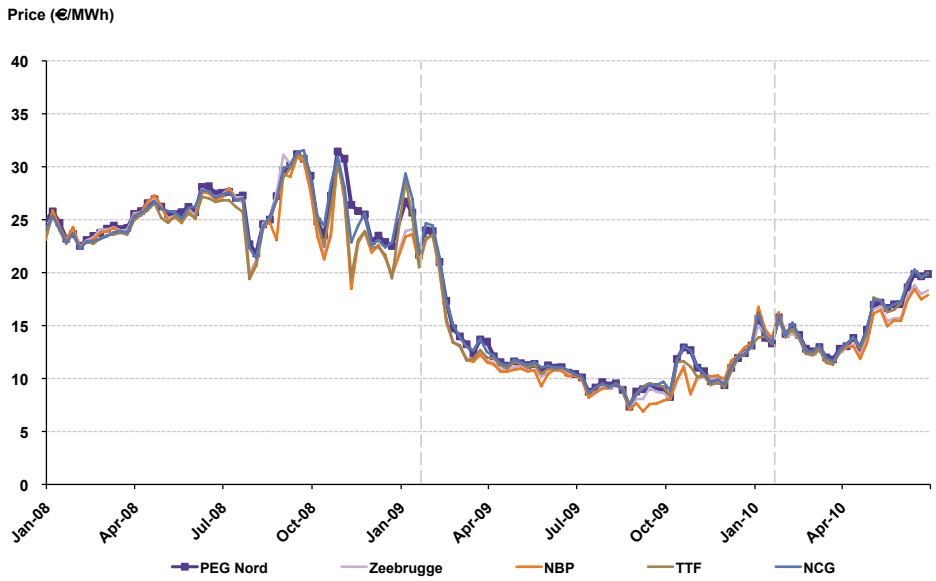
It is also important to highlight the low price Spread between Day-ahead and winter 10/11 products on PEG Nord. The average Spread on this hub was around €3/MWh during the second quarter of 2010. As a comparison, the average Spread of Day-ahead and winter 10/11 prices on the TTF market was around €8.2/MWh with prices similar to those of the French market in the second quarter of 2009.

This low Spread of summer/winter prices favoured the buying of Season type products for deliveries in winter rather than calling on the storage infrastructures.

2.2. Changes generally in phase with European market places, with a close correlation over the recent period between PEG Nord, NCG (Germany) and TTF (the Netherlands)

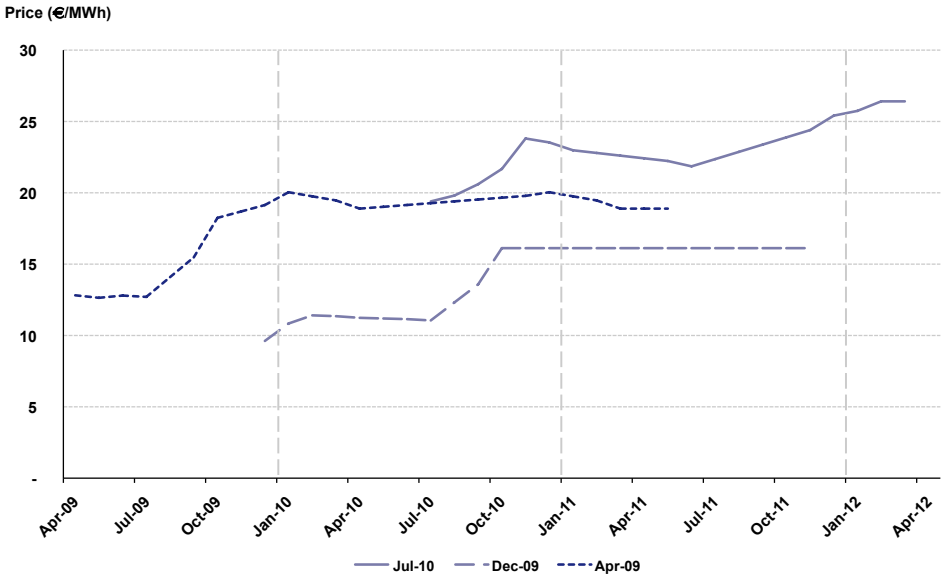
Gas prices on the main market places in Europe have undergone similar changes: steep drop in 2009, then an upward turnaround from the low points of the third quarter of 2009 (Graph 49). The graph of Futures prices at Zeebrugge (Graph 50) also shows a continuation of this upward trend.

GRAPH 49 - France - Europe Day-ahead prices (weekly averages)



Sources: Argus, Heren, Powernext - Analysis: CRE

GRAPH 50 - Graph of Futures prices at Zeebrugge

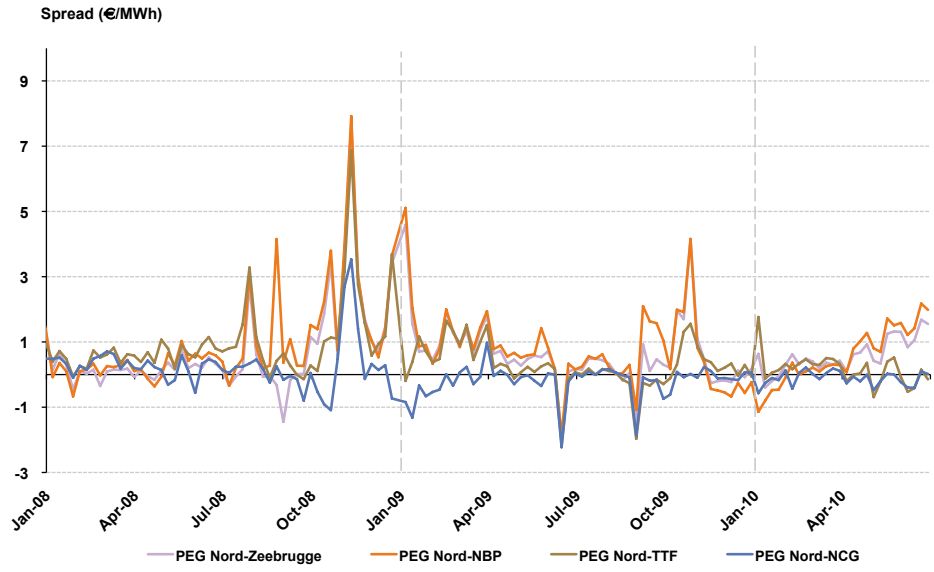


Sources: Argus, Heren, Powernext - Analysis: CRE

Therefore, the Spreads of gas prices between the different European market places have remained low (Graph 51 and Table 12, p. 72): on average over 2009, the Spreads between the prices at PEG Nord and the prices at NBP or Zeebrugge were of the order of €0.5/MWh. The Spread in relation to the Dutch market place (TTF) varied within a narrower range, of the order of €0.2-0.3/MWh.

Since the spring of 2010, the changes in prices at PEG Nord have been closely linked with those on the German and Dutch markets, whereas they are becoming disconnected from changes on the British and Belgian markets.

GRAPH 51 - France - Europe Day-ahead price Spreads (weekly averages)



Sources: Argus, Heren, Powernext - Analysis: CRE

TABLE 12 - Spreads

a. On Spot prices (Day-ahead)

Average Spread €/MWh	2008	2009	H1 2010
Zeebrugge (B)	0.69	0.58	0.58
NBP (UK)	0.95	0.71	0.55
TTF (NL)	0.93	0.28	0.18
NCG (Ger)	0.27	-0.19	-0.12

b. On Futures prices (Month-ahead)

Average Spread €/MWh	2008	2009	H1 2010
Zeebrugge (B)	0.20	0.49	0.57
NBP (UK)	0.44	0.52	0.64
TTF (NL)	0.72	0.31	0.18
NCG (Ger)	0.20	- 0.15	- 0.07

Note: average daily Spread (PEG Nord - foreign price).

Sources: Argus, Heren, Powernext - Analysis: CRE

2.3. The lack of correlation between market prices and the gas price resulting from contracts indexed on petroleum prices has continued even though the rise in market prices since spring 2010 has reduced the Spread

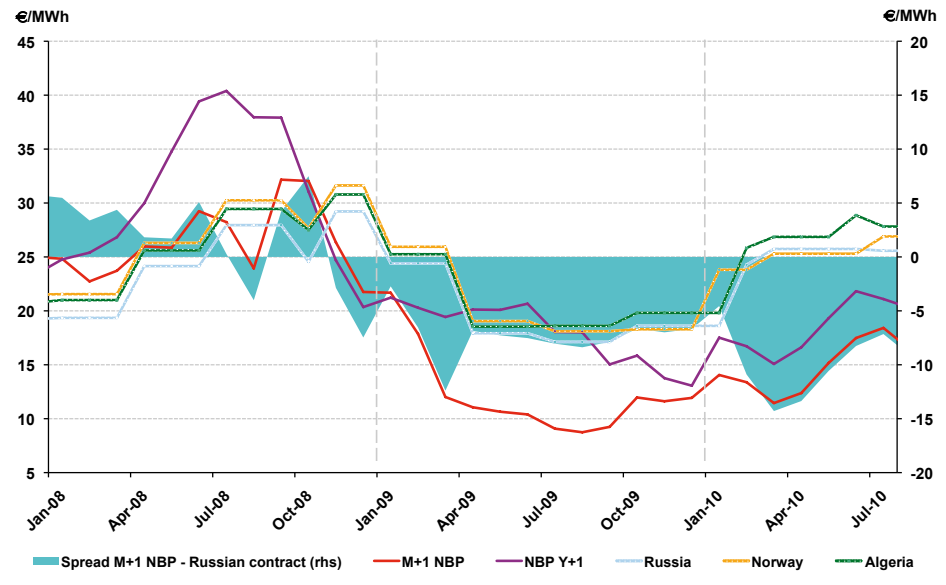
Graph 52 shows the changes in gas prices taken from long term contracts indexed on petroleum products (reference prices of gas from Algeria, Russia and Norway published by Heren) and market prices (reference prices a month-ahead at PEG Nord and NBP and a year-ahead at the NBP). Since the end of 2008 gas prices on the market have been lower than the prices of long-term contracts indexed on petroleum products. The Spread was particularly large throughout 2009 and in the first months of 2010. However it has greatly reduced since the low point of March 2010, due to the recent rise recorded in gas prices on the markets.

The origin of the disconnection lies in the configuration of world gas markets since 2009 (see above). Whereas the demand for gas shrank under the effect of the economic recession, the offer of gas was abundant, mainly due to:

- the abundance of liquefied natural gas, many gas liquefaction units coming into service concomitantly;
- the development of unconventional gas in the United States, thus reducing the reliance on imports of LNG (Box 1, p. 74).

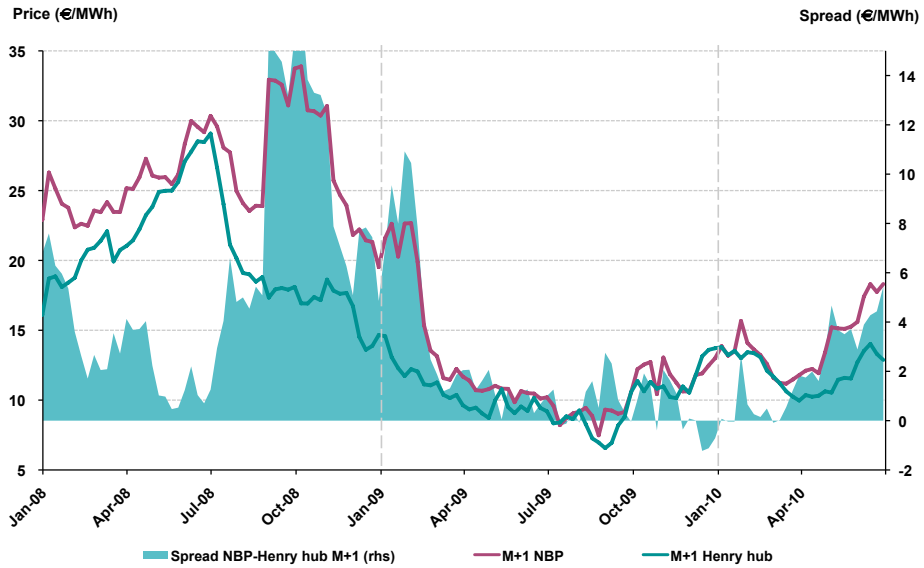
The growth of American gas production has led to a clear relaxation of prices in the United States. Particularly large price Spreads were observed between the gas prices on the British NBP and on the American Henry Hub (Graph 53, p. 74). After having reached more than €10/MWh at the end of 2008 and at the start of 2009, this Spread has since reduced but still represented more than €4/MWh in spring 2010.

GRAPH 52 - Gas prices (market indexes and prices of contracts indexed on petroleum products)



Source: Heren - Analysis: CRE

GRAPH 53 - M+1 price in the United Kingdom and the United States (2009 - June 2010)



Sources: Heren, Bloomberg - Analysis: CRE

BOX 1 - The development of unconventional gases

There are three types of unconventional gas. The most widespread is shale gas, which makes up almost half of the reserves. Since 2000, production of shale gas has been multiplied by 8 in the United States. Now, more than half of American gas production comes from unconventional sources.

The steep rise in gas prices on the American market between 2003 and 2008 (reaching €33 to €35/MWh in 2008 on the Henry Hub) along with the appearance of new drilling techniques have been behind this spectacular growth. Today, the profitability thresholds are around €10 to €13 /MWh, or lower (€5 to €8/MWh) for some fields. Despite the steep drop in wholesale gas prices in 2009 and 2010 (between €8 and €15/MWh), this trend has not been reversed.

This new situation on the American gas market could last because the United States may have around 60 Tm^3 of technically recoverable unconventional gas reserves available (against around 7 Tm^3 of proven conventional gas reserves). Furthermore, the American Energy Department's forecasts of LNG imports have been revised downwards, with a 3% share in gas supplies in 2030, as against a 2007 forecast of 16% in the same year.

Can we foresee the American situation being repeated in Europe?

At world level, the International Energy Agency estimates the ultimately recoverable reserves of unconventional gas at 314 Tm^3 (against 471 Tm^3 of ultimately recoverable reserves of conventional gas). All included, the total gas resources may represent about 250 years of production at the current rate, against 61 years today for conventional gas.

In Europe, little is known about the reserves of unconventional gas and estimates are still very approximate. The International Energy Agency estimates the ultimately recoverable reserves of unconventional gas in Western Europe at around 10 Tm^3. Remember that the proven reserves of conventional gas stand at 3 Tm^3 for the European Union and 3 Tm^3 for Norway. Several American companies producing shale gas are increasingly active in certain European countries. Exxon Mobil, Chevron and ConocoPhilips are present in Hungary, Germany, Sweden and above all Poland. The large European groups are also taking positions in this market: Statoil, BP and Total have signed agreements with the American producer Chesapeake Energy and Shell, ENI and OMV are looking to develop the unconventional gas reserves in Europe.

At present, the Australian European Gas Limited (EGL) company is the only one exploring for and producing unconventional gas in France. It extracts 0.4 TWh/year of mine gas from the old coal mines in the Nord Pas de Calais region and has two coal gas (CBM) exploration permits in Lorraine, as well as in the sud-midi basin, in the Valenciennois, in the Jura, near Saint-Etienne and at Gardanne in the Bouches du Rhône area.

Similarly, Total has just been granted an exploration permit for five years in the region of Montelimar (Drôme) for assessing the shale gas potential of more than 4,300 km^2. The group has undertaken to invest more than €37 million in exploration over the period.

Even though the future of unconventional gas in Europe is still uncertain, its growth in the United States has a direct impact on the European markets. The excess offer appearing on the market brings down the prices of the European wholesale markets, by bringing into play competition between suppliers, creating a large Spread with the prices of long-term contracts.

- *A lack of correlation that encourages suppliers and consumers to purchase gas on the market*

The lack of correlation between market prices and prices of contracts indexed on petroleum products has continued in 2010, due, in particular, to changes in the prices of petroleum products and the euro - dollar parity. This has created a context that incites suppliers and consumers to purchase supplies on the markets in Europe in general and France in particular. This context has also led the producers and suppliers to start discussions about revising the terms and conditions of long-term import contracts (revision of volumes, indexing on market indexes). In the case of GDF SUEZ, the impact of these renegotiations has been examined by CRE in the framework of the audit of the procurement formula used to set the regulated end-user tariffs (Box 2).

BOX 2 - Audit of the GDF SUEZ procurement formula

CRE started an audit of the GDF SUEZ formula, used as the basis for establishing the regulated tariffs for the sale of natural gas, in April 2010, with the following objectives:

- to check the match between the costs really borne by GDF SUEZ and the estimate resulting from the application of the formula;
- to analyse the current GDF SUEZ supply structure (long-term contracts, purchases on the wholesale markets, etc.) and check the pertinence of the scope chosen for the formula in relation to that structure;
- to identify and measure the extent to which contract renegotiations that have ended or are in progress, taking into account the recent changes on the gas markets, may impact on the reliability of the formula;
- to ensure that the remarks and findings made during the previous audits carried out by CRE have been correctly taken into account.

This audit, which covered 2008 and 2009 and the first half of 2010, resulted in a decision dated 31 August 2010.

CRE indicated that, over the period, the formula correctly reflected the GDF SUEZ supply costs within the framework of the scope of the public service contract, i.e. the long-term purchase contracts for gas imported into France.

From a forward looking point of view, several related questions were asked about the appropriateness of:

- revising the current formula to include a wholesale market indexing part in order to better reflect the cost of long-term contracts for gas imported by GDF SUEZ following the renegotiations;
- taking into account the difference noted between the formula and the costs of these contracts;
- widening the scope of the purchases retained for calculating the costs of supply to other sources (LNG that is not imported, short term, etc.);
- passing on part of the gains of arbitrage by the operator to the benefit of the consumer.

CRE formulated the following recommendations in answer to these questions:

Recommendation 1: a new formula should be set up to take account of the new indexing of certain long-term contracts on the prices of wholesale gas markets.

Given that certain contracts contain an element of indexing on the prices of wholesale gas markets, a new formula including this element would better reflect changes to contracts.

It should be noted however that as the prices of wholesale gas markets are more volatile than those of petroleum products, then such a formula could cause larger fluctuations up or down. Furthermore, since the second quarter of 2010, market prices have experienced a rapid rise. The benefits to the consumer of introducing an indexing on the prices of the wholesale gas markets into the formula would therefore be reduced compared to the situation that prevailed during the first months of 2010.

Recommendation 2: the differences noted between the formula and real costs should be the subject of an annual examination with a view to eventual adaptations of the formula.

CRE considers that the difference noted between the formula and the costs of supply should be measured on a regular basis, preferably annually, and, if necessary, they should lead to a revision of the formula.

Recommendation 3: the impact on the average import price of sources of supply other than gas imported under long-term contracts should be measured.

The fact that alternative gas supply sources, which are intrinsic to the global portfolio of GDF SUEZ, are not taken into account means there is a risk of an unfavourable selection: this would be the case if the operator was led to exclude gas bought cheaper from the scope decided by agreement with the public service contract.

Therefore, it seems important that the cost of gas not used in the ex-ante scope of calculation of the formula should be regularly monitored and give rise, if necessary, to an adjustment of the scope of supply used for establishing the formula.

- *Wholesale gas market prices more volatile than petroleum product indexes*

Table 13 compares the historic volatilities of gas market prices and petroleum product indexes. Over the 2008-2010 period, the market prices are generally more volatile than for crude oil or its distillates (light and residual fuel oils).

- *The maintaining of a large Spread between the market price and the price of long-term contracts will depend on several economic and structural factors*

The rise in market prices since Spring 2010 has reduced the Spread between the market price of gas and the prices of contracts indexed on petroleum products. Nevertheless, it is still wide. How long this lack of correlation lasts will depend on several economic and structural factors.

On the economic level, the changes in oil prices (Graph 54) and the demand for gas will be determining factors. In the case of demand, the differences in the pace of recovery in Asia and Europe will be particularly crucial for the arbitrations determining the direction of the LNG offer. However, the latter will remain structurally important (Graph 55) in the medium term.

Generally speaking, the structural factors that have modified the configuration of the gas markets (unconventional gases and LNG) will continue to be determining factors for the changes in prices and volumes on the wholesale markets.

TABLE 13 - Annual volatility of market prices and petroleum products (daily data)

	Gas market prices				Prices of petroleum products		
	PEG N	NBP	Zeebrugge	TTF	Brent	DFO	LFO
2008	64%	105%	96%	77%	52%	37%	65%
2009	81%	125%	101%	95%	41%	46%	52%
2010 YTD	66%	96%	94%	75%	26%	29%	29%
2008-2010	72%	112%	97%	84%	44%	39%	54%

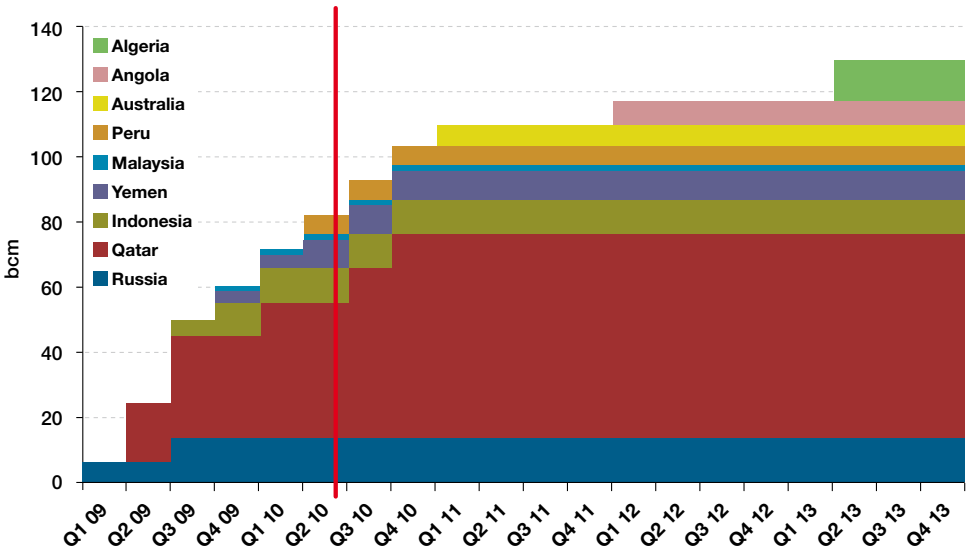
Note: PEG Nord, NBP, Zeebrugge, TTF Day-ahead prices - Brent, DFO and LFO in €.

Sources: Argus, Heren, Bloomberg, DGEC - Analysis: CRE

GRAPH 54 - Changes in the prices of Brent

Source: Bloomberg - Analysis: CRE

GRAPH 55 - Forecasts of commissioning of LNG liquefaction plants



Source: IEA, Medium-Term Oil & Gas Markets 2010

3. THE GAS INFRASTRUCTURES

The organisation of access to the gas transmission system has improved significantly in the last few years: an increasing number of players (Table 14) have access to all of the French gas infrastructures under conditions that regularly improve, thus facilitating the development of competition and the liquidity of these markets.

Access to the gas infrastructures should continue to improve in the coming years:

- on the one hand, GDF SUEZ has given the European Commission an commitment that from 2014 it will limit its share of long term entry capacities into France to 50%, which is a signal that is favourable to the development of competition. This will enable alternative suppliers to have access to entry capacities on the French market, from October 2010, for significant volumes over long periods. For the land entry points concerned (Taisnières H and Obergailbach), the marketing of entry capacities has given concomitant access to the upstream market places (NCG in Germany, Zeebrugge in Belgium and NBP in United Kingdom). These "hub-to-hub" transmission capacities will thus increase the possibilities of arbitration between the French market and the other European market places. Similarly, the regasification capacities returned by GDF SUEZ at the Montoir and Fos-Cavaou terminals will allow alternative suppliers to subscribe to long term capacities and encourage the diversification of their supply portfolios;
- on the other, decisions have been taken on infrastructure developments that will increase entry capacities into France. By 2013, the entry capacities into France from Belgium and Spain will increase by 50 and 135 GWh/d respectively (i.e. up to 6 Gm^3/year). The France-Spain open season that ended in July 2010 validated the increase in entry capacities into France from the Biriatou point in 2015. Three projects for new methane terminals are at various stages of progress: Dunkerque LNG, Fos Faster and Antifer. Finally, Elengy is proposing to extend the period of operation of the Fos-Tonkin terminal and launch a call for proposals for an extension of the regasification capacities of the Montoir terminal.

TABLE 14 - Number of users that have reserved capacity on the infrastructures

	1 Jan 2008	1 Jan 2009	1 Jan 2010	1 June 2010
GRTgaz	37	50	57	65
TIGF (transmission network)	13	19	19	21

	1 April 2008	1 April 2009	1 April 2010
Storengy	22	23	30
TIGF (storage)	8	8	10

	2008	2009	2010
Montoir Terminal	4	5	6 (13)
Fos-Tonkin Terminal	2	2	2
Fos-Cavaou Terminal	-	-	2

Sources: GRTgaz, TIGF, Storengy, Elengy - Analysis: CRE

(13) Number of users that have reserved capacity beyond 2010 at the Montoir terminal: 7.

Nevertheless, the increase in liquidity encouraged by the positive moves to increase access to the gas infrastructures in France remains uneven. In practice, although access to the North zone is now easy, the same cannot be said for the south of France, which is made up of the South (GRTgaz) and South West (TIGF) zones. However, it should be noted that this congestion has recently been reduced with the bringing into service of the Fos-Cavaou terminal (see below).

Furthermore, infrastructure developments have slipped back when compared to the 10 year investment plans published in 2009. These lesser investments could slow down the growth of liquidity in the markets.

3.1. Satisfactory use of the infrastructures of the North zone

Today, the North zone (GRTgaz) accounts for around 80% of gas import capacities in France, with 2,150 GWh/d.

- *A growing number of shippers in spite of the persistent concentration of the holding of entry capacities*

In the North zone, the number of active shippers (i.e. having reserved transmission capacity) increased between 2009 and 2010 on each of the land entry points: Taisnières (from 25 to 27), Obergailbach (from 18 to 24) and Dunkirk (from 11 to 12).

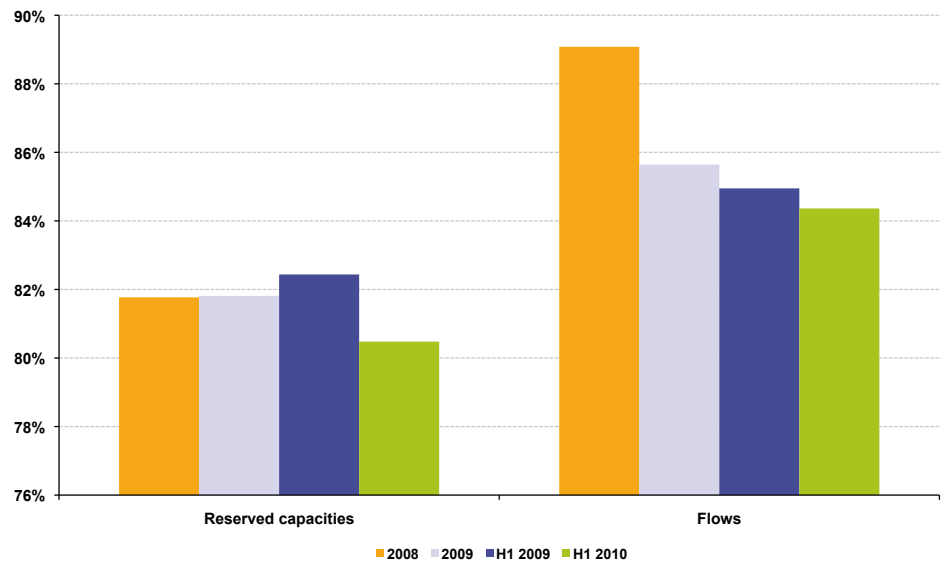
Though the number of users of gas import infrastructures in the North zone has increased, the share of the three main shippers remains particularly high in 2010 at 76% at Taisnières, 82% at Obergailbach and 89% at Dunkirk (Graph 56, p. 82). Therefore, access to the entry points in the North zone remains very concentrated and the HHI index for Taisnières, Obergailbach and Dunkirk stands at 3,522, 3,783 and 5,170 respectively for 2009.

Therefore, the reservations of entry capacities appear to be much more concentrated than the transactions on PEG Nord (see chapter I, 1.2).

The fourth entry point in the North zone, the Montoir-de-Bretagne methane terminal, also has a growing number of users. Two Spot unloading slots were subscribed to during the first half of 2010. They are linked, in particular, to the implementation of the new UIOLI rules since 1 January 2010, which represent a significant improvement to the access conditions at the Montoir-de-Bretagne methane terminal. The capacity reserved under the terms of the uniform service remains unchanged in 2010 in relation to 2009 with a slight increase in the number of unloading slots. Within the context of the GDF SUEZ commitments (Box 3, p. 83), access capacities at the Montoir terminal have been subscribed to in the long term.

The increasing use of the uniform offer and access to the Spot offer at this terminal make it a particularly attractive access gate to PEG Nord in the current context of low LNG market prices compared to the prices of long term supply contracts indexed on petroleum products.

GRAPH 56 - Share of the three largest shippers in the reservations and use of entry capacities at Taisnières H, Obergailbach and Dunkirk (in %, 2008 - H1 2010)



Source: GRTgaz - Analysis: CRE

- *Considerably improved access to the adjacent markets*

GDF SUEZ's commitments to its share of entry capacities in France (Box 3) are accompanied by the development of markets upstream of the North zone, which should reinforce the effect of those commitments.

The German markets are continuing with their in-depth transformations. There are now only two major market places for H gas, GasPool in the North and NCG in the South, in which liquidity has grown strongly since mid-2009. NCG is one of the most dynamic market places in continental Europe. Furthermore, in May 2010, the German government announced the continuation of the simplification of the transmission system, started by the regulator in Germany, which should result in the existence of only two zones in 2013, as well as the introduction of short term capacity products (2 years and less), as there are already in France. These changes should contribute to the development of the German market and increasing possibilities of arbitration between that market and PEG Nord.

In Belgium, the constitutional court ruled in favour of the Belgian regulator (CREG) when it declared that there could be no difference between the transit of gas through Belgium and the transmission of gas within Belgium. This confirmation of the CREG position opens the way to the introduction of an entry-exit system for all of the gas flows in Belgium which should make access to the Belgian transmission network easier and work towards greater harmonisation of conditions within Europe.

BOX 3 - GDF SUEZ commitments

On 16 May 2008, the European Commission opened infringement proceeding against Gaz de France SA and its subsidiaries, suspected of practices that could have prevented or restricted competition in the upstream natural gas supply markets in France, especially by the long term reservation of gas transmission capacities. In order that these proceedings can be closed, in July 2008 GDF SUEZ made an offer to the European Commission by proposing **to limit its share of long term (duration greater the 1 year) entry capacities on the French natural gas transmission system to 50% from 2014 for a period of 10 years.** GDF SUEZ also offered to make a significant amount of its capacities available again starting from 1 October 2010.

A structural undertaking for access to the gas market in France

The main undertaking covers the limiting of the long term capacities for entry to French territory held by the GDF SUEZ group to 50% from 2014 and has led GDF SUEZ to return to GRTgaz and to the methane terminals, from 1 October 2010, some of the long term entry capacities that it held at the main entry points (Obergailbach and Taisnières H land interconnections, Montoir and Fos-Cavaou methane terminals).

In the cases of the Obergailbach and Taisnières H entry points, it will also be possible to obtain an equivalent capacity on the upstream transmission systems in Germany and Belgium and on the "Interconnector" gas pipeline connecting the United Kingdom and Belgium. For the Montoir and Fos-Cavaou methane terminals, the marketing was done in the form of lots of 1 Gm^3 per year (i.e. 12 boats per year).

A beneficial undertaking for the gas market in France

The limiting of the long term entry capacities held by GDF SUEZ to 50% is a determining factor for the opening up of the markets and the development of competition in France to the benefit of the end users. The alternative suppliers thus have access to new long term entry capacities, which should enable them to diversify their sources of supply and make better offers to their end users. It is important to stress that this 50% limit applies separately to the North and South of the country.

In the North, the already active competition, which has accelerated since 1 January 2009, will be further strengthened by the redistribution of entry capacities. In the South, new entrant suppliers currently encounter access difficulties, as they have no choice but to route gas from the North. Competition should receive a real boost, firstly due to the handing back of capacities at the Fos-Cavaou methane terminal and secondly by the limiting of the GDF SUEZ share of long term capacities.

CRE associated with defining and implementing the commitments

CRE has collaborated closely with European Commission departments in the definition of these solutions. The first sale of capacities returned by GDF SUEZ took place at the start of 2010 for implementation as from 1 October 2010. CRE has also collaborated with the mandated agent to ensure that these commitments are correctly implemented.

A significant part of the capacities offered are subscribed

Even though not all of the capacities returned have been subscribed to long term, a major part of them found takers. In the cases of the land entry points, all of the 10 GWh/d offered at Taisnières were subscribed to, whilst at Obergailbach, 50 GWh/d with an access to the German NCG notional hub were allocated. In the case of the LNG terminals, two 1 Gm^3/year lots were allocated, one at Montoir and the other at Fos-Cavaou. The quantities not allocated were put back on the market on a "first come, first served" basis.

- *The infrastructure developments planned in the North zone*

A certain number of projects may further increase entry capacities in the GRTgaz North zone.

- following the Belgium-France open season that ended in 2008, the capacity at the Taisnières interconnection point will increase by 50 GWh/d in December 2013;
- in the case of the import of liquefied natural gas, the final investment decision for the Dunkerque LNG project proposed by EDF is expected at the end of 2010. As for the Antifer terminal, the examination of the operating permit request submitted in November 2009 has been suspended on the request of Gaz de Normandie, the project's proposer. In May 2010, Elengy announced a future call for proposals about the possibility of an extension to 12.5 or 16.5 Gm^3 of the regasification capacity of its Montoir-de-Bretagne terminal.

Moreover, in order to better integrate the Belgian and French markets, an open season for exit capacities from France to Belgium was launched by GRTgaz and Fluxys (non committing phase from May to August 2010). It proposes the creation of a new 400 GWh/d interconnection point that would allow physical flows of gas from France to Belgium, whereas today only virtual reverse flows at Taisnières are possible. This new interconnection would also allow for physical flows to come from Belgium particularly in cases of crises of supply and would thus contribute to supply security.

BOX 4 - Low level of storage facilities due to the small difference in the prices between the summer Spot and winter season

During the April 2009 to March 2010 period, the Storengy and TIGF storage capacities were held respectively by 30 and 12 shippers, with the three leaders holding 84 and 96% of those capacities.

At all of the storage facilities, the proportion of capacities subscribed to by new entrant suppliers increased between the subscriptions on 1 November 2009 and those on 1 April 2010. The proportion of capacities not subscribed to on 1 April 2010 amounted to nearly 7.5%. At the end of April 2010, after the marketing of the envelope of attributable rights, 9 TWh remained unsold for the Storengy storage facilities, or almost 8% of the total volume of its storage facilities, whereas the whole useable volume of TIGF was sold.

At Storengy and TIGF, 12 and 2 shippers respectively that did not have storage rights were able to reserve capacity during the marketing operations for storage capacities not subscribed to after the subscription of capacities linked to the storage rights mechanism [(14)].

Throughout 2010, the difference in the price of gas on the markets between the summer 2010 and winter 2010/2011 seasons was particularly low, even lower than the price of storage. Therefore, the shippers had few incentives to reserve storage capacities for injecting gas during the summer of 2010 apart from their regulatory obligations related to their supply permit issued by the government.

TABLE 15 - Level of gas in store in France (in TWh, 2007-2010)

	31/03/2007	31/03/2008	01/11/2008	31/03/2009	01/11/2009	31/03/2010	01/09/2010
Storengy	26.9	38.8	110.4	20.7	111.2	26.9	90.1
TIGF	7.4	11.3	27.1	7.1	28.6	10.1	28.1
Total	**34.3**	**50.1**	**137.5**	**27.8**	**139.8**	**37**	**118.1**

Sources: Storengy, TIGF

(14) Pursuant to the decree of the 21 of August 2006 concerning access to underground natural gas storage facilities, each year a ministerial order defines the individual consumption profiles of the final customers and the unitary storage rights associated with them. On the basis of the provisions of this order, an envelope of storage rights (in volume and in withdrawal rate) is attributed to the suppliers holding an effective portfolio of final customers.

3.2. Access to the infrastructures still restricted in the south of France but showing signs of improvement

In 2009, the entry capacities in the south of France only just covered consumption and the flows related to the injections of gas into the storage facilities whilst the usage rates of the zone's two main entry points were very high: 96% for the North - South link and 87% for the Fos-Tonkin terminal. The provision of short term UIOLI capacities [15] played an important role in optimising access to the North - South link by making the day's remaining unused capacity available to all of the shippers for the next day.

This situation improved in 2010 due to the partial bringing into service of the Fos-Cavaou terminal, which was then completely authorised at the end of August. This easing of the restriction will increase in the medium term with the entry into service of physical flows from Spain to France at the Larrau point at the end of 2010 (+ 30 GWh/d) then, in 2013 and 2015, the setting up of additional import capacities from Spain (Larrau and Biriatou).

The link between the North and South zones is crucial for supplying the south of France with gas and for the correct working of the market because most suppliers can only access the users in the south of France by that link.

During the allocation of North - South link capacity at the end of 2007, 21 shippers obtained capacity as from 1 January 2009 for periods of 2, 3 or 4 years, thus doubling the number of shippers with an access to the South zone.

In the first half of 2010, the use rate of the North - South link was 82% (Graph 57) as against 96% in 2009. This drop in use rate is to a large extent due to the partial bringing into service of the Fos-Cavaou terminal on 1 April 2010, after a tests phase that started in October 2009: 13 LNG tankers were unloaded between January 2010 and June 2010.

The South zone's other supply point is the Fos-Tonkin terminal, with a capacity of 7 Gm^3/year, giving an emission capacity of around 250 GWh/d. In the first half of 2010, its usage rate was 73% as against 87% in 2009 (Table 16). This drop reflects the decrease in the pressure on supply in the South zone.

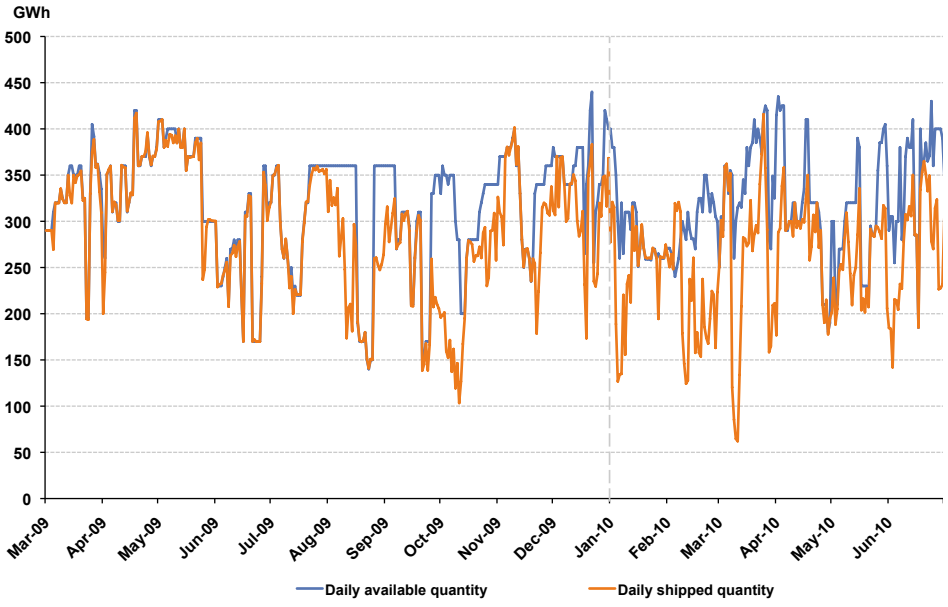
TABLE 16 - Use rate of the Fos-Tonkin terminal

2007	2008	2009	H1 2010
72%	71%	86.8%	73.1%

Source: Elengy

(15) What makes the always high use of the North - South link possible is the application of the interruptible short term Use-it-or-lose-it (UIOLI) mechanism at that point. This mechanism allows shippers to nominate quantities higher than the capacities reserved. If some shippers nominate quantities lower than those they have reserved, GRTgaz then reallocates the capacities that have not been nominated to the shippers who have nominated capacities higher than their reserved capacities. This reallocated capacity is interruptible because its initial holder retains the right to modify its nomination during the day. This mechanism optimises the use of the North - South link by redistributing the capacity between shippers according to their needs.

GRAPH 57 - Use of the North - South link (2009 - H1 2010)



Note: firm and interruptible capacities.

Source: GRTgaz - Analysis: CRE

At Fos-Cavaou, GDF SUEZ's commitments to the European Commission imposed the return over 20 years of two 1 Gm^3/year lots (secondary market) as well as 0.175 Gm^3/year (2 unloading windows marketed by STMFC): their marketing resulted in a subscription to a 1 Gm^3/year lot.

Furthermore, two "short term" slots were sold by the Fos-Cavaou terminal in July and November 2010.

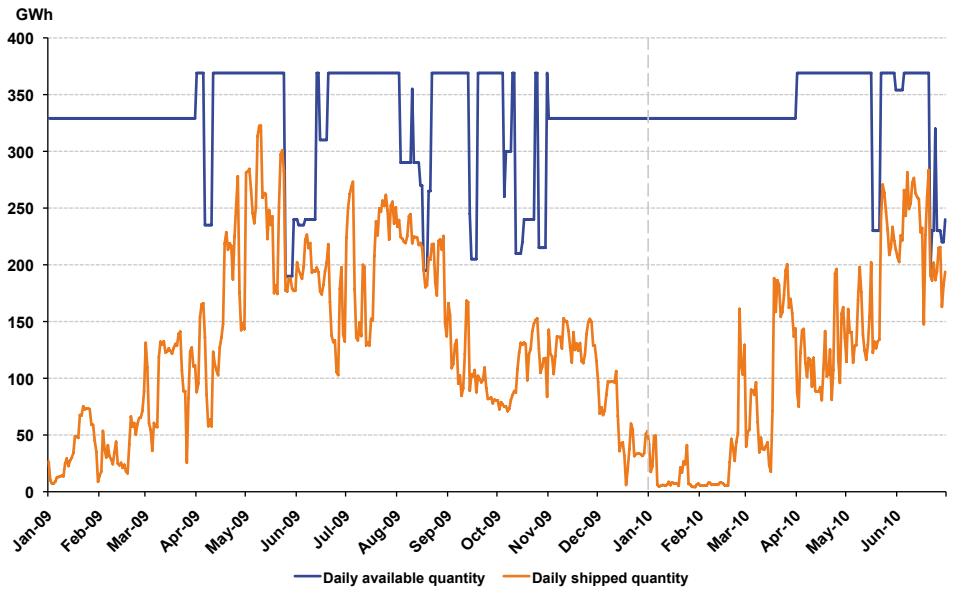
- *Access conditions in the south of France should continue to improve*

Supply conditions in the south of France should continue to improve in the short and medium terms. The firm physical capacities from Spain to France will gradually come into service, rising from 5 GWh/d today to 30 GWh/d (in winter) and 50 GWh/d (in summer) from November 2010, then 165 GWh/d in April 2013 and to 225 GWh/d in December 2015.

- *No physical congestion between the South and South West zones*

Though the supply of the south of France remains relatively under pressure, the link between the South and South West zones is not itself under stress (Graph 58, p. 88).

GRAPH 58 - Use of the capacity at the Midi SIP in the GRTgaz South zone to TIGF direction (in GWh/d, 2009 - H1 2010)



Source: GRTgaz - Analysis: CRE

• *Conclusions*

In 2009, access conditions to the gas infrastructures, a key factor in the development of the wholesale natural gas markets, continued to improve.

In this matter, the commitments made by GDF SUEZ to limit its share of the import capacities into France to 50% is an essential contribution to the development of liquidity, in both the north and south of France. In practice these commitments mean more players with entry capacities on the French market. In addition, the development of new interconnection capacities between France and Spain in 2013 and 2015 should also contribute to the growth of the market in the southern half of France.

In the longer term, access to the infrastructures should benefit from other significant improvements. At the European level, the development, which is underway, of a guidelines framework relating to the allocation of transmission capacity at the interconnection points between systems should considerably ease access to the systems on either side of the interconnection points and the cross-border gas flows and will therefore open up possibilities of arbitration and increased competition in the market places in France.

4. THE SUPPLY OF PLAYERS/NEW ENTRANTS (16)

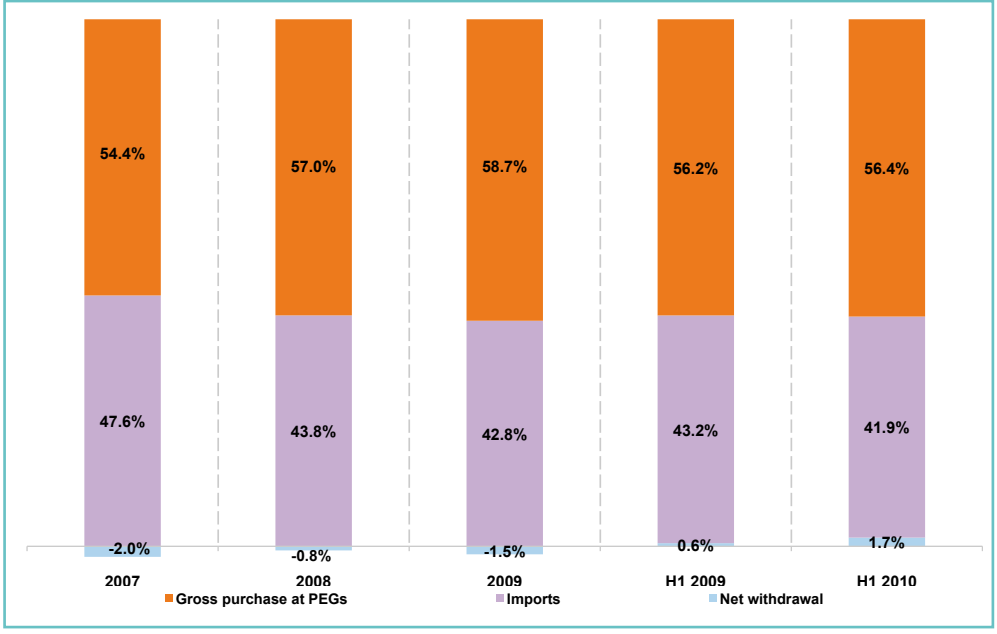
4.1. Increasing use of the PEGs for the supply of new entrants

The supply of new entrants in France is mainly based on imports and purchases at the PEGs. The storage chain is integrated into the supply structure due to the balancing role that it plays in cases of fluctuations in consumption.

Graph 59 shows the growth in the percentage of purchases at the PEGs and the converse lower recourse to imports over the period of 2007 to the first half of 2010. Purchases at the PEGs, 54.4% in 2007, increase by 4.3% in 2009 to reach 58.7%. In parallel, imports recorded a fall of 4.8%, shrinking from 47.6% in 2007 to 42.8% in 2009. There was a more marked use of storage in the first half of 2010 with 1.7% as against 0.6% in the first half of 2009, reflecting the weather conditions.

(16) The alternative suppliers or new entrants cover all of the shippers that are not incumbent suppliers in France.

GRAPH 59 - Supplies of new entrants in France by source (in %, 2007 - H1 2010)



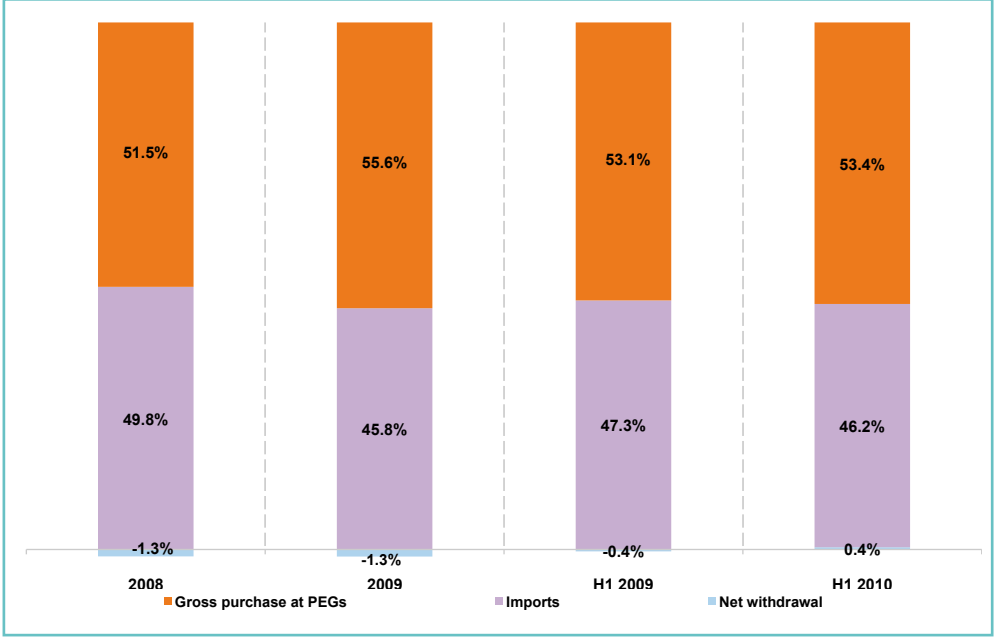
Sources: GRTgaz, TIGF - Analysis: CRE

4.2. Drop in the percentage of imports in the North zone's supplies

The emergence of the North zone following the merger of the three GRT gaz balancing zones on 1 January 2009 improved the liquidity of PEG Nord and increased the quantities of volumes traded in that zone by 45% between 2008 and 2009. The new players have access to more entry points (Montoir, Dunkirk, Taisnières and Obergailbach) for getting their gas supplies and supplying an enlarged base of end users.

Graph 60 shows the changes in the breakdown of supplies in the North zone over the period from 2008 to the first half of 2010. The trends of growth in purchases at the PEG and reduction in imports are similar to those observed at national scale. Thus, purchases at the PEG increased by 4.1% with 55.6% in 2009 as against 51.5% in 2008 and imports fell by 4% between 2008 and 2009. The storage facilities were called on for 0.4% in the first half of 2010 as against - 0.4% in the identical period in 2009.

GRAPH 60 - Supplies of new entrants in the North zone by source (17) (in %, 2008 - H1 2010)



Sources: GRTgaz, TIGF - Analysis: CRE

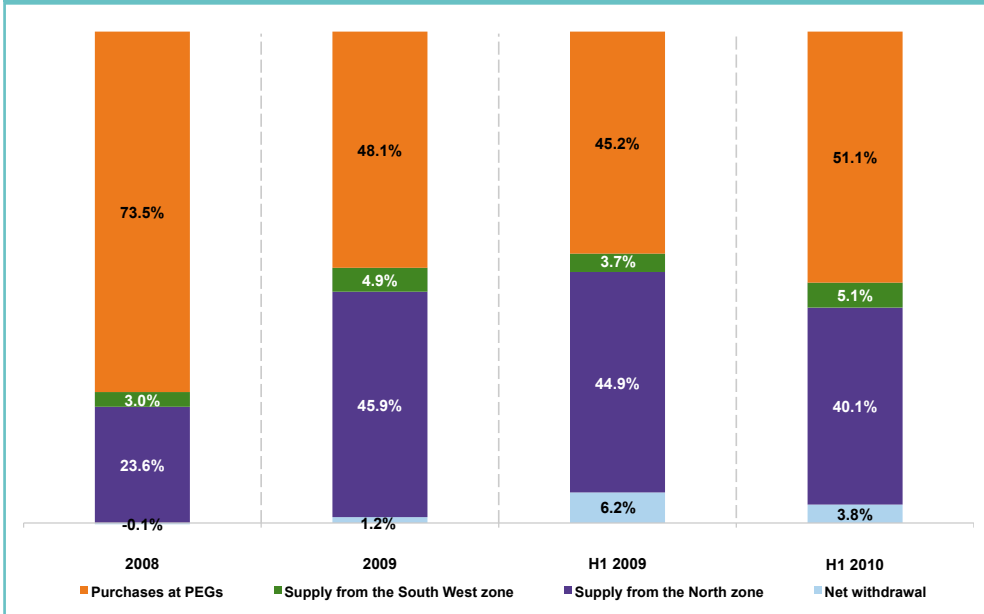
(17) The South/North link is not taken into account because imports from the South zone are still marginal.

4.3. Similar supply structures in the South and South West zones since the end of the gas release programme

Up until 2008, gas releases allowed the new entrants to get supplies directly at PEGs. Since then, there was first of all a reduction in use of the PEGs for obtaining supplies before this method showed signs of picking up again in the first half of 2010. This trend can be observed in both South and South West zones (Graph 61 and Graph 62, p. 91-92). It should be confirmed with Fos-Cavaou coming into service in April 2010.

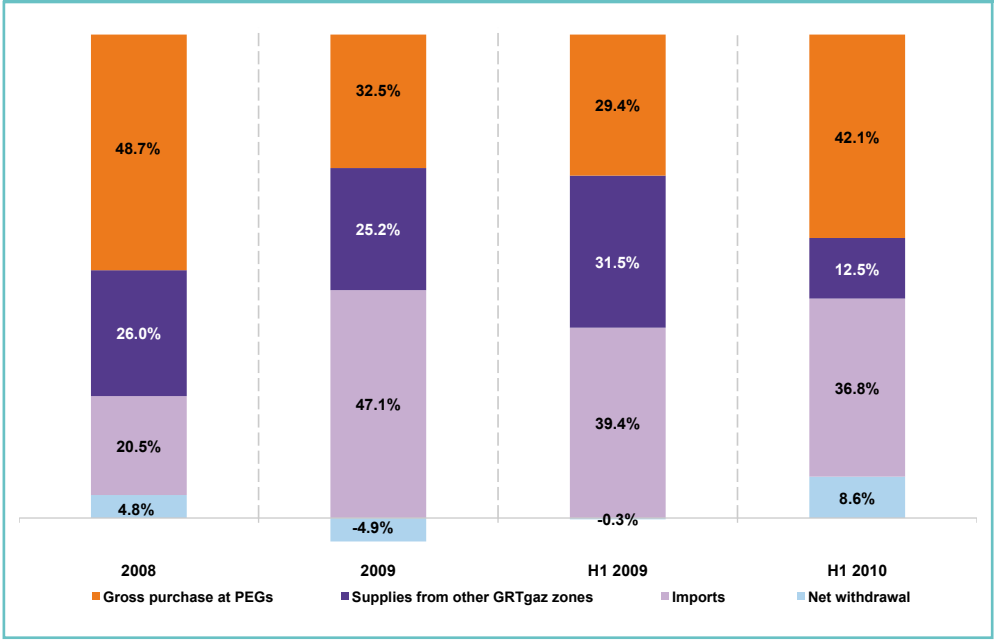
In the case of the South zone, a comparison between the data for the first six months of 2010 and 2009 shows that supplies from the North zone have decreased significantly (- 4.8%), a fall that is compensated for by an increase in purchases at PEG Sud (+ 5.9%). The new entrants have preferred direct purchases on the market to purchases from the neighbouring zones, which require the use of inter-zone links. Supplies from the South West zone remain limited to around 5% (between 2009 and H1 2010).

GRAPH 61 - Supplies of new entrants in the South zone by source (in %, 2008 - H1 2010)



Sources: GRTgaz, TIGF - Analysis: CRE

GRAPH 62 - Supplies of new entrants in the South West zone by source (in %, 2008 - H1 2010)



Sources: GRTgaz, TIGF - Analysis: CRE

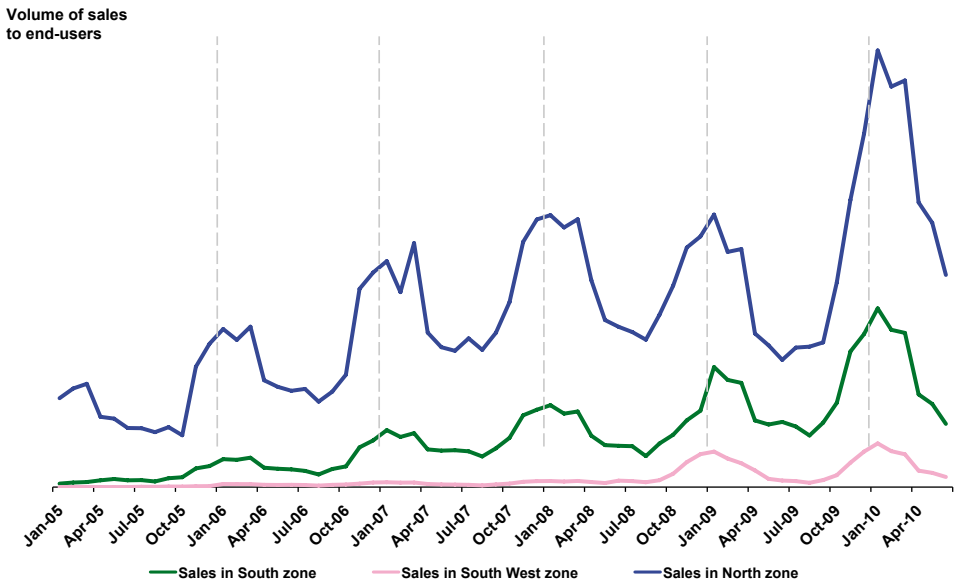
In the South zone, the new entrants mainly use their supplies for the consumption of end users and resale at the PEG whereas the incumbent suppliers mainly use their gas volumes for final consumption and exports to the South West zone.

As in the case of the South zone, the supply structure of new entrants in the South West zone varied greatly between 2008 and 2009, due to the interruption of the gas release operations. In 2009, almost 70% of the supplies of new entrants were provided by imports and supplies from the South zone. Purchases at the PEG represented 32.5% in 2009. They made clear progress in the first half of 2010, to 42.1%, with a concomitant fall in supplies from the South zone. Also note a significant call on the storage facilities in the first half of 2010.

4.4. The activity of alternative suppliers is developing unevenly over the whole country

Finally, the development of markets in the three zones has enabled the alternative suppliers to develop their activity: in the first half of 2010, deliveries to end users increased on average by 59.2% compared to the first half of the previous year. Nevertheless, as Graph 63 shows, sales in the South West zone (+ 28.5%) increase slower than those in the North zone (+ 74.2%) and South zone (+ 38.7%).

GRAPH 63 - Monthly sales by alternative suppliers to final users in the three zones (2005 - H1 2010)



Sources: GRTgaz, TIGF - Analysis: CRE

Section III

Appendices

1. GLOSSARY

OTC market: Over the Counter market on which interaction is bilateral. It may either be mediated, when purchase and sales orders are made via brokers, thus allowing supply to meet the demand, or pure, if the transactions are made directly between operators.

1.1. Wholesale electricity market

- *Main power exchanges in Europe (organised markets)*

APX: Amsterdam Power Exchange, mandatory for imports and exports in the Netherlands (www.apx.nl).

EPEX Spot France: French exchange, not mandatory (www.powernext.fr).

EPEX Spot Germany: German exchange, not mandatory (www.eex.de).

NordPool: Scandinavian exchange, not mandatory (www.nordpool.no).

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

- *Wholesale products*

Base: 24 hours out of 24, 7 days out of 7.

Day-ahead: contract signed on one day before delivery.

Futures or Forward: standard contract signed to deliver a given quantity at a given price according to a defined schedule, requiring the payment of a premium and a guarantee deposit. The proposed terms vary according to the organised markets (weekly, monthly, quarterly, every six months, annually). The term Y+1 corresponds to the calendar year following the current year.

Peak (continental Europe): between 8:00 am and 8:00 pm from Monday to Friday.

- *Segments of the wholesale market*

Final consumption: sales to sites as a balancing responsible entity or in the form of blocks.

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

Sales to the system 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

VPP: "Virtual Power Plant" or capacities auctions organised by EDF following a decision of the European Commission (see Case DG COMP/M.1853 - EDF/ENBW).

http://encherescapacites.edf.com/accueil-com-fr/encheres-de-capacite/presentation-114005.html)

VPP Base: products reflecting a power plant running in base mode. The principle is that bidders pay a fixed premium (in €/MW) every month to reserve available capacity, and they regularly send EDF a schedule for using these capacities. They then pay an exercise price per MWh taken off, close to the marginal cost of the EDF nuclear power stations. The pricing structure is therefore "fixed cost + variable cost".

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

Wholesale purchases and sales (OTC): block trading notifications, i.e. quantities nominated Day-ahead to RTE, excluding the transactions on Powernext.

1.2. Wholesale gas market

Reverse capacity: capacity on the main system that enables the shipper to make nominations in the opposite direction to the dominant direction of flows when the flows of gas can only flow in one direction. On any given day, they can only be used if the total flow resulting from all of the nominations by shippers is in the dominant direction of the flow.

Flexibility clause: provision inserted in a long-term import contract giving the buyer the option of reducing or increasing the volumes withdrawn within the limits of a previously defined range.

Short term: the short term market is for the Day-ahead, Week-end, Week and Other products.

ERGEG (European Regulators Group for Electricity and Gas): created by the European Commission as part of the implementation of the 2003 directives, ERGEG's role is to advise and assist the Commission in consolidating the internal energy market by contributing to full implementation of European directives and regulations and preparing future legislation in the areas of electricity and gas. ERGEG is composed of the European Commission and independent regulators from the 27 European Union Member States. Member States of the European Economic Area and countries that have applied for membership to the Union are invited as observers. To achieve its objectives, which are also part of a public work programme, ERGEG has a structure similar to that of CEER. In addition, ERGEG widely consults energy sector players on issues where its opinion is required. This opinion also involves the European Commission, which can then give it legally binding status through the Community comitology process.

DFO: domestic fuel oil at 0.1%.

LFO: low sulphur content fuel oil.

Gas release: obligation for a supplier to release part of its gas resources to other suppliers for a given period. The purpose of this operation is usually to stimulate competition by offering alternative suppliers the opportunity to secure supply without having to negotiate directly with the incumbent supplier.

Herfindahl-Hirschmann Index (HHI): is equal to the sum of the squares of the market shares of the players and measures the concentration of the market. The higher it is, the more concentrated the market. It is generally considered that a market is not very concentrated if its HHI is less than 1,000 and is very concentrated if it is higher than 1,800.

Intraday: market for contracts concluded on day D for delivery the same day or the following day, if the transaction is made after the main activity period of the Day-ahead market.

NBP (National Balancing Point): gas hub of the United Kingdom. Due to the large volumes exchanged on this virtual hub, the prices quoted there are an important reference for wholesale gas exchanges in Europe.

Net-back: method of fixing the price of long-term gas purchase contracts based on pricing natural

gas in relation to the energies competing with it and taking into account the costs of transporting gas from the producer country to the consumer country.

Nomination: quantity of energy expressed in kWh (Higher Calorific Value 25°C) notified by the shipper to the TSO each day that the shipper asks the TSO to take, route and deliver. By extension, the verb "Nominate" defines the act of notifying the TSO about a nomination.

Gas Exchange Point (PEG): virtual points on a French gas transmission network where shippers can exchange gas. There is a gas exchange point in each balancing zone in the French network.

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

Forward product: contract signed to deliver a given quantity at a given price according to a defined schedule.

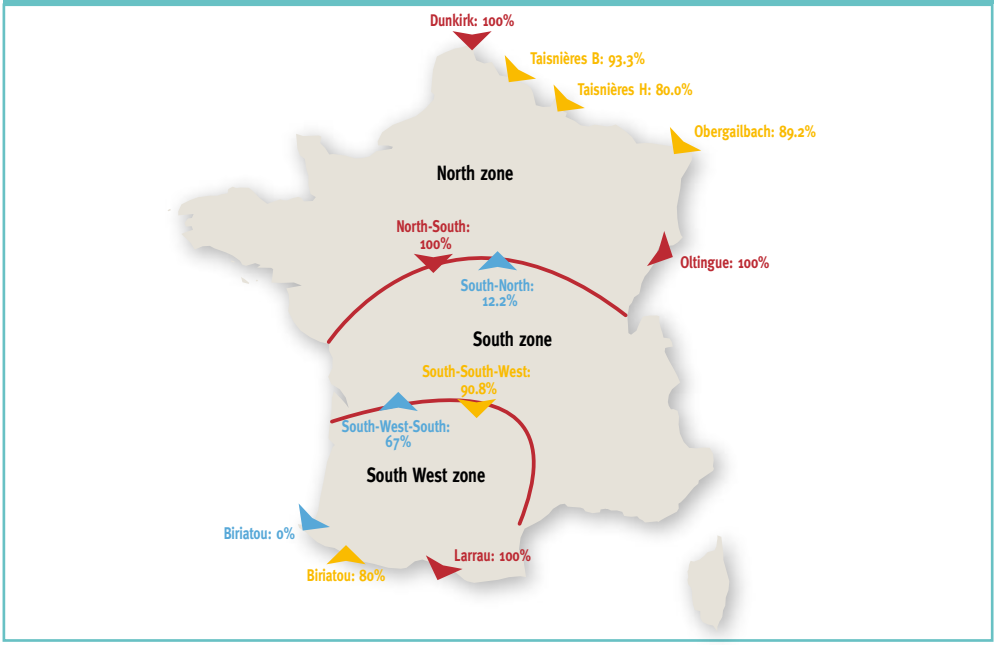
Future product: Forward contract negotiated on an exchange (organised market). The proposed terms vary according to the organised markets (weekly, monthly, quarterly, every six months, annually). The term Y+1 corresponds to the calendar year following the current year (delivery from 1 January to 31 December).

Uniform service: the regasification of a cargo of LNG is ensured in constant emission over 30 days.

Spot: short term market, including operations for short deadline delivery. The Spot market covers the Intraday and Day-ahead products.

Take-or-pay: clause in a gas or electricity supply contract by which the seller guarantees that the gas or electricity will be available for the supplier, which, as a counterpart, guarantees to pay for a minimum quantity of gas or power, whether it takes delivery or not.

Gas zones and firm subscribed capacities compared to the capacities that can be marketed (H2 2010)



Sources: GRTgaz, TIGF - Analysis: CRE

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