

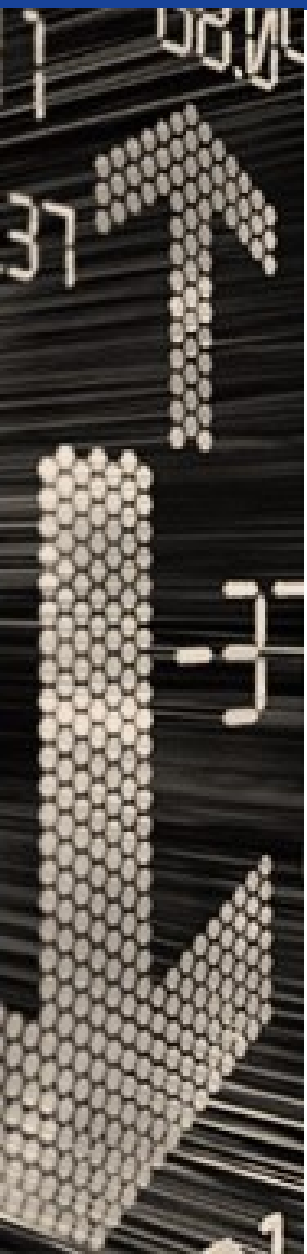
# Gas

Gas storage and swing report

No 34 – April 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	14.72	6.95	13.82	7.71
TTF	60/60	SY2023	0.50	0.00	8.57	3.33	8.17	3.53	
TTF	60/120	SY2023	0.50	0.00	6.13	2.77	6.01	1.96	
NBP	30/30	SY2023	1.00	0.60	41.03	18.93	39.97	24.77	
NBP	60/60	SY2023	1.00	0.58	25.47	12.93	25.88	15.65	
NBP	60/120	SY2023	1.00	0.45	19.62	10.12	19.97	9.90	

Swing	Market	Max/day	Min/Max	Period	Price	Intrinsic	Rolling Intrinsic		Option	
							Average	10%	Average	10%
	TTF	4	360/360	2023	96.60	0.00 ▼	1.21 ▼	0.57 ▼	1.14 ▼	0.63 ▼
TTF	1	0/365	2023	96.60	0.00 ⇄	9.78 ▲	1.18 ▲	10.02 ▲	2.56 ▲	
TTF	4	360/360	2023	MA	-0.02 ⇄	6.62 ▲	2.44 ▲	8.87 ▲	5.69 ▲	
NBP	4	360/360	2023	243.92	-0.01 ▼	1.22 ▲	0.00 ⇄	1.86 ▲	-5.47 ▼	
NBP	1	0/365	2023	243.92	0.00 ⇄	26.21 ▲	0.00 ▼	24.17 ▲	5.87 ▲	
NBP	4	360/360	2023	MA	-0.02 ⇄	17.34 ▲	6.88 ▲	22.18 ▲	14.26 ▲	

# Price history



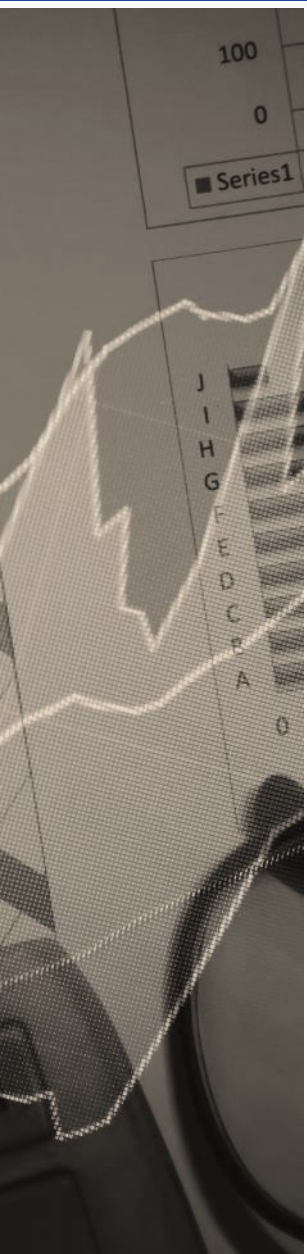
## TTF Price History



## NBP Price History

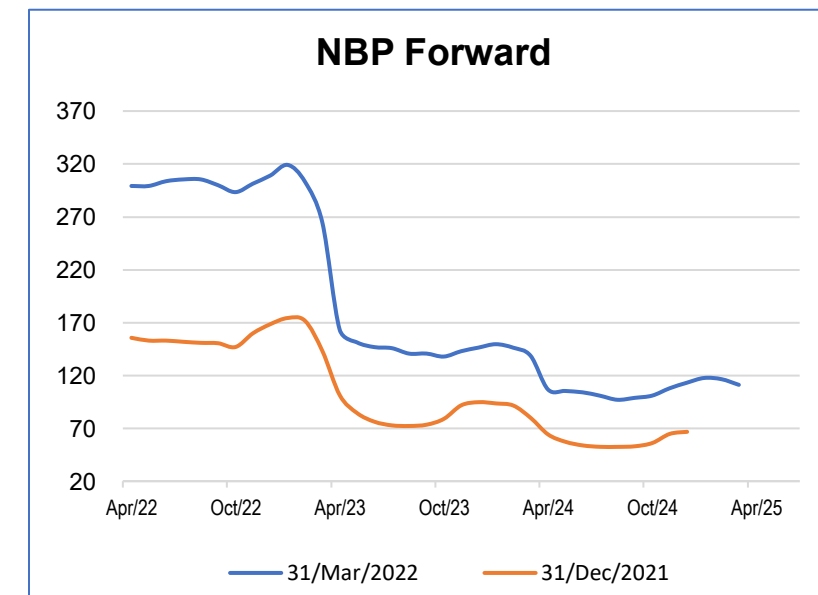
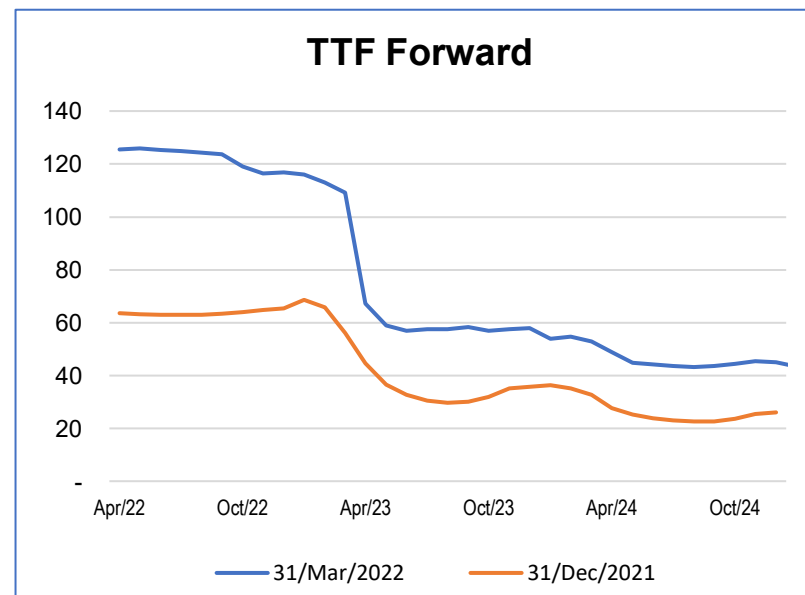


# Volatility and price forward curves



Market	Spot Volatility				
	1m	3m	6m	12m	KYOS sugg.
<b>TTF</b>	138% ▲	99% ▲	80% ▲	60% ▲	42% ⇄
<b>NBP</b>	58% ▼	114% ▲	104% ▲	87% ▲	42% ⇄
<b>THE</b>	123% ▲	85% ▲	74% ▲	57% ▲	43% ⇄
<b>PEG</b>	158% ▲	107% ⇄	106% ▲	78% ▲	45% ⇄

Year-ahead Forward volatility					
	1m	3m	6m	12m	KYOS sugg.
	106% ▼	112% ▼	113% ▲	85% ▲	40% ▼
	112% ▼	115% ▼	113% ▲	84% ▲	40% ▼
	104% ▼	106% ▼	110% ▲	82% ▲	40% ▼
	105% ▼	107% ▼	110% ▲	82% ▲	40% ▼



# Market Trend



The war in Ukraine leads to unprecedented dynamics in the gas markets. The absolute price level is of course the most visible indicator. The TTF Month-ahead rose over the quarter to well over 220€/MWh on 7 March. This brought the whole gas curve in extreme backwardation. On 7 March the Q1-23 x Q3-22 storage spread closed even at almost -83 €/MWh. Prices and especially the front end of the curve relaxed again after this date. The TTF Month-ahead closed the quarter at 125€/MWh. This also removed the extreme backwardation.

The Q1-23 x Q3-22 storage spread however, remained negative during the remainder of this quarter. Negative storage spreads give storage users no incentive to start

filling their storage for SY2022. At the same time, draft EU regulation will impose a minimum fill level of 80% on 1 November 2022. Several countries, including Germany and The Netherlands are therefore looking into applying measures to ensure that storages will be filled during this summer.

As of this report we are assessing a new storage contract: SY2023. The negative TTF storage spread is reflected in the valuation of the TTF storages by the zero intrinsic value. The full option value assessed by our models is at a relatively high value. The main driver here is the high price level. This will lead to large absolute price changes and therefore opportunities to extract value from the storage.

It is important to notice that we always report the gross trading value of the contracts. This means that additional costs that storage users have with optimizing the storage are not taken into account. At current high price levels, especially the costs to finance the injected gas and the margining costs related to forward hedges are very substantial. The value of storage products that can be currently seen in the market is therefore lower than we report. We are interested to get your views on this topic and to hear where you see current market value for storages.

Please let us know your thoughts on [info@kyos.com](mailto: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 31 March 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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