Gas

No. 16 • April 2018

Gas Storage and Swing Report

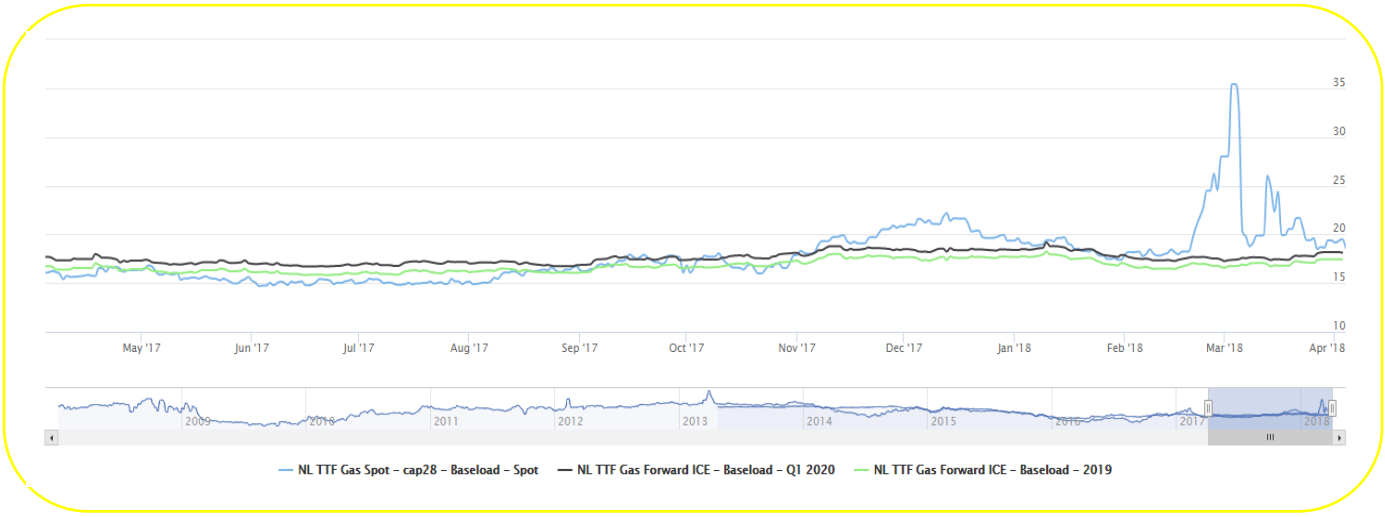
Storage

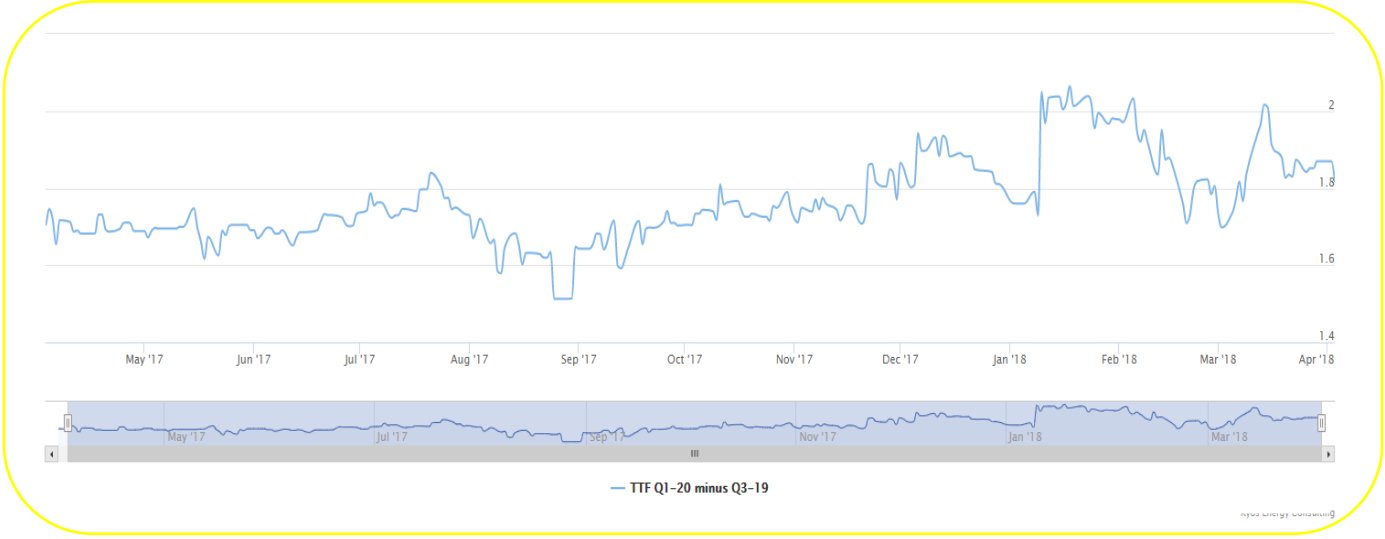
Market	Product	Period	Cycle Cost	Intrinsic	Rolling Intrinsic Avg	Rolling Intrinsic 10%	Option Avg	Option 10%
TTF	30/30	SY2019	0.50	0.74	3.24	2.24	4.72	3.87
TTF	60/60	SY2019	0.50	0.74	2.26	1.58	3.11	2.48
TTF	60/120	SY2019	0.50	0.63	1.85	1.43	2.50	1.99
NBP	30/30	SY2019	1.00	7.93	21.00	15.90	22.97	20.00
NBP	60/60	SY2019	1.00	7.93	15.62	13.17	17.03	15.17
NBP	60/120	SY2019	1.00	7.98	14.65	13.07	15.37	13.62

Swing

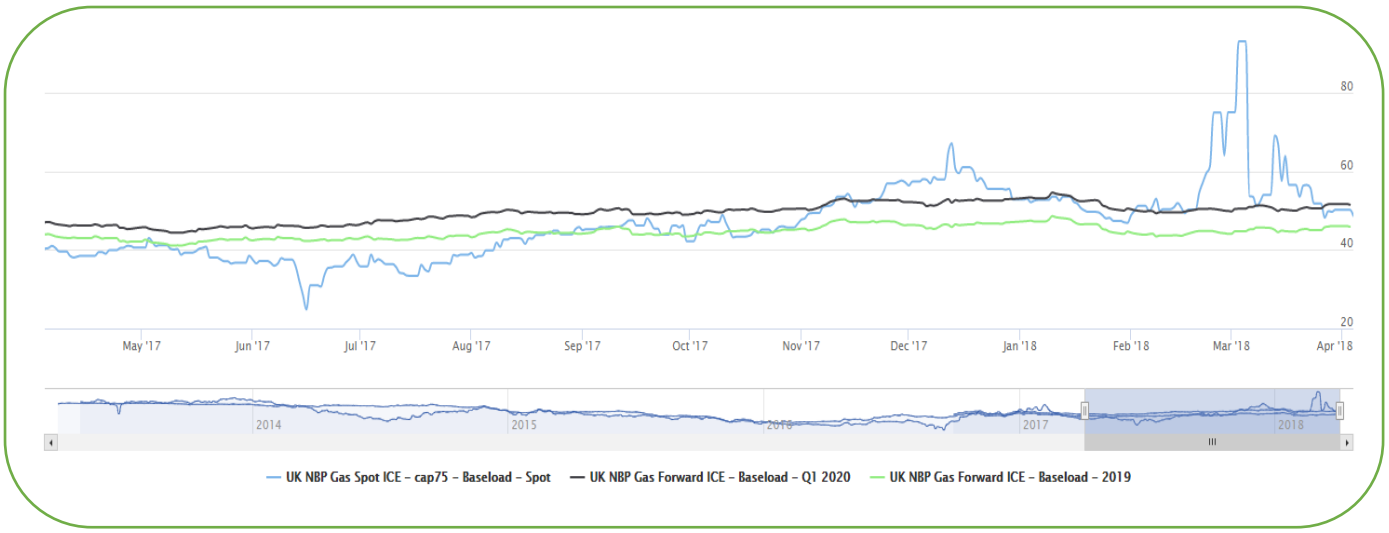
Market	Max/ day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic Avg	Rolling Intrinsic 10%	Option Avg	Option 10%
TTF	4	360/360	2019	19.21 ↑	-0.02 ⇔	0.11 ↓	-0.02 ⇔	0.30 ↓	-0.16 ↑
TTF	1	0/365	2019	19.21 ↑	0.00 ↓	0.50 ↓	0.06 ↓	0.61 ↓	0.10 ↓
TTF	4	360/360	2019	MA	-0.02 ↓	0.61 ↑	0.36 ↓	1.19 ↑	0.84 ↓
NBP	4	360/360	2019	55.68 ↑	-0.02 ⇔	0.26 ↓	-0.02 ⇔	0.57 ↓	-0.45 ↓
NBP	1	0/365	2019	55.68 ↑	0.00 ↓	1.22 ↓	0.24 ↓	1.28 ↓	0.39 ↓
NBP	4	360/360	2019	MA	-0.02 ⇔	2.87 ↓	1.82 ↓	4.28 ↓	3.08 ↓

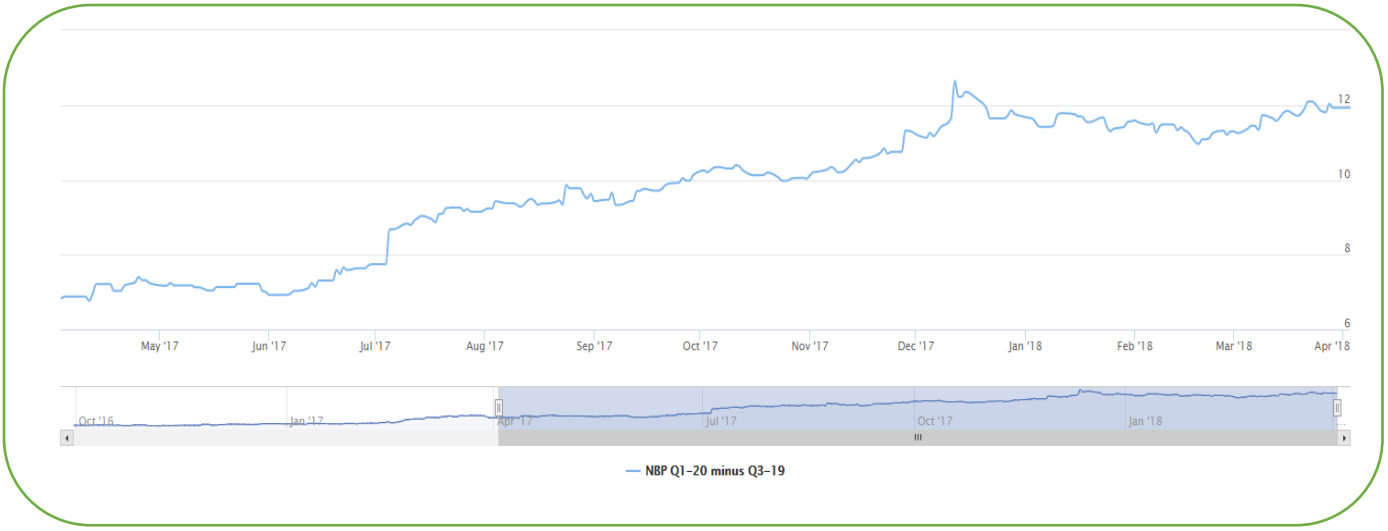
TTF Price History





NBP Price History

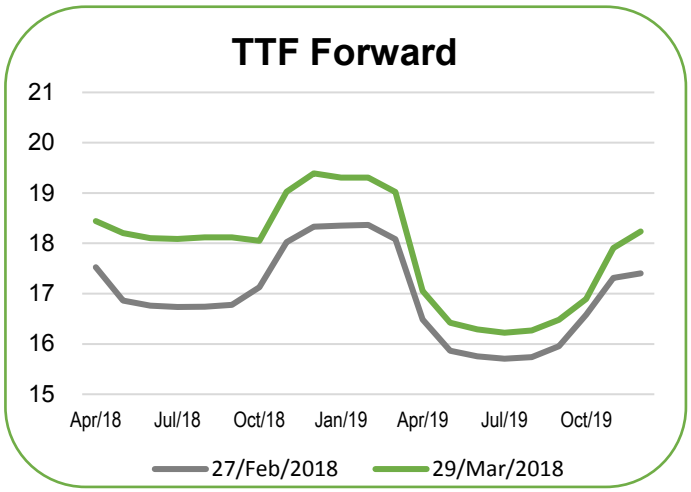


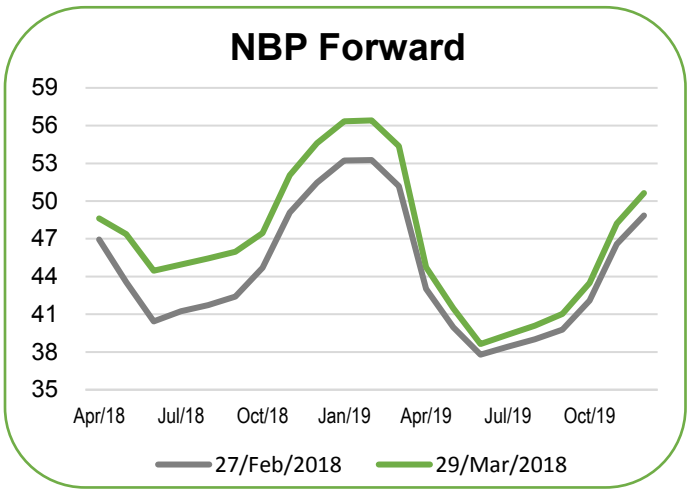


Volatility

Market	Spot Volatility					Year-ahead Forward volatility				
	1m	3m	6m	12m	KYOS sugg.	1m	3m	6m	12m	KYOS sugg.
TTF	131% ↑	96% ↑	74% ↑	58% ↑	58% ↑	11% ↓	14% ⇔	14% ↓	14% ↓	14% ↓
NBP	130% ↑	68% ↑	74% ↑	70% ↑	70% ↓	12% ↓	15% ⇔	15% ↓	14% ↓	14% ↓
GPL	132% ↑	98% ↑	77% ↑	60% ↑	58% ↑	10% ↓	13% ⇔	13% ↓	13% ↓	14% ↓
NCG	129% ↑	91% ↑	72% ↑	57% ↑	58% ↑	10% ↓	13% ↓	13% ↓	14% ⇔	14% ↓
PEG-N	118% ↑	79% ↑	70% ↑	57% ↑	58% ↑	10% ↓	13% ↓	14% ⇔	13% ↓	14% ↓

Price Forward Curves





Market Trend

General

Due to the cold weather and low storage levels, gas market prices were extremely turbulent during the last days of February and the first week of March: on TTF the daily spot prices reached a maximum of 71 €/MWh and on NBP 200 p/therm, about four times higher than normal. However, we believe that those levels were an exception and unlikely to be reached in the next winter periods. Therefore, we have taken out this extreme period in our historical calibrations.
There are several reasons for taking out this turbulent week and we advise to use more moderate (though historically still high) volatility levels for valuations over the next 1-2 years. First of all, by the end of March, the summer-winter spreads were largely at similar levels as before the cold snap, e.g. for TTF at about 1.80 €/MWh and NBP at about 12 p/th. If market players expect prices will spike again next winter, this would have been reflected in a significant rise in the summer-winter spread. Secondly, we have analyzed a few storage auctions that took place in March. They did not show much increase in realized storage prices. Finally, several market participants shared their views with us that the high spot price levels were unlikely to be repeated next winter periods. Therefore, we have decided to take out about a week of price data when calibrating historical volatilities and mean-reversion rates. Furthermore, our 'KYOS suggested values' are similar to the values from our previous report, with e.g. 1% higher TTF spot price volatility (from 57 to 58%) and 5% lower NBP spot price volatility (from 75 to 70%).

Gas storage

Up to last month we reported storages for storage year 2018. Since we are now in April 2018, we will from now on consider storage year 2019 for our valuations. The specifications of our storages remain unchanged, with the exception of the cycle costs. We decided to decrease these costs to 0.5€/MWh for the TTF storages and 1p/th for the UK storages to better reflect traded products in the market.
Since we changed the storage period and cycling costs we did not include the comparison of the values to last months' reported values.

Swing

The value of the majority of the reported swing contracts was down over the month. For the fixed price contracts this is mainly caused by a change of the shape of the forward curve. The fixed price contracts are priced at the level of the Q1-19 contract. The spread between Q1-19 and the remainder of the 2009 increased resulting in a lower overall value. On the NBP this effect got amplified by a decrease in the used spot volatility. The only exception to this trend is the month-ahead priced TTF contract. This contract showed a marginal higher rolling intrinsic and option value as a result of the increase in used TTF spot volatility.

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 29 Mar 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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