

WHOLESALE MARKETS OBSERVATORY

4th quarter of 2018

Wholesale electricity and natural gas markets

INTRODUCTION

The wholesale markets observatory aims to provide general monitoring indicators of electricity and natural gas in France.

This observatory is updated on a quarterly basis and published on CRE's website (www.cre.fr). A French version is also available.

The first part of the report summarizes the highlights of the quarter. The indicators (main dates, key figures and Figures) are detailed in the second part.

The underlying data of the tables displaying the key market indicators are available on the CRE's website in the "Open Data" section (www.cre.fr/Pages-annexes/Open-Data).

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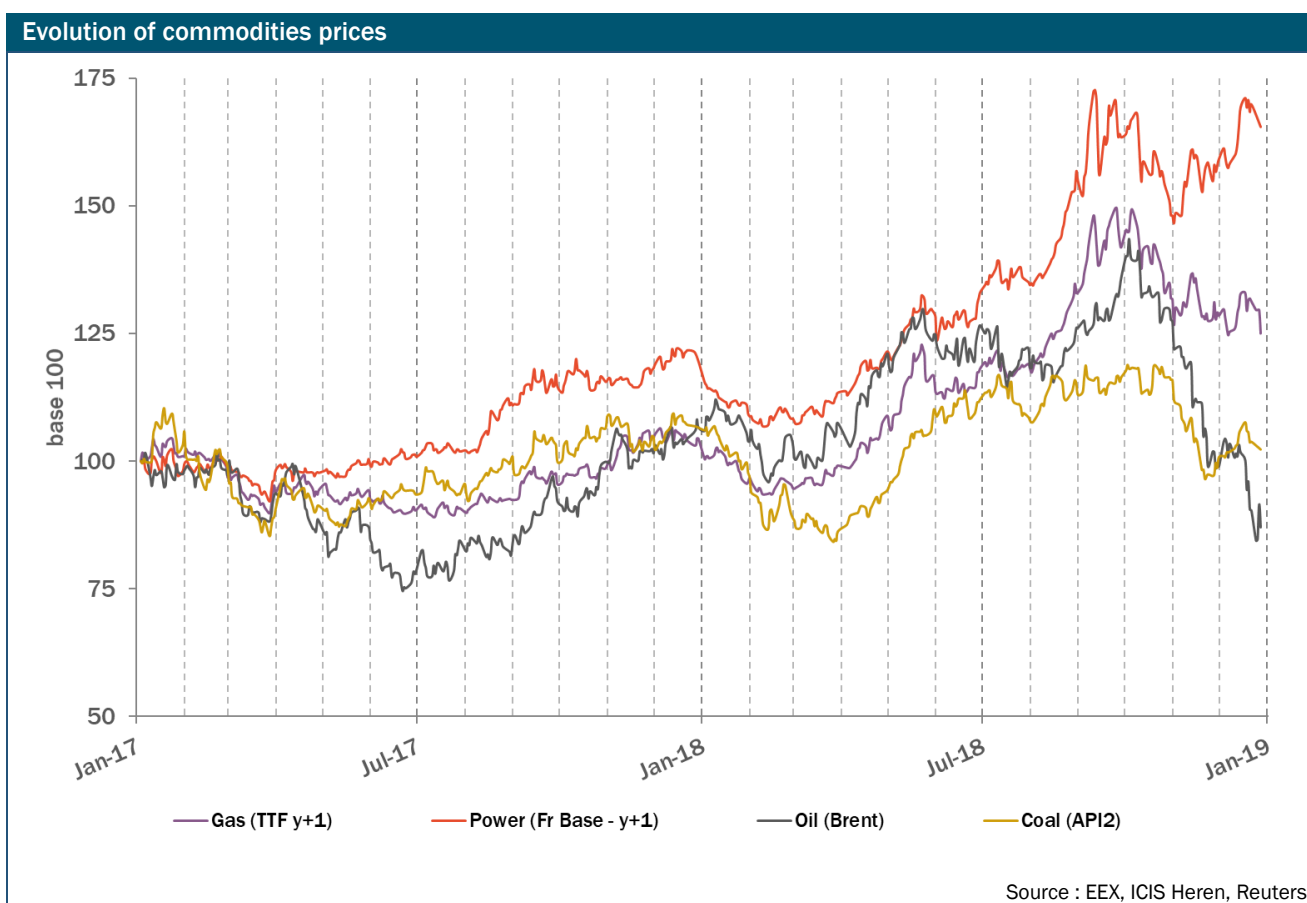
QUARTERLY HIGHLIGHTS

Steep drop of oil prices during the fourth quarter

While oil was trading at a nearly four-year high of 75 €/bbl in October, oil prices plunged afterwards to close the year just below 50 €/bbl. November experienced a steep drop of 23 % and recorded the biggest monthly loss since October 2008 during the financial crisis.

Several coinciding factors drove the decline, on the supply side, the USA, Russia and Saudi Arabia showed higher figures of production, near record levels. On the demand side, the drop was spurred by the waivers granted by the USA to allow certain countries to continue to import Iranian oil despite the sanctions. Demand was also driven by more pessimist macroeconomic forecasts in the context of the on-going trade dispute between the USA and China.

Coal prices followed the same bearish trend as oil, it started the fourth quarter at 87 €/t and ended the year at 76 €/t. The first importer, China, drove the prices down as it restricted coal imports until the end of the year and relied on its domestic inventories. There was a small rebound in December due to low storage in India and optimistic outlook for China to revive imports in 2019.



The upward trend of the wholesale electricity market prices remains in a context of rising commodity and CO₂ prices

Compared with the fourth quarter of 2017, French consumption during the same period in 2018 decreased at around 118 TWh (Figure 14) while it was at 123 TWh during the same quarter of 2017 (-3.7%). Nuclear availability increased slightly (Figure 15), with an average availability rate of 75.7% (+5.3 % compared to the fourth quarter of 2017). Availability rate was hence 9.1 points higher than in the third quarter of 2018 (66.6%). Overall, nuclear production amounted to 103.1 TWh, an increase of + 7.7% compared to the same period in 2017.

Compared with the year 2017, hydraulic production in the fourth quarter of 2018 placed at the bottom of the historic tunnel following the trend of the same period of the previous year, with an increase of + 1.7% reached 12.1 TWh (Figure 18). However, it is down -1.3% from the previous quarter (12.2 TWh). The quarter also recorded a -115% increase in wind generation (8.8 TWh) compared to the previous quarter. The generation rate for the coal and gas sectors (Figures 16 and 17) was thus 24% and 41 % on average during the fourth quarter of 2018, compared to

20% and 19%, respectively, in the previous quarter. Compared to the fourth quarter of 2017 this same fossil production shows a decrease of -24.2%.

France's export balance stands at 11.1 TWh against 2.0 TWh in the fourth quarter of 2017 (Figure 20). Exports increased by + 20.8%, with a +29.8% increase in exports during peak hours and +16.7% on exports outside these periods. Imports fell by -38.4%, with a -38.2% drop in imports during peak hours and -38.5% in imports outside these periods.

Spot prices for electricity reached an average of € 64.9 / MWh in the fourth quarter of 2018, an increase of +15% compared to the same period in 2017. This upward trend is also marked in Germany, where German spot prices averaged € 53.6 / MWh, up + 60.4% from the previous year (Figure 10). The spread France-Germany fell by 51% from € 23.1 / MWh in the fourth quarter of 2017 to € 11.3 / MWh over the same period in 2018.

Calendar product French prices for delivery the following year show a clear progression rising by 8% on average compared to the previous quarter, and its German equivalent increased by 9%. Prices reached € 57.6 / MWh and € 52.9 / MWh respectively. Compared to the same period in 2017 these prices show increases of + 35% on average for the French calendar. Prices for Monthly products increased by an average of +24% compared to the third quarter of 2018, and amounted to € 72.2 / MWh, which corresponds to an increase of about +14% compared to the fourth quarter 2017 (Table 2).

Regarding trading in the futures market, yearly products (Y+1) volumes traded decreased by -52% compared to the fourth quarter of 2017 and increased by 29% compared to the third quarter of 2018. For monthly products (M + 1), the volumes traded are up + 1% compared to the fourth quarter of 2017 and - 15% compared to the third quarter of 2018. As about traded volumes, in the Spot market they are down by -2% compared to the same period in 2017 and by -12% compared to the previous quarter (Table 3).

New single marketplace PEG starts its first winter amid abundant supply conditions

The new single French zone has been launched on the 1st November 2018 with the merger of PEG Nord and TRS. This is the final achievement of over 15 years of works aiming to improve the attractiveness of the hub, to ensure a better functioning zone and to reinforce security of supply. New PEG single price should then experience fewer volatility spikes, especially regarding historical congestion in the south zone.

The new zone is poised to get through its first winter without any major difficulties thanks to favorable fundamentals. Indeed, LNG deliveries reached 43 TWh this quarter, a twofold increase as compared to the previous quarter. French terminals activities boomed with the example of Montoir unloading 18 cargoes (17.7 TWh) during this quarter. This record LNG influx in France and in Europe is a result of a low demand in Asia due to above seasonal temperatures in Northern Asia and high nuclear availability in Japan. Furthermore, that bearish demand is coinciding with a growth in global supply as new LNG liquefaction terminals entered the market, namely Ichthys LNG in Australia, Yamal in Russia or several trains in the USA.

French consumption fell to 146 TWh this quarter linked to mild temperatures, a 10.5 % drop compared to the fourth quarter of 2017. As LNG arrivals soared, pipelines imports decreased by 8 % to 109 TWh compared to last quarter. The comfortable conditions limited storage utilization to only 24 TWh of net withdrawals that allowed to keep stocks at record levels (95 TWh by 1st January 2019) and reinforcing then French supply's security.

PEG *day-ahead* price closed 2018 at 21.2 €/MWh with a quarterly average of 24.6 €/MWh, far from mid-September's peak at almost 30 €/MWh on PEG Nord. The TTF-PEG spread on the fourth quarter was on average 0.1 €/MWh whereas it is usually around 0.2 €/MWh and market conditions in France even led the PEG to trade at a discount to the TTF on several occasions. The North-South link utilization rate was only 81 % as TRS price promptly converged to PEG Nord's price in October ahead of merger.

Future prices also fell from September's highs amid bearish commodities markets, PEG Cal'19 ended the year at 22.1 €/MWh with a quarterly average of 23.7 €/MWh which is still 30 % higher than the average of the fourth quarter of 2017.

CO₂: following a high decrease in October, the year ends at a level closed to the annual maximum

The closing price of the year 2018 is 24.64 €/tCO₂, which is a level closed to the maximum one reached over the year in September, that was 25.18 €/tCO₂. This final rise happens after a period of decrease: whereas the price was above 20 €/tCO₂ at the beginning of October, the month of November started with a price of 15.62 €/tCO₂. This was among other factors due to the uncertainty related to the United Kingdom leaves the European Union without agreement and therefore to its exit of the EU ETS market. The EUA traded volume on exchanges, including

stock markets and brokers, was 4309 MtCO₂ during the fourth trimester of 2018, which represents an increase of 67% compared to the previous year. This growth reflects the increase of the buying interest in EUAs from the actors who already anticipate the effect of the Market Stability Reserve (MSR), which will start operating in January 2019 and aims to regulate the available amount of carbon quotas on the market.

MARKET INDICATORS

PART 1: **WHOLESALE ELECTRICITY MARKET**

1. KEY DATES

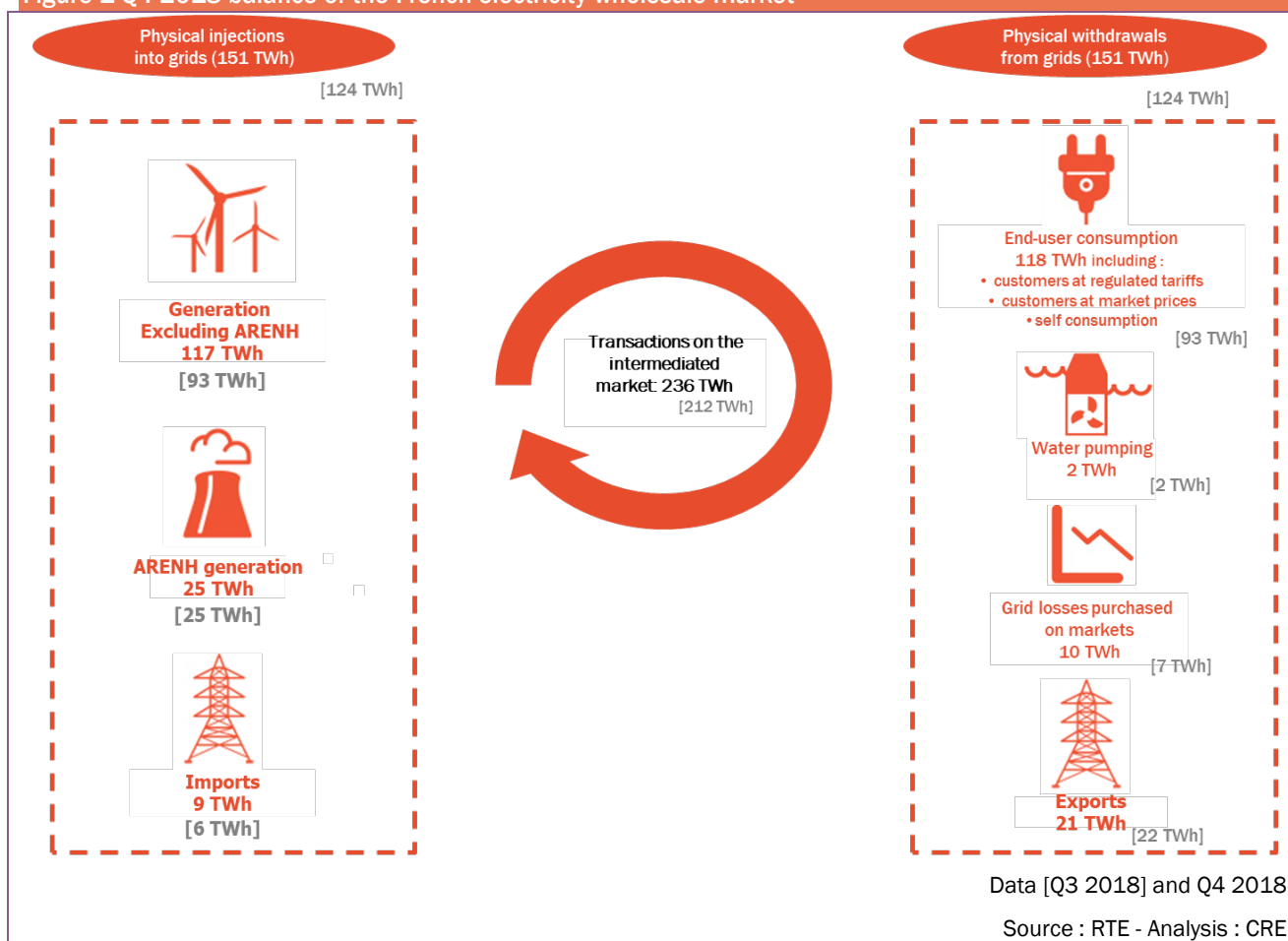
November 2000	CRE validated the initial version of the Balancing Responsible Entity (BR) contract
Early 2001	First purchases of losses on the market by RTE
May 2001	First OTC quotations published regarding the French electricity market
September 2001	First virtual power plant auctions set up by EDF (VPP)
November 2001	Launch of the Powernext Day-ahead market
June 2004	Launch of the Powernext Futures market
July 2004	First purchases of losses on the market by the distribution system operator (ERDF)
January 2006	Implementation of explicit capacity auctions on interconnections (except for Switzerland)
November 2006	Launch of the market coupling between France, Belgium and the Netherlands
July 2007	Launch of Powernext Intraday and Continuous markets
March 2009	A sixth broker active on the French electricity wholesale market
April 2009	Merger of Powernext and EEX markets - launch of EPEX SPOT and EPD for futures contracts
November 2010	Day-ahead market coupling with France, Belgium, Netherlands, Luxembourg and Germany
December 2010	Start of the intraday market coupling between Germany and France
July 2011	First ARENH subscription
November 2011	Futures products traded on EPD France become cash-settled
November 2011	End of VPP auctions ¹
January 2012	Beginning of explicit auctions for long-term cross-border transmission capacity allocations between France and Switzerland.
January 2012	Beginning of explicit intraday cross-border transmission capacity allocations between France and Switzerland
June 2012	Beginning of explicit intraday cross-border transmission capacity allocations between France and Italy
June 2013	Launch of the Swiss intraday market, and intraday market coupling with Germany and France
February 2014	Coupling of the NWE zone
April 2014	Coupling of the SWE zone
May 2014	Coupling of NWE and SWE zones
September 2014	New EEX transparency platform (www.eex-transparency.com)

¹ http://encherescapacites.edf.com/fichiers/fckeditor/File/Encheres/DecisionCE_Fin_VPP_301111.pdf

December 2014	New RTE transparency platform in order to comply with the transparency rules CE 543/2013
February 2015	Extension of market coupling to France-Spain border and Austria-Slovenia border
May 2015	Flow-based methodology for CWE market coupling successfully launched
December 2015	Transition to half-hourly products in the intraday market for the France-Switzerland and France-Germany interconnections
March 2016	Transition to explicit continuous capacity allocations for France-Belgium in the intraday market
October 2016	Intraday market coupling of Belgium and the Netherlands. The France-Belgium interconnection capacity is only implicitly available.
December 2016	Launch of the first auction of capacity guarantee
March 2017	Launch of 30 minutes products on Intraday market in France, Germany and Switzerland
June 2018	XBID launch : European cross-border intraday trading platform

2. BALANCE OF THE WHOLESALE ELECTRICITY MARKET

Figure 1 Q4 2018 balance of the French electricity wholesale market



3. KEY DATA

Table 1 : Physical flows on the wholesale electricity market

	Quarterly values					Quarterly variation Q4 2018 / Q3 2018		Yearly variation Q4 2018 / Q4 2017	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	In percentage	In values	In percentage	In values
Injections, in TWh									
Production (excluding ARENH and VPP), in TWh	117	140	103	92	117	27%	24,86	0%	0,16
ARENH, in TWh	21	23	24	25	25	-	0,00	20%	4,08
Imports, in TWh	15	10	5	6	9	44%	2,76	-38%	-5,60
Withdrawals, in TWh									
Consumption, in TWh	123	137	96	93	118	28%	25,76	-3,7%	-4,60
Water pumping, in TWh	2	2	2	2	2	28%	0,44	3%	0,06
Exports, in TWh	17	24	27	22	21	-5%	-1,15	19%	3,24
Grid losses, in TWh	10	11	7	7	10	45%	3,10	-1%	-0,07

Source : RTE – Analysis : CRE

Table 2 : Wholesale electricity market prices during the quarter

	Quarterly values					Quarterly variation Q4 2018 / Q3 2018		Yearly variation Q4 2018 / Q4 2017	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	In percentage	In values	In percentage	In values
Spot Market prices									
Intraday Price France, in €/MWh	57,7	46,2	37,1	57,1	61,1	7%	3,98	6%	3,38
Day-Ahead Base Price France, in €/MWh	56,6	43,8	36,8	57,2	64,9	13%	7,67	15%	8,31
Day-Ahead Peak Price France, in €/MWh	70,0	52,1	44,2	64,3	75,1	17%	10,80	7%	5,14
Spread Base Day-Ahead France-Germany, in €/MWh	23,1	8,3	0,8	3,7	11,3	204%	7,56	-51%	-11,88
Spread Peak Day-Ahead France-Germany, in €/MWh	23,5	8,1	3,6	4,5	13,4	200%	8,94	-43%	-10,13
France-Germany Day-Ahead prices convergence rate	7%	31%	28%	54%	23%	-57%	-0,31	229%	0,16
Futures Market Prices									
M+1 Price France, in €/MWh	63,2	44,0	39,3	58,1	72,2	24%	14,08	14%	8,94
Spread M+1 France-Germany, in €/MWh	22,5	6,9	0,9	3,8	14,0	270%	10,18	-38%	-8,51
Q+1 Price France, in €/MWh	55,4	34,0	41,4	68,3	69,6	2%	1,23	26%	14,18
Spread Q+1 France-Germany, in €/MWh	13,9	1,3	0,6	13,1	11,2	-15%	-1,92	-20%	-2,73
Y+1 Price France, in €/MWh	42,5	40,0	45,0	53,3	57,6	8%	4,25	35%	15,06
Spread Y+1 France-Germany, in €/MWh	5,9	5,0	4,7	4,9	4,7	-4%	-0,19	-19%	-1,13
Ratios Y+1 Peakload/Baseload ratios									
France	129%	128%	127%	127%	126%	0%	0,00	-2%	-0,03
Germany	124%	125%	124%	122%	122%	0%	0,00	-2%	-0,02

Source : EPEX SPOT, EEX Power Derivatives, Courtiers – Analysis : CRE

Table 3 : Traded volumes during the quarter

	Quarterly values					Quarterly variation Q4 2018 / Q3 2018		Yearly variation Q4 2018 / Q4 2017	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	In percentage	In values	In percentage	In values
NEB									
NEB volumes, in TWh	113,99	119,92	102,17	99,65	110,01	10%	10,36	-3%	-3,98
Ratio NEB/Consumption in France	93%	88%	107%	108%	93%	-	-0,15	-	0,00
Spot Market, in TWh									
Volumes on EPEX SPOT Intraday market, in TWh	1,8	2,0	1,9	2,4	2,7	13%	0,26	51%	0,91
Fr-De Cross-Border Intraday volumes market shares	57%	65%	72%	76%	66%	-14%	-0,10	17%	0,09
Volumes on EPEX SPOT Day-Ahead market, in TWh	24,7	29,8	31,4	28,1	24,5	-11%	-3,59	-1%	-0,20
Volumes on Brokers Day-Ahead market, in TWh	6,4	7,8	5,8	4,0	5,2	29%	1,16	-19%	-1,25
Futures Market									
Volumes, in TWh	326,8	238,7	171,7	188,2	204,0	8%	15,8	-38%	-122,83
Brokers market share	86,1%	87,1%	83,3%	78,1%	75,7%	-	-2,4%	-	-10,4%
EEX Power Derivatives market share	13,9%	12,9%	16,7%	21,9%	24,3%	-	2,4%	-	10,4%
Number of Transactions	28 061	32 098	16 873	23 112	23 810	3%	698	-15%	- 4 251
Brokers market share	79,7%	84,8%	83,8%	79,8%	73,7%	-	-6,2%	-	-6,0%
EEX Power Derivatives market share	20,3%	15,2%	16,2%	20,2%	26,3%	-	6,2%	-	6,0%
Y+1 product									
Volumes, in TWh	149,2	58,9	59,6	54,9	71,1	29%	16,16	-52%	-78,11
Number of Transactions	3465	1593	1667	1786	2523	41%	737	-27%	-942
Q+1 product									
Volumes, in TWh	38,0	35,7	19,7	29,5	24,9	-16%	-4,67	-35%	-13,12
Number of Transactions	3485	2972	1371	2676	2578	-4%	-98	-26%	-907
M+1 product									
Volumes, in TWh	29,0	42,9	21,5	34,5	29,3	-15%	-5,28	1%	0,23
Number of Transactions	6873	9771	4391	6922	7171	4%	249	4%	298

Source : RTE – Analysis : CRE

Table 4 : Availability of electricity generating plants

	Quarterly values					Quarterly variation Q4 2018 / Q3 2018		Yearly variation Q4 2018 / Q4 2017	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	In percentage	Variation	In percentage	Variation
Nuclear power plants									
Average nuclear generation rate (%)	65,7	80,2	66,5	61,5	70,4		8,9		4,7
Availability rate of nuclear power plants (%)	70,4	86,7	75,5	66,6	75,7		9,1		5,3
Hydraulic storage capacity rate									
Hydro storage level (end of quarter) (%)	21,3	37,9	37,1	25,6	19,5		-6,1		-1,8

Source : RTE- Analysis : CRE

Table 5 : Cross-border flows

	Quarterly values					Quarterly variation Q4 2018 / Q3 2018		Yearly variation Q4 2018 / Q4 2017	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	In percentage	Variation	In percentage	Variation
Imports (TWh)									
Peakload imports (TWh)	5,5	4,0	2,2	2,3	3,4	45,3%	1,1	-38,2%	-2,1
Offpeak imports (TWh)	9,1	6,5	2,9	2,9	5,6	93,8%	2,7	-38,5%	-3,5
Exports (TWh)									
Peak exports (TWh)	5,2	8,7	9,1	7,2	6,8	-5,6%	-0,4	29,8%	1,6
Offpeak exports (TWh)	11,4	14,6	16,8	14,6	13,3	-8,8%	-1,3	16,7%	1,9
Net balance (TWh)	2,0	12,9	20,8	16,5	11,1	-33,1%	-5,5	452,5%	9,1

Source : RTE- Analysis : CRE

Table 6 : French balancing responsible entities

	Quarterly values					Quarterly variation Q4 2018 / Q3 2018		Yearly variation Q4 2018 / Q4 2017	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	In percentage	Variation	In percentage	Variation
Balancing responsible									
Active in electricity generation	19	20	19	20	20	0,0%	0	5,3%	1
Holder of rights of regulated access to ARENH	16	18	17	18	18	0,0%	0	0,0%	2
Final customers provider	27	28	27	27	27	0,0%	0	0,0%	0
Active on imports/exports	47	49	46	44	42	-4,5%	-2	-10,6%	-5
Active on block exchange	87	82	82	83	85	2,4%	2	-2,3%	-2

Source : RTE- Analysis : CRE

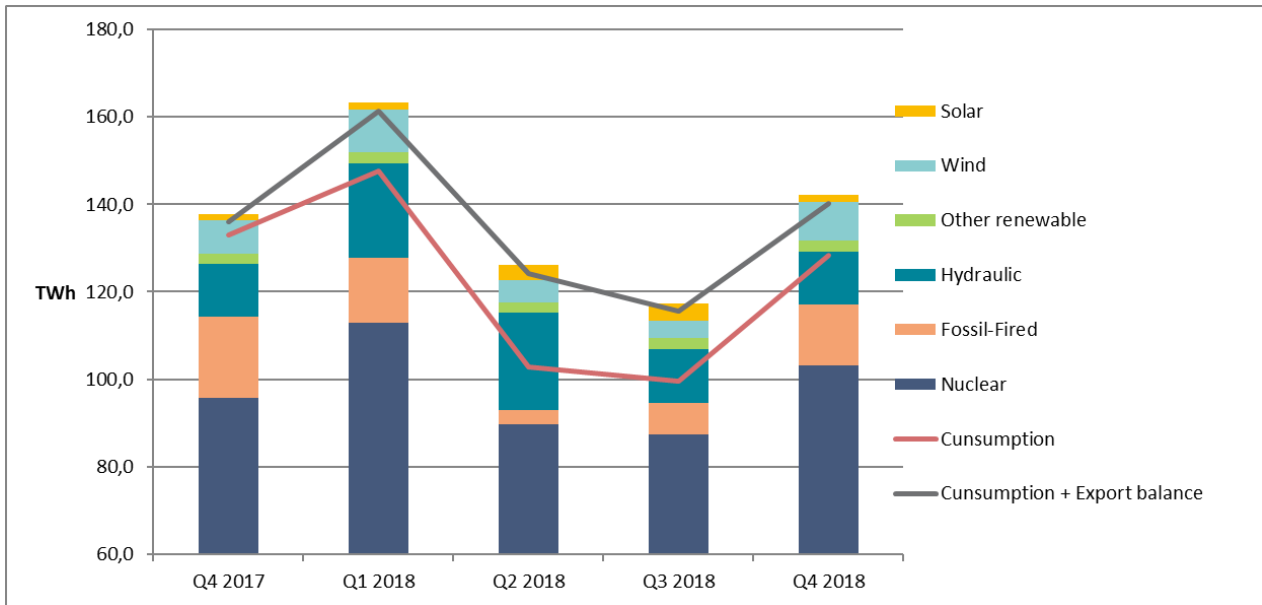
Table 7 : Index of market concentration

	HHI - Concentration indices					
	Q4 2017		Q3 2018		Q4 2018	
	<i>EDF included</i>		<i>EDF included</i>		<i>EDF included</i>	
Wholesale energy market						
OTC - block purchases	496	700	397	880	528	794
OTC - block sales	596	614	560	761	711	678
EPEX - purchases	559	1058	357	966	491	841
Injections						
Generation	3334	6583	3958	7362	2959	4467
Imports	2155	1619	860	852	1091	901
Deliveries						
End-consumer consumption	1898	5078	1275	3882	1461	4302
Grid losses	1602	1495	2303	2000	1952	1709
Exports	959	3449	1107	1108	716	2258

Source : RTE, EPEX SPOT, EEX Power Derivatives, Courtiers - Analysis : CRE

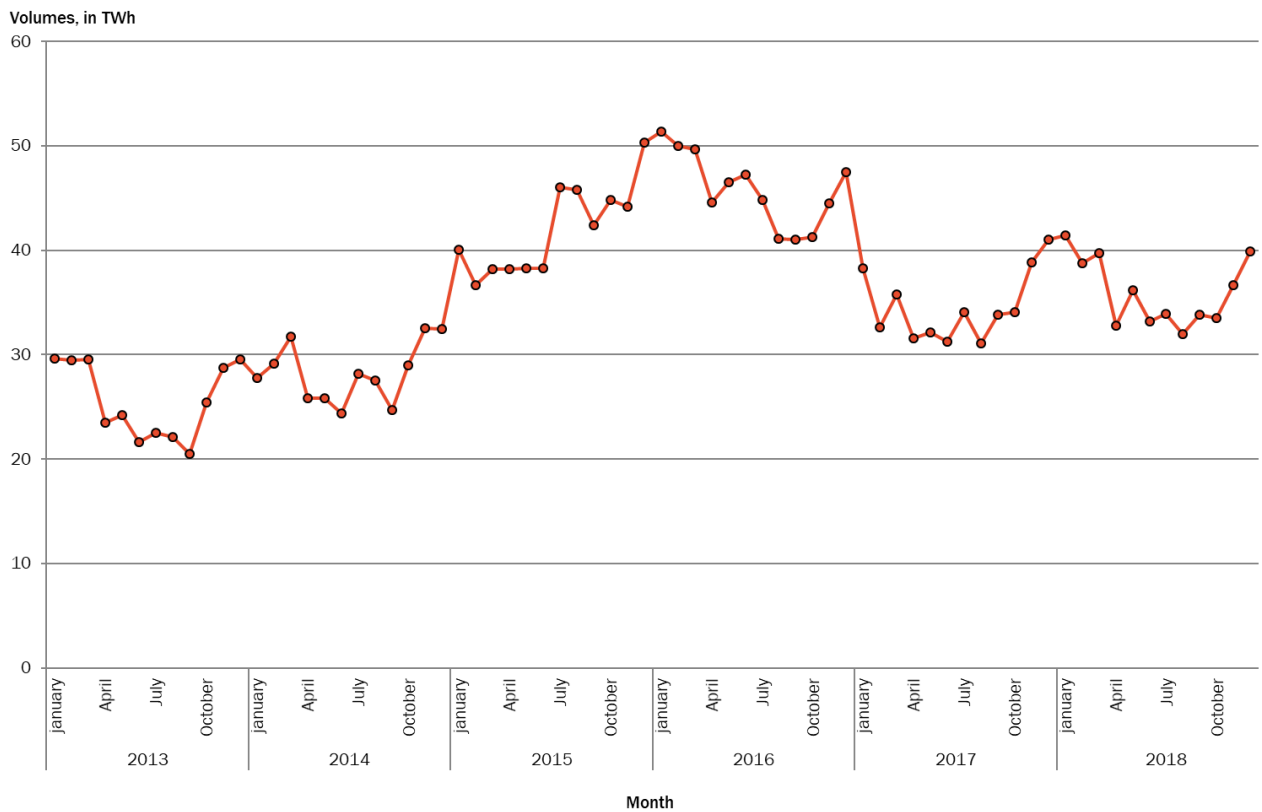
4. FIGURES

Figure 2 : Generation per technology and quarterly consumption



Source : RTE – Analysis : CRE

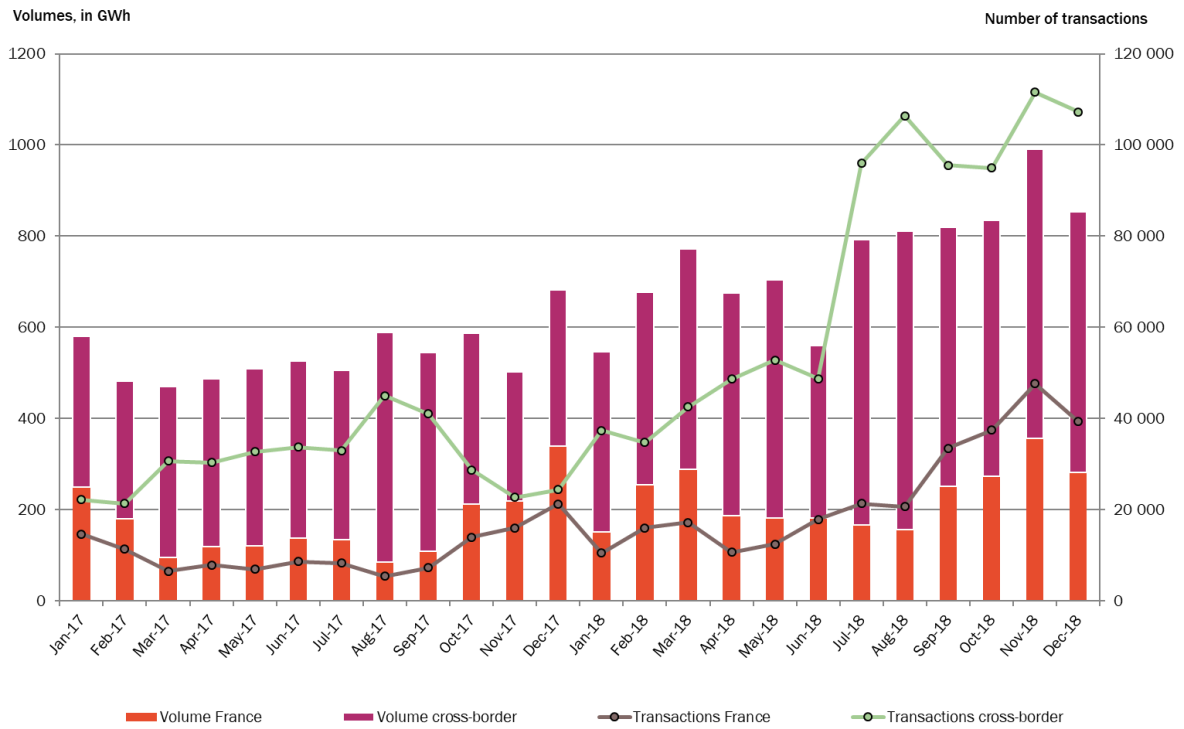
Figure 3 : Volume of net deliveries resulting from OTC transactions (excluding ARENH)



Source : RTE – Analysis : CRE

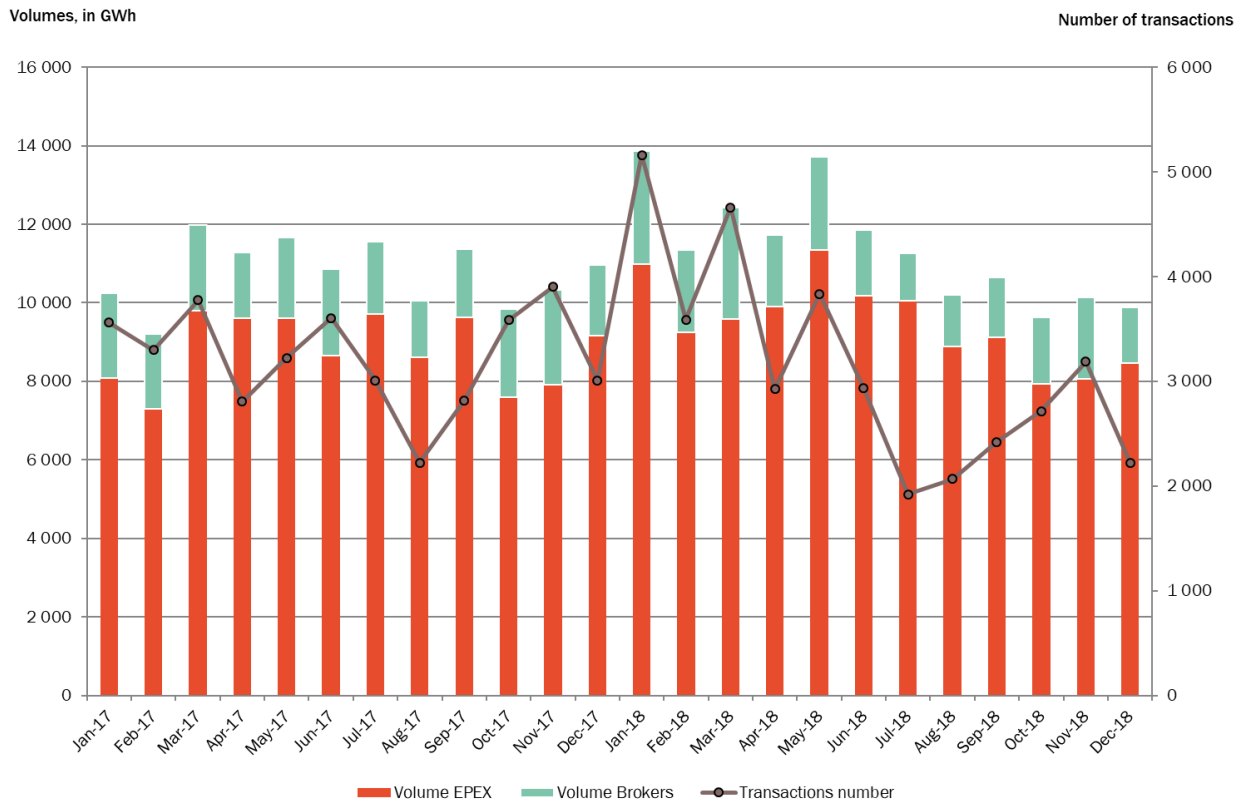
Figure 4 : Volumes and amount of intraday transactions on the EPEX SPOT exchange

// SUMS ON A MONTHLY BASIS //



Source : EPEX SPOT, Courtiers – Analysis : CRE

Figure 5 : Volumes and amount of day-ahead transactions on the OTC intermediated market and the EPEX SPOT exchange



Source : EPEX SPOT, Courtiers - Analysis : CRE

Figure 6 : Quarterly traded volumes on the intermediated wholesale market

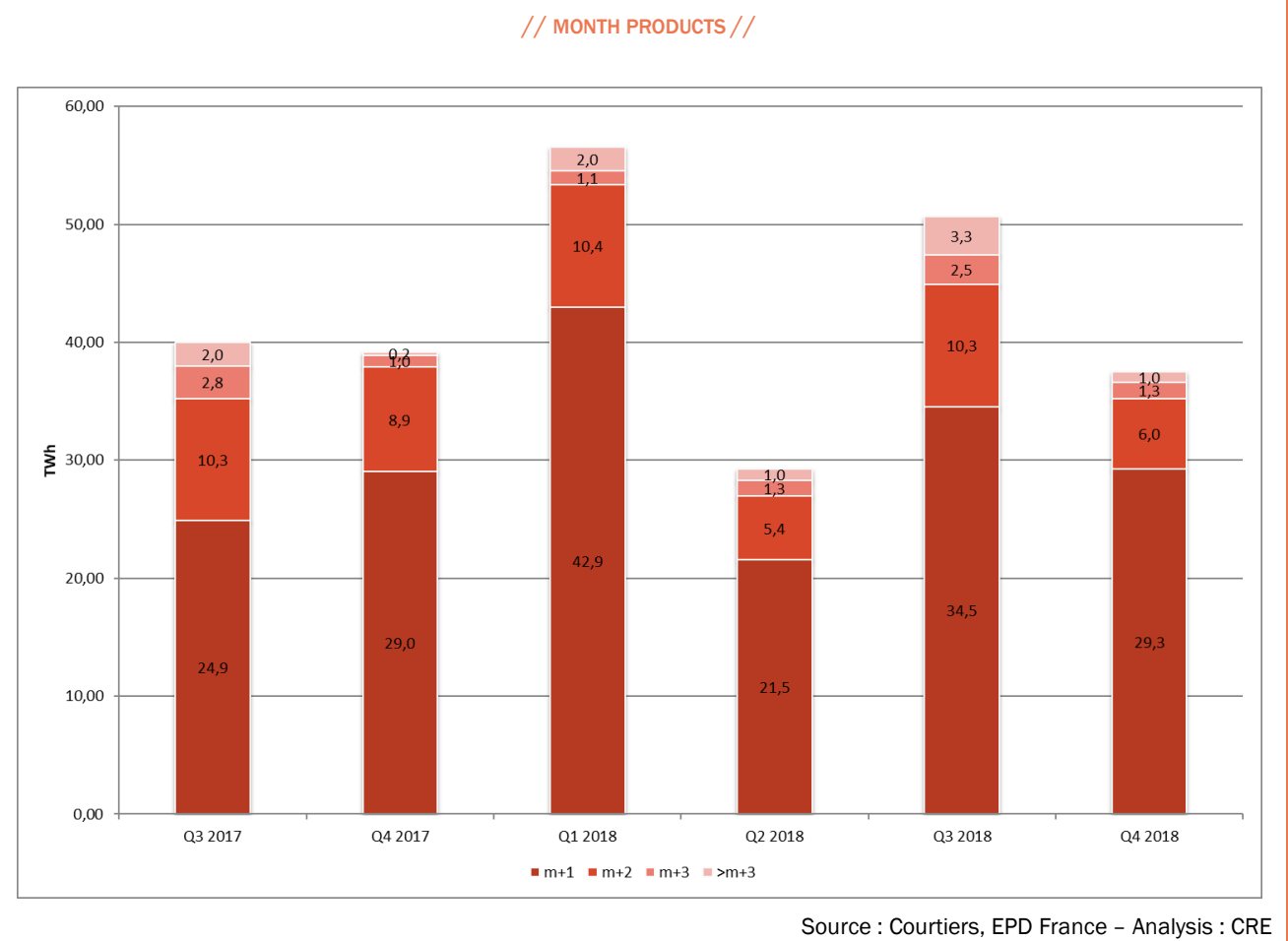
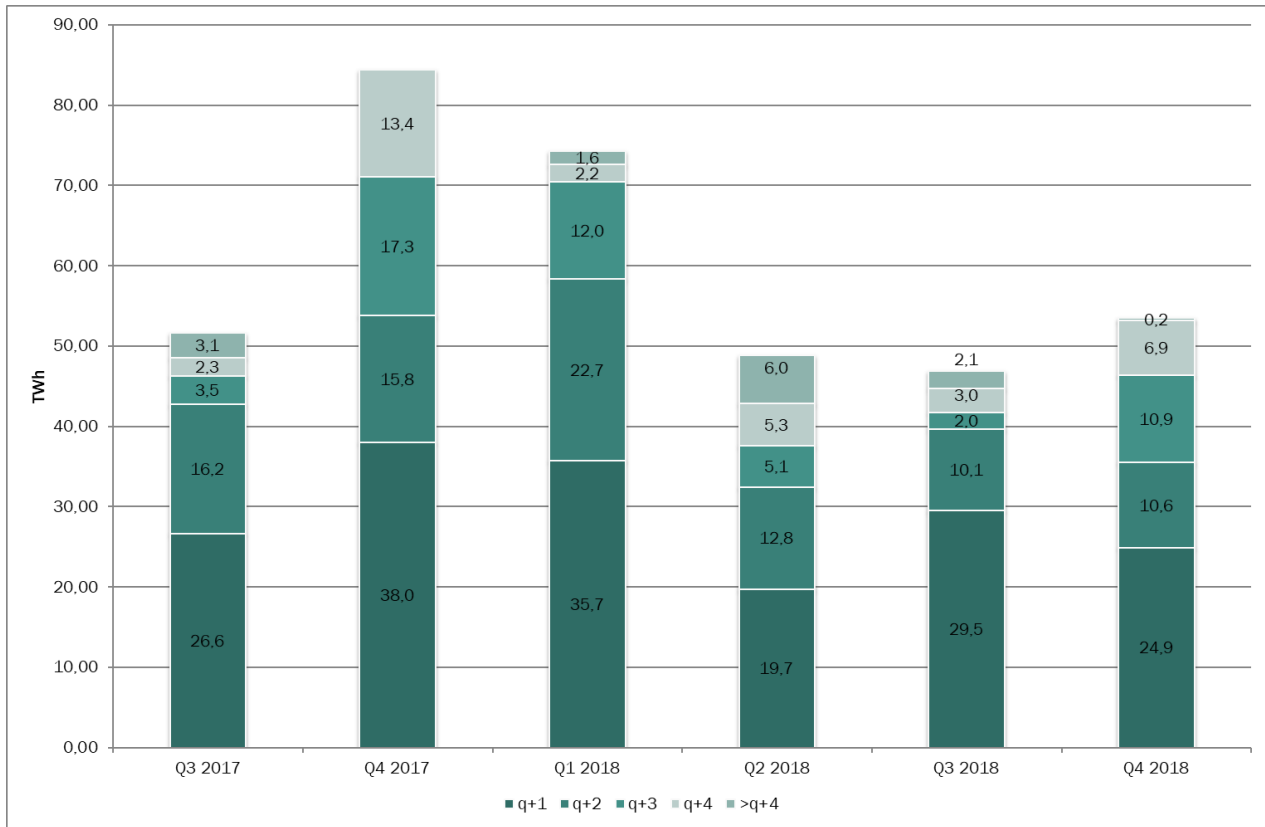


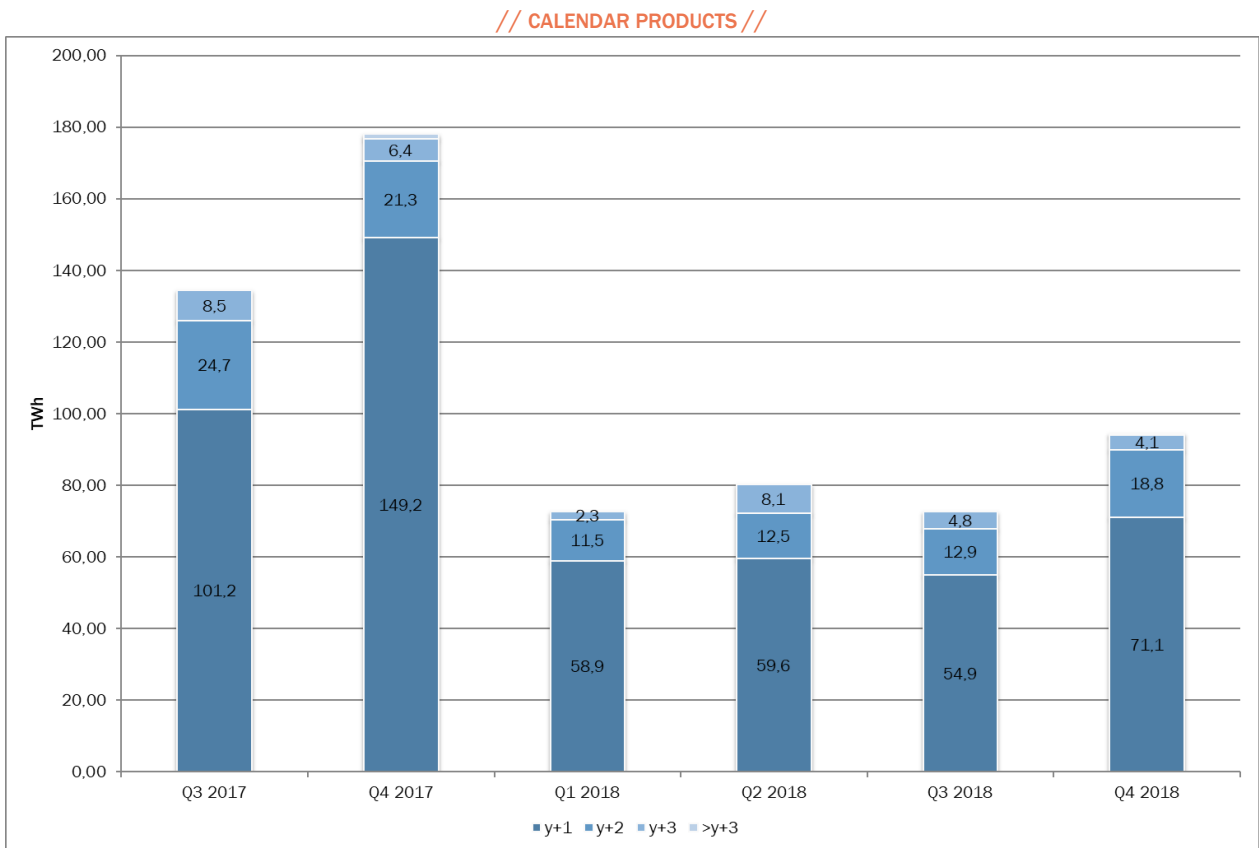
Figure 7 : Quarterly traded volumes on the intermediated wholesale market

// QUARTER PRODUCTS //



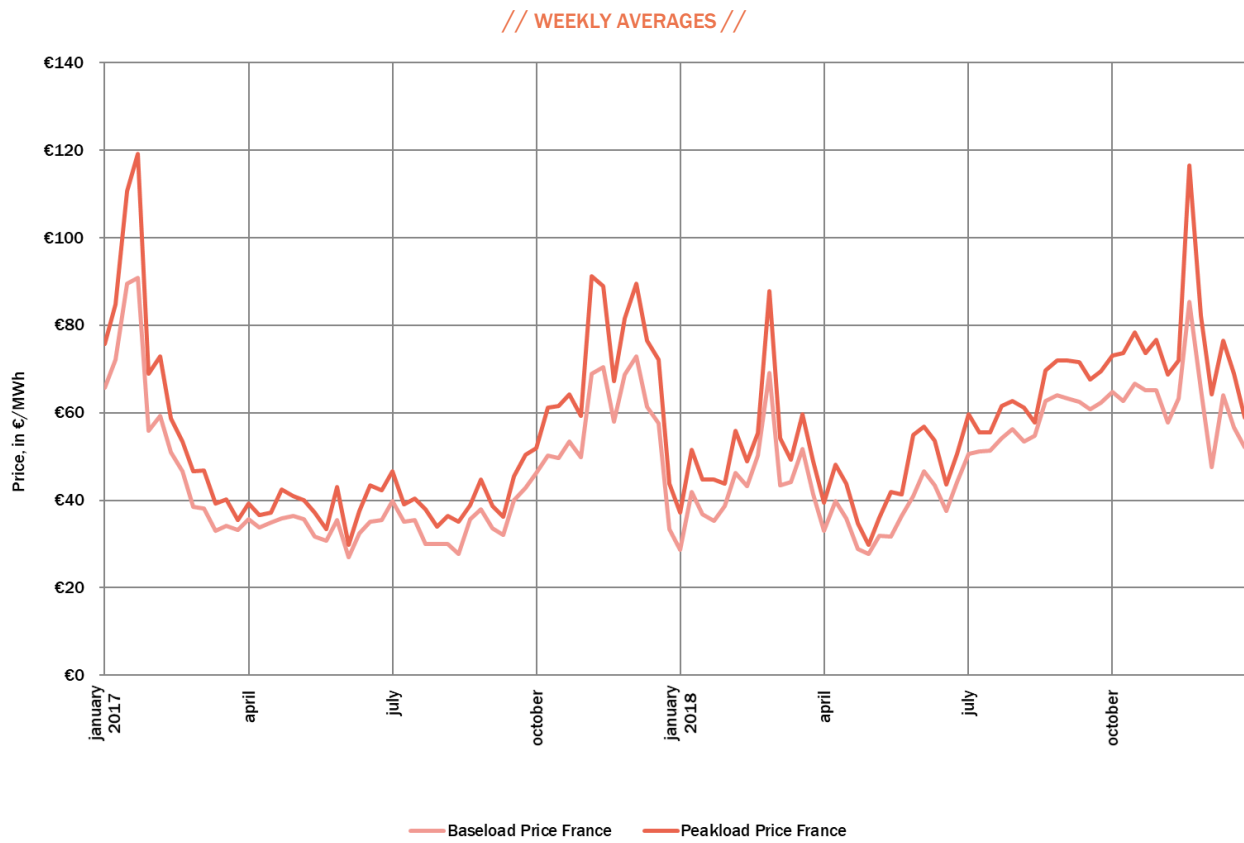
Source : Courtiers, EPD France – Analysis : CRE

Figure 8 : Quarterly traded volumes on the intermediated wholesale market



Source : Courtiers, EPD France - Analysis : CRE

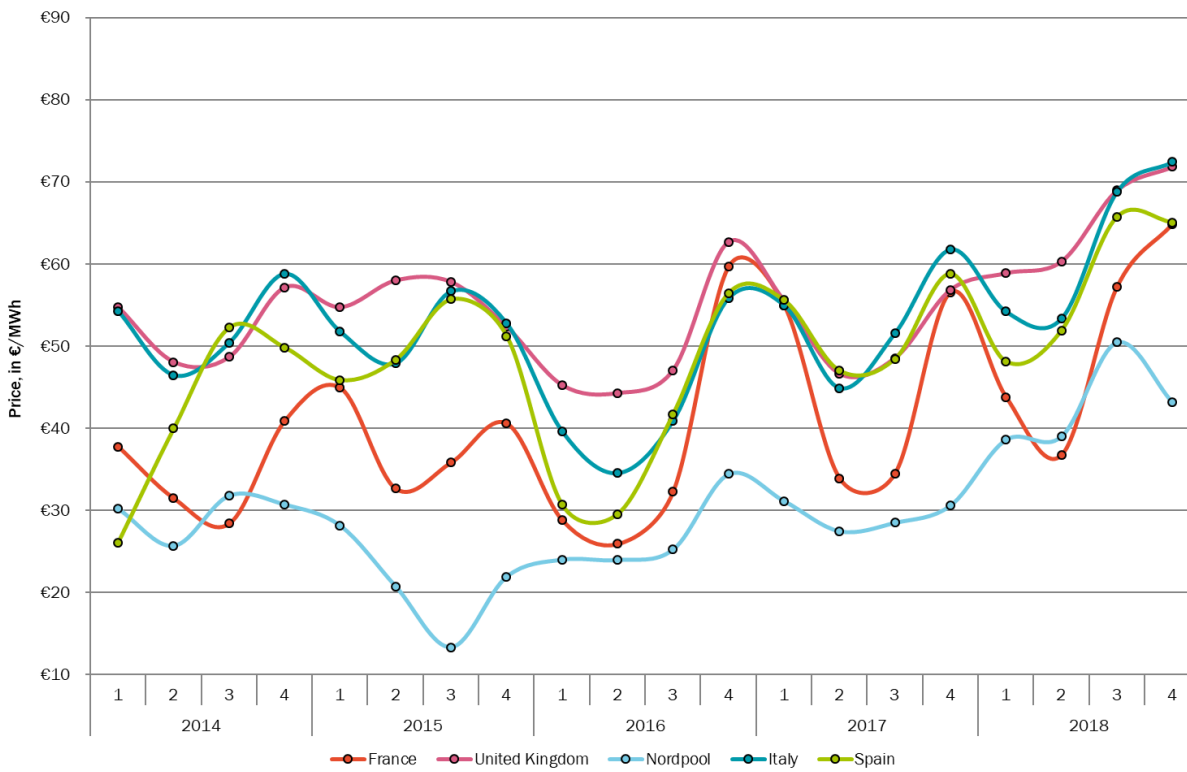
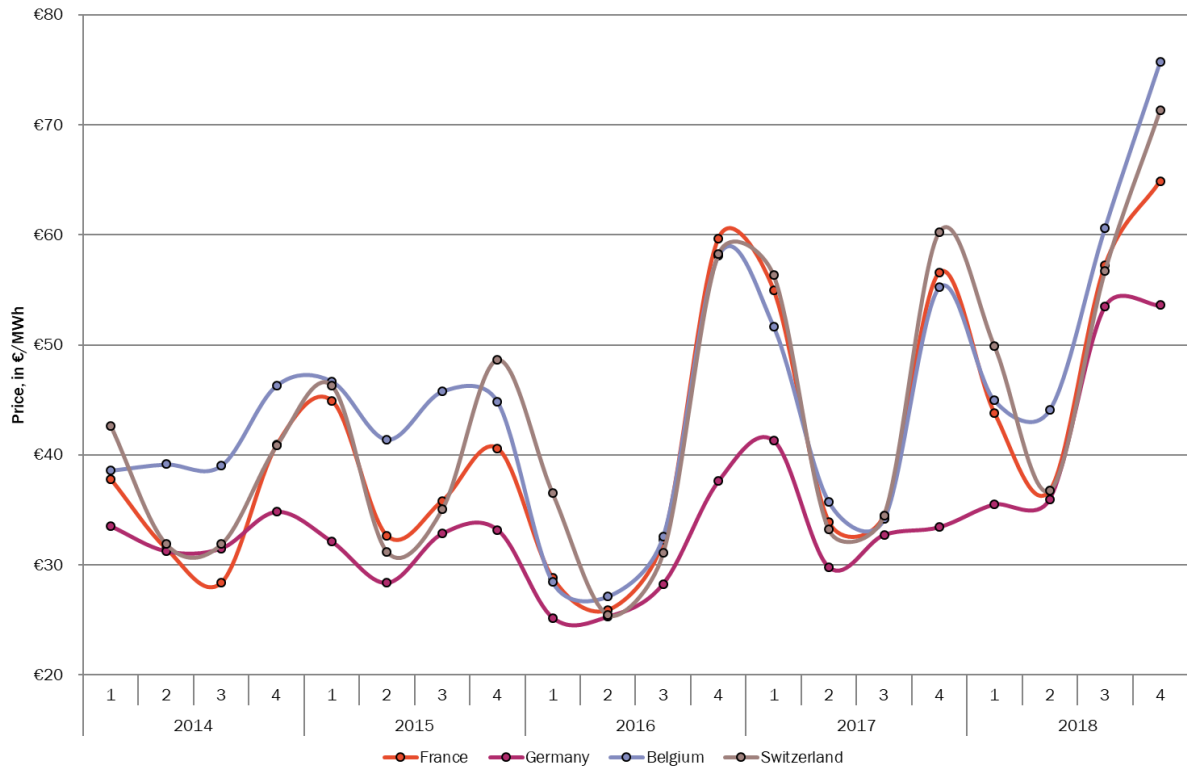
Figure 9 : French Day-ahead prices on EPEX SPOT (baseload and peakload) EPEX SPOT



Source : EPEX SPOT – Analysis : CRE

Figure 10 : Day-Ahead Baseload prices on the main European electricity markets

// QUARTERLY AVERAGES //

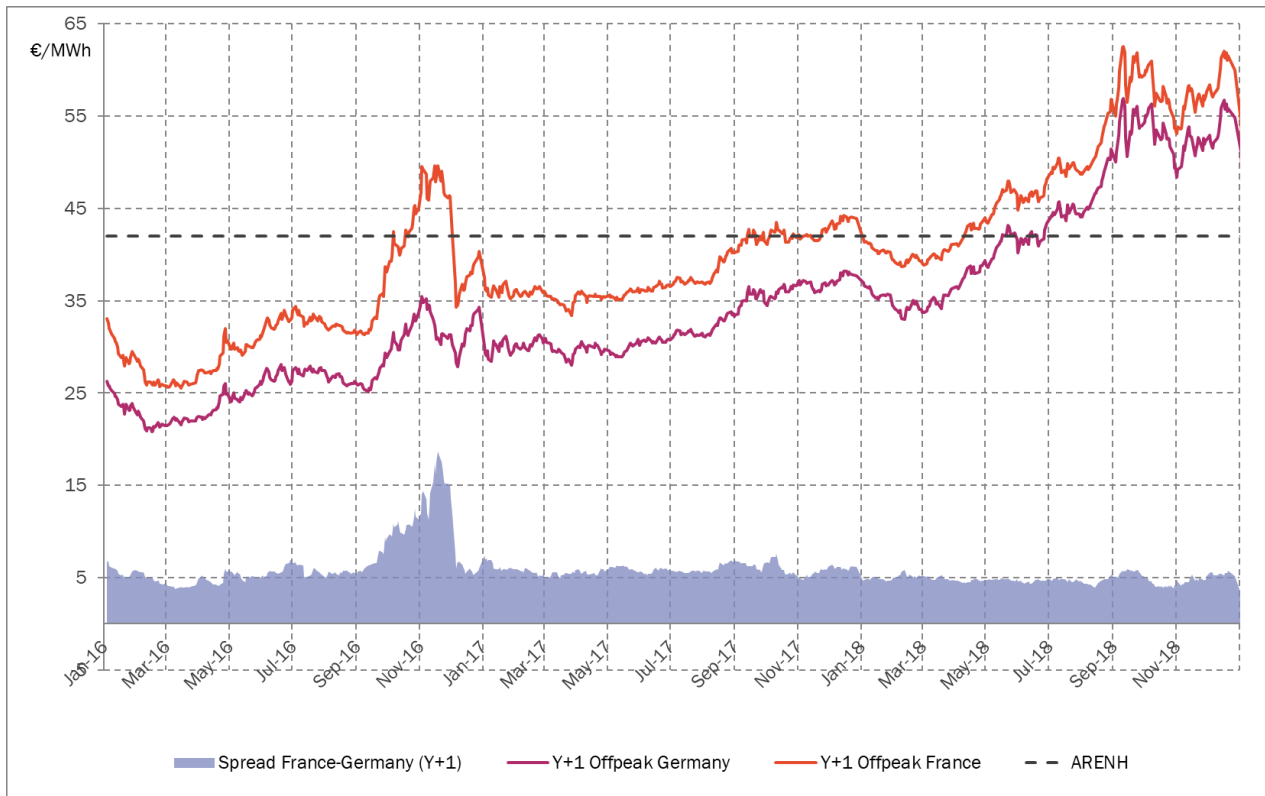


Source : EPEX SPOT, Nordpool, N2EX, GME, OMEL, BELPEX – Analysis : CRE



Figure 11 : Baseload Y+1 calendar prices in France and Germany

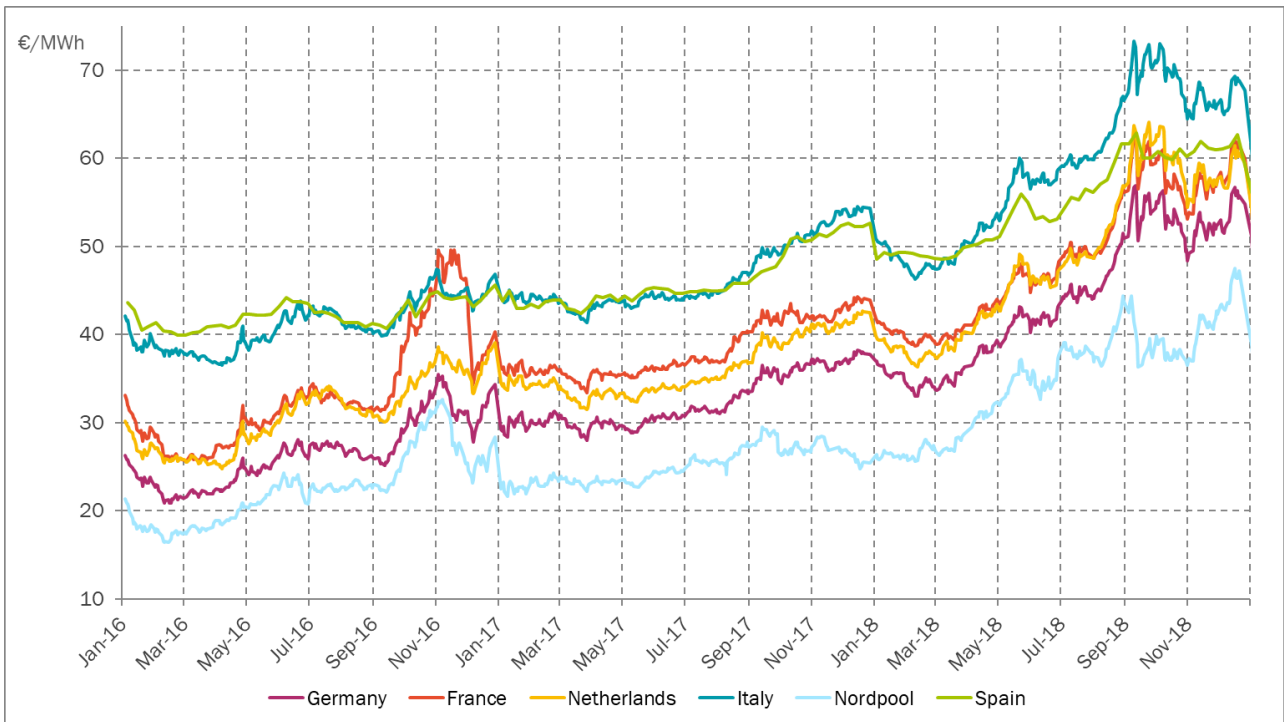
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Source : EEX Power Derivatives - Analysis : CRE

Figure 12 : Baselaod Y+1 calendar prices in Europe

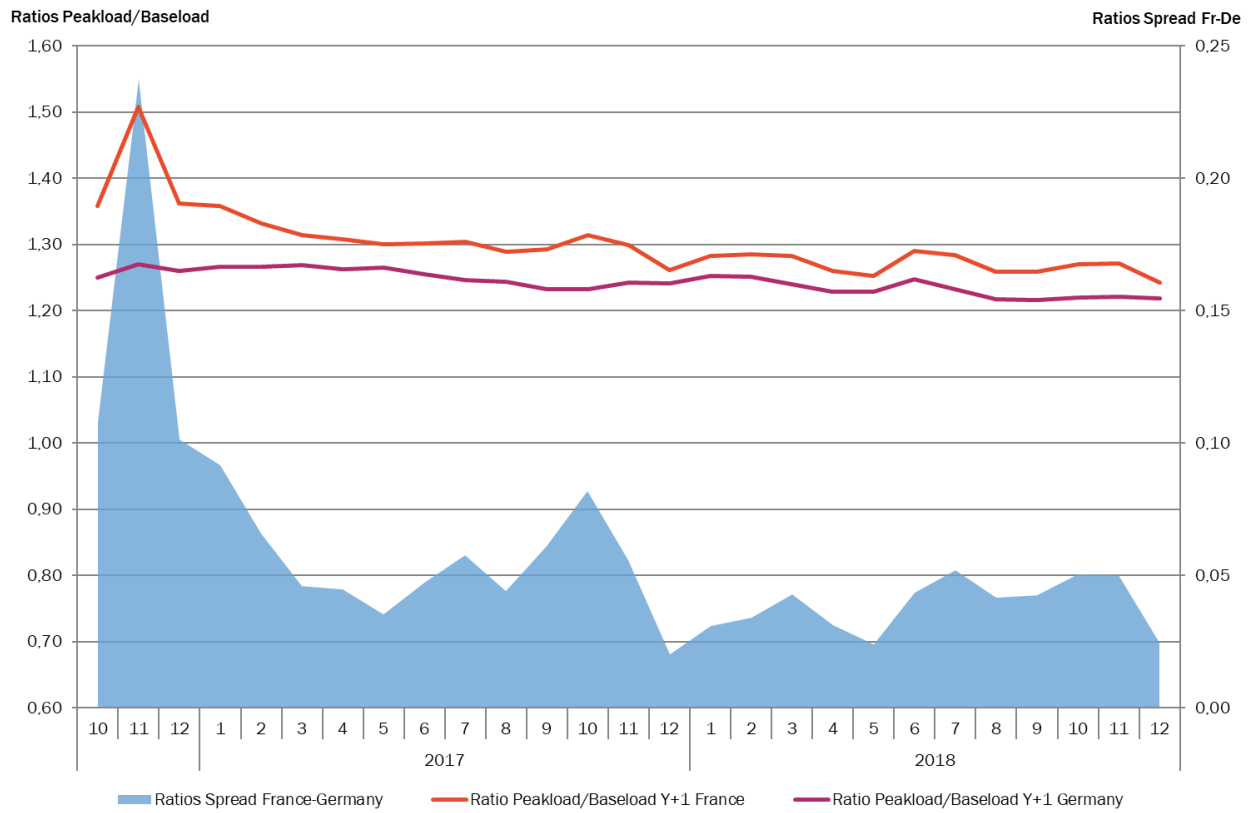
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Source : EEX Power Derivatives, Courtiers – Analysis : CRE

Figure 13 : Ratio Peakload/Baseload of Y+1 calendar prices in France and Germany

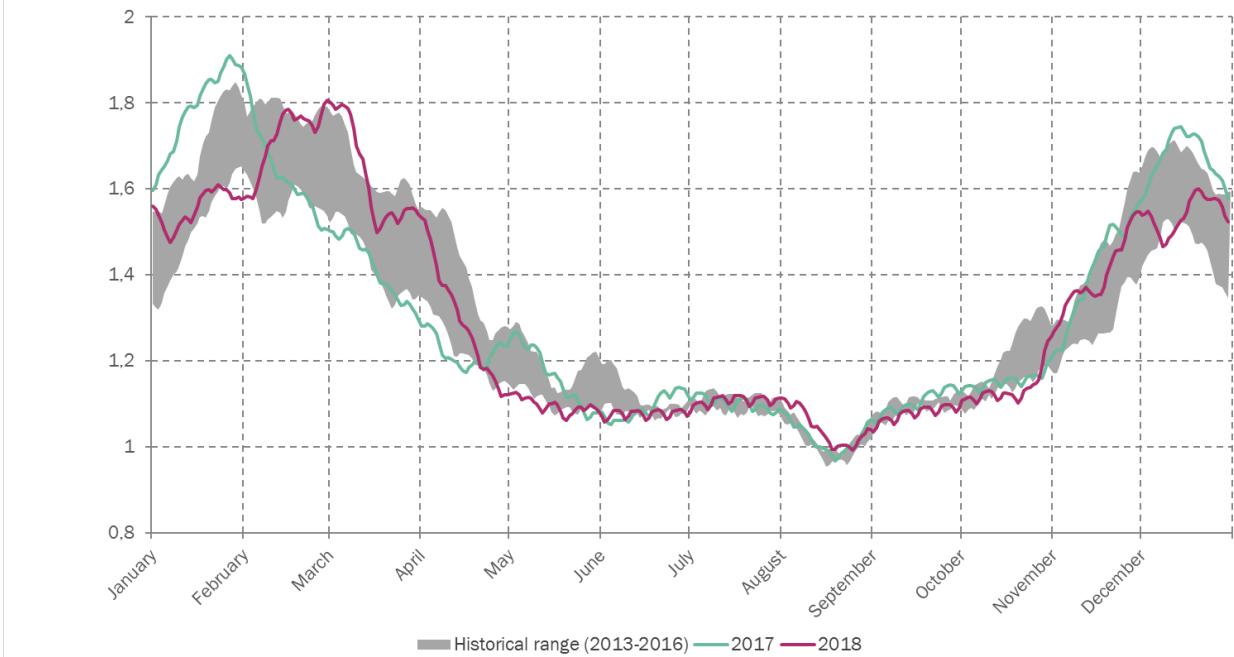
// MONTHLY AVERAGES //



Source : EEX Power Derivatives – Analysis : CRE

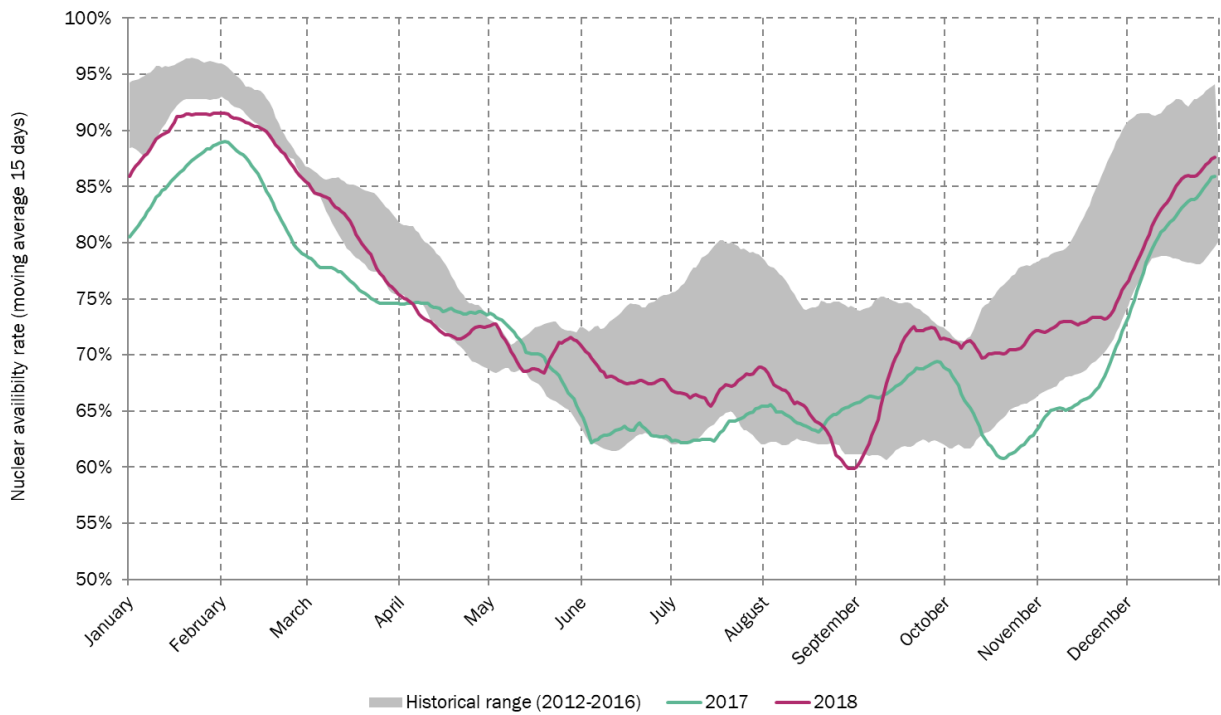
Figure 14 : French electricity consumption

Daily consumption (TWh) - moving average 15 days



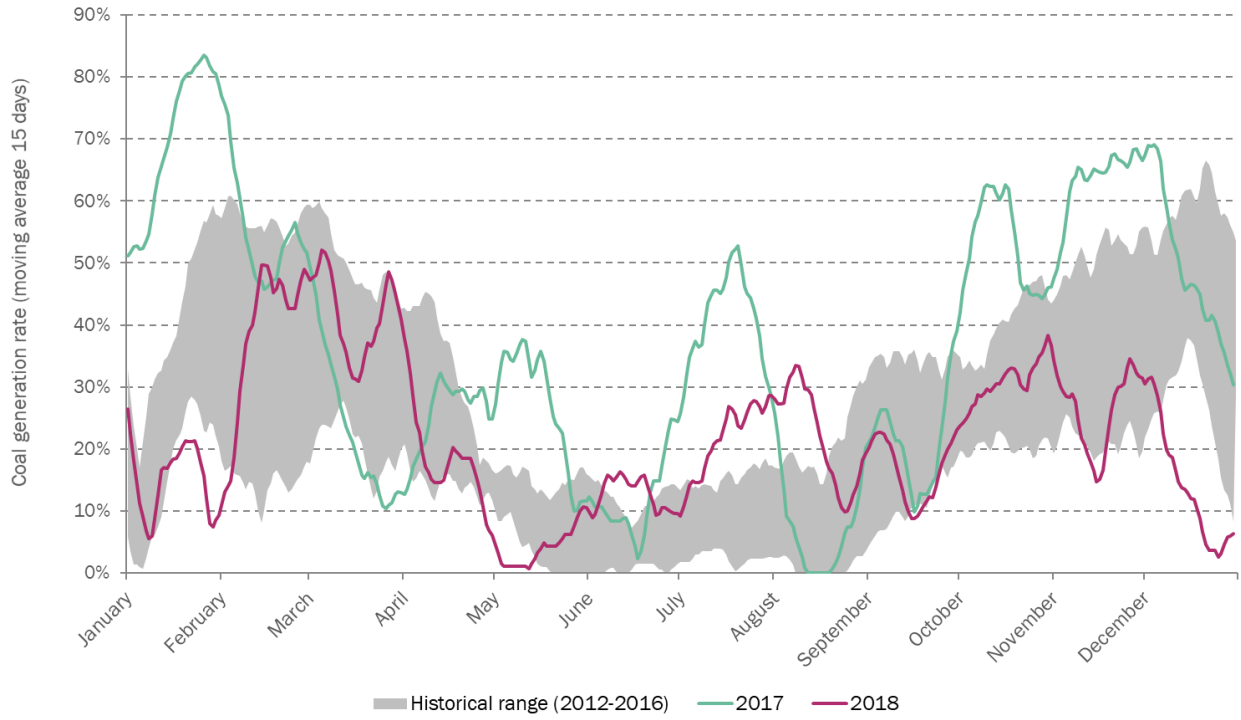
Source : RTE – Analysis : CRE

Figure 15 : Availability of nuclear generating capacity



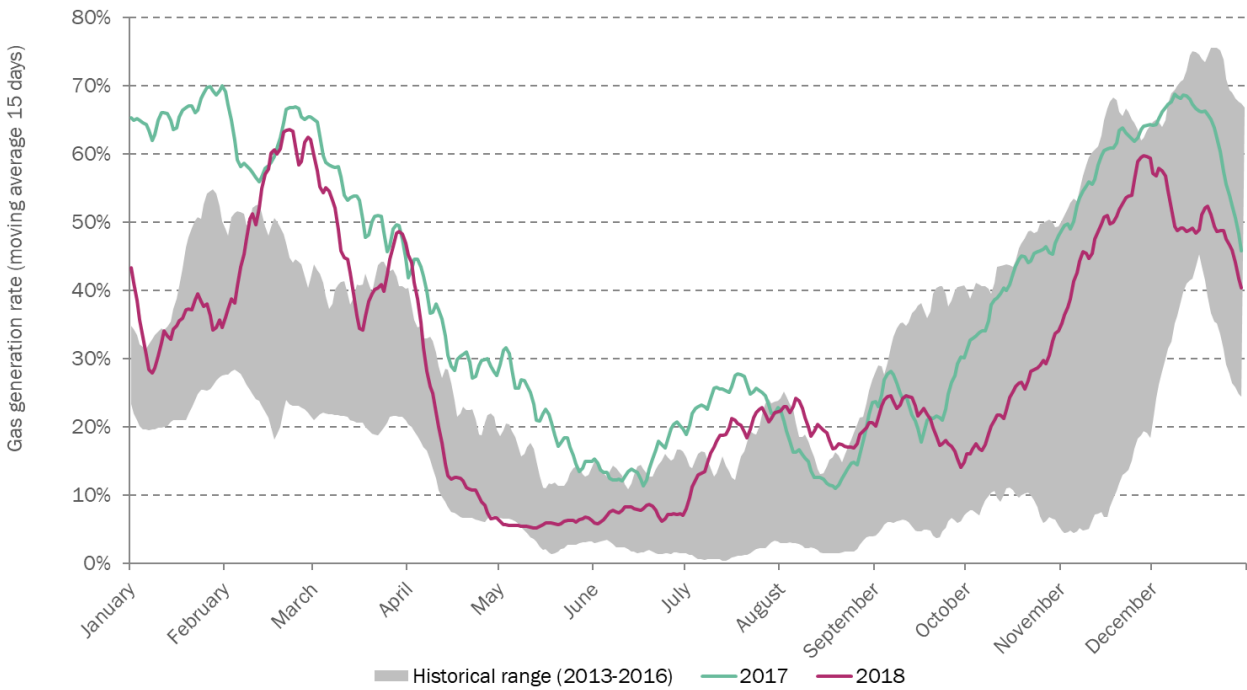
Source : RTE – Analysis : CRE

Figure 16 : Average coal generation rate



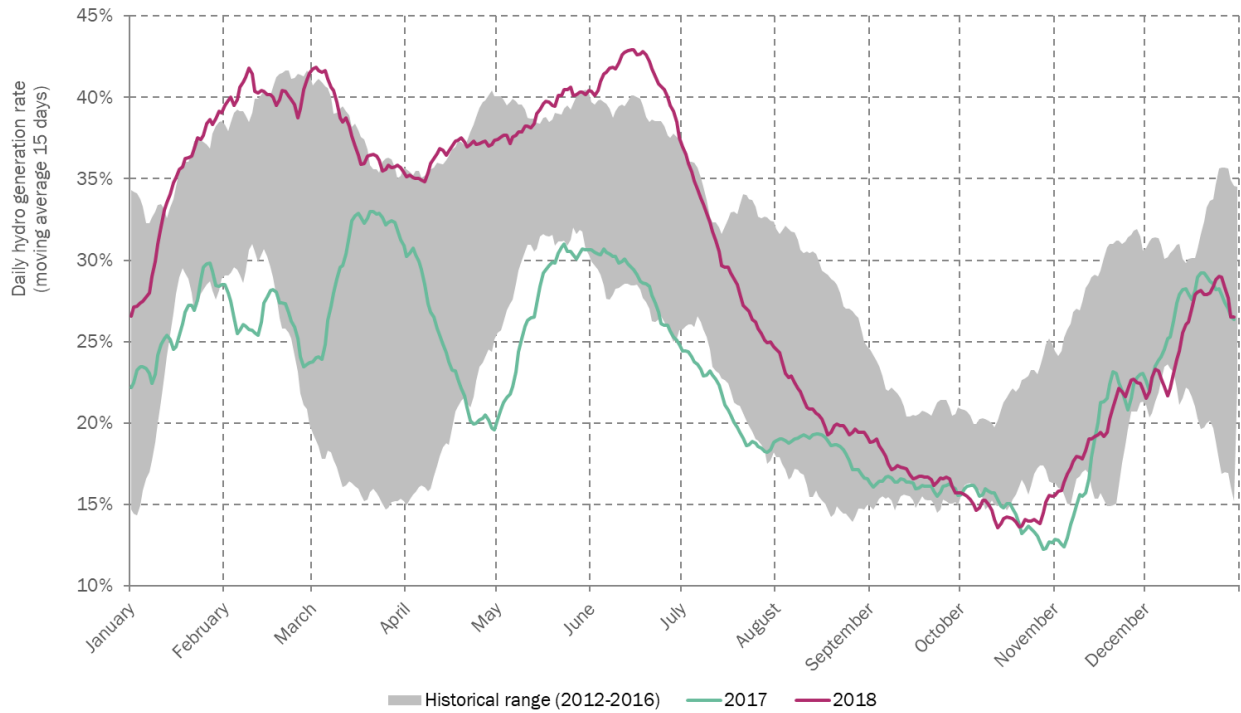
Source : RTE – Analysis : CRE

Figure 17 : Average gas generation rate



Source : RTE – Analysis : CRE

Figure 18 : Hydraulic generation rate



Source : RTE - Analysis : CRE

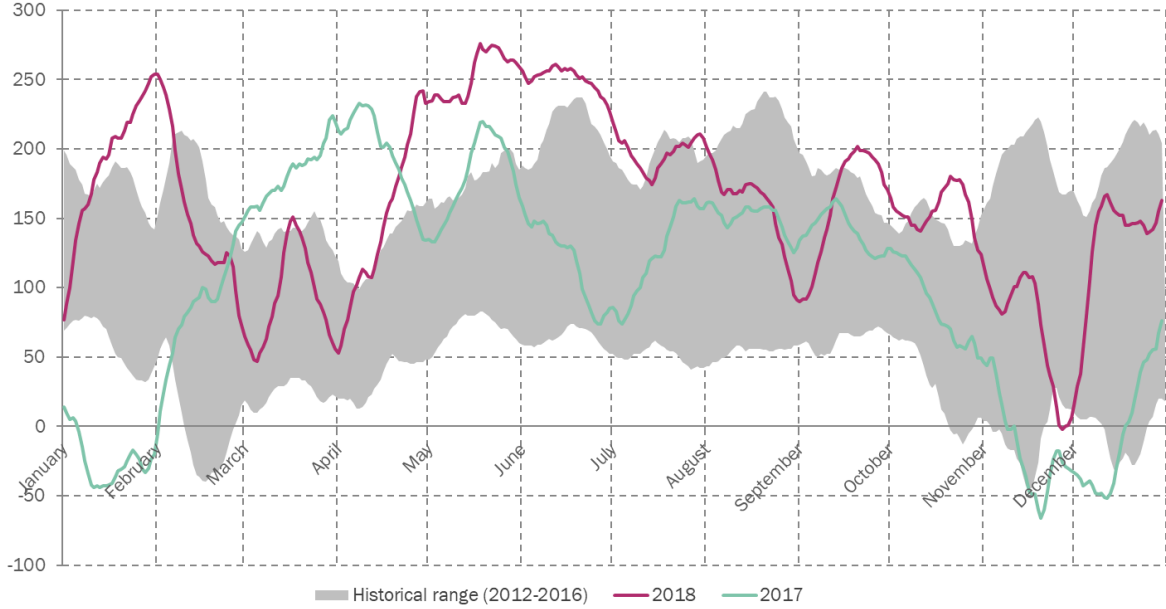
Figure 19 : Imports and exports (peak/Off-peak)



Source : RTE - Analysis : CRE

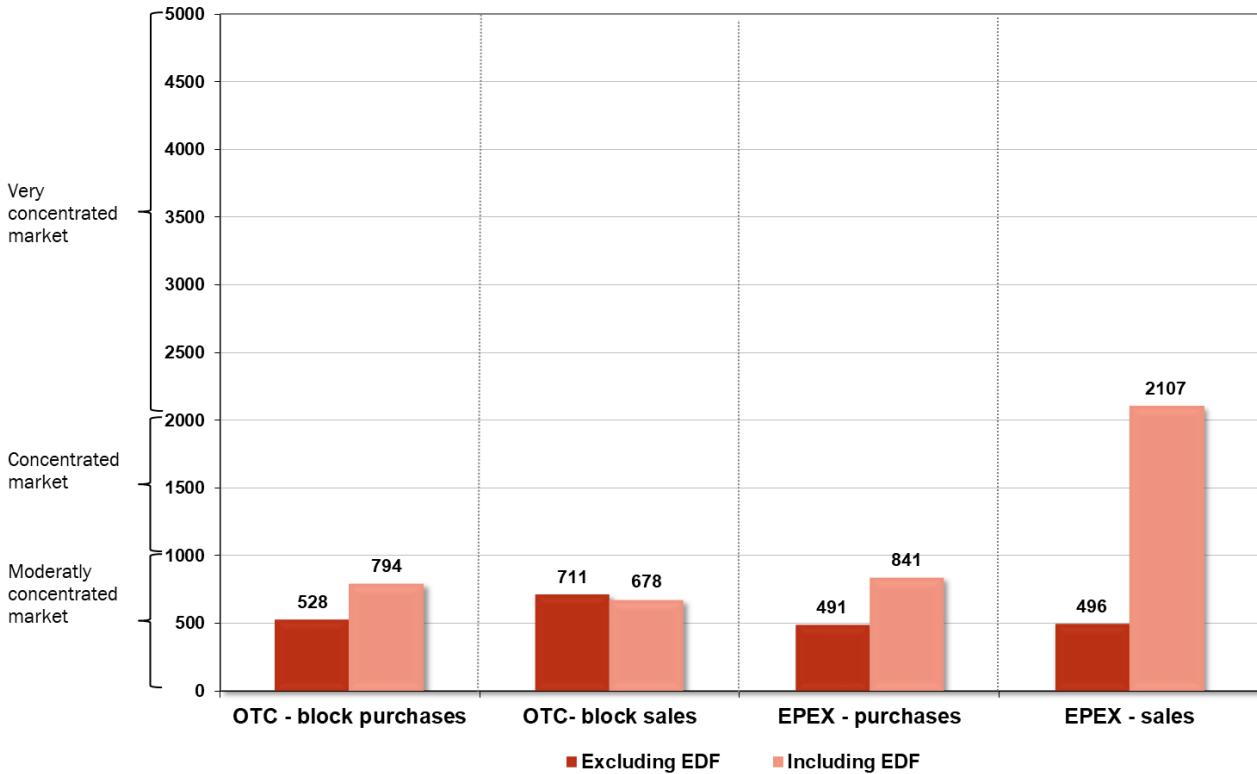
Figure 20 : Export balance

Daily net exports (GWh)
moving average 15 days



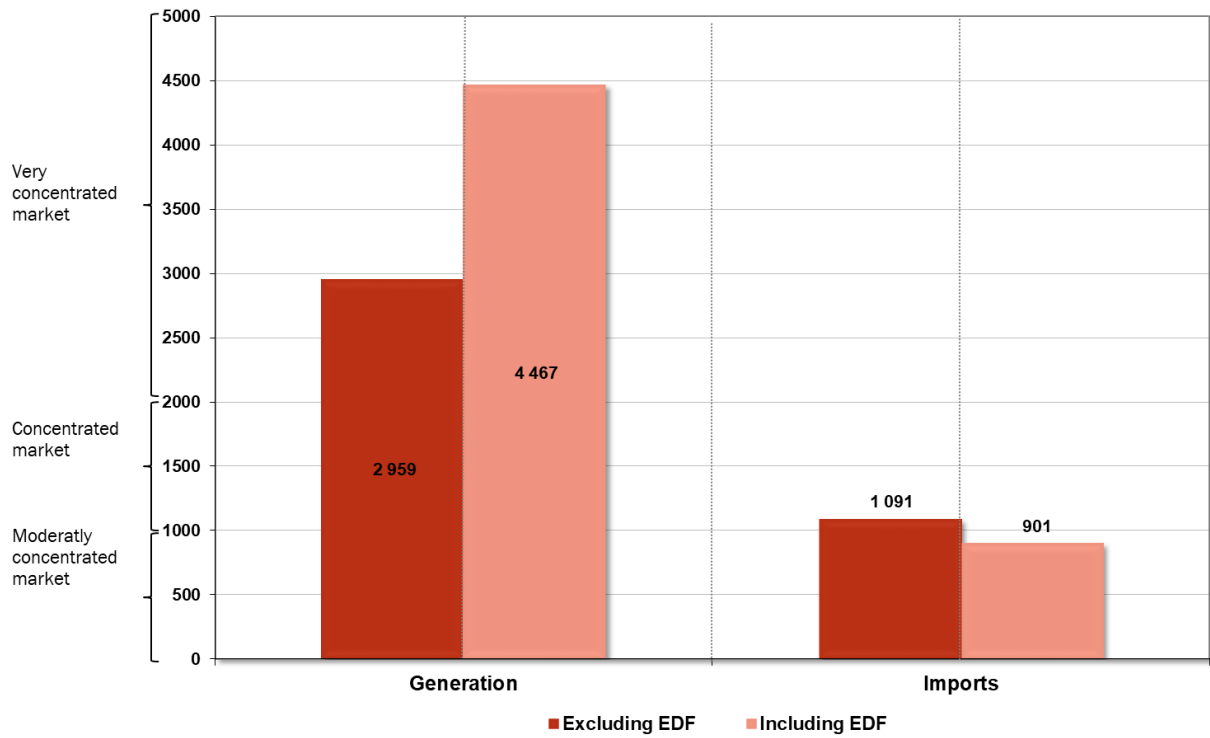
Source : RTE – Analysis : CRE

Figure 21 : HHI concentration index – Energy wholesale market in Q4 2018



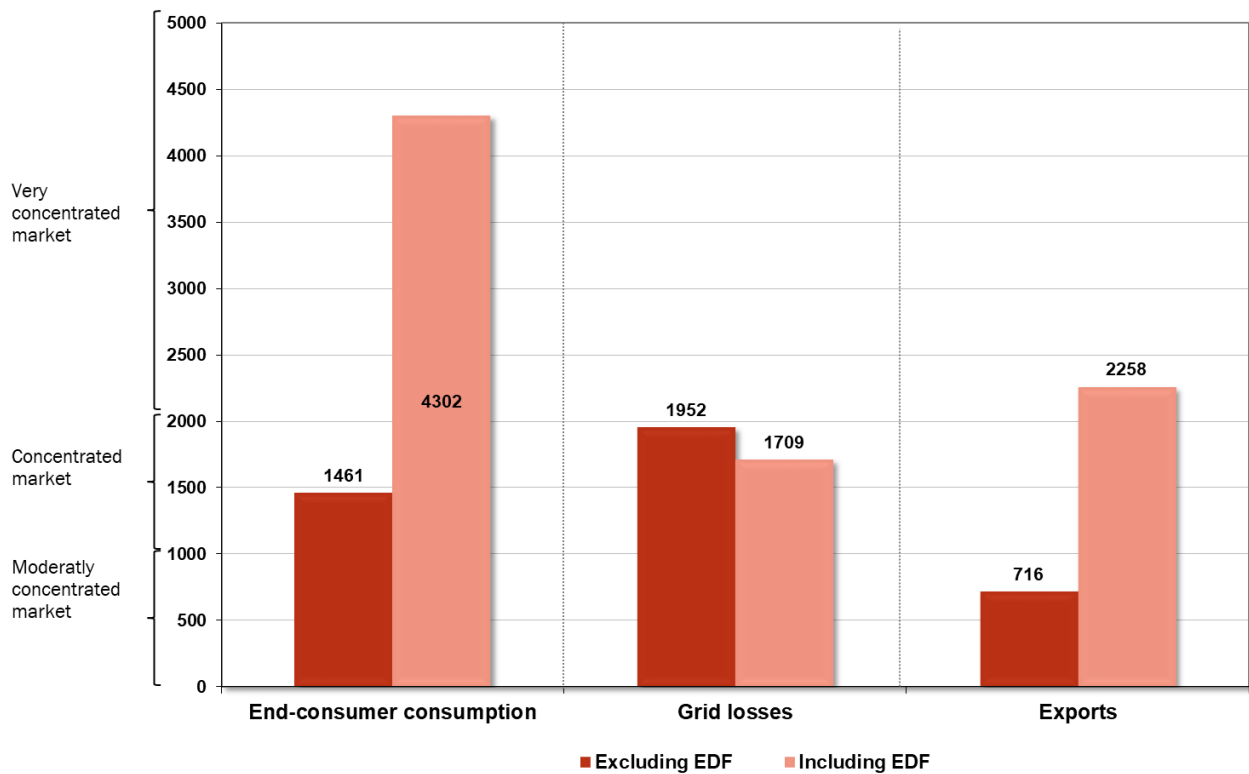
Source : EPEX SPOT, EEX Power Derivatives, Courtiers – Analysis : CRE

Figure 22 : HHI concentration index – Injections in Q4 2018



Source : RTE – Analysis : CRE

Figure 23 : HHI concentration index – Withdrawals in Q4 2018



Source : RTE – Analysis : CRE

PART 2: WHOLESALE NATURAL GAS MARKET

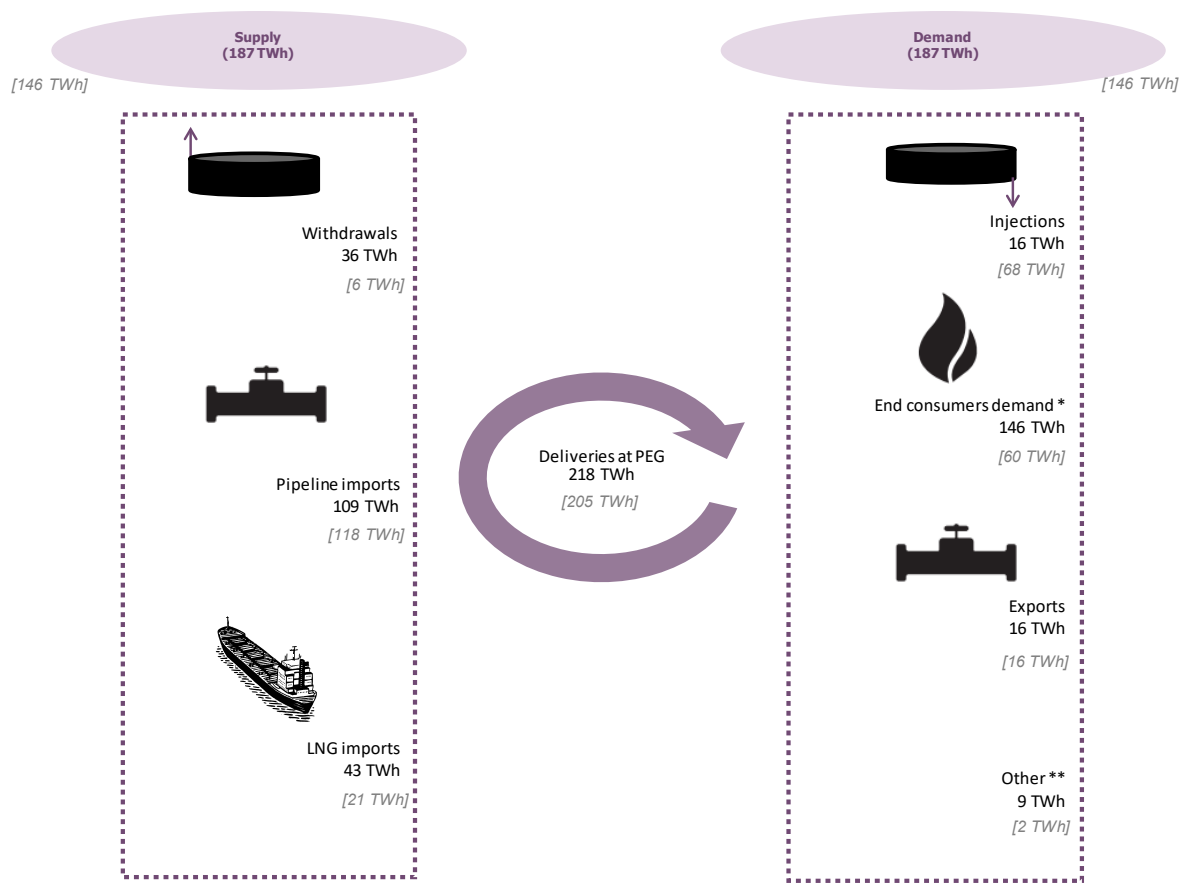
1. KEY DATES

2004	First publication of price references for the French gas markets
January 2005	Launch of the French Gas Release program on a volume of 16.3 TWh/yr during 3 years
April 2007	Launch of the platform Powernext Balancing GRTgaz designed as a market access for the TSO in order to cover its daily balancing needs
2008	Accessibility to the wholesale market for consumers directly connected to GRTgaz transmission system
November 2008	Launch of Powernext Gas Spot and Powernext Gas Futures
January 2009	Merger of the 3 balancing zones of GRTgaz in the North of France (Nord-H, East and West)
December 2009	GRTgaz starts covering part of its balancing needs on the Powernext Gas Spot platform (Powernext Balancing GRTgaz platform is abandoned)
November 2010	Commissioning of the Fos Cavaou LNG terminal at 100% of its capacity
December 2010	Commercialization of daily and monthly interconnection capacity between Zeebrugge and PEG Nord
January 2011	GRTgaz and Luxembourgish CREOS launch a market consultation for the development of firm interconnection capacity from France to Luxembourg
May 2011	Powernext launches a spread PEG Nord / PEG Sud contract on its platform Powernext Gas Spot
July 2011	GRTgaz and Powernext Gas Spot launch the first market coupling initiative in the European gas markets
December 2011	TIGF becomes a member of Powernext Gas Spot and starts covering a part of its daily balancing needs at PEG TIGF
February 2012	Elengy launches a reloading service at Montoir-de-Bretagne LNG terminal
February 2013	Powernext Gas Futures launches the TTF and spread PEG Nord/TTF contracts
April 2013	Launch of PRISMA, a joint capacity booking platform of major European Transmission System Operators Merger of the Nord-H and Nord-B balancing zones New capacities at the border between France and Spain. Total available capacities at Larrau interconnection passed from 70 to 165 GWh/d for entry and from 100 to 165 GWh/d for exit
May 2013	Powernext and EEX launch PEGAS, a natural gas trading cooperation allowing market participants to trade both exchanges' contracts on a common trading platform
June 2013	Launch of the auction Joint Transport Storage (JTS) mechanism for commercializing additional daily capacities at GRTgaz north-to-south link
October 2013	Powernext launches both a new Front Month contract at PEG Sud and its spread contract with PEG Nord's Front Month

March 2014	Decree N° 2014-328 modifying the rules for accessing French storages in order to improve the security of supply
July 2014	Powernext launches a 24/7 service on its spot platform
October 2014	Launch of an auction mechanism through the PRISMA platform for the capacity allocations at GRTgaz north/south link
April 2015	Creation of TRS (Trading Region South) resulting from the merger of PEG South and PEG TIGF
January 2017	Commissioning of the Dunkirk LNG terminal
July 2017	Decree of 31 July 2017 on the modalities for taking into account other modulation instruments for the application of the reporting and holding obligation and storage capacity of natural gas suppliers
November 2017	Early implementation of the locational spread mechanism (locational products involving the purchase or the sale of gas at a precise point of the network)
December 2017	The Taisnières H and Alveringhem network interconnection points (PIRs) became the Virtualys virtual interconnection point (PIV Virtualys): a single point for the transmission of gas between France and Belgium
February 2018	Launch of an auction mechanism for the allocation of storage capacities
November 2018	Launch of the single gas marketplace : the Trading Region France (TRF) resulting from the merger of PEG Nord and TRS

2. BALANCE OF THE WHOLESALE GAS MARKET

Figure 24: Quarterly supply and demand of natural gas in France



* Consumption includes clients at both regulated and market based prices

** 'Others' includes TSOs and DSOs consumptions, metering errors and losses

Data [Q3 2018] and Q4 2018

Source: GRTgaz, Teréga

3. KEY DATA
Table 1: Fundamentals

Market fundamentals	Quarterly values					Quarterly variation		Yearly variation	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q4 2018 / Q3 2018		Q4 2018 / Q4 2017	
						In percentage	In value	In percentage	In value
Entry and exit flows									
Supply (TWh)	194	218	155	146	187	28%	41	0	-7
Storages withdrawals	36	69	5	6	36	464%	29	-2%	-1
Imports	157	149	150	139	151	9%	12	-4%	-6
Pipeline	135	128	118	118	109	-8%	-9	-20%	-27
LNG	22	21	32	21	43	102%	22	93%	21
Demand (TWh)	194	218	155	146	187	28%	41	-3%	-7
Storages injections	9	3	56	68	16		-52	88%	8
End consumer demand	163	187	70	60	146	145%	86	-11%	-17
Distribution consumers	102	135	39	22	91	319%	69	-11%	-11
Consumers connected to the transmission system	61	53	31	38	55	45%	17	-10%	-6
Exports	20	24	28	16	16	-4%	-1	-22%	-4
Other	2	4	1	2	9	381%	7	355%	7
Deliveries at PEG (TWh)	210	236	193	205	218	6%	13	4%	8
PEG*	179	198	162	166	203	22%	37	13%	24
TRS	32	38	30	40	16	-60%	-24	-50%	-16
Infrastructure figures									
North-to-South link**	97%	78%	99%	100%	81%		-19%		-16%
Availability of the North-to-South link**	94%	92%	70%	73%	93%		20%		-2%
Utilization of Virtualys (Entry)	59%	45%	50%	46%	34%		-11%		-25%
Utilization of Obergaibach interconnection (Entry)	53%	56%	75%	46%	36%		-10%		-17%
Stock levels (TWh as at the end of the Quarter)	69	4	55	118	94	-20%	-24	36%	25
Avg. Net variation of French stocks (GWh/j)	-303	-732	556	669	-212	-132%	-881	-30%	91
Avg. LNG terminals emissions (GWh/j)	240	238	352	229	460	101%	231	91%	219
Avg. Exports from France to Spain (GWh/j)	118	125	70	85	152	78%	67	29%	34

* PEG Nord before 1st November 2018

** Applicable until 1st November 2018

Source: GRTgaz, Teréga – Analysis: CRE

Table 2: Prices

Prices	Quarterly values					Quarterly variation		Yearly variation	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q4 2018 / Q3 2018		Q4 2018 / Q4 2017	
						In percentage	In value	In percentage	In value
Spot prices (€/MWh)									
PEG day-ahead (avg.)*	19,6	21,2	21,0	24,4	24,6	1%	0,2	26%	5,0
TRS day-ahead (avg.)	22,2	21,2	22,8	27,0	25,7	-5%	-1,3	16%	3,5
Day-ahead PEG Nord/TRS spread (avg.)*	2,6	0,0	1,9	2,6	0,2	-93%	-2,4	-93%	-2,4
Day-ahead PEG/TTF Spread (avg.)	0,4	-0,3	-0,1	-0,2	-0,1	-38%	0,1	-128%	-0,5
Forward prices (€/MWh)									
PEG M+1 (avg.)	19,9	19,0	20,9	24,6	25,1	2%	0,5	26%	5,3
PEG Y+1 (avg.)	18,2	17,4	19,8	22,9	23,7	4%	0,8	30%	5,5
M+1 PEG Nord/TRS spread (avg.)**	4,0	0,6	0,8	2,7	0,0	-100%	-2,7	-100%	-4,0
M+1 PEG/TTF spread (avg.)	0,3	0,3	0,2	0,3	0,2	-15%	0,0	-24%	-0,1
Summer-ahead/Winter-ahead spread (avg.)***	1,5	1,3	0,9	0,7	1,3	68%	0,5	-17%	-0,3

* PEG Nord before 1st November 2018

** Applicable until 1st November 2018

*** During the winter season, this indicator corresponds to the spread between winter-ahead and summer-ahead prices. During the summer season, it corresponds to the spread between winter-ahead and Balance of summer prices (calculated from contracts delivering during the rest of the summer)

Source: Powernext, ICIS Heren – Analysis: CRE

Table 3: Trading Activity

Trading activity	Quarterly values					Quarterly variation		Yearly variation	
	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q4 2018 / Q3 2018		Q4 2018 / Q4 2017	
						In percentage	In value	In percentage	In value
Activity in the French wholesale gas markets									
Natural gas exchanged at PEG* (TWh)	151	176	142	147	177	21%	31	17%	26
% of national consumption	93%	94%	205%	246%	121%				
Trading volumes in the French intermediated markets									
Spot market (TWh)	50	60	46	44	50	14%	6	0%	0
Intraday	9	10	7	7	9	28%	1,9	-4%	-0,4
Day Ahead	28	32	24	23	26	11%	2,5	-7%	-2,0
Exchange (DA, WD, WE, other spot)	45	53	38	37	38	2%	0,9	-16%	-7,3
Brokers (DA, WD, WE, other spot)	5	7	8	7	12	75%	5,3	155%	7,5
Forwards market (TWh)	68	186	81	82	132	61%	50	93%	64
M+1	21	24	21	20	31	54%	10,8	46%	9,7
Q+1	15	2	11	8	19	155%	11,7	31%	4,6
S+1	14	75	14	11	32	204%	21,7	136%	18,7
Y+1	4	10	3	3	4	43%	1,1	2%	0,1
Exchange (all maturities)	3	4	3	2	2	15%	0,3	-26%	-0,8
Brokers (all maturities)	65	181	79	80	130	62%	49,9	99%	64,6
Number of transactions in the French intermediated markets									
Spot market	41308	45353	36371	35322	36052	2%	730	-13%	-5256
Intraday	8 618	9 319	7 766	7 570	8 088	7%	518	-6%	-530
Day Ahead	26 882	28 768	22 601	22 082	22 312	1%	230	-17%	-4570
Exchange (DA, WD, WE, other spot)	39 574	43 577	33 535	32 398	31 874	-2%	-524	-19%	-7700
Brokers (DA, WD, WE, other spot)	1 734	1 776	2 836	2 924	4 178	43%	1254	141%	2444
Forwards market	1045	1648	1045	965	1323	37%	358	27%	278
M+1	604	811	573	484	600	24%	116	-1%	-4
Q+1	191	24	105	71	177	149%	106	-7%	-14
S+1	52	300	60	46	114	148%	68	119%	62
Y+1	15	39	16	15	36	140%	21	140%	21
Exchange (all forwards)	147	176	157	94	127	35%	33	-14%	-20
Brokers (all forwards)	898	1 472	888	871	1 196	37%	325	33%	298
Concentration of the natural gas market in France									
Number of shippers active in the market	107	103	98	97	101	4%	4	-6%	-6
Active in Powernext Gas Spot	56	58	56	55	63	15%	8	13%	7
Active in Powernext Gas Futures	28	31	32	29	30	3%	1	7%	2

* Deliveries resulting from exchanges in the intermediated markets in France

Source: GRTgaz, Teréga, Powernext, Brokers – Analysis: CRE

4. FIGURES

4.1 Evolution of natural gas prices in France and Europe

Figure 25: Day-ahead prices in the main wholesale markets in Europe

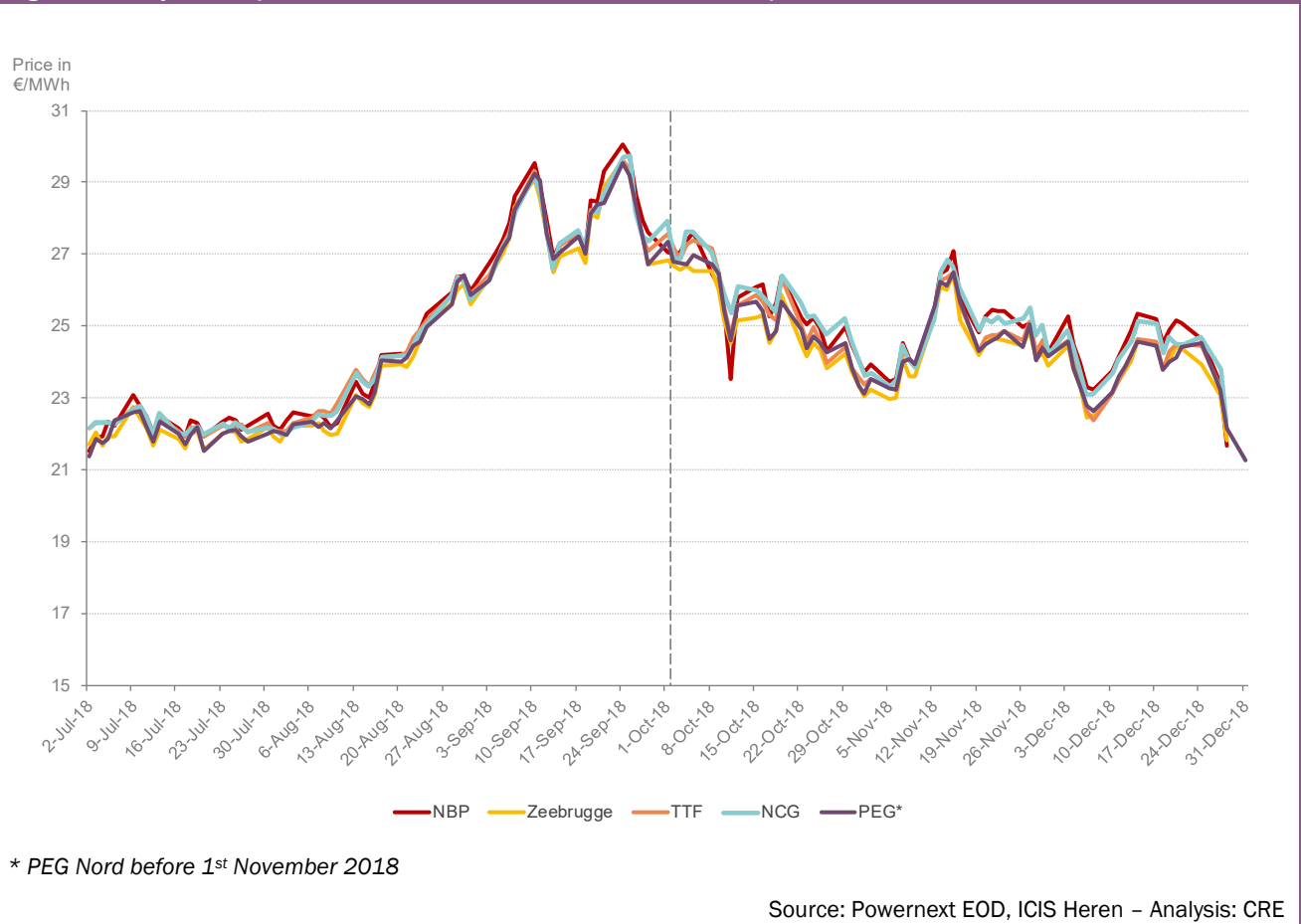
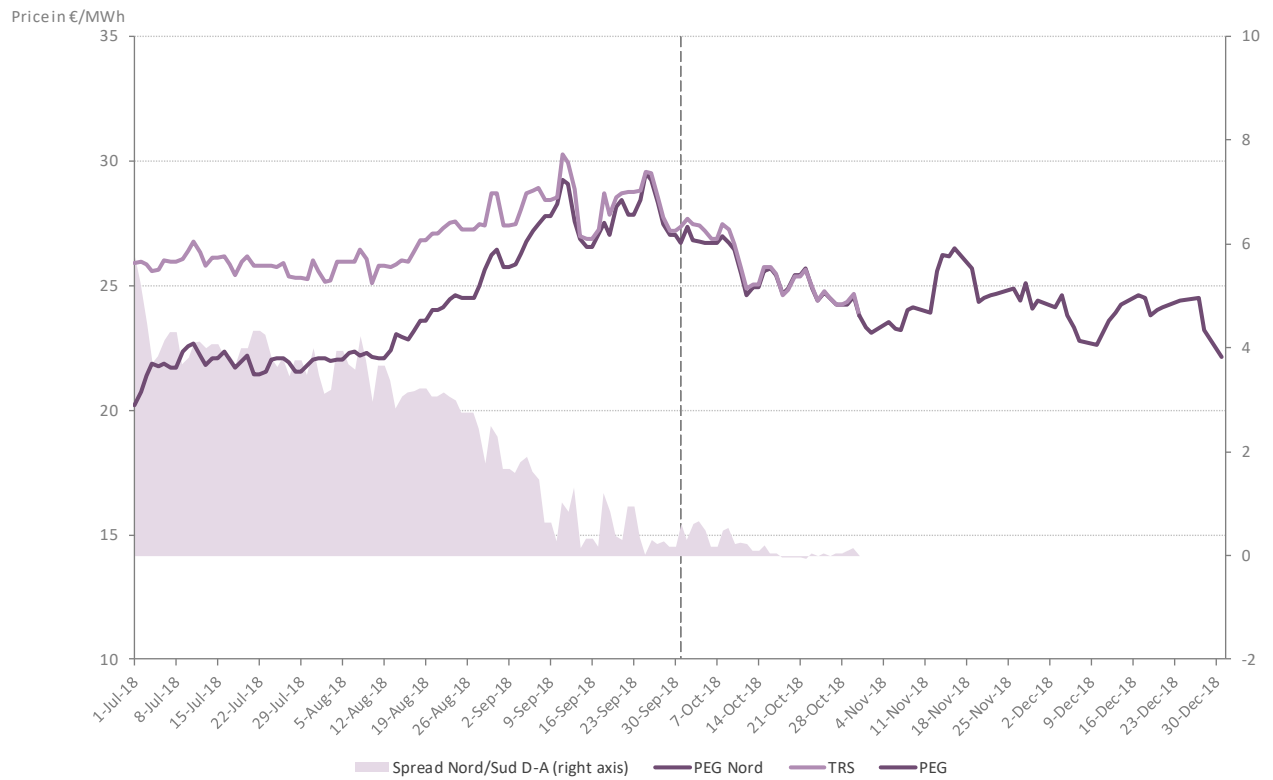
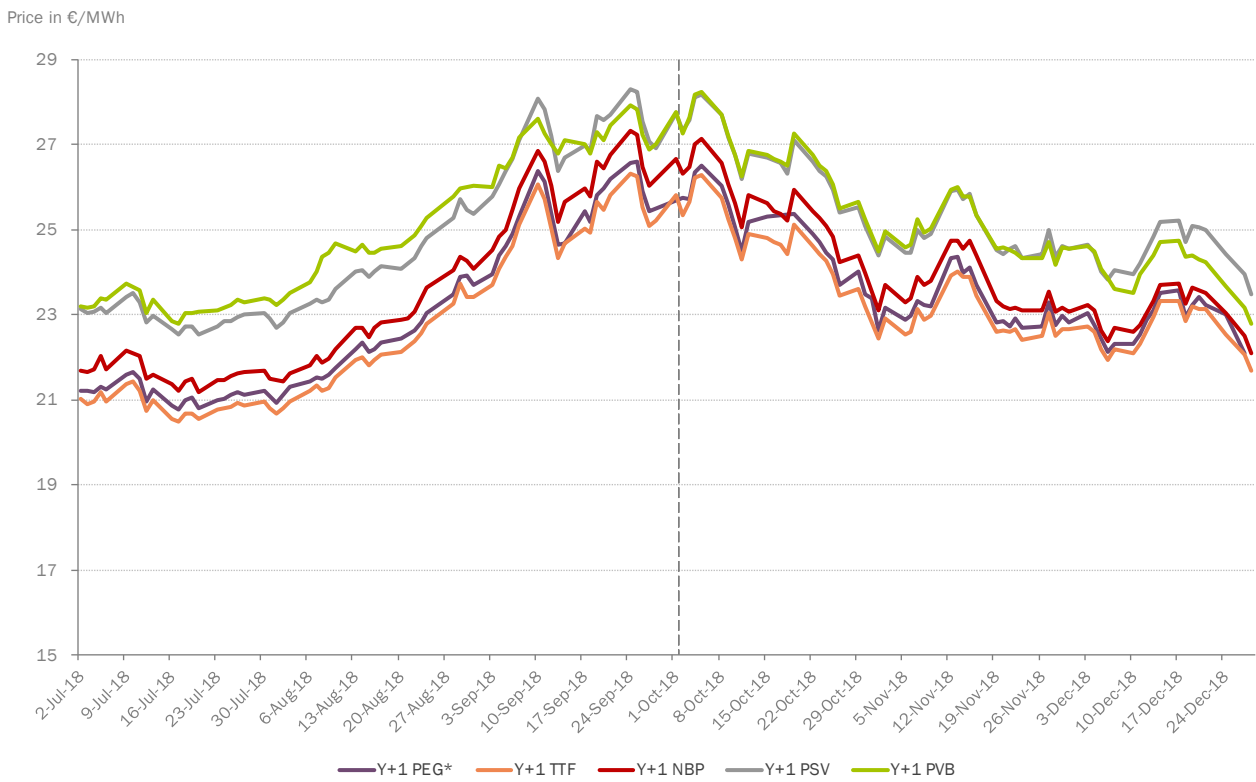


Figure 26: Day-ahead prices in the wholesale market in France



Source: Powernext EOD, ICIS Heren for TRS – Analysis: CRE

Figure 27: Year-ahead prices in the main wholesale markets in Europe



* PEG Nord before 1st November 2018

Source: Powernext, ICIS Heren – Analysis: CRE

Figure 28: Price of calendar-year contracts for PEG and TTF

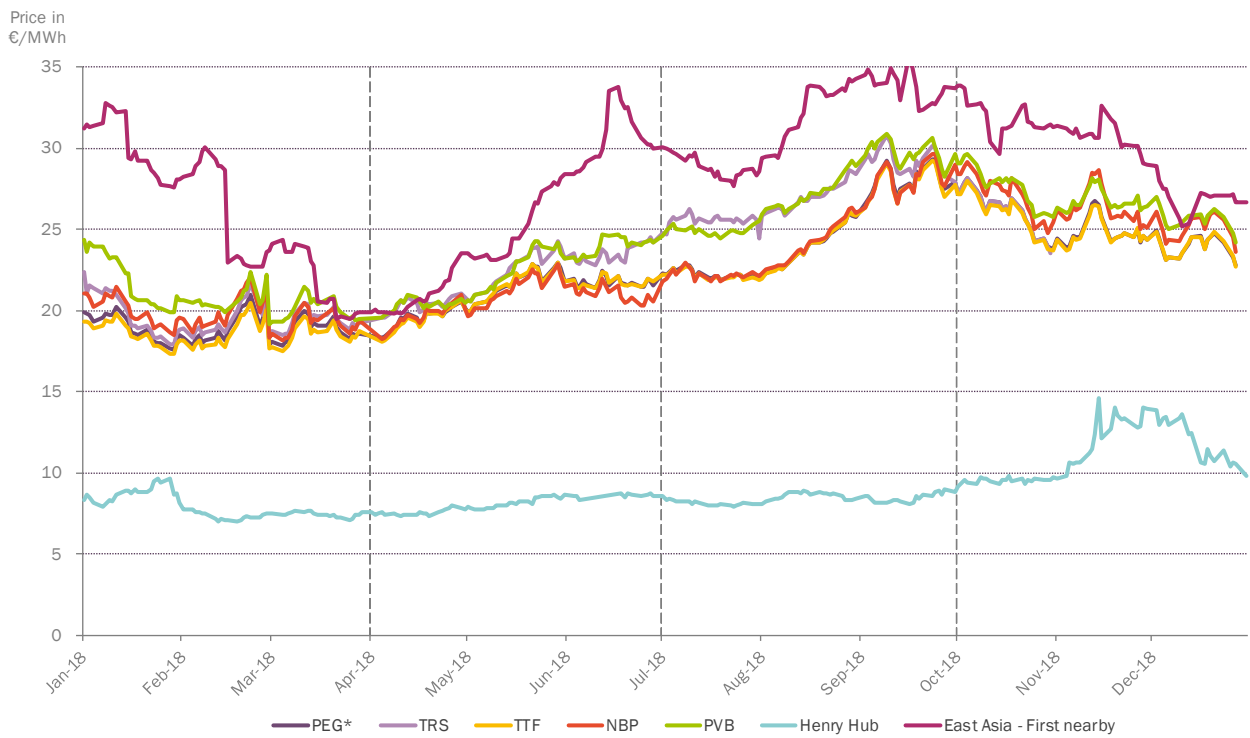


* PEG Nord before 1st November 2018

Source: Powernext, ICIS Heren – Analysis: CRE

4.2 Global markets

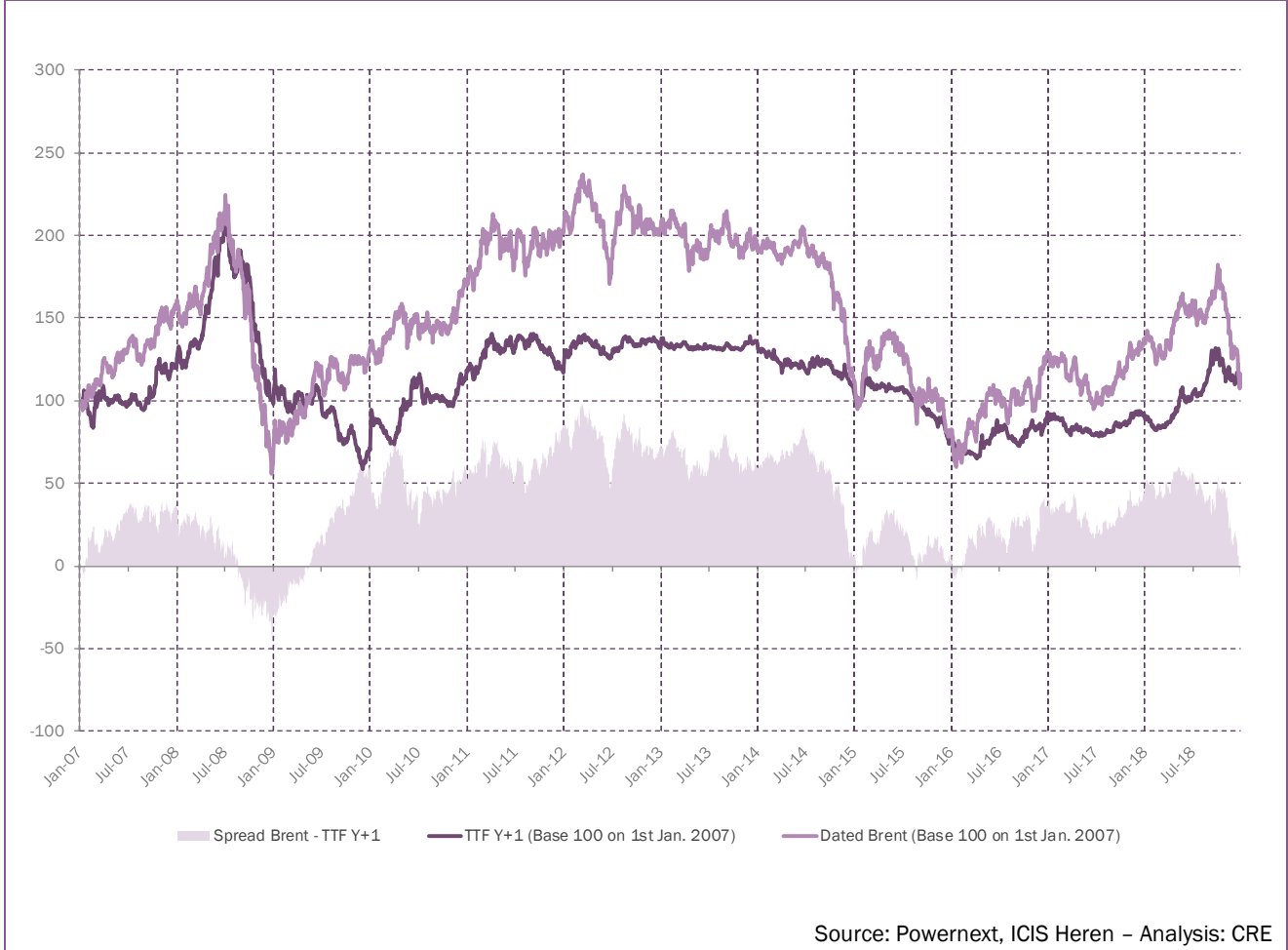
Figure 29: International month-ahead natural gas prices



* PEG Nord before 1st November 2018

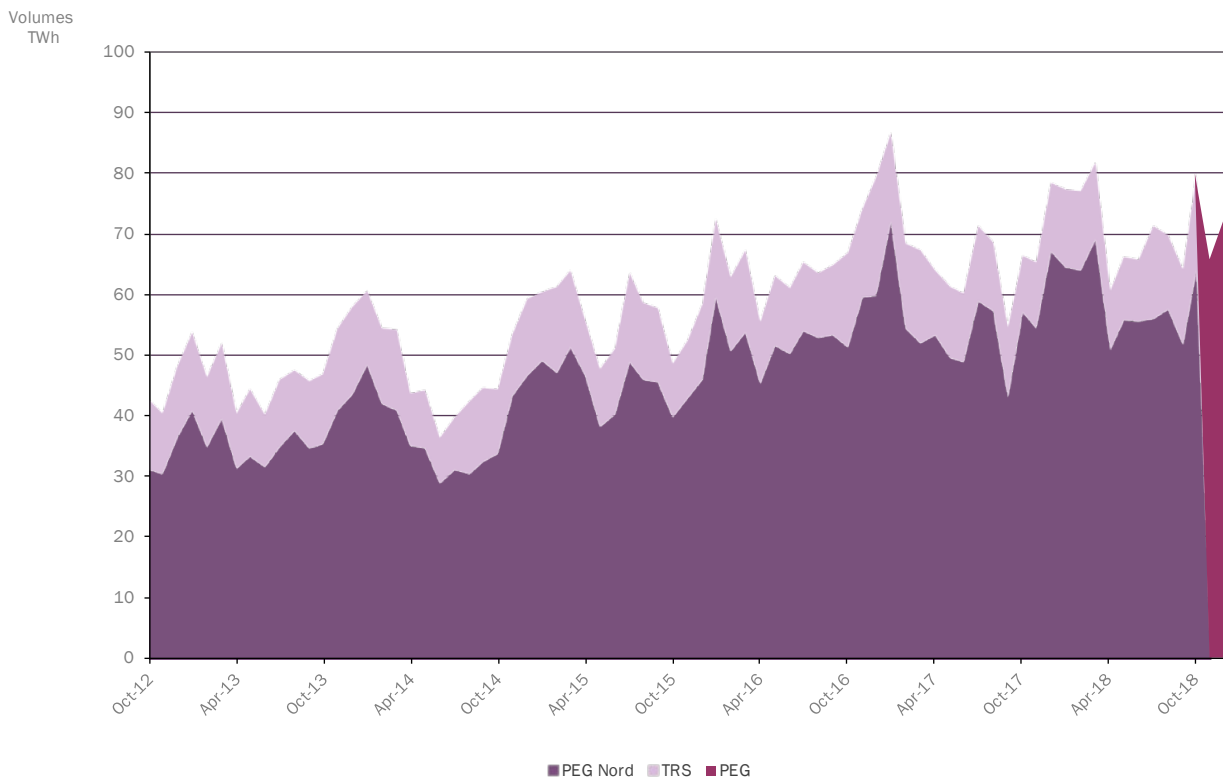
Source: Powernext, ICIS Heren – Analysis: CRE

Figure 30: Comparison between natural gas and oil prices



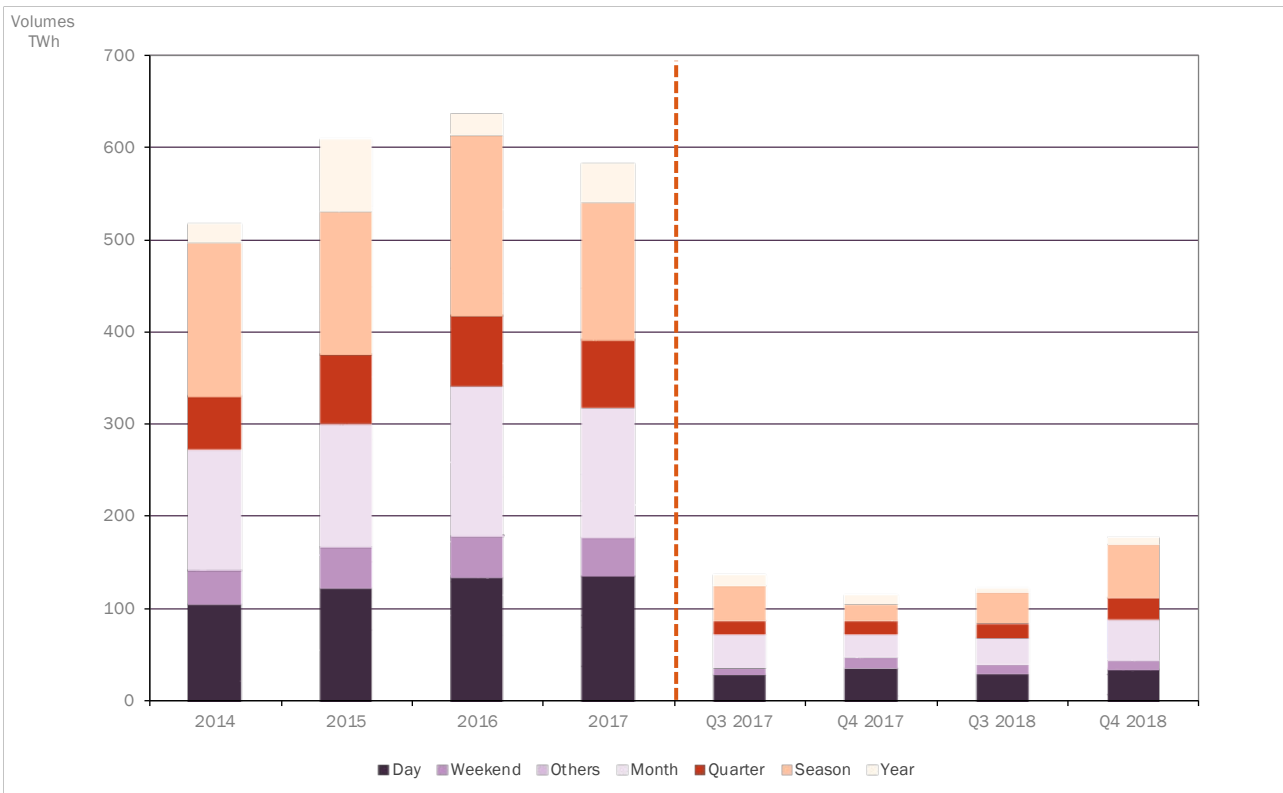
4.3 Development of the French natural gas markets

Figure 31: Deliveries at PEGs



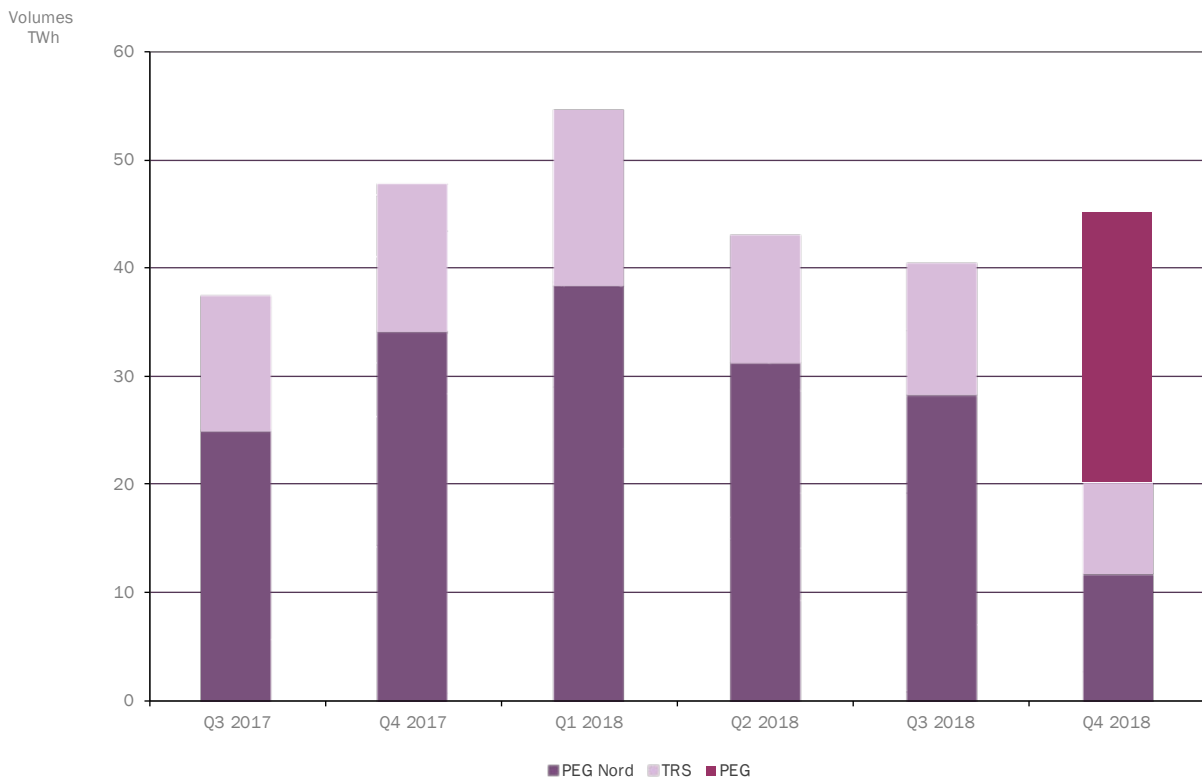
Source: GRTgaz, Teréga – Analysis: CRE

Figure 32: Trading volumes in the intermediated markets by contract



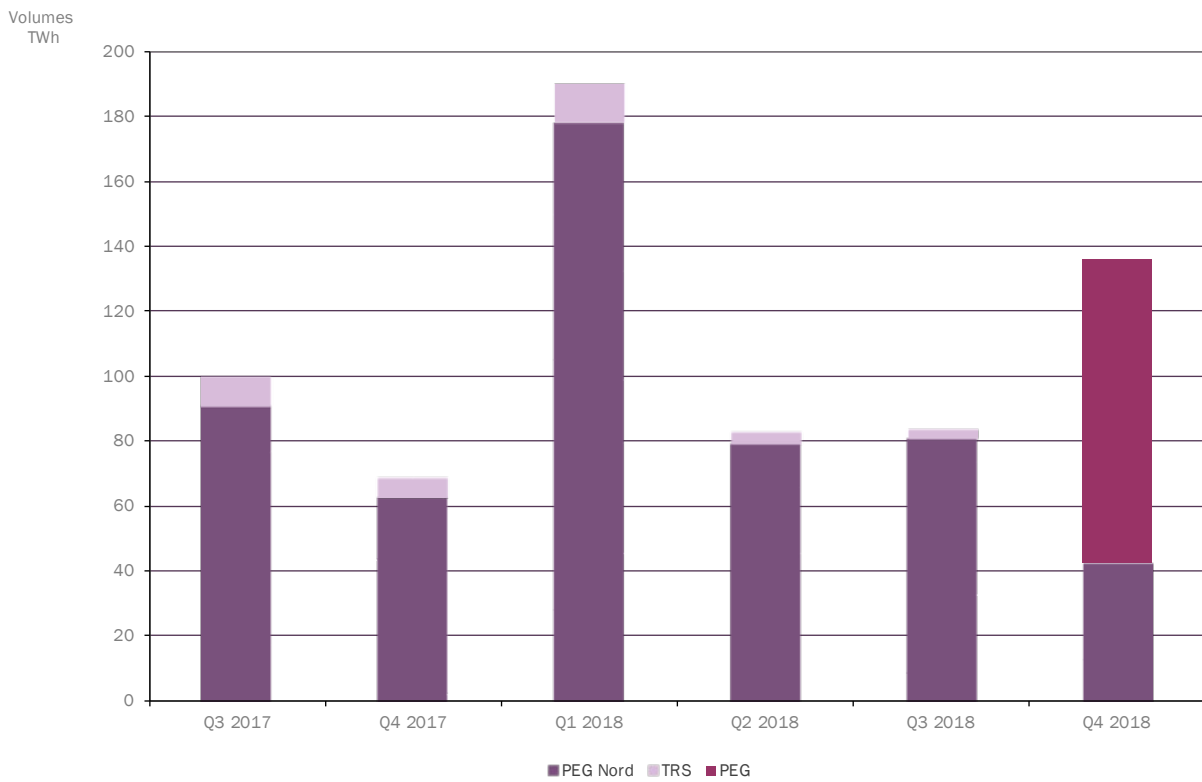
Source: Powernext, Brokers – Analysis: CRE

Figure 33: Trading volumes in the spot markets by zone



Source: Powernext, Brokers – Analysis: CRE

Figure 34: Trading volumes in the forward markets by zone



Source: Powernext, Brokers – Analysis: CRE

Figure 35: Trading volumes in the spot markets by type of intermediation

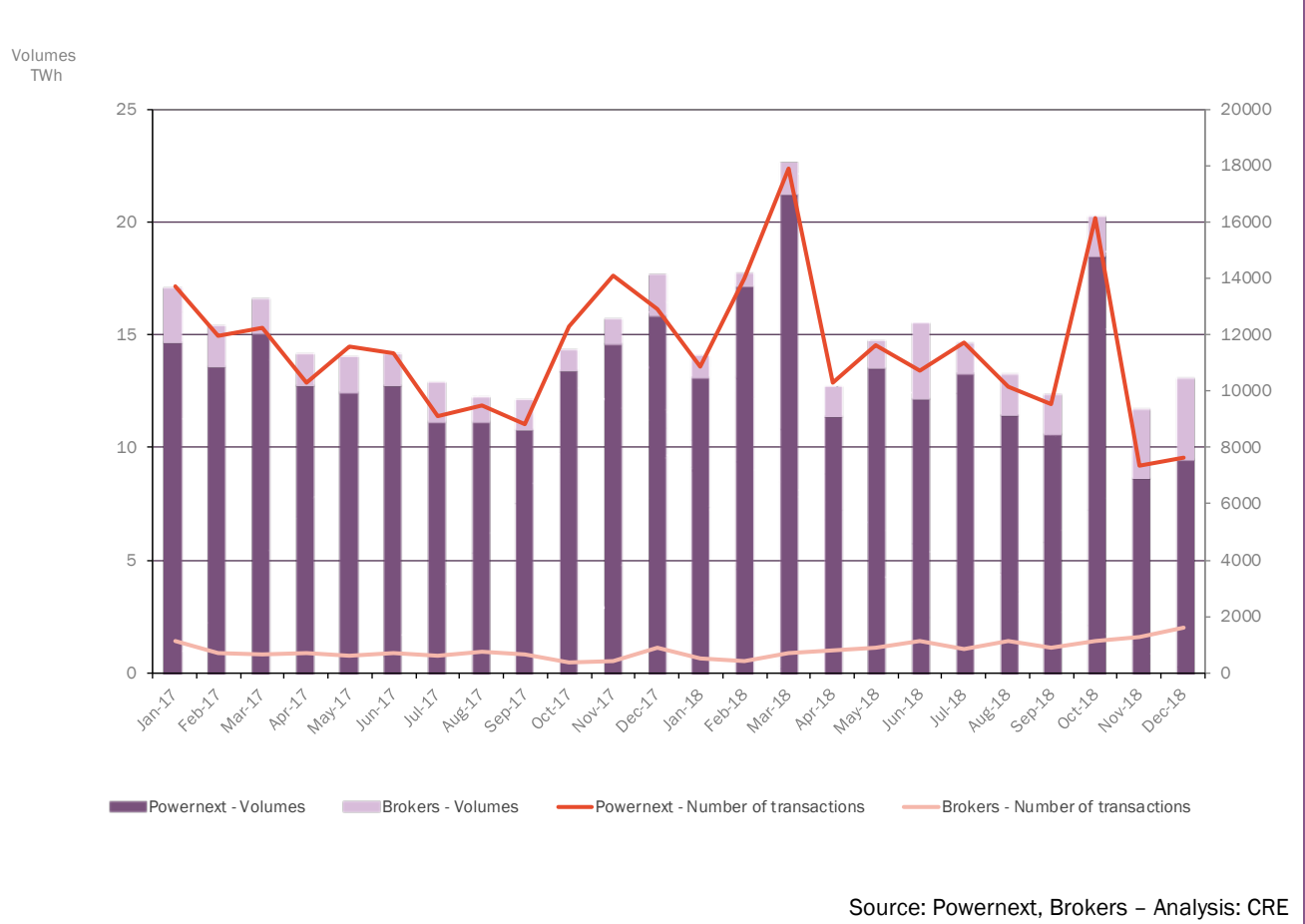


Figure 36: Trading volumes in the forward markets by type of intermediation

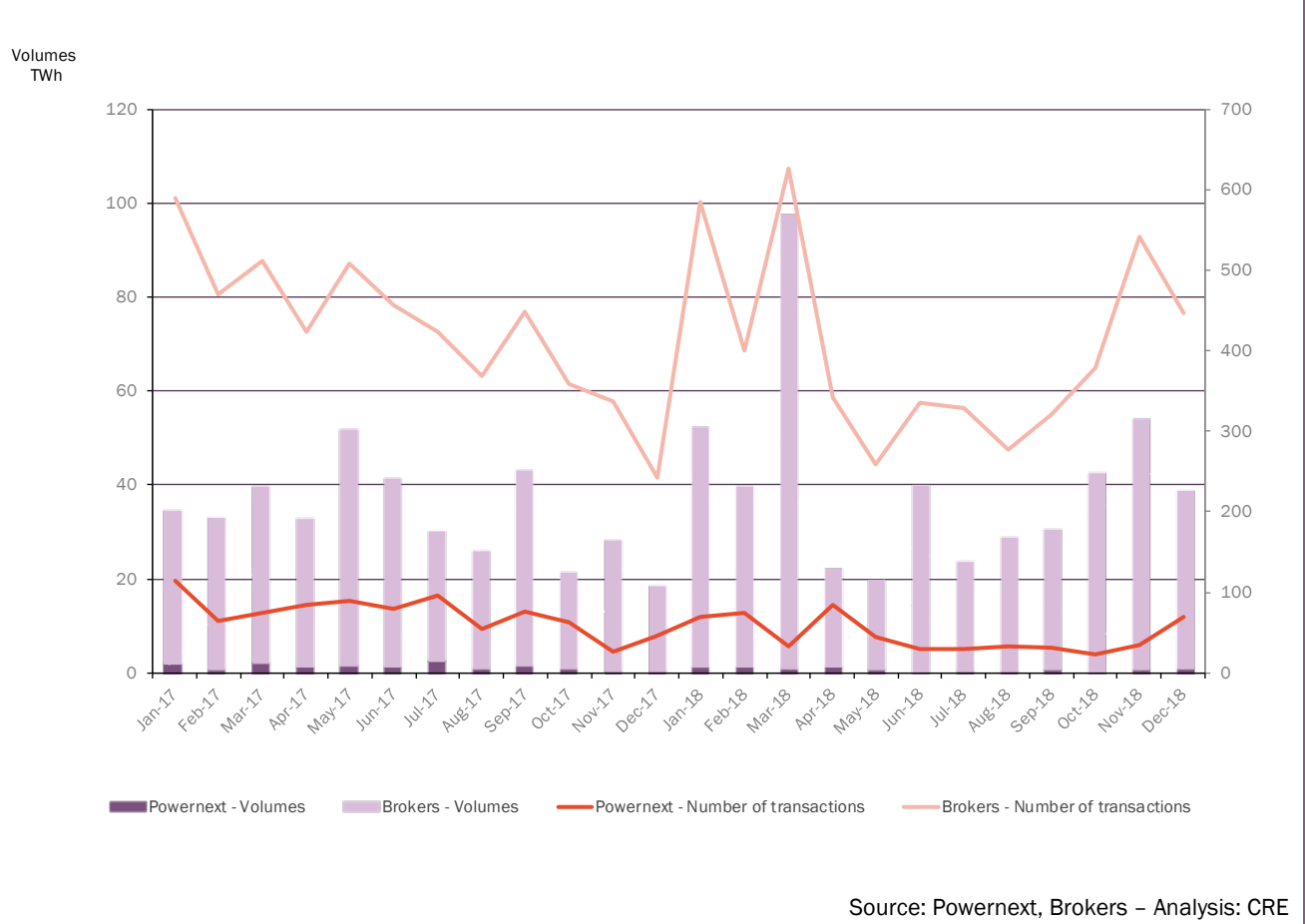
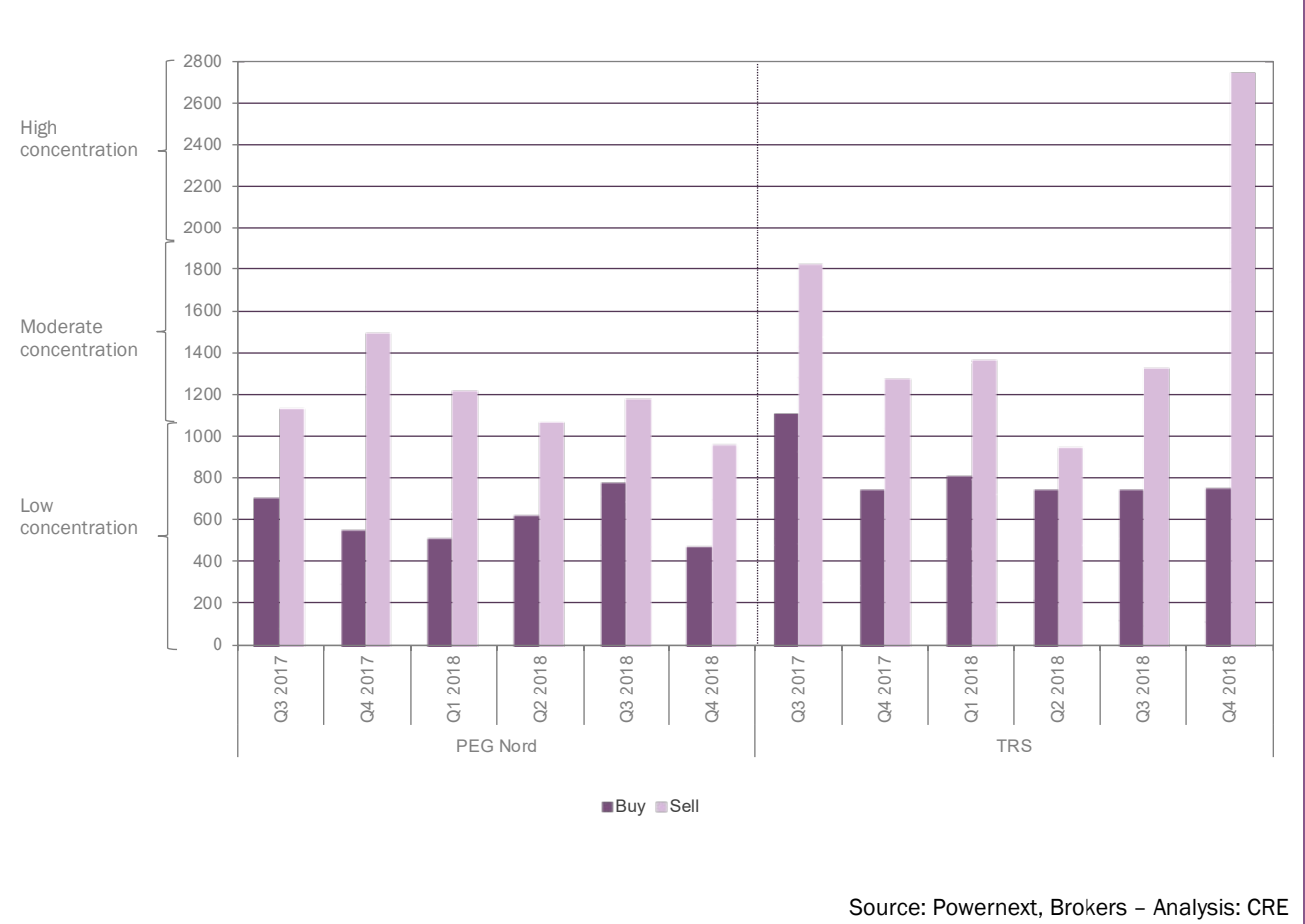
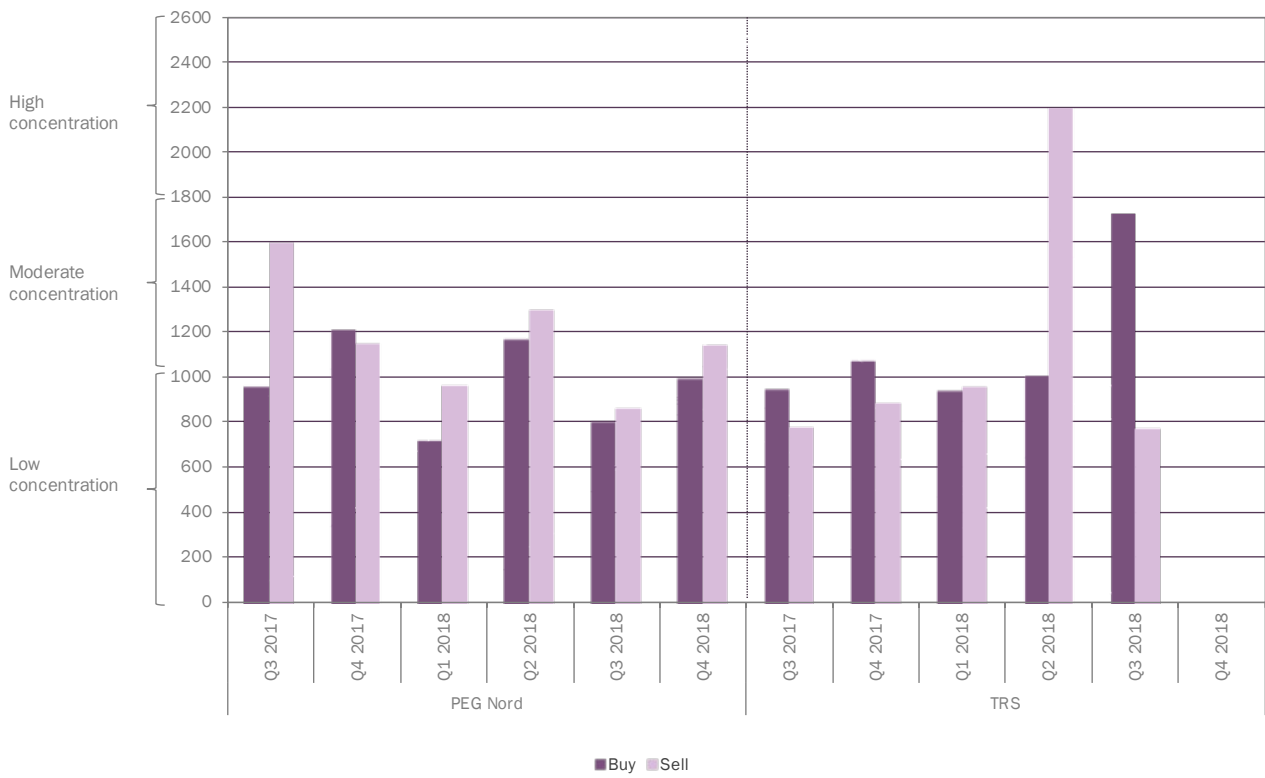


Figure 37: Concentration indexes in France on the spot market, by zone



Source: Powernext, Brokers – Analysis: CRE

Figure 38: Concentration indexes in France, by zone



Source: Powernext, Brokers – Analysis: CRE

4.4 Market fundamentals

Figure 39: Natural gas consumption in France

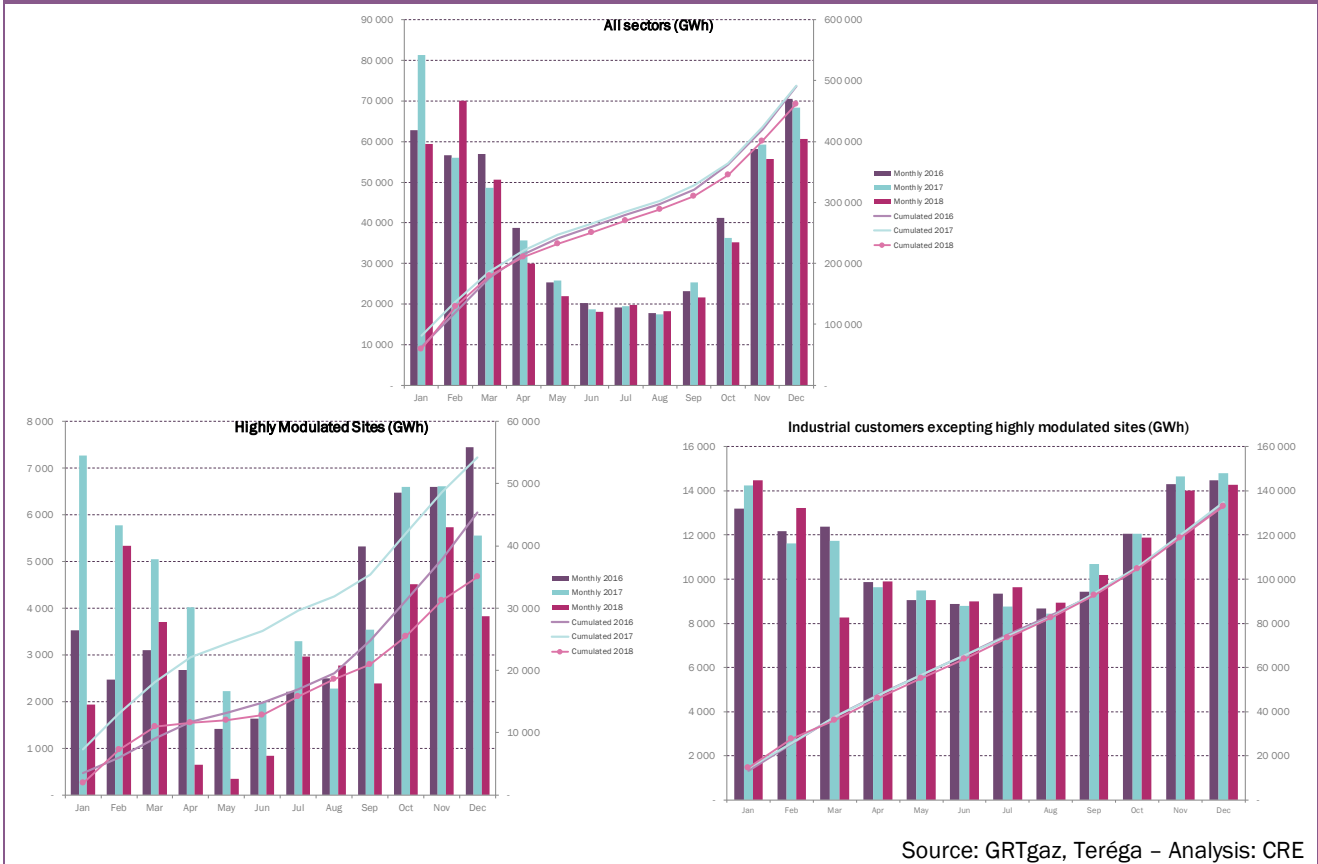
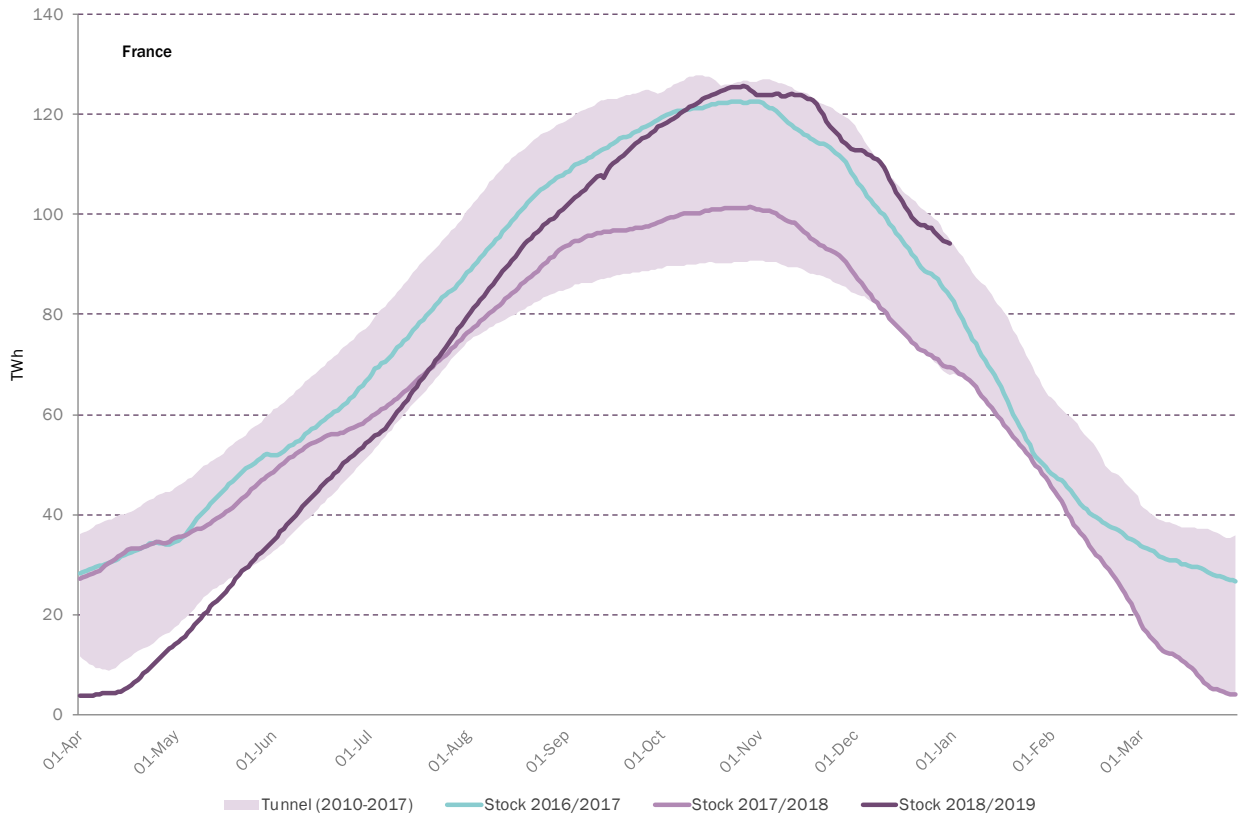
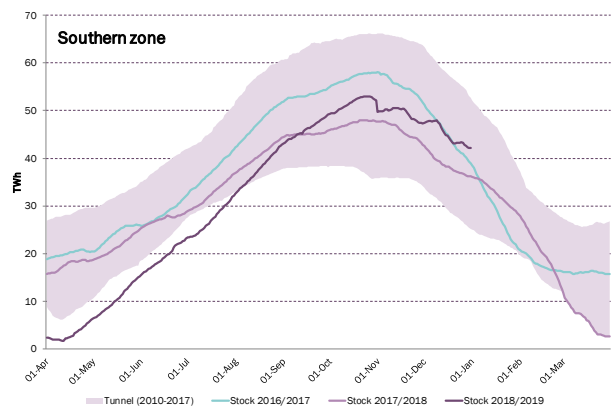
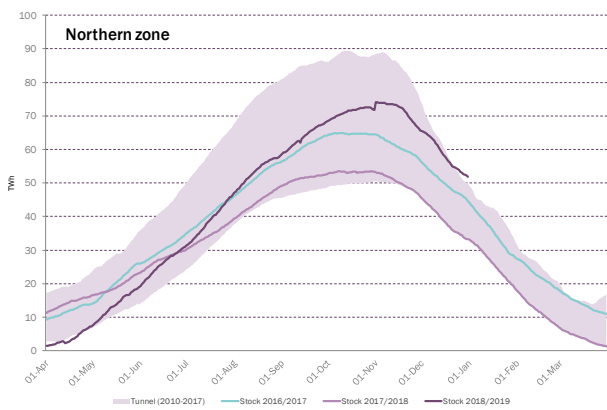


Figure 40: French stocks



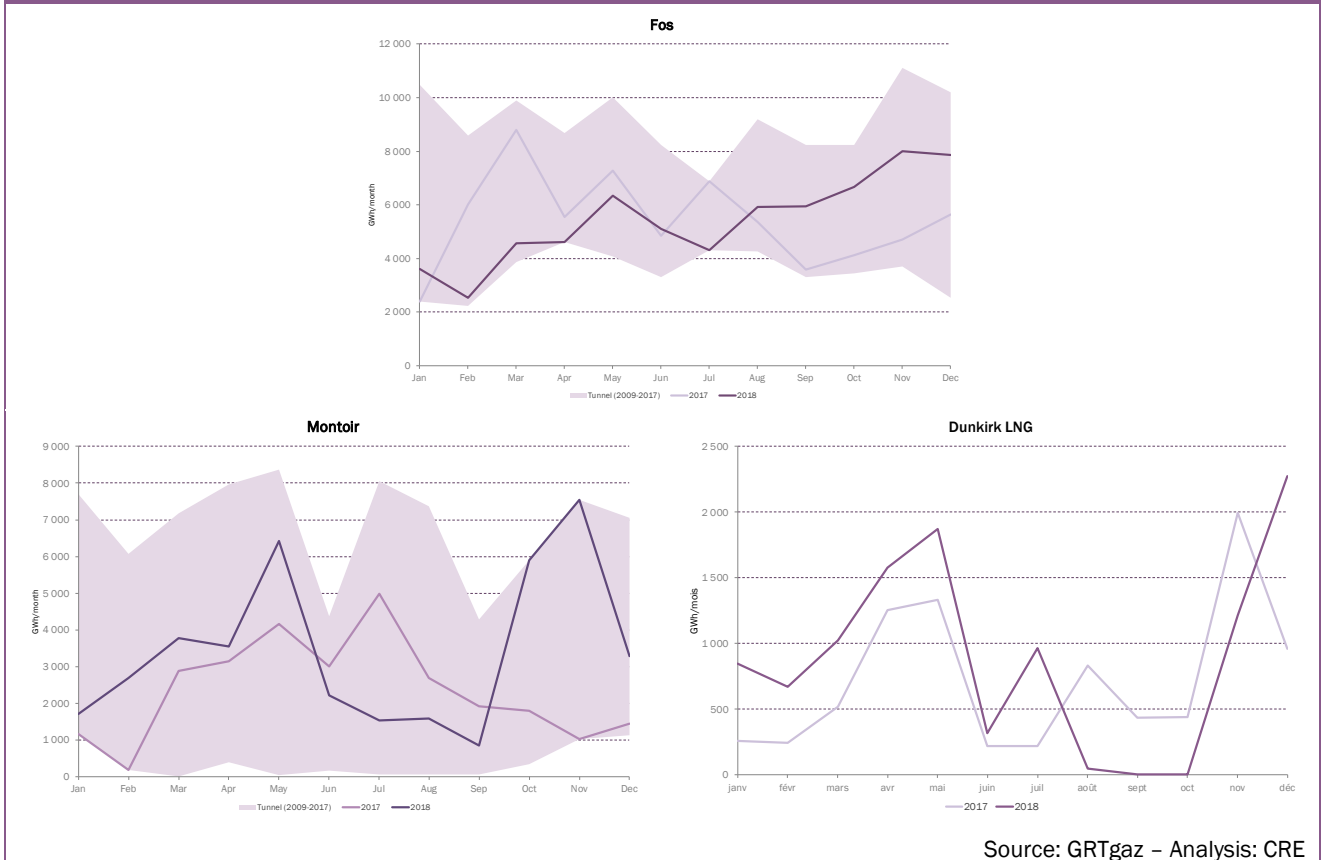
Source: Storengy, Teréga – Analysis: CRE

Figure 41: French stocks by zone



Source: GRTgaz, Teréga – Analysis: CRE

Figure 42: Send-out of the French LNG terminals



Source: GRTgaz – Analysis: CRE

Figure 43: North-South link utilization (North to south)

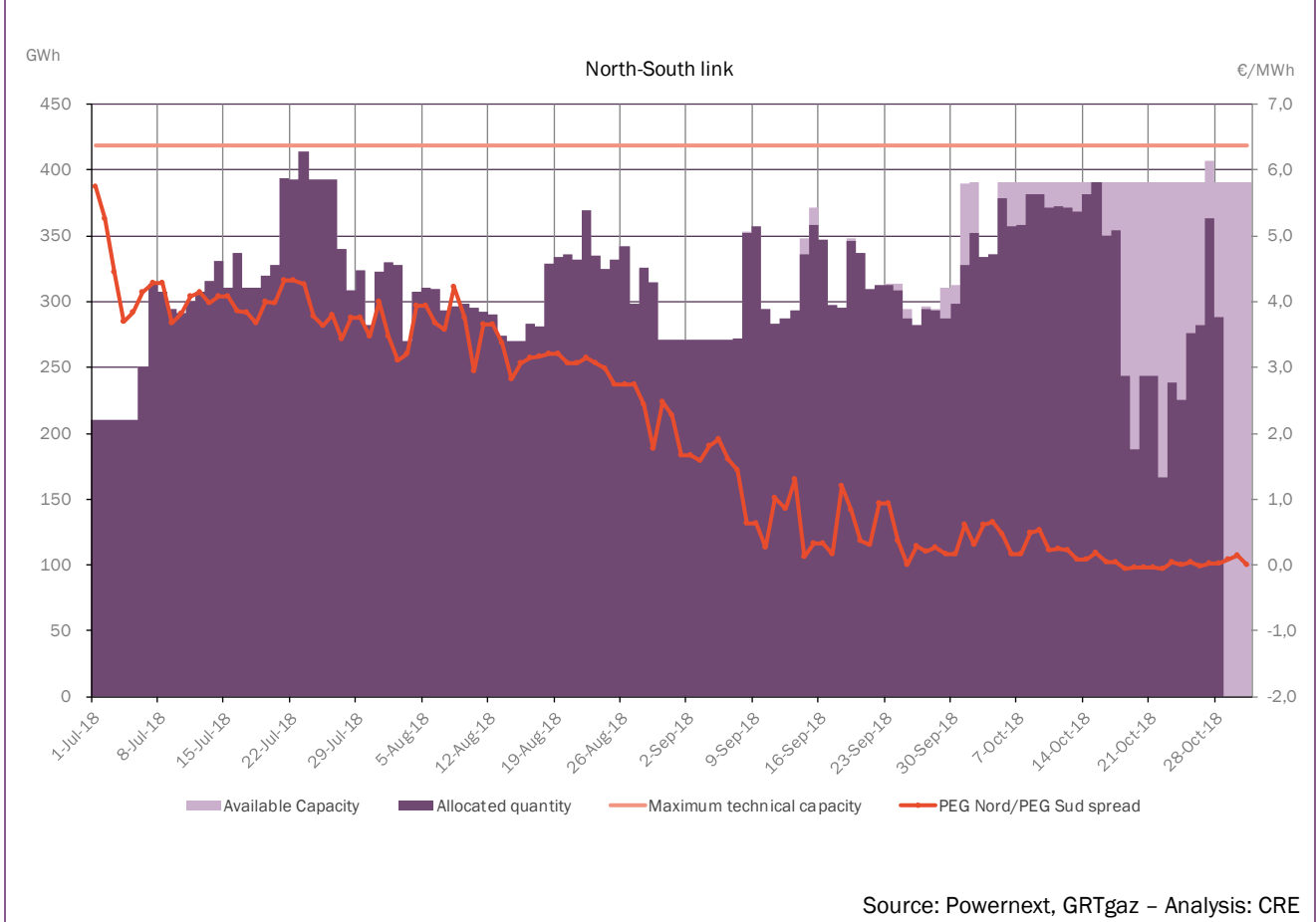


Figure 44: Dunkirk interconnection utilization (Entry)

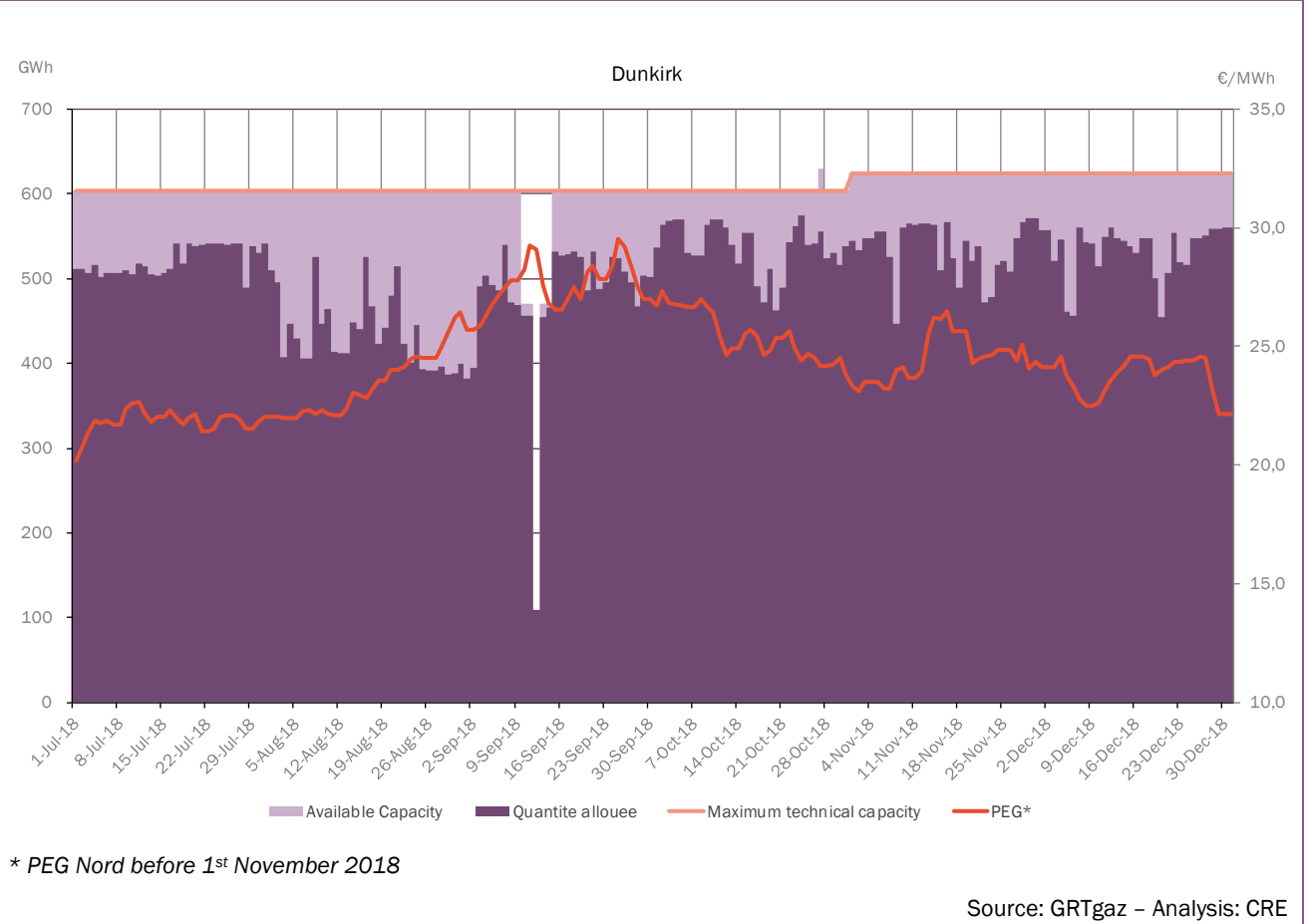


Figure 45: PIV Virtualys interconnection utilization (Belgium to France)

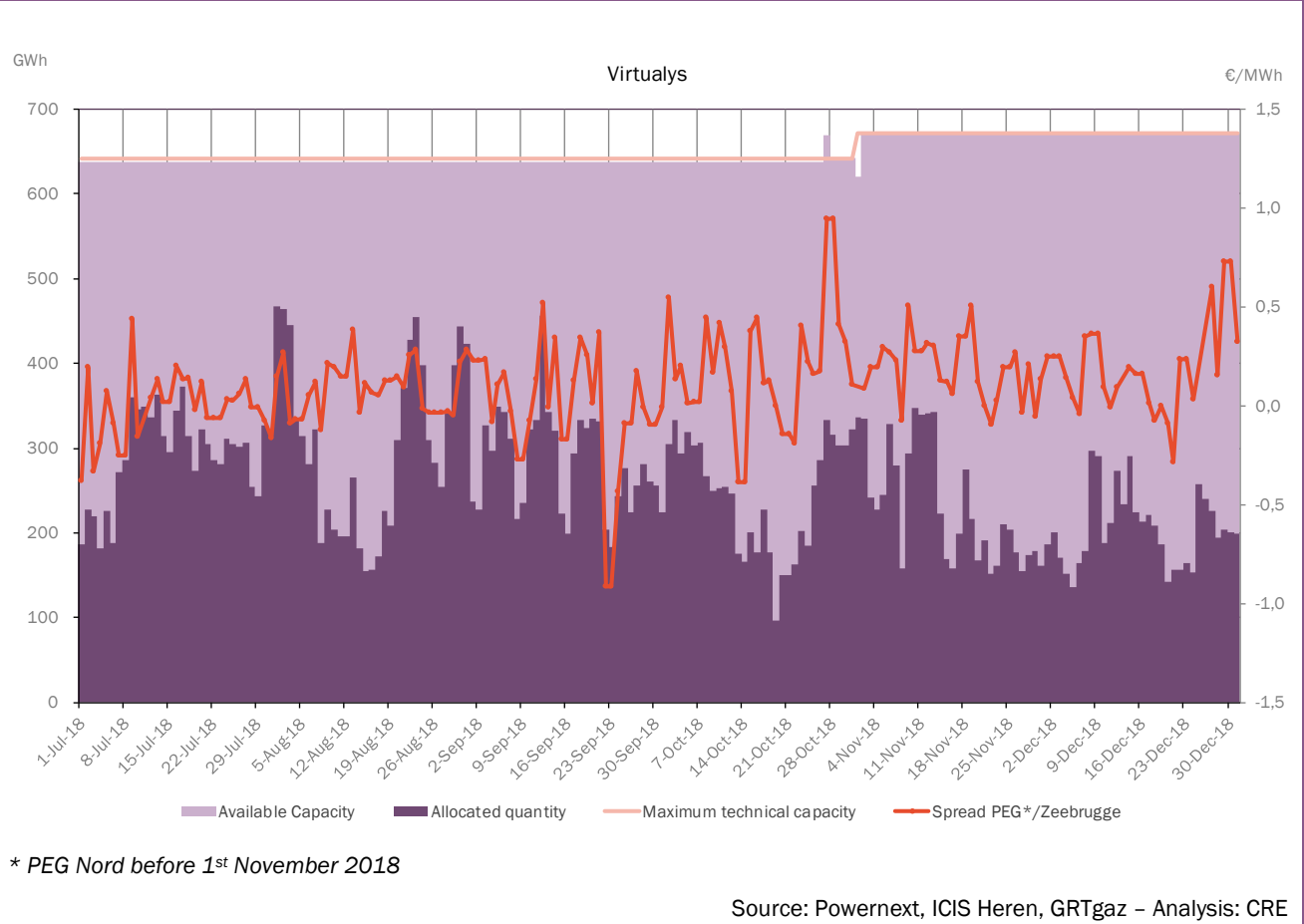


Figure 46: Obergailbach interconnection utilization (Germany to France)

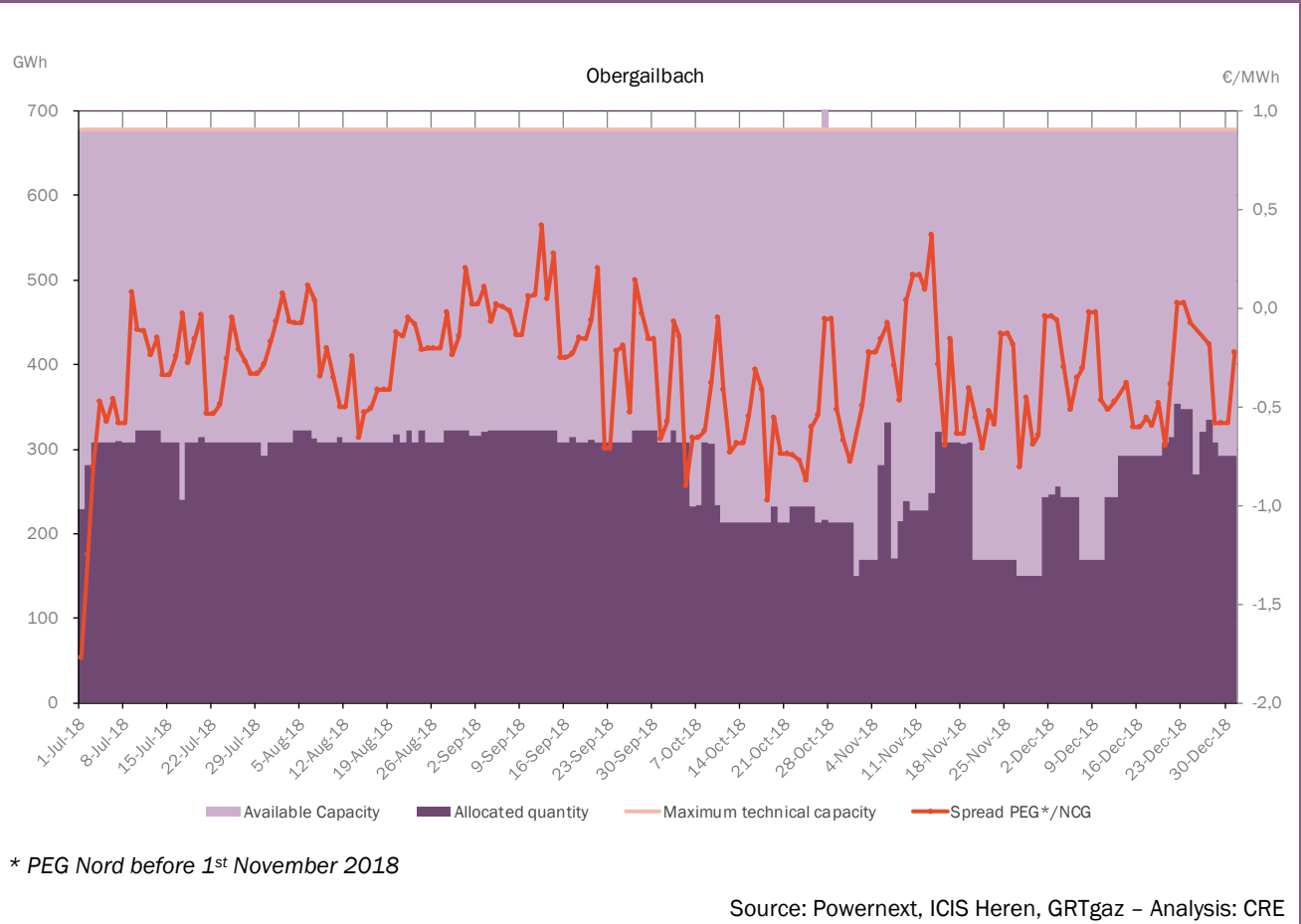
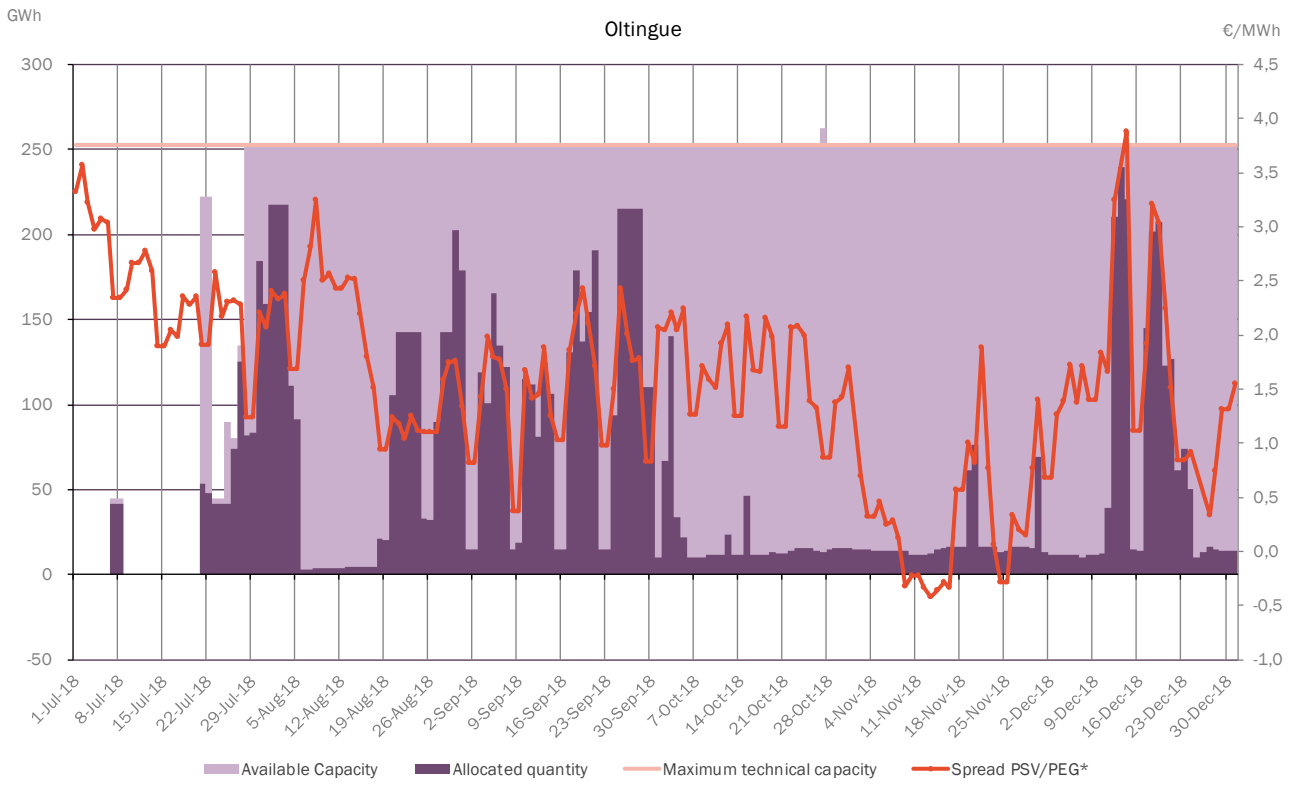


Figure 47: Oltingue interconnection utilization (France to Switzerland)



* PEG Nord before 1st November 2018

Source: Powernext, ICIS Heren, GRTgaz – Analysis: CRE

Figure 48: Montoir entry point utilization (entry)

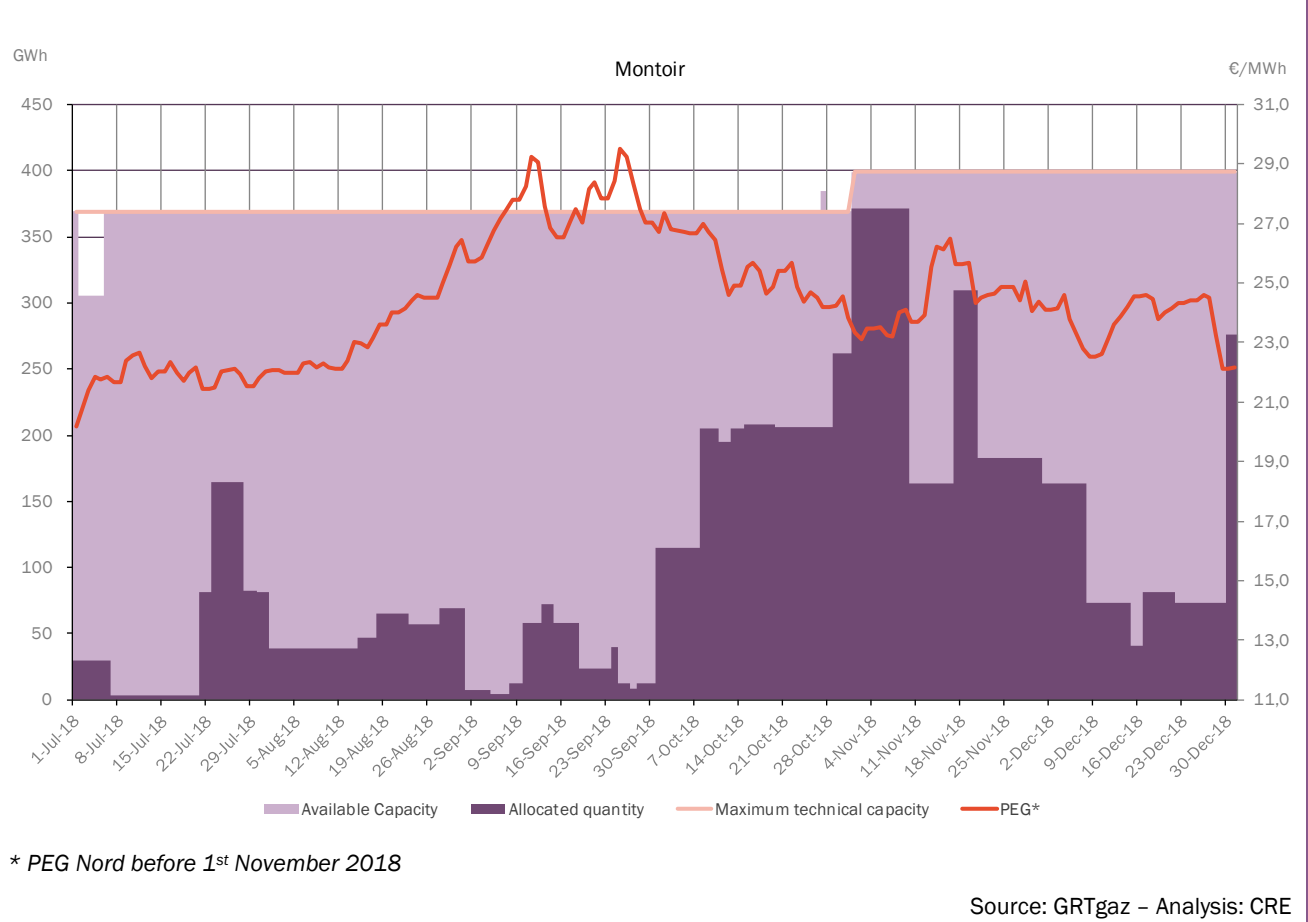
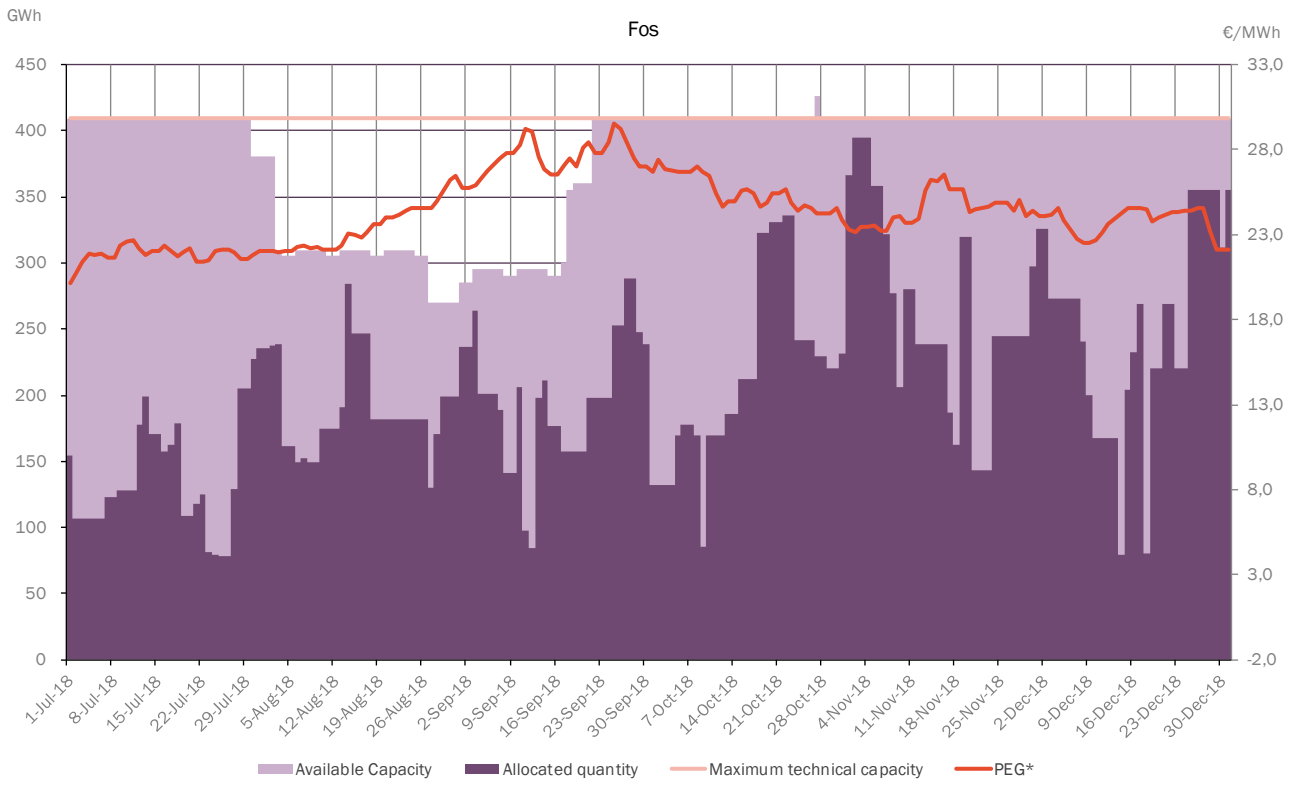


Figure 49: Fos entry point utilization (entry)



* PEG Nord before 1st November 2018

Source: GRTgaz – Analysis: CRE

Figure 50: Exports from France to Spain vs PVB/PEG spread

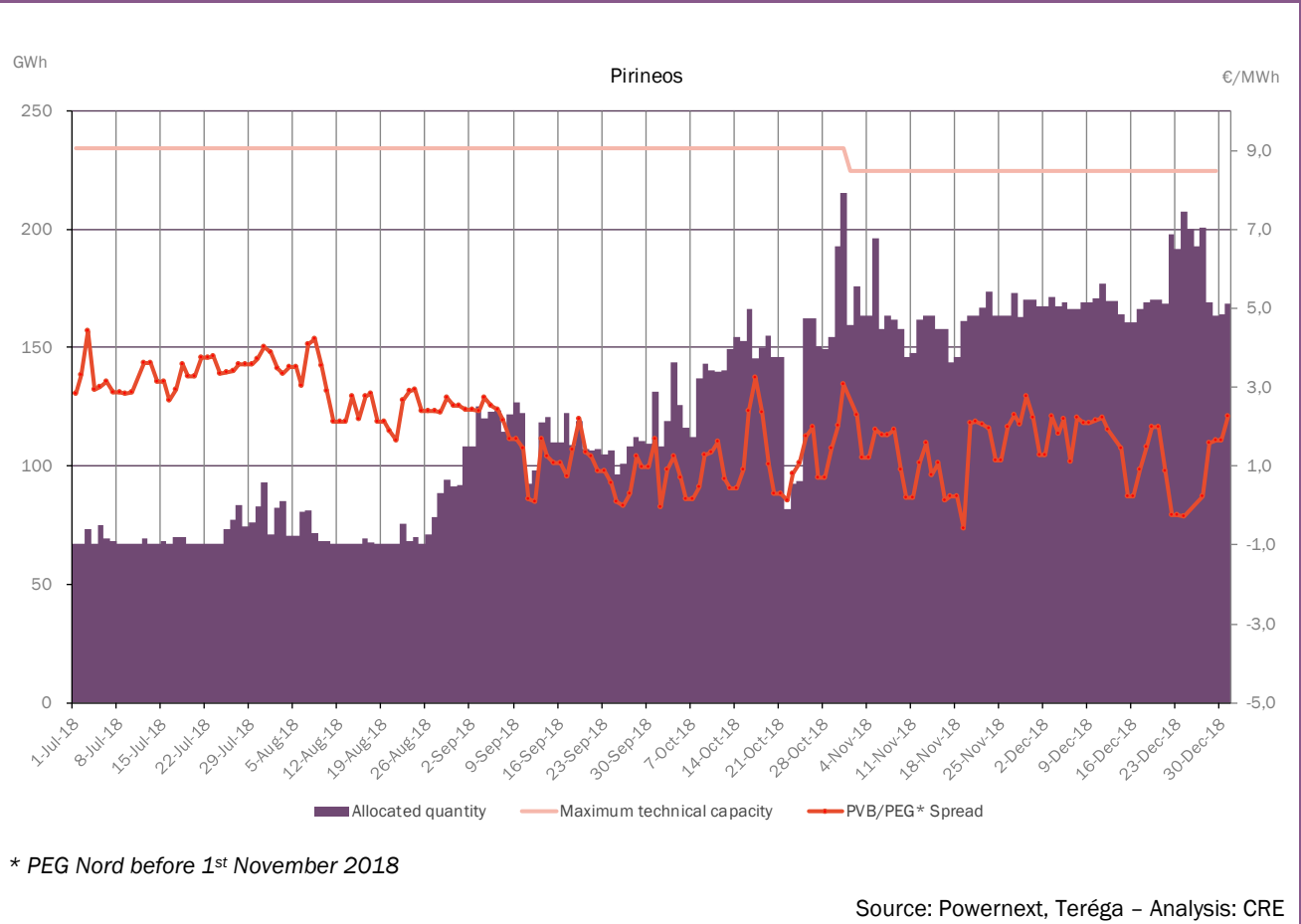
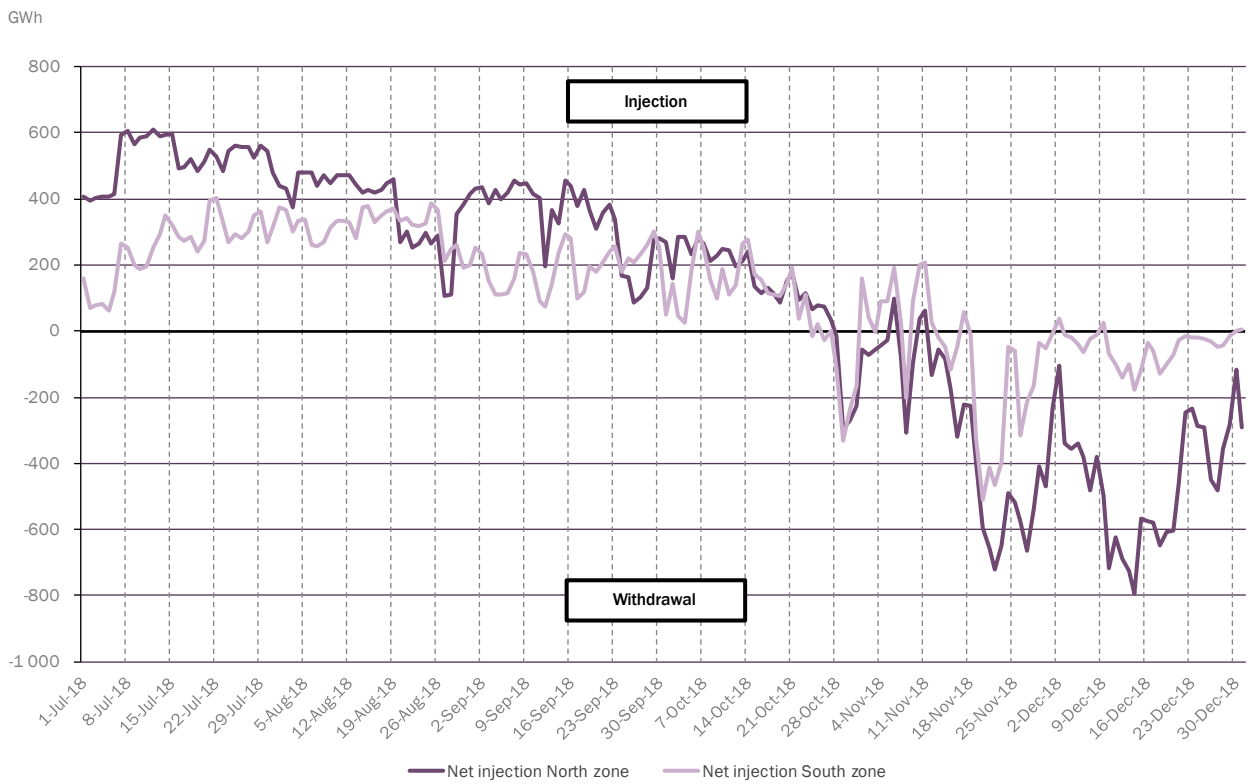
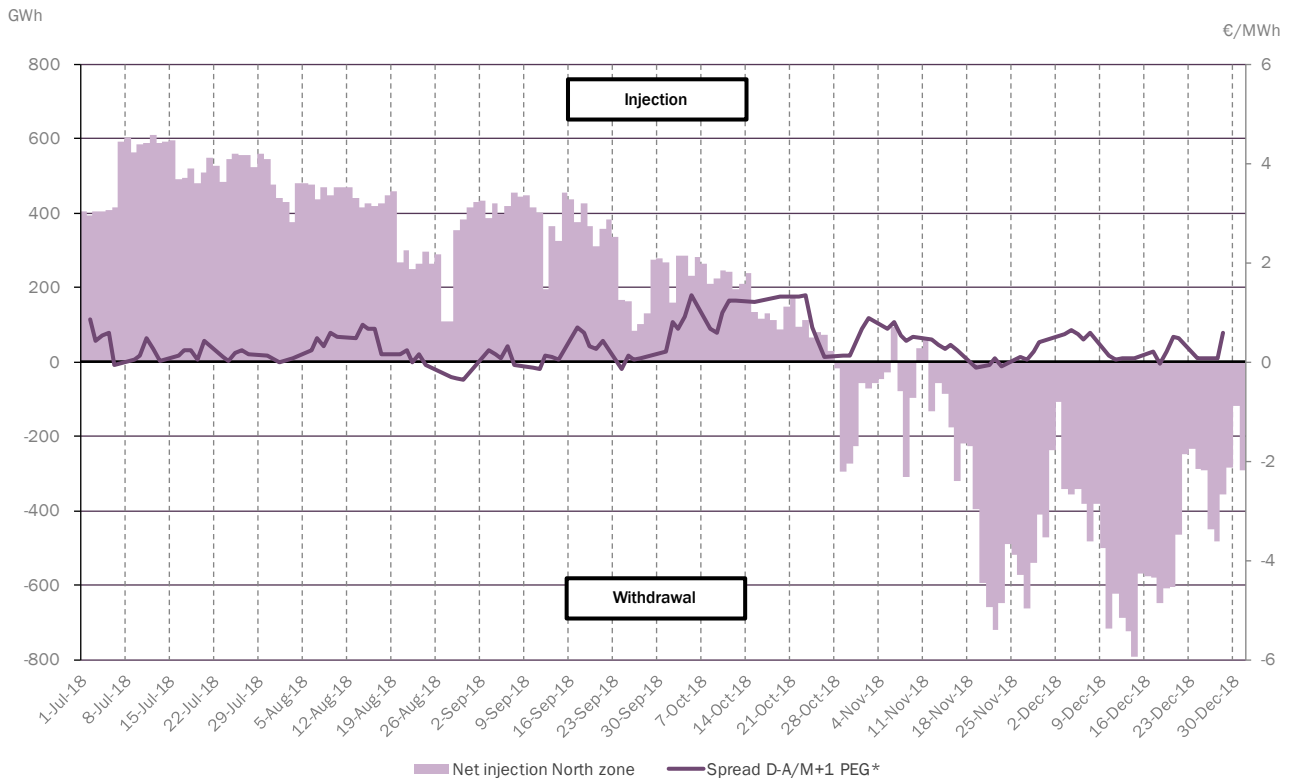


Figure 51: Storages utilization



Source: GRTgaz, Teréga – Analysis: CRE

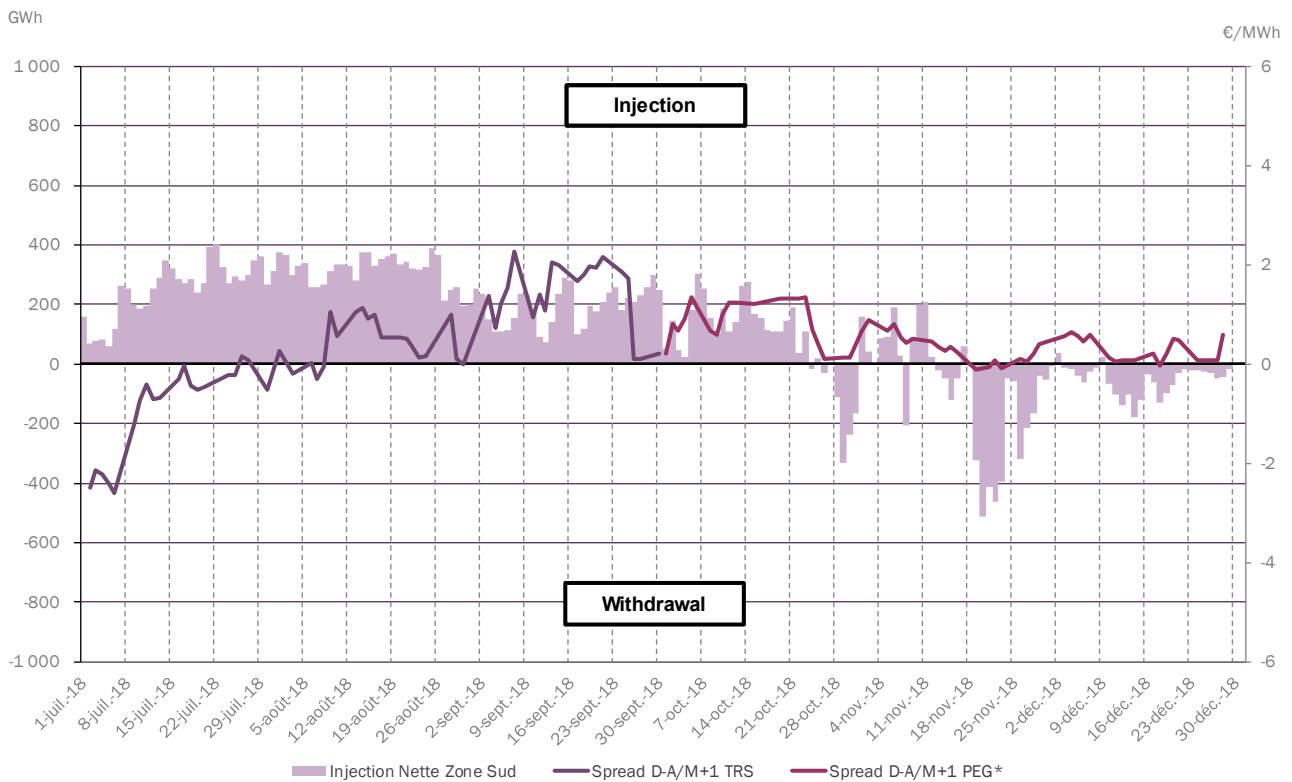
Figure 52: Net stock variation in the North zone vs temporal spreads (same trading date)



* PEG Nord before 1st November 2018

Source: Pownext, GRTgaz – Analysis: CRE

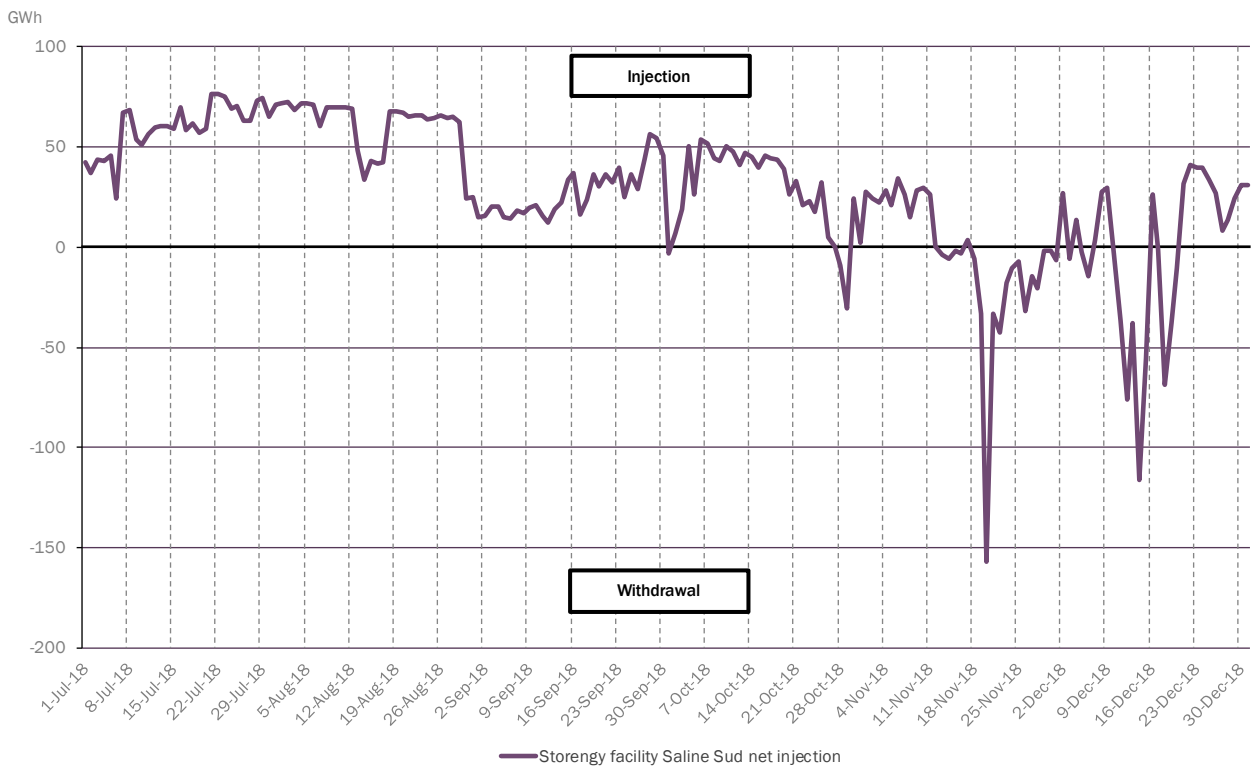
Figure 53: Net stock variation in the South zone vs temporal spreads (same trading date)



* PEG Nord before 1st November 2018

Source: Pownext, GRTgaz – Analysis: CRE

Figure 54: Net stock variation of Salins storage in the South zone

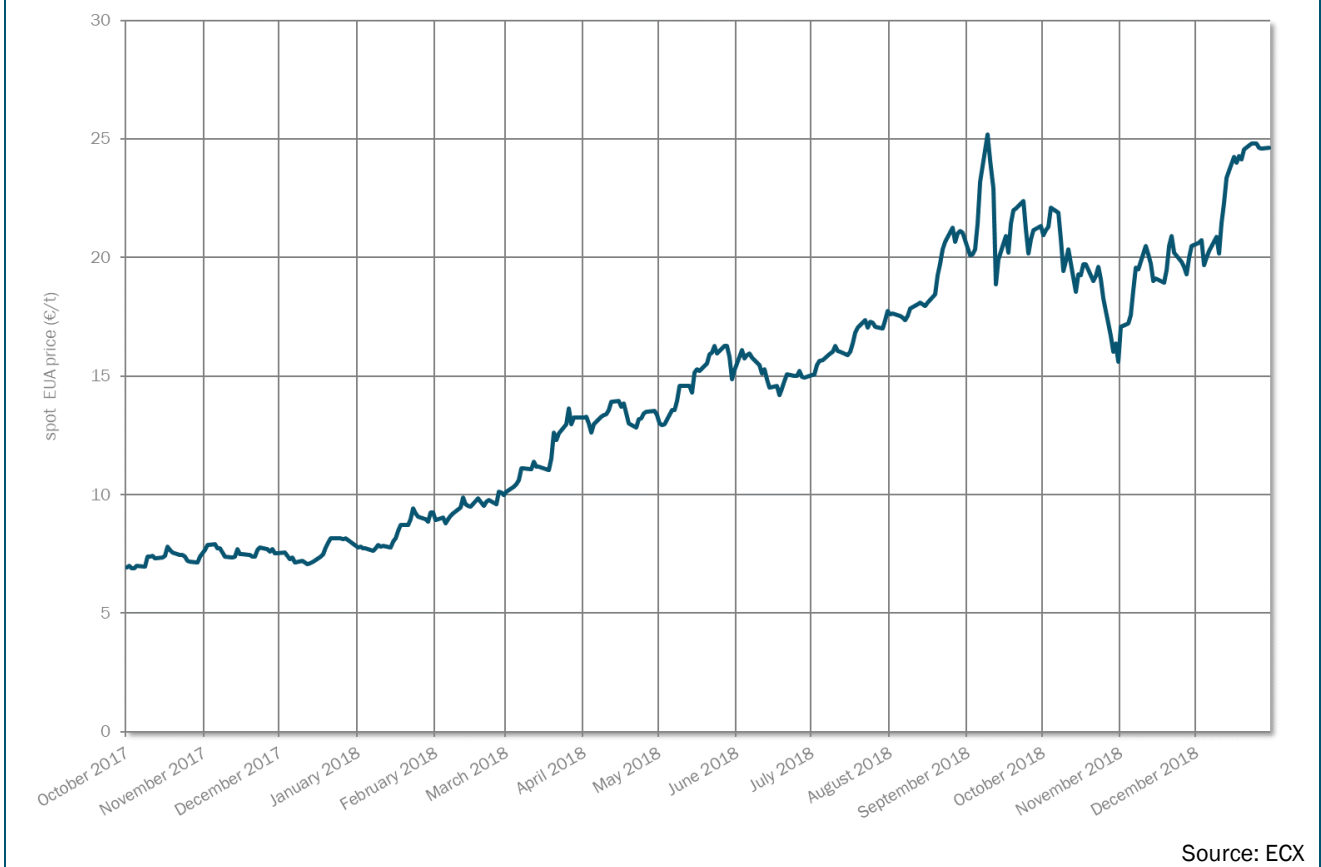


Source: GRTgaz, Teréga – Analysis: CRE

PART 3: **OTHER INDICATORS**

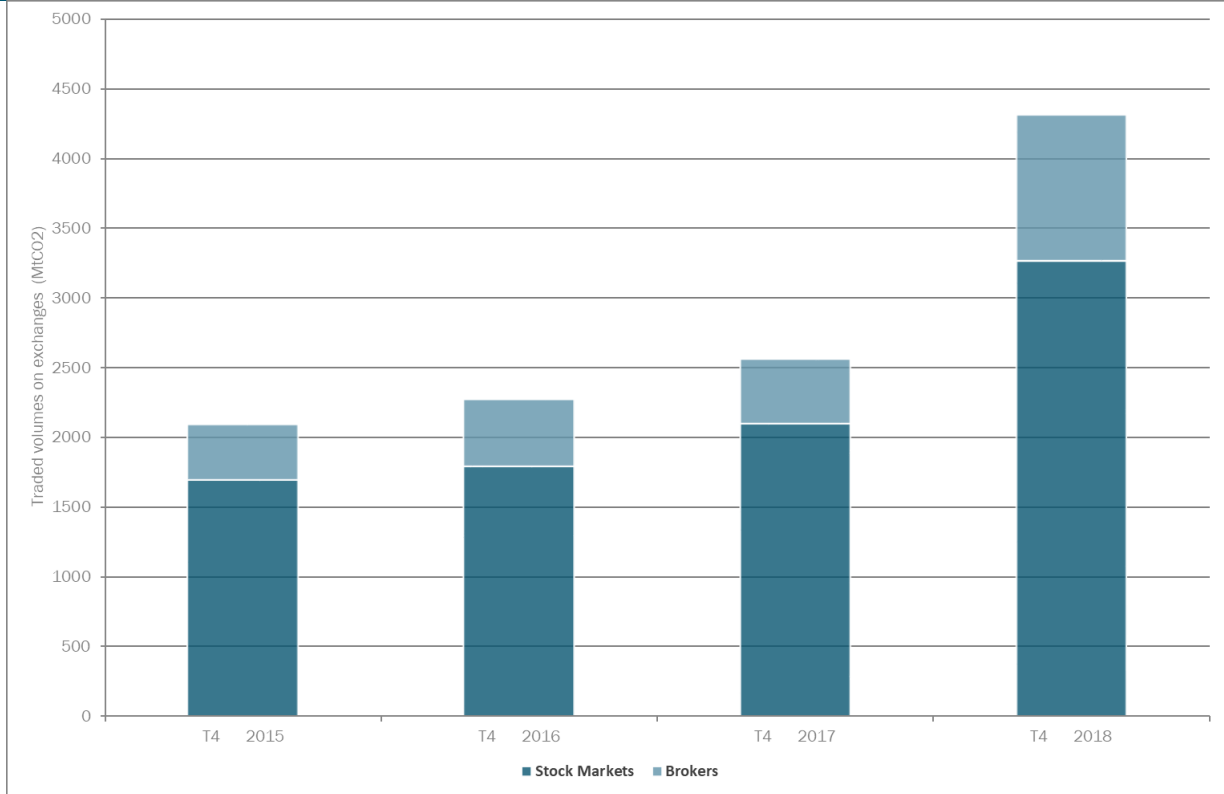
1. PRICE OF CO₂ ALLOWANCES

Figure 55: Evolution of EUA prices



Source: ECX

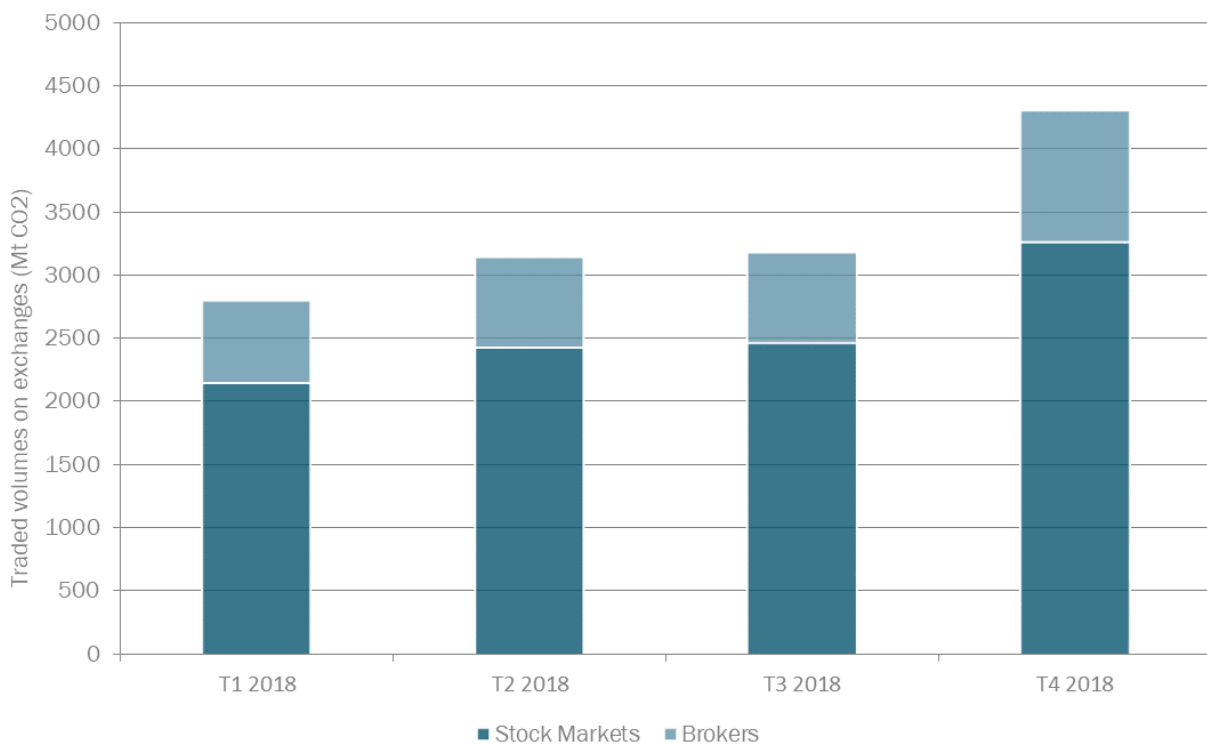
Figure 56: EUA quarterly volumes traded on exchanges and via brokers



Source: EEX, ECX, LEBA

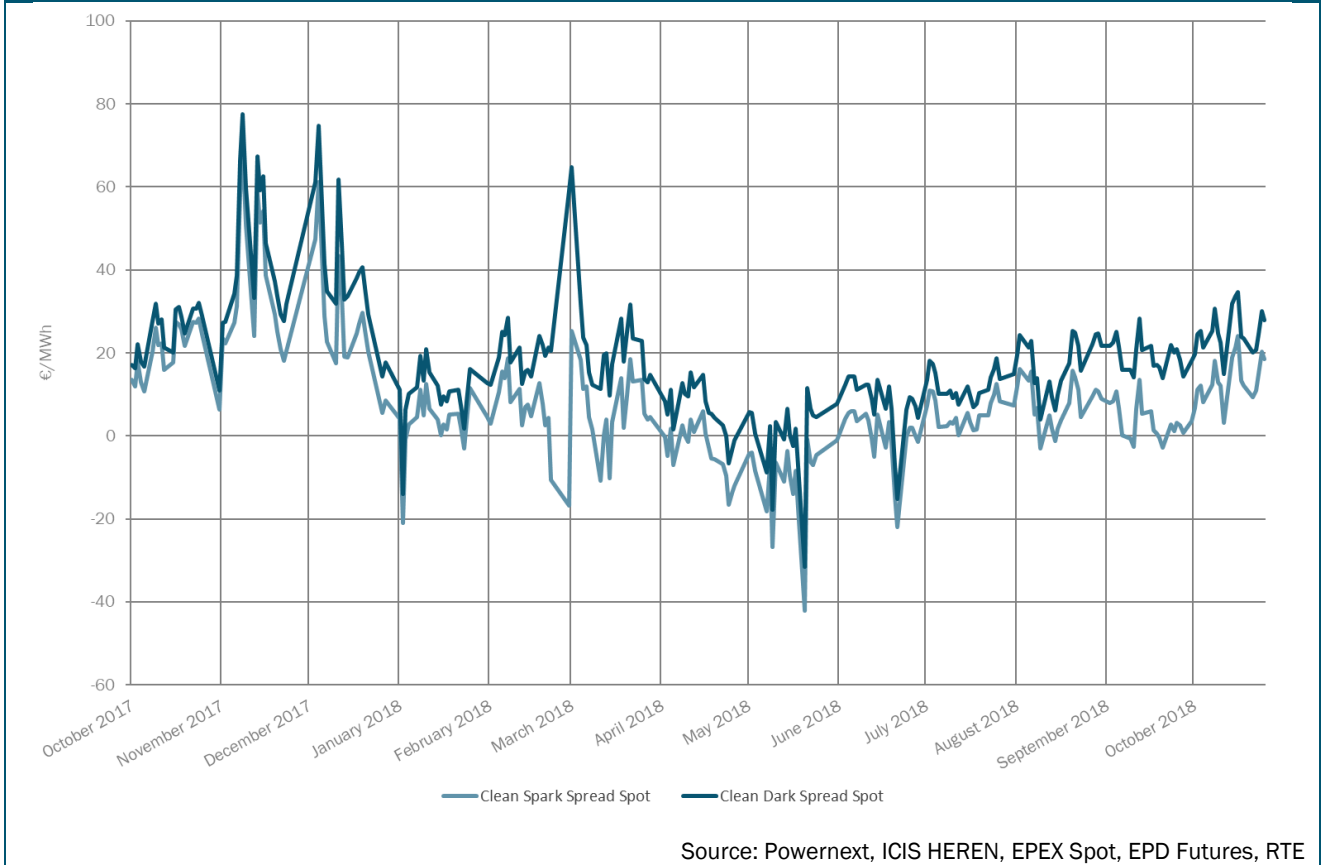
Figure 56 EUA annually volumes traded on exchanges and via brokers

Corrective: CRE has observed that the 2018 EUA volume data have been updated after the publication of the observatory of the 1st, the 2nd and the 3rd trimester. A correction is available below.



Source : ECX, EEX, LEBA

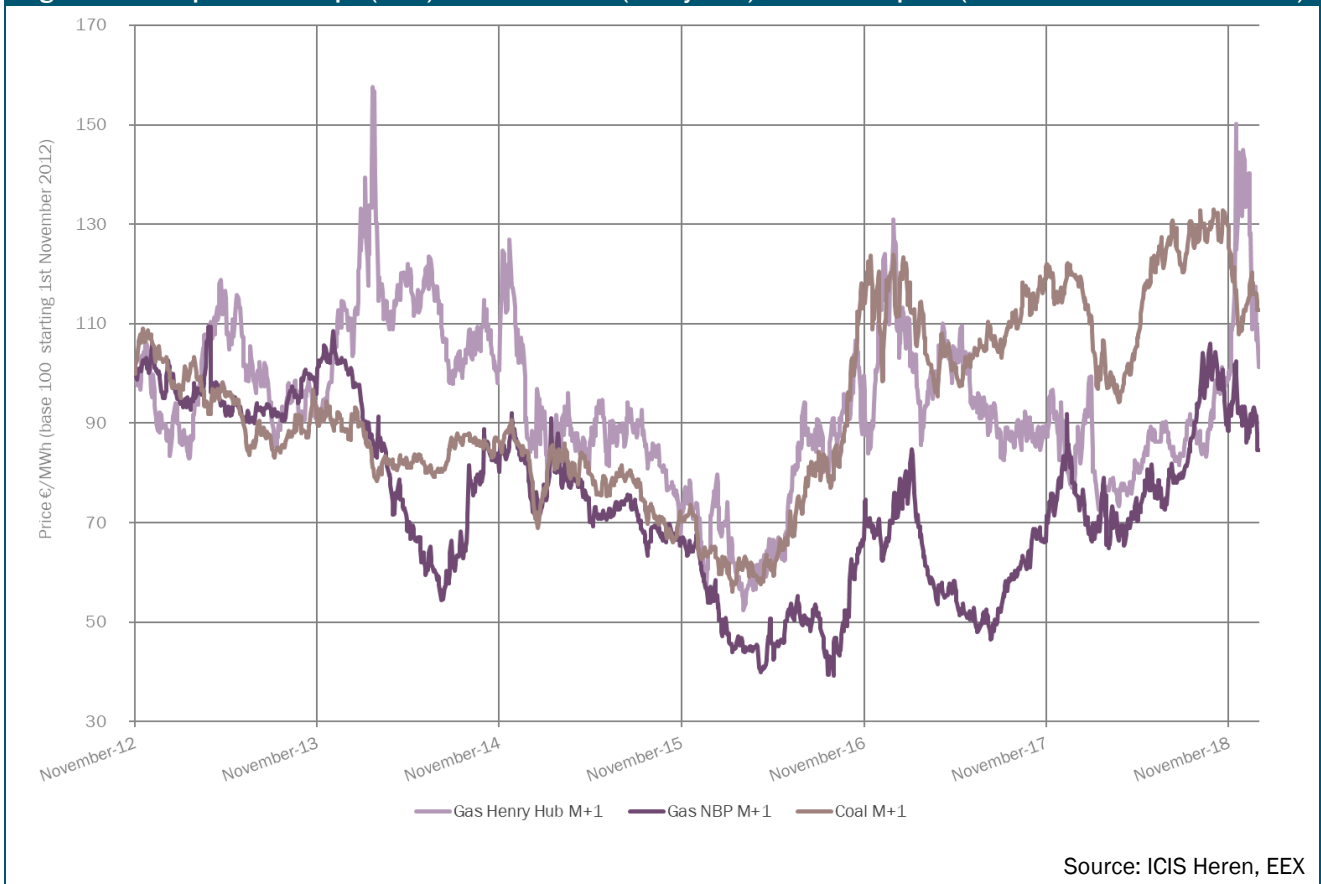
Figure 57: Evolution of the Clean Dark Spread and Clean Spark Spread on spot peakload



Clean Dark Spread (€/MWh) = $p_E - (\alpha p_C + \beta p_{CO_2})$	Clean Spark Spread (€/MWh) = $p_E - (\gamma p_G + \delta p_{CO_2})$
<ul style="list-style-type: none"> • p_E spot or Y+1 peakload price in France (€/MWh) • p_C M+1 or Y+1 coal price (€/MWh) • p_{CO_2} spot or Y+1 CO₂ price(€/MWh) • α includes the calorific power value and the coal yield* • β coal emission factor** 	<ul style="list-style-type: none"> • p_E spot or Y+1 peakload price in France (€/MWh) • p_G M+1 or Y+1 gas price at PEG North (€/MWh) • p_{CO_2} spot or Y+1 CO₂ price(€/MWh) • γ gas yield*** • δ gas emission factor****
<p>* Based on the assumption of a calorific power of 8.14 MWh/t for coal and a yield of 35% for coal-fired plants. It should be noted that these yields correspond to new reference installations and therefore may be quite different from the yields of existing installations and that other costs, including transportation, are not taken into account.</p> <p>** Based on an assumed emission factor of 0.96 t CO₂/MWh for coal-fired plants.</p> <p>*** Based on an assumed yield of 49% for gas plants.</p> <p>**** Based on an assumed emission factor of 0.46 t CO₂/MWh for gas plants.</p>	

2. GAS PRICE IN EUROPE AND IN AMERICA VERSUS COAL PRICE

Figure 58: Gas price in Europe (NBP) and in America (Henry Hub) versus coal price (base 100 in November 2012)



GLOSSARY

GENERAL GLOSSARY

Delivery on the wholesale market: Daily declaration of a market player to a system operator, of the gas or electricity exchanges taking place the following day with each of its counterparties. Each delivery can result from one or several transactions concluded beforehand on the wholesale market.

Forward contract: a standard contract agreement for delivery of a given quantity at a given price, for a given maturity (OTC markets).

Future contract: a standard contract agreement for delivery of a given quantity at a given price, for a given maturity (organized exchanges). Different maturities can be proposed depending on the exchange platform (week, half-year, quarter, month, year, etc.). The Y+1 contract correspond to the calendar year after the current year.

Day-ahead: a contract agreement signed for delivery the day after.

Transaction on the wholesale market: Conclusion of a contract between two wholesale market players, relative to the delivery of gas or electricity for a determined period of time, at a given price. The number of transactions in a market represents its level of activity, or its liquidity.

WHOLESALE ELECTRICITY MARKET GLOSSARY

Main electricity power exchanges in Europe:

- **EPEX Spot:** French power exchanges, non-mandatory (www.epexspot.com/fr).
- **EEX Power Derivatives:** German European Energy Exchange power exchanges, non mandatory (www.eex.de).
- **APX:** Dutch Amsterdam Power Exchange power exchanges, mandatory for imports and exports to the Netherlands (www.apx.nl).
- **Omel:** Spanish pool, almost mandatory (www.omel.es).
- **NordPool:** Scandinavian power exchanges, non-mandatory (one of the power exchanges in Europe, www.nordpool.no).

Wholesale products:

- **Intraday:** hourly contracts and intraday blocks for an undergoing day delivery.
- **Day-ahead:** contract negotiated the day before the delivery date.
- **Future:** standard contract for a given quantity, at a given price, at a given delivery date. The maturity of the contracts depends on the organized market place (week, month, quarter, season, year). The maturity Y+1 refers to the next calendar year following the on-going year.
- **Baseload:** 24 hours a day, 7 days a week.
- **Peak:** from 8 a.m. to 8 p.m. Monday to Friday.

Wholesale market segments:

- **Generation**
 - **ARENH:** stands for 'Regulated Access to Incumbent Nuclear Electricity'. It is a right that entitles suppliers to purchase electricity from EDF at a regulated price, in volumes determined by the French energy regulator.
 - **VPP:** "Virtual Power Plant" or capacity auction sales set up by EDF as a result of a decision made by the European Commission (<http://capacityauctions.edf.com/the-edf-group/capacityauctions/overview-114023.html>)

- **Wholesale purchases and sales (OTC, over the counter):** Block trading notifications, i.e, quantities selected by RTE the previous day for the day after, excluding trading via EPEX Spot.
- **Imports and exports:** http://www.rte-france.com/htm/fr/offre/offre_inter_1.htm.
- **Purchases and sales via EPEX Spot, the French electricity power exchange:** www.epexspot.com.
- **Final consumption:** sales to sites as a balancing responsible entity or under block trading.
- **Sales to network operators to compensate for their losses:** http://www.rtefrance.com/htm/fr/offre/offre_perte.htm.
- **Ventes aux gestionnaires de réseaux pour la compensation de leurs pertes :** http://www.rte-france.com/htm/fr/offre/offre_perte.htm.
- **VPP - Products auctioned off by EDF:**
 - **VPPs baseload:** these are products that reflect a generator running in base mode. It runs on the principle that bidders pay a fixed premium (in Euros/MW) each month in order to reserve available capacity, and that they regularly send EDF a schedule for using these capacities. Then they pay an operating fee per MWh taken off, which is similar to the marginal cost of EDF's nuclear generators. The price structure is therefore "fixed cost + variable cost".
 - **VPPs peak:** these are products that reflect a generator running in peak mode. The principle is the same as for the VPPs baseload, but the price paid for each MWh taken off is an estimate of the marginal cost of EDF's peak generators. Given this high variable cost, the fixed premium paid by bidders is lower than for VPPs baseload.

WHOLESALE NATURAL GAS MARKET GLOSSARY

Bcm: billion cubic meters.

Balancing zone: geographical zone of the natural gas transmission system within which entry and exit flows must be balanced by shippers.

Day-ahead: contract negotiated the day before the delivery date.

ENTSO-G: European Network of Transmission System Operators for Gas, association created by the European Commission to facilitate the cooperation between the network operators from European Member States and the creation of a European gas network.

Forward: contract with delivery at a given quantity, price and deadline.

Future: forward contract traded on an exchange (organized market).

Gas release program: in order to encourage competition in the South of France, a gas release program was set up in 2005 for a three-year period. During this program, Gaz de France released 15 TWh per year (i.e. 45 TWh for the entire program) at PEG South through calls for tenders and bilateral negotiations. Total released 1,1 TWh per year (i.e. 3,3 TWh during the program) at PEG TIGF.

Herfindahl–Hirschman Index (HHI): it is equal to the sum of the squares of the market shares of the companies and measures the market's concentration. It is higher for a concentrated market. It is normally assumed that a market is not concentrated when the HHI is lower than 1,000 and very concentrated if it is above 1,800.

Market coupling: mechanism that enables to bring together supply and demand of the coupled markets and to simultaneously and implicitly allocate the interconnection capacities between the balancing zones (North and South). Market coupling between North and South GRTgaz zones respects the specificities of the gas market: day-ahead prices are set continuously (each transaction is dealt at a particular price) and not by a fixing as it is for the electricity market (a unique auction operated by the exchange to set the price for each hour of the day).

Liquefied Natural Gas (LNG): LNG is natural gas condensed into liquid (by reducing its temperature to about -160 °C at atmospheric pressure), which has a volume decreased to about 1/600. It is mainly transported by sea in LNG tankers and unloaded in regasification terminals before being reinjected into the transport network.

National Balancing Point (NBP): gas hub of the United Kingdom. Because of the large volumes exchanged on this hub, prices on that exchange are an important reference for gas wholesale exchanges in Europe.

Nomination: quantity of energy, expressed in kWh (PCS 25 °C) notified by the shipper to the TSO any day that the shipper asks the TSO to take off, transmit or deliver gas in the transport network. By extension, “to nominate” refers to the notification to the TSO of a nomination.

North H / North B balancing zones: the North B balancing zone is supplied by B-gas, which comes essentially from the Netherlands and is characterized by a higher level of nitrogen (B and H meaning low and high calorific value, respectively). Since 1st April 2013, the North-H and North-B balancing zones merged creating a unique balancing zone.

PEG, Point d'échange de gaz: Virtual point attached to each balancing zone in France in which players in the wholesale market can exchange physical quantities of gas.

Spot market: the spot market include Intraday, Day-ahead, Weekend, Week products and those with a maturity below one month.

Take-or-Pay: clause of a long-term gas contract under which the seller (generally the producer) guarantees to supply a defined volume of gas to its client (generally an end consumer supplier) in exchange of its engagement to pay a minimal volume, whether or not the client decided to take this volume.

Unconventional gas: shale gases include three types of natural gas: shale gas, coal bed methane and tight gas. Unlike conventional gases, unconventional gases are found in low permeability rocks difficult to access. Their extraction is done thanks to two techniques: horizontal drilling and hydraulic fracturing.

WHOLESALE CARBON MARKET GLOSSARY

Backloading: Short-term solution to limit the surplus of CO2 allowances available on the market. It consists in removing 400 million of allowances in 2014, 300 million in 2015 and 200 million in 2016. Instead of selling it back in 2019 or 2020, these allowances will finally be put in the Market Stability Reserve in 2019

Banking: possibility for registrants to use an allowance issued at the beginning of a previous compliance period for compliance purposes.

Borrowing: the borrowing of an allowance for compliance purposes, giving registrants the option to use an allowance granted at the beginning of the followings compliance period (allowances for Year N are entered on the registers before 28 February, while on 30 April in Year N, allowances must be returned in respect of emissions for Year N-1).

Carbon dioxide (CO2): main greenhouse gas, produced primarily from the combustion of fossil energies.

CITL: Community Independent Transaction Log, a central transaction log run by the European Commission, which records the information provided by national registers.

CDM: Clean Development Mechanism. This is one of the flexibility mechanisms under the Kyoto Protocol, which enables developed countries to finance emissions reduction or greenhouse gas sequestration projects in developing countries and to claim Certified Emissions Reduction units (CERs), which they can accrue to fulfil their own emissions reduction obligations. CDM projects aim to encourage the transfer of environmentally-friendly technologies and to promote sustainable development in developing countries.

CER: Certified Emissions Reduction units from projects deployed under the Clean Development Mechanism (CDM) of the Kyoto Protocol. Some countries and companies make use of credits from CDM projects and joint application projects to comply with their Kyoto objectives. These units can be used in a limited way for the EU ETS compliance purpose until the end of the third phase, meaning 2020.

ECX: European Climate Exchange, carbon exchange based in London (www.theice.com)

Emission allowance (or emissions permit): unit of account under the EU Emission Trading Scheme. The allowance is a quantity of GHG emissions (expressed in tonnes of CO2 equivalent) that cannot be exceeded over a given period, which is granted to a country or an economic agent by an administrative authority (intergovernmental organization or government agency).

Energy - climate package: a set of EU laws adopted late 2008, relating to energy and climate change.

ERU: Emission Reduction Unit, carbon credits generated by Joint Implementation (JI) projects, in accordance with the rules defined by the Kyoto Protocol. Companies falling within the scope of the European Union Emission Trading Scheme (EUETS) can use these credits to meet their greenhouse gas emission reduction obligations. These units can be used in a limited way for the EU ETS compliance purpose until the end of the third phase, meaning 2020.

EUA: European Union Allowance, European emission allowance that authorizes the holder to emit the equivalent of one tonne of carbon dioxide in greenhouse gases.

EU ETS: the European Union Emission Trading Scheme is an EU mechanism that aims to reduce the global emission of CO₂ and achieve the European Union's objectives under the Kyoto Protocol. It is the largest greenhouse gas emission trading scheme in the world.

GHG: greenhouse gas. Gas contributing to the greenhouse effect (see Greenhouse effect). Not all GHGs make the same contribution to the greenhouse effect. In order to compare the different greenhouse gas emissions, their effects are expressed in terms of tonnes of carbon dioxide.

Greenhouse effect: effect causing a natural process, which maintains the lower atmosphere at an average temperature of 15°C. It is linked to the presence of certain gases in the atmosphere, such as carbon dioxide and methane, which trap the radiation emitted by the Earth and reflect some of it in the direction of the sun. As the quantity of greenhouse gases produced by humans is too high, temperatures are increasing significantly.

Kyoto Protocol: international treaty aiming to reduce greenhouse gas emissions. The Protocol sets out detailed commitments for the industrialized countries concerned, for reducing or limiting greenhouse gas (GHG) emissions during the first, so-called commitment period, i.e. 2008-2012 (-5.2% in relation to 1990). To achieve this, these countries are obliged to define policies and national measures to fight climate change.

Market Stability Reserve: Long-term solution to limit the surplus of CO₂ allowances available on the market. This mechanism will start in 2019 and will absorb 12 % of the market surplus when it is above 833 MtCO₂ and release 100 MtCO₂ when it is below 400 MtCO₂. From 2019 to 2023, the absorption rate will be doubled. Finally, the volume of the reserved is capped by the amount of allowances that were auctioned the previous year: if the reserve volume is above this amount, the surplus of allowances will be cancelled.

Phase IV: the fourth phase of the EU ETS for the period 2021-2030, whom reform, adopted in November 2017 by the European Commission, aims to better address the risk of carbon leakage, and limit the surplus on the carbon market.

Set aside: option of setting aside a share of the allowances for Phase III proposed by the European institutions, in order to curb the surplus of allowances of EU ETS.

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