

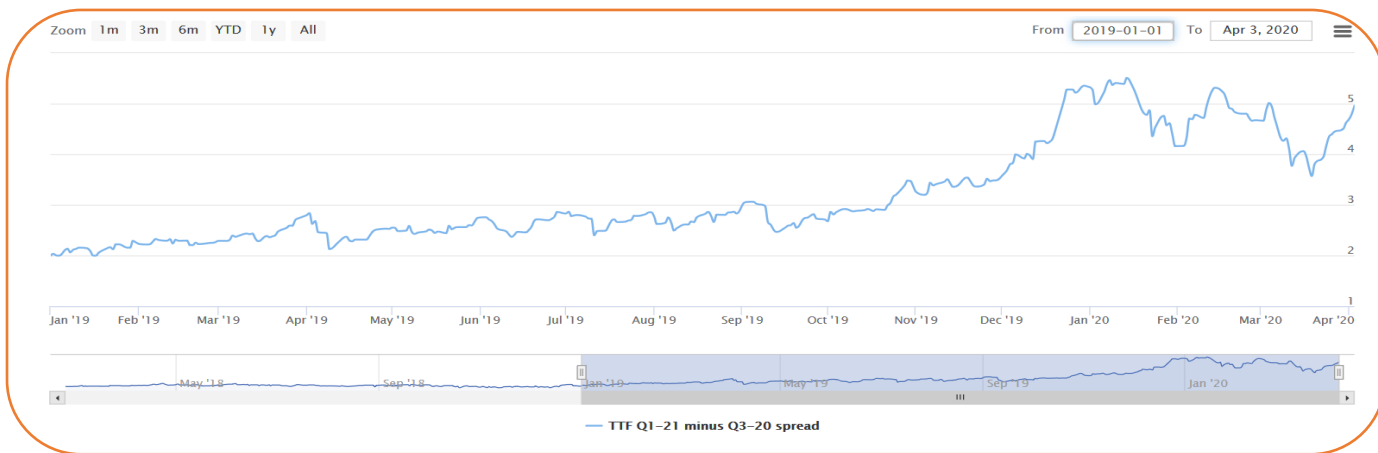


## Gas Storage and Swing Report

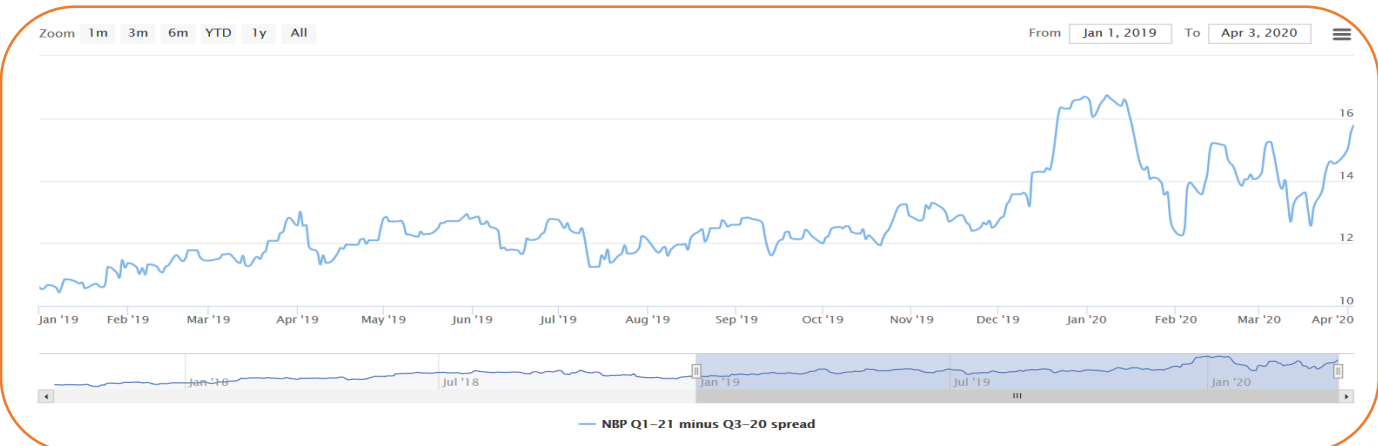
Storage	Market	Product	Period	Cycle Cost	Intrinsic	Rolling Intrinsic		Option	
						Avg	10%	Avg	10%
	TTF	30/30	SY2020	0.50	4.60 ▼	5.67 ▼	5.20 ▼	6.20 ▼	5.60 ▼
	TTF	60/60	SY2020	0.50	4.59 ▼	5.11 ▼	4.90 ▼	5.73 ▼	4.95 ▼
	TTF	60/120	SY2020	0.50	4.43 ▼	4.86 ▼	4.68 ▼	5.04 ▼	4.67 ▼
	NBP	30/30	SY2020	1.00	16.27 ▼	20.17 ▼	18.53 ▼	21.07 ▼	19.27 ▼
	NBP	60/60	SY2020	1.00	16.03 ▼	17.93 ▼	17.12 ▼	18.42 ▼	17.18 ▼
	NBP	60/120	SY2020	1.00	15.53 ▼	17.08 ▼	16.48 ▼	17.33 ▼	16.20 ▼

Swing	Market	Max/day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic		Option	
							Avg	10%	Avg	10%
	TTF	4	360/360	2021	12.23 ▼	1.27 ▲	1.61 ▲	0.23 ▲	1.66 ▲	1.27 ▲
	TTF	1	0/365	2021	12.23 ▼	0.32 ▲	1.39 ▼	0.62 ▲	1.55 ▼	0.81 ▲
	TTF	4	360/360	2021	MA	-0.02 ⇄	0.52 ▼	0.23 ▼	1.10 ▼	0.78 ▼
	NBP	4	360/360	2021	34.18 ▼	0.01 ▲	0.03 ▼	0.02 ▼	0.03 ▼	0.02 ▼
	NBP	1	0/365	2021	34.18 ▼	0.00 ⇄	0.03 ▼	0.01 ▼	0.03 ▼	0.02 ▼
	NBP	4	360/360	2021	MA	0.00 ▲	0.02 ▼	0.01 ▼	0.03 ▼	0.02 ▼

### TTF Price History



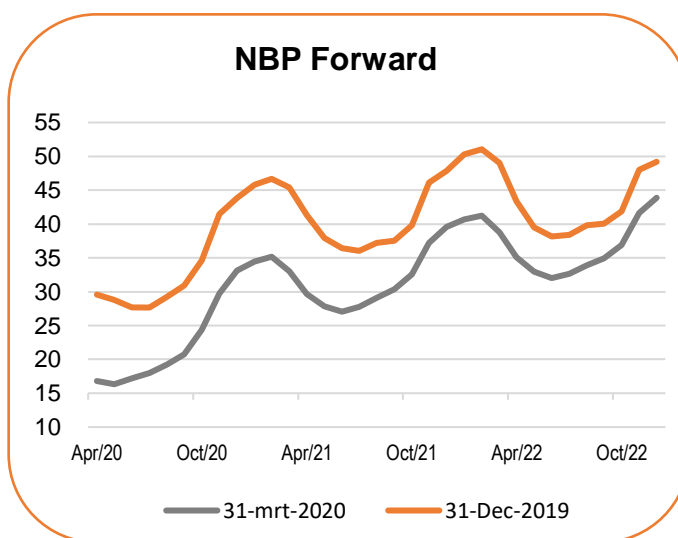
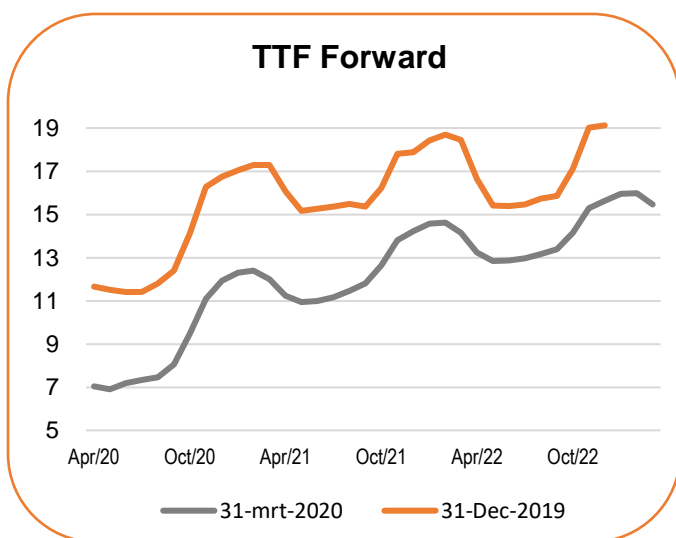
### NBP Price History



## Volatility

Market	Spot Volatility					Year-ahead Forward volatility				
	1m	3m	6m	12m	KYOS sugg.	1m	3m	6m	12m	KYOS sugg.
TTF	30% ▼	29% ▼	82% ▼	79% ▲	62% ▼	29% ▼	37% ▲	30% ▲	30% ▲	30% ▲
NBP	61% ▼	55% ▼	88% ▼	85% ▲	65% ▼	28% ▼	36% ▲	30% ▲	30% ▲	30% ▲
GPL	35% ▼	44% ▼	97% ▼	91% ▲	66% ↔	29% ▲	30% ▲	26% ▼	27% ▲	27% ▲
NCG	42% ▼	43% ▼	102% ▼	90% ▲	66% ↔	29% ▲	31% ▲	27% ↔	27% ▲	27% ▲
PEG-N	24% ▼	46% ▼	103% ▼	90% ▲	65% ↔	30% ↔	31% ▲	28% ↔	28% ▲	28% ▲

## Price Forward Curves



## Market Trend

The first quarter of 2020 was a very dynamic period. Spot prices went to historical lows which haven't been seen since 2009. The average realized TTF spot price in Q1-2020 was about 9.5 €/MWh. This is almost 50% lower than during Q1-2019 (18.5 €/MWh). The low spot prices were not only a result of the mild winter conditions in Europe, but also of strong LNG supply to Europe, partly caused by the COVID-19 effect on Chinese gas demand.

The TTF storage spread Q1-2021/Q3-2020 showed large movements too. It started off at 5.3€/MWh, moved down to 3.6€/MWh in March to finally close the quarter at 4.6€/MWh. Different factors played a role, one of them being the storage auctions that happened during this quarter. Hedging and speculative trading of the storage spread around those auctions led to price moves. All auctions, especially those of Gasterra and Bergermeer, attracted lots of market attention. The cleared prices were at or above the fair market value we assessed. This indicates a high demand, including of existing customers who wish to roll-over inventories to the next storage year, thereby avoiding withdrawals at the low spot prices.

Our assessment of storage year 2020 went slightly down as compared to our previous report that was based on market prices at the end of 2019. A lower storage spread, lower spot volatility and lower overall price levels all contribute to this decrease. This is the last report for the storage year 2020 contracts. As of next report we will look at storage year 2021.

The intrinsic value of the fixed price swing contracts increased as a result of more a curve in stronger contango. Lower spot volatility and lower price level dragged the overall value down almost all the swing contracts.

## 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 March 2020.
- 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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