



Gas Storage and Swing Report

Storage	Market	Product	Period	Cycle Cost	Intrinsic	Rolling Intrinsic		Option	
						Avg	10%	Avg	10%
	TTF	30/30	SY2019	0.50	1.17 ↑	4.82 ↓	3.34 ↓	6.31 ↓	5.06 ↓
	TTF	60/60	SY2019	0.50	1.17 ↑	3.26 ↓	2.40 ↓	4.00 ↓	3.18 ↓
	TTF	60/120	SY2019	0.50	1.16 ↑	2.53 ⇔	1.94 ↑	3.13 ↓	2.46 ↓
	NBP	30/30	SY2019	1.00	9.23 ↑	21.57 ↓	17.23 ↓	23.67 ↓	20.10 ↓
	NBP	60/60	SY2019	1.00	9.08 ↑	15.57 ↓	13.28 ↓	16.75 ↓	14.48 ↓
	NBP	60/120	SY2019	1.00	9.00 ↑	13.12 ↓	11.47 ↓	13.98 ↓	12.12 ↓

Swing	Market	Max/day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic		Option	
							Avg	10%	Avg	10%
	TTF	4	360/360	2020	22.22 ↓	-0.02 ⇔	0.09 ↓	-0.02 ↓	0.22 ↓	-0.42 ↓
	TTF	1	0/365	2020	22.22 ↓	0.00 ↓	1.18 ↑	0.12 ↓	1.31 ↑	0.08 ↓
	TTF	4	360/360	2020	MA	-0.02 ⇔	0.92 ↓	0.47 ↓	1.58 ↓	1.01 ↓
	NBP	4	360/360	2020	62.54 ↓	-0.02 ⇔	0.25 ↓	0.00 ↑	1.21 ↑	-1.44 ↓
	NBP	1	0/365	2020	62.54 ↓	0.00 ↓	3.06 ↑	0.36 ↓	2.13 ↑	0.31 ↓
	NBP	4	360/360	2020	MA	-0.02 ⇔	3.21 ↓	1.79 ↓	5.39 ↑	2.91 ↓

TTF Price History



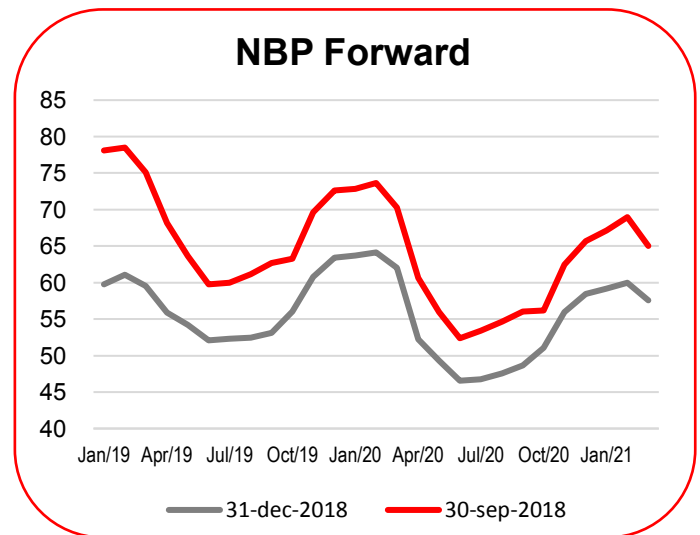
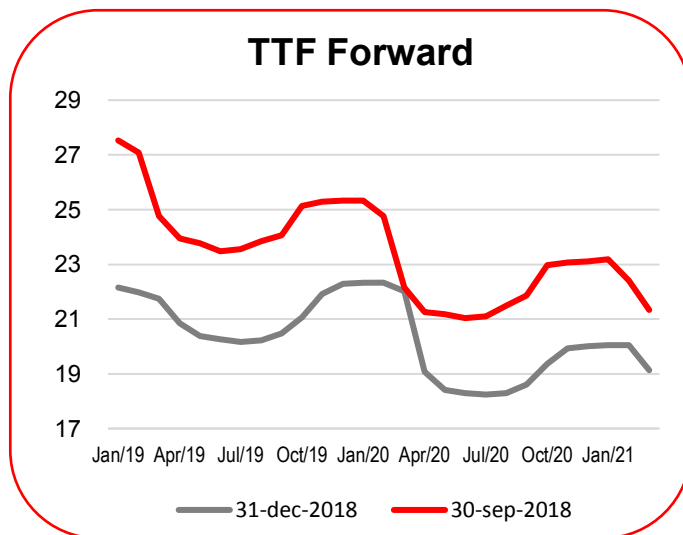
NBP Price History



Volatility

Market	Spot Volatility					Year-ahead Forward volatility				
	1m	3m	6m	12m	KYOS sugg.	1m	3m	6m	12m	KYOS sugg.
TTF	37% ↑	43% ↑	36% ↑	59% ⇔	58% ⇔	24% ↓	25% ↑	25% ↑	22% ↑	22% ↑
NBP	46% ↑	59% ↑	49% ↑	62% ↑	60% ↓	23% ↓	25% ↑	25% ↑	22% ↑	22% ↑
GPL	39% ↑	43% ↑	35% ↑	59% ⇔	56% ↓	19% ↓	24% ↑	25% ↑	22% ↑	22% ↑
NCG	38% ↑	41% ↑	34% ↑	55% ↓	55% ↓	19% ↓	24% ↑	24% ↑	22% ↑	22% ↑
PEG-N	30% ↓	44% ↑	37% ⇔	53% ↓	54% ↓	19% ↓	24% ↑	24% ↑	22% ↑	22% ↑

Price Forward Curves



Market Trend

The bull run that we observed during Q3-2018 got almost entirely cancelled over the course of Q4-2018. As an example, the TTF cal19 contract went down from 25.6 EUR/MWh to 21.7 EUR/MWh. At the same time the Q120 x Q319 TTF spread went up with approximately 0.4 EUR/MWh. An explanation could be the relatively mild and eventless winter we have seen so far. Northwest European storage levels are therefore at an above average level, leading to less risk for strong injections over Summer as we have seen in 2018.

Interestingly enough the same spread on the NBP only showed marginal movement during Q4-2018. Volatilities at the TTF and NBP did not show big movements.

For the storage values this led to a clear increase in the intrinsic value, but at the same time a decrease of the overall storage value (intrinsic + extrinsic). For our 60/60day TTF storage product for example, the total option value went down with 0.5EUR/MWh to 4.0EUR/MWh.

As of this quarter we consider a new set of swing contract, with delivery period 2020.

Explanation

Storage

- Product: 60/120 means 60 days of withdrawal and 120 days of injection capacity.
- The storage values are expressed per MWh (or therms) of working volume.

Swing

Product:

- Max/day is the maximum daily take
- Min/Max are the minimum and maximum annual take

Price

- A fixed price put at Q1-level or
- Month-ahead indexed price (MA)

The swing values are per MWh or therms of contract volume, which is 365 for the daily callable options (max 1 per day) and 360 for other contracts (max 4 per day).

Volatilities

The volatilities are derived from the end-of-day settlement prices of gas spot and futures exchanges. They are calculated with a history of 1, 3, 6 and 12 months. The 'KYOS suggested' volatilities are our expert view, considering the historical estimates as well as recent market developments. These estimates are used for the valuations.

Valuation Methodologies

- All valuations have been performed with KYOS software and models, KyStore and KySwing. They are expressed in €/MWh (TTF) or p/th (NBP). Inputs include the spot and forward volatilities from the table in this report, as well as forward curves and some other settings.
- The trading date for all values is 31 Dec 2018.
- A discount rate of 2% has been applied.
- Intrinsic values are derived from the tradable products in the market.
- Rolling intrinsic and option values are derived from Monte Carlo simulations of spot and forward prices:
 - Rolling intrinsic: the intrinsic value is locked in initially with tradable products; then this position, including spot, may be adjusted daily to capture extra value.
 - Option value: the spot trades are optimized, taking into account the optionality of the asset, based on the least-squares Monte Carlo method. In addition, the position is delta hedged in the forward market to minimize the risk.
 - Of the rolling intrinsic and option value, the table shows the average across the simulations and the 10th percentile, which is a more conservative value estimate.
 - In all trading strategies, the model takes into account transaction costs of 0.02 €/MWh (TTF) or 0.02 p/th (NBP).

Contact us for more information about the models and assumptions underlying this report, or to request a demonstration of the KYOS software.

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Our analytics
Your advantage

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