

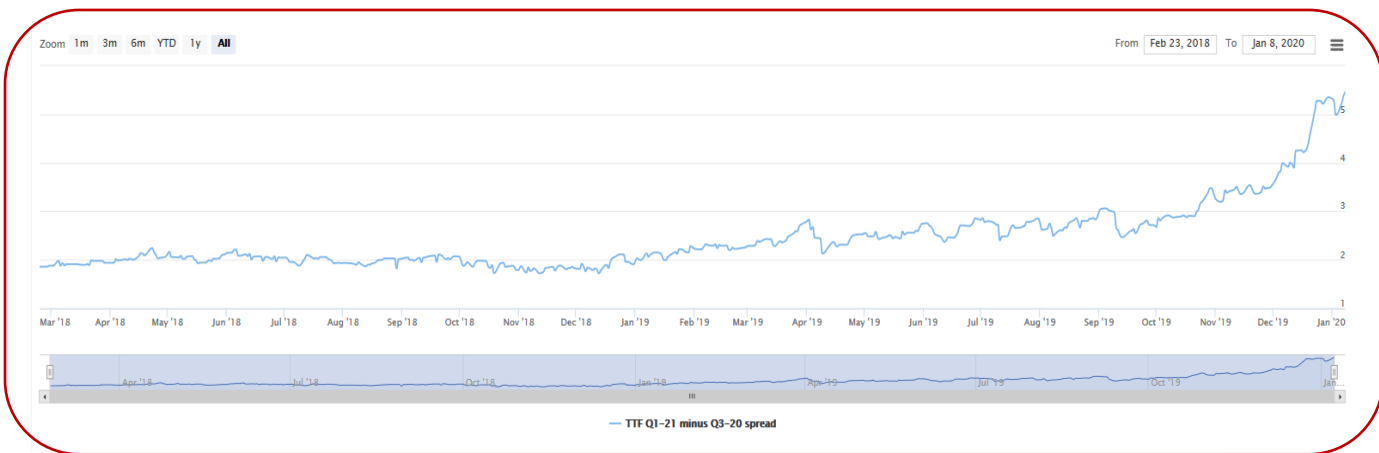


Gas Storage and Swing Report

Storage	Market	Product	Period	Cycle Cost	Intrinsic	Rolling Intrinsic		Option	
						Avg	10%	Avg	10%
	TTF	30/30	SY2020	0.50	5.02 ▲	7.34 ▲	6.26 ▲	8.27 ▲	7.23 ▲
	TTF	60/60	SY2020	0.50	5.02 ▲	6.19 ▲	5.65 ▲	6.70 ▲	5.96 ▲
	TTF	60/120	SY2020	0.50	4.92 ▲	5.77 ▲	5.40 ▲	6.04 ▲	5.37 ▲
	NBP	30/30	SY2020	1.00	16.60 ▲	24.03 ▲	20.57 ▲	25.77 ▲	22.63 ▲
	NBP	60/60	SY2020	1.00	16.58 ▲	20.07 ▲	18.43 ▲	20.97 ▲	18.92 ▲
	NBP	60/120	SY2020	1.00	15.82 ▲	18.55 ▲	17.45 ▲	19.13 ▲	17.32 ▲

Swing	Market	Max/day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic		Option	
							Avg	10%	Avg	10%
	TTF	4	360/360	2021	17.21 ▼	-0.01 ▼	0.67 ▼	0.23 ▼	1.12 ▲	0.63 ▼
	TTF	1	0/365	2021	17.21 ▼	0.00 ▼	1.43 ▲	0.24 ▼	1.71 ▲	0.67 ▼
	TTF	4	360/360	2021	MA	-0.02 ⇔	0.76 ▲	0.36 ▼	1.42 ▲	1.03 ▲
	NBP	4	360/360	2021	45.94 ▼	-0.02 ▼	2.10 ▼	0.10 ▼	2.69 ▼	1.41 ▼
	NBP	1	0/365	2021	45.94 ▼	0.00 ▼	3.77 ▲	0.45 ▼	3.97 ▲	1.44 ▼
	NBP	4	360/360	2021	MA	-0.02 ⇔	2.59 ▼	1.34 ▼	3.96 ▼	2.84 ▼

TTF Price History



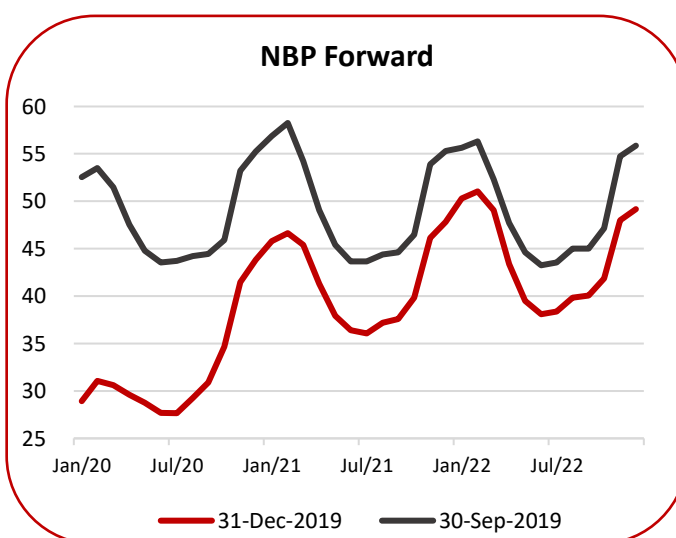
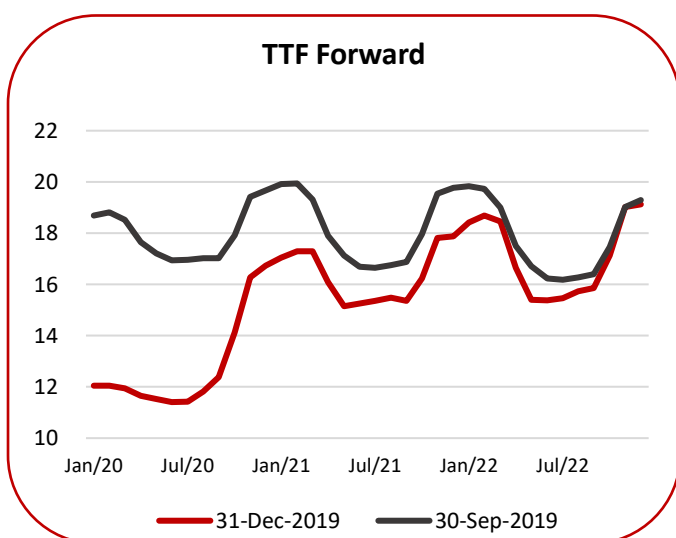
NBP Price History



Volatility

Market	Spot Volatility					Year-ahead Forward volatility				
	1m	3m	6m	12m	KYOS sugg.	1m	3m	6m	12m	KYOS sugg.
TTF	70% ▼	109% ▲	101% ▲	78% ▲	65% ▲	33% ▼	27% ▼	29% ▲	26% ▲	26% ▲
NBP	79% ▼	110% ▲	103% ▲	82% ▲	67% ▲	36% ▲	28% ↔	29% ▲	27% ▲	27% ▲
GPL	91% ▼	128% ▲	115% ▲	90% ▲	66% ▲	28% ▼	23% ▼	27% ▲	24% ↔	24% ↔
NCG	80% ▼	131% ▲	115% ▲	89% ▲	66% ▲	28% ▼	24% ▼	27% ▲	24% ↔	24% ↔
PEG-N	80% ▼	136% ▲	112% ▲	88% ▲	65% ▲	30% ▼	24% ▼	28% ▲	25% ▲	25% ▲

Price Forward Curves



Market Trend

The winter started relatively mild. Together with the ongoing strong inflow from LNG, unusual low storage withdrawals were seen during Q4-2019. Spot prices remained low as well. The TTF spot prices were in the last week of December 2019 around 12€/MWh. This is about 10€/MWh lower than during the last week of 2018. The combination of low spot prices and high storage levels put downward pressure on the whole front end of the curve. The TTF Summer 2020 went down during Q4-2019 with 32% from 17.2€/MWh on 1 October 2019 to 11.7€/MWh on 31 December 2019. The Q1-2021 contract went down less, leading to a doubling of the Q1-2021/Q3-2020 spread to 5.34€/MWh at the last trading day of 2019.

The intrinsic value of the storages of our report went up in the same way. The intrinsic value for our TTF 30/30 product is now calculated at 5.02€/MWh, compared to 1.96€/MWh in our October report.

Our view on the spot volatility went up as well. The TTF spot volatility is now marked at 65%, up from 57% in our report 3 months ago. This value is still lower than the spot value calculated using a one-year historical window. This lower assessment is for example confirmed when looking at the results of the Gasterra storage auction of end of November 2019. The published prices for this auction suggest that the market uses lower volatility assumptions than based on a one-year historical window.

With the increase in both intrinsic value and volatility, the full market value of all our storages went up. We calculate for example the 10% percentile of the Full Option value for the TTF 30/30 storage products at 7.23€/MWh, an increase of almost 50% compared to our previous report.

For the swing contracts we now publish the results of new delivery periods, calendar year 2021. The other product characteristics have not been changed compared to our previous report.

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 2019.
- 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.

Contact information: www.kyos.com/contact

KYOS energy asset optimization and valuation: www.kyos.com/energy-asset-optimization

E-mail: info@kyos.com