



Gas Storage and Swing Report

Storage	Market	Product	Period	Cycle Cost	Intrinsic	Rolling Intrinsic Avg		Option 10%	
								Avg	10%
	TTF	30/30	SY2021	0.50	2.04 ▼	4.98 ▼	3.46 ▼	6.28 ▼	5.00 ▼
	TTF	60/60	SY2021	0.50	2.00 ▼	3.63 ▼	2.77 ▼	4.39 ▼	3.34 ▼
	TTF	60/120	SY2021	0.50	1.98 ▼	3.13 ▼	2.49 ▼	3.64 ▼	2.79 ▼
	NBP	30/30	SY2021	1.00	11.00 ▼	20.07 ▼	15.37 ▼	21.87 ▼	18.43 ▼
	NBP	60/60	SY2021	1.00	10.58 ▼	15.77 ▼	13.30 ▼	16.75 ▼	14.13 ▼
	NBP	60/120	SY2021	1.00	10.50 ▼	14.18 ▼	12.42 ▼	14.68 ▼	12.35 ▼

Swing	Market	Max/day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic Avg		Option 10%	
									Avg	10%
	TTF	4	360/360	2020	13.68 ▲	0.89 ▼	1.35 ▼	1.06 ▼	1.42 ▼	1.12 ▼
	TTF	1	0/365	2020	13.68 ▲	0.23 ▼	1.13 ▼	0.48 ▼	1.26 ▼	0.76 ▼
	TTF	4	360/360	2020	MA	-0.02 ↔	0.62 ▲	0.32 ▲	1.23 ▲	0.88 ▲
	NBP	4	360/360	2020	40.31 ▲	0.72 ▼	2.84 ▼	1.89 ▼	3.05 ▼	2.39 ▼
	NBP	1	0/365	2020	40.31 ▲	0.22 ▼	2.48 ▼	0.96 ▼	2.74 ▼	1.51 ▼
	NBP	4	360/360	2020	MA	-0.02 ↔	2.25 ▲	1.32 ▼	3.58 ▼	2.57 ▲

TTF Price History



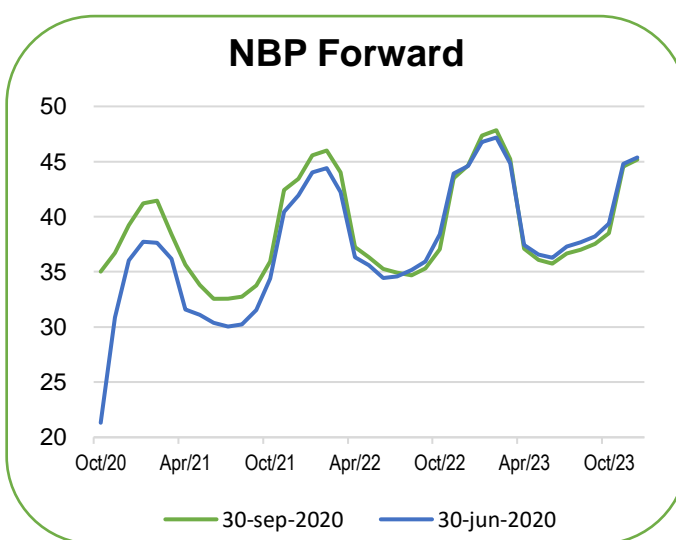
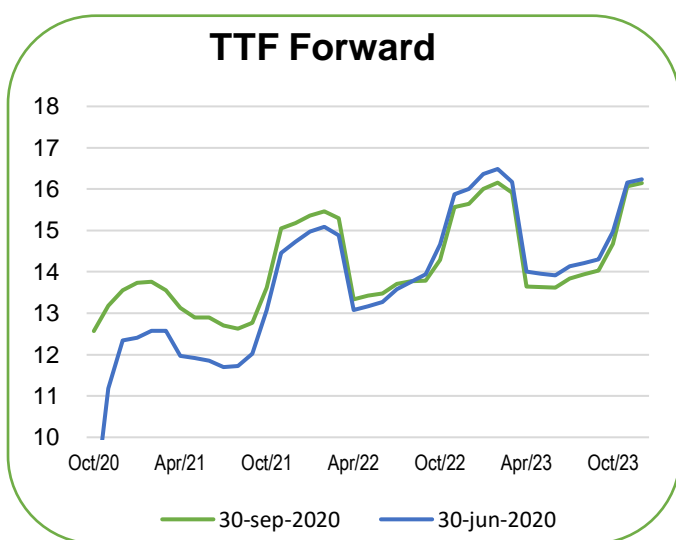
NBP Price History



Volatility

Market	Spot Volatility					Year-ahead Forward volatility				
	1m	3m	6m	12m	KYOS sugg.	1m	3m	6m	12m	KYOS sugg.
TTF	86% ▼	101% ▲	92% ▲	95% ▲	65% ▼	16% ▼	23% ↔	27% ▼	30% ▲	30% ▲
NBP	81% ▲	73% ▼	111% ▲	107% ▲	71% ↔	17% ▼	24% ↔	26% ▼	30% ↔	30% ↔
GPL	74% ▼	88% ▲	78% ▲	98% ▲	70% ▲	18% ↔	23% ▲	26% ▼	28% ▲	28% ▲
NCG	78% ▼	95% ▲	80% ▲	100% ▲	70% ▲	15% ▼	22% ▲	26% ▼	28% ▲	28% ▲
PEG-N	82% ▼	106% ▲	96% ▲	102% ▲	70% ▲	16% ▼	24% ▲	27% ▼	29% ▲	29% ▲

Price Forward Curves



Market Trend

The third quarter of 2020 was another dynamic period in the European gas market, especially on the prompt period. Spot prices had basically only one direction during this quarter: up. The TTF day-ahead price increased from 5.66 €/MWh at the start of the quarter to 12.26 €/MWh at the end. Spot prices are now again at the same levels as during December 2019. The main reasons for the strong spot prices were strong gas demand out of the power sector due to gas replacing coal in Germany and various power plant outages. A strong decrease in LNG imports during this quarter, primarily a result of an exceptional hurricane season in the US Gulf coast region, also put upwards pressure to the European gas prices.

The back end of the curve did not see large changes. The stronger front end of the curve did lead however to decreasing price differentials relevant for the contracts we consider. The TTF Q1-2022 x Q3-2021 price spread for example narrowed over the course of the quarter from 3.25 €/MWh to 2.65 €/MWh. This resulted in a strong decrease in intrinsic value for the storages and fixed price swing contracts we analyze in this report. And since our TTF and NBP spot volatility assessment also went down slightly, the full option value of basically all our storage and swing contracts went down. The full option value of our slow-churn TTF storage for example went down 9% from 4.01 €/MWh to 3.64 €/MWh.

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 30 Sept 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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