

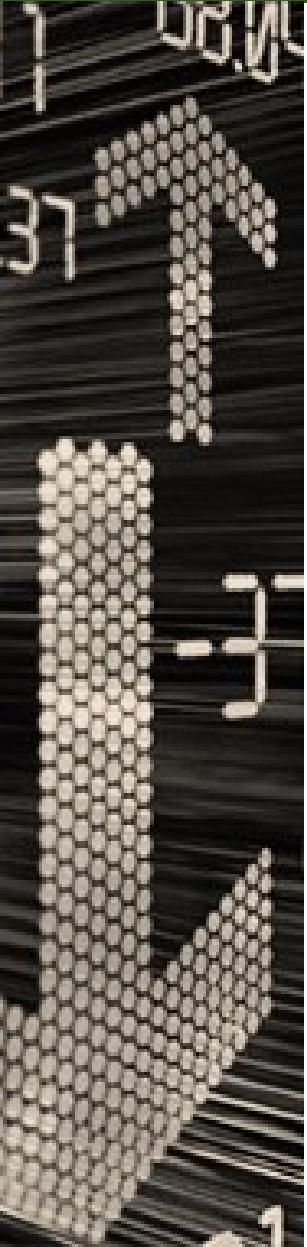
Gas

Gas storage and swing report

No 36 – October 2022



Storage and swing contract developments



Storage	Market	Product	Period	Cycle Cost	Intrinsic	Rolling Intrinsic		Option	
						Average	10%	Average	10%
	TTF	30/30	SY2023	0.50	0.00 ▼	54.20 ▲	32.86 ▲	50.90 ▲	35.57 ▲
TTF	60/60	SY2023	0.50	0.00 ▼	30.25 ▲	17.35 ▲	29.83 ▲	18.65 ▲	
TTF	60/120	SY2023	0.50	0.00 ▼	20.83 ▲	11.58 ▲	21.32 ▲	11.02 ▲	
NBP	30/30	SY2023	1.00	27.20 ▲	192.37 ▲	114.63 ▲	195.97 ▲	146.53 ▲	
NBP	60/60	SY2023	1.00	27.20 ▲	117.40 ▲	75.78 ▲	121.47 ▲	89.10 ▲	
NBP	60/120	SY2023	1.00	25.48 ▲	88.48 ▲	56.78 ▲	93.10 ▲	66.95 ▲	

Swing	Market	Max/day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic		Option	
							Average	10%	Average	10%
	TTF	4	360/360	2023	171.16 ▲	-0.02 ▼	3.33 ▲	0.16 ▼	4.62 ▲	-2.08 ▼
TTF	1	0/365	2023	171.16 ▲	0.10 ▼	19.58 ▲	3.16 ▲	20.28 ▲	9.87 ▲	
TTF	4	360/360	2023	MA	-0.02 ⇔	14.04 ▲	6.44 ▲	18.85 ▲	12.36 ▲	
NBP	4	360/360	2023	450.19 ▲	-0.01 ▼	1.24 ▲	-0.01 ▼	4.19 ▲	-4.41 ▼	
NBP	1	0/365	2023	450.19 ▲	0.93 ▼	36.87 ▲	5.21 ▲	39.82 ▲	15.33 ▲	
NBP	4	360/360	2023	MA	-0.02 ⇔	35.87 ▲	17.84 ▲	48.29 ▲	32.51 ▲	

Price history



TTF Price History



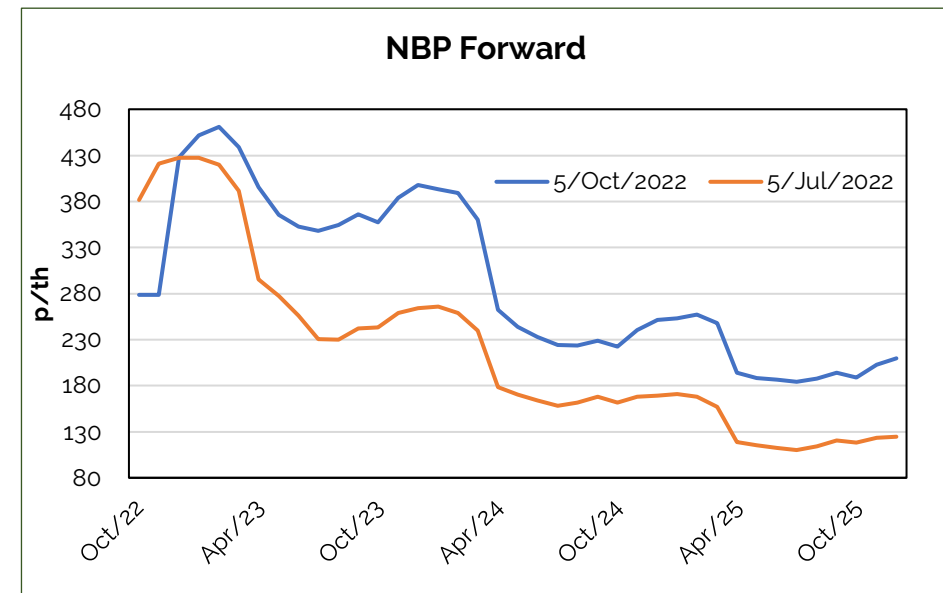
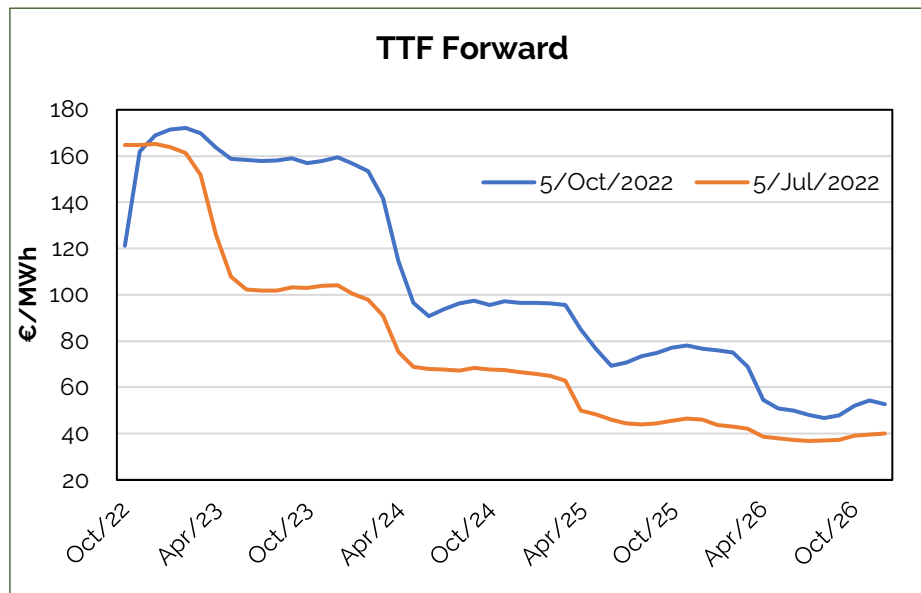
NBP Price History



Volatility and price forward curves

Market	Spot Volatility				
	1m	3m	6m	12m	KYOS sugg.
TTF	126% ▲	91% ▲	86% ▼	86% ▲	47% ↔
NBP	299% ▼	256% ▼	347% ▲	268% ▲	60% ↔
THE	115% ▲	83% ▲	84% ▼	83% ▲	47% ↔
PEG	309% ▲	207% ▲	164% ▲	148% ▲	49% ↔

Market	Year-ahead Forward volatility				
	1m	3m	6m	12m	KYOS sugg.
TTF	112% ▲	114% ▲	86% ▲	99% ▲	45% ↔
NBP	106% ▲	115% ▲	87% ▲	99% ▲	47% ↔
THE	96% ▲	108% ▲	83% ▲	96% ▲	45% ↔
PEG	98% ▲	117% ▲	89% ▲	98% ▲	45% ↔



Market Trend



The energy markets remained extremely volatile during Q3-2022 and prices rose considerably versus our last report, mainly due to further cuts in Russian gas imports, with Nord Stream 1 now offline indeterminately.

TTF and NBP prices for next year delivery reached new record highs in late August before correcting, but still trading at very high levels. In this context, the good news is that European storage levels stands at 90%, well above the 80% target by 1st November aimed by the EU Commission (you can track storage levels and other statistics on our website gas.kyos.com).

The bad news is that several risk factors are expected to further drive price volatility: A cold winter that would quickly erode storage levels, a cold Asian winter that could redirect LNG send-outs to Asia rather than Europe or further Russian cuts via the Ukrainian and Turkish transits. Because the front end of the curves got lifted more heavily than the back-end, the Q1-24/Q3-23 spreads have widened both for NBP and TTF compared to our last issue. The positive Q1-24/Q3-23 NBP trades around +25 p/th while the negative Q1-24/Q3-23 TTF trades around -10 EUR/MWh. This leads to zero intrinsic values for our assessed TTF storage and healthy intrinsic value for our NBP storages. It will be

interesting to watch this spread developing over the next months. Gas flows are expected to be low next Summer due to low/reduced Russian flow, while storage demand will likely be high over the Summer. This could have further negative effects on the Q1-24/Q3-23 spread.

We kept our volatility assumptions in line with last report.

Current extreme market conditions make it hard to assess volatility levels. We are therefore interested to hear your opinion on our assessments. Where do you see volatility at the moment? Please share you insights at info@kyos.com

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 5 October 2022.
- 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)

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