ACER
Agency for the Cooperation of Energy Regulators

European Gas Target Model – review and update

Annex 5

Market Participants' Needs metrics: Results for Selected European Gas Markets

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1 Executive summary

The analyses in this annex show that the British NBP and the Dutch TTF are the currently most developed gas markets in Europe. Especially on the forward and prompt market, they perform far better than any other European gas market.

Forward trading is possible on these markets (NBP, TTF) in a liquid market environment for about two years into the future. For all other European markets this value is below six months, severely limiting access to gas and cost efficient hedging of gas retail activities to the detriment of gas end users.

When it comes to short term trading the picture is more varied. NBP and TTF are still in the lead by a considerable margin, but for Germanys' NCG and Gaspool markets the gap is much less than for forward markets. All other markets again lag far behind.

2 Introduction

This annex describes the state of selected European gas wholesale markets in the year 2013. The description focuses on gas forward, prompt and spot markets[1,2] and is based on the following metrics as defined in the revised ACER Gas Target Model:

- Metric 1: Order book volume and liquid order book horizon, respectively
- Metric 2: Bid-offer spread
- Metric 3: Order book price sensitivity
- Metric 4: Deals per day and trading horizon, respectively

The analyses presented in this annex are conducted according to the wholesale market metrics calculation specifications provided in Annex 3 of the revised ACER Gas Target Model.

Metric results are provided both in absolute values as well as relative to the currently best functioning European gas wholesale markets, the British NBP and the Dutch TTF respectively.

In addition to the analyses per market and supplementary information on the metric calculation, the appendix also provides metric results for three different market merger scenarios.

[1] 'Spot' means gas products with 'immediate' delivery (i.e. on the same calendar day and all following calendar days until the next trading day). 'Prompt' means gas products with delivery after the spot window but still in the near future (by the last calendar day of the following (front) month). 'Forward' means gas products with delivery after the prompt window.

[2] The analyses focus on trading activities on broker platforms and exchanges, hence the term 'forward market' means OTC and exchange traded products.

3 Examined markets and data

Gas wholesale markets covered by the analyses in this annex comprise:

- Austrian Virtual Trading Point (AT - VTP)
- Belgium Zeebrugge Beach (BE - ZEE)
- Belgium Virtual Trading Point (BE - ZTP)
- Czech Virtual Trading Point (CZ - VTP)
- German Gaspool (DE - GPL)
- German Net Connect Germany (DE - NCG)
- French point d'échange de gaz Nord (FR - PEG Nord)
- French point d'échange de gaz Sud (FR - PEG Sud)
- Italian Punto di Scambio Virtuale (IT - PSV)
- Dutch Title Transfer Facility (NL - TTF)
- British National Balancing Point (UK - NBP)

Other European markets have not been included in the analysis since the respective detailed trading data was not available.[3]

The analyses in this annex focus on physical gas contracts (spot, prompt and forward) traded on broker platforms and exchanges (i.e. using a transparent trading venue). They are based on the respective brokered deals and orders for all of the markets listed above. For German markets Gaspool and NCG, exchange based transactions (EEX) are considered additionally. For NBP and TTF, exchange trading activities are not considered in detail but more generally (and hence only approximately) on the basis of volume data published by ICE, / IceEndex and EEX.

On all other markets except NBP, TTF, NCG and Gaspool exchange volumes are not included in the analyses as the respective trading data was not available. To the best of our knowledge the respec-

[3] The analyses cover all markets for which the London Energy Broker Association (LEBA, covering the main brokers) provides market data.

tive exchange volumes are not large, but for less developed markets an inclusion of exchange data might lead to (slightly) better performances especially in the short term market.

> Note: as analyses focus on trading activities on broker platforms and also on exchanges, the term 'forward market' means OTC and exchange traded products.

The time period considered for the analyses is the trading year 2013, i.e. orders placed and deals executed in 2013 are examined. Note that – depending on the transacted product – gas deliveries flowing out of these transactions may reach into the year 2014 and beyond.

Note

The results presented in this annex are based on market data available at the time of calculation. They should be reviewed and where possible the results should be recalculated for each market by competent authorities using an even more extensive data set if available.

4 Detailed results

4.1 Absolute metric values

4.1.1 About this section

This section provides the absolute results for 'market participants' needs' metrics for forward, prompt, and spot markets for the calendar year 2013.

4.1.2 Forward market

4.1.2.1 Overview

This table provides the metric results for the forward market[4] for the calendar year 2013.

Table 1: Wholesale market metrics (absolute values) 2013: Forward products

	Forward products – Wholesale market metrics (absolute values), 2013								
	Metric 1		Metric 2		Metric 3				Metric 4
	Average liquid order book horizon (months) with at least 120MW in the order book		Average bid-offer spread (%)		Order book price sensitivity: Average price markup/markdown (%) on best offer/bid				Average trading horizon (months) with at least 8 deals per day
					12th month: for 120 MW		24th month: for 90 MW		
	Offer side	Bid side	12th month	24th month	Offer side	Bid side	Offer side	Bid side	
AT - VTP	0.6	0.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.4
BE - ZEE	0.1	0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.2
BE - ZTP	0.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
CZ - VTP	0.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
DE - GPL	0.3	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.4
DE - NCG	0.7	1.1	0.5%	n.a.	n.a.	n.a.	n.a.	n.a.	5.8
FR - PEG Nord	0.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.2
FR - PEG Sud	0.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
IT - PSV	3.8	3.3	1.4%	n.a.	n.a.	n.a.	n.a.	n.a.	0.3
NL - TTF	19.3	17.4	0.2%	0.4%	0.2%	0.2%	0.1%	0.1%	24.1
UK - NBP	24.1	23.8	0.4%	0.6%	0.2%	0.1%	0.1%	0.2%	22.6

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% (12th month) or less than 60% (24th month) of the trading days. Respective markets are considered to have 'failed' the corresponding category.
In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, UK - NBP, NL - TTF.

[4] The front month product is not included in the analyses for the forward market, but is analysed separately in the prompt market.

4.1.2.2 Metric 1: Liquid order book horizon

Metric 1 describes for how far into the future bids and offers for forward products amounting to at least 120 MW are (on average) available in the market (this is the liquid order book horizon). The metric is determined separately for the bid and offer sides of the order book. Longer liquid order book horizons mean better functioning markets.

In 2013 the average liquid order book horizons at the Dutch TTF and British NBP reached between 17 and 24 months into the future. This means that potential buyers or sellers of gas were able to find forward products in the order book amounting to at least 120 MW for a time horizon of 17 / 24 months in the future respectively. Hence, these potential buyers were able to buy or sell gas for delivery this far into the (then) future in a market environment that was considered liquid (as far as the order book is concerned). Notably, at both the TTF and the NBP bid activities reach slightly less far into the future than offer activities.

For all other analysed markets liquid order book horizons were rather short. At the Italian PSV it reached on average three months into the future, at the German NCG only one month. The other hubs showed liquid order book horizon even below one month. These low average liquid order book horizons illustrate that 120 MW of forward products were rarely (or even never) bid for/offered in the order book.
Even if volume requirements are halved[5] from 120 MW to 60 MW (not shown in table), average liquid order book horizons still remain low: 11 to 12 months at the PSV, 5 to 8 months at NCG, and below 6 months on all other hubs.

4.1.2.3 Metric 2: Bid-offer spread

The bid-offer spread metric measures how close the lowest price at which a seller is willing to sell gas (best offer-price) and the highest price a buyer is willing to pay for gas (best bid-price) are at the same time. It describes the price gap which needs to be paid on a full 'turnaround' (buy gas and sell it immediately again). The bid-offer spread metric is expressed as a percentage of the best bid-price. Lower bid-offer spreads mean better functioning markets.

Metric 2 examines the bid-offers spread for the following two time horizons[6]: (i) forward products with deliveries in the 12th month after the transaction date and (ii) forward products with deliveries in the 24th month after the transaction date.

In 2013 the bid-offer spreads for products with deliveries in the 12th future month were 0.2% and 0.4% respectively at the Dutch TTF and the British NBP. This means the lowest prices offered by sellers are on average 0.2% and 0.4% higher than the buyers' best bid prices respectively. Looking at the 24th month after the transaction date, bid-offer spreads increase to 0.4% and 0.6% respectively.

[5] The lowered requirement does not mean that the Acer Gas Target Model requirements are lowered, but serves purely informational purposes.

[6] Note that the calculation specification in Annex 3 also foresees the examination of the 6th and 18th month after the transaction date.

As shown in the analysis of Metric 1 above, time horizons with substantial bids and offers for forward products are rather short for all hubs but TTF and NBP. Consequently, not enough bid/offer data points are available to calculate the bid-offer spread for Metric 2 for many markets. Markets in which simultaneous bids and offers are available for less than 80% of the trading days at a 12 month time horizon or for less than 60% of the trading days at a 24 month time horizon are considered to have failed the metric. In this case the metric value is labelled as 'n.a.' (not available).

German NCG and Italian PSV at least meet the minimum data requirement for the 12th month into the future and the respective bid-offer spread is calculable. For NCG it is in the range of TTF and NBP at 0.5%, while for PSV the spread is considerably higher at 1.4%.

4.1.2.4 Metric 3: Order book price sensitivity

The order book price sensitivity metric measures how close the average prices in the order book get to the 'best' prices. The metric is determined separately for the bid and the offer side. For the offer side of the order book the metric calculates the difference (markup) between the best (lowest) offer price and the weighted average price for a certain volume of gas (the "maximum quantity"). Similarly, for the bid side the metric evaluates the relative difference (markdown) between the average bid prices (again for a certain maximum volume) and the best (highest) bid price. Lower markups and markdowns mean better market functioning.

Metric 3 examines the markups and markdowns for the following two alternative time horizons[7] and maximum quantities (in brackets):
(i) forward products (best 120 MW) with deliveries in the 12th month after the transaction date and
(ii) forward products (best 90 MW) with deliveries in the 24th month after the transaction date.

For TTF and NBP the average markups and markdowns on the bid and offer sides varied between 0.1% and 0.2% (for deliveries in the 12th and the 24th respectively). This means that for buying 120 MW of forward products with delivery 12th month into the future at once, the buyer would need to pay on average 0.1% to 0.2% more than for the cheapest offer available at the same time. It also means that on the bid side a seller who sold 120 MW at once turned over on average 0.1% less than if accepting only the highest bid offer.

For the other examined markets, not enough data points were available to calculate the metric (on only less than 80% of trading days enough bid or offer volumes are available for the 12th month after the transaction date and on less than 60% of trading days for the 24th month after the transaction date). Therefore, these markets are considered to have failed the metric and are labelled as "n.a." (not available).

[7] Note that the calculation specification in Annex 3 also foresees the examination of the 6th and 18th month after the transaction date.

4.1.2.5 Metric 4: Trading horizon

Metric 4 measures how far into the future forward products are traded at a frequency of at least eight trades per trading day (trading horizon). Longer trading horizons mean better functioning markets.

In 2013 the Dutch TTF and the British NBP had the longest trading horizons with 24 and 22 months respectively. This means that up to these time horizons forward products were traded at least eight times per day which supported market participants' confidence in transparent and reliable market prices for these periods.

However, all other considered markets exhibited again rather short trading horizons. At the German markets Gaspool and NCG, trading horizons reached about four to six months into the future, at the Belgium market Zeebeach the trading horizon is about one month. The other analysed hubs had trading horizons even below that level, including the Italian PSV. These short time horizons indicate that forward products were only rarely (if ever) traded eight times per day. With a reduced deal rate[8] of at least four deals per day (not shown in table), trading horizons rose to 10 and 14 months for Gaspool and NCG, for all other hubs they still remain below six months.

4.1.2.6 Summary

Forward markets at the Dutch TTF and British NBP perform far better than other European forward markets.

Transactional liquidity (trading) and pre-transactional liquidity (order book volumes) reach 17 to 24 months into the future at TTF and NBP.

In contrast, in the other analysed markets forward products are traded only for a rather short time horizon (reaching less than six months into the future). The availability of forward products in the order book at the required levels is even less (less than four months) on these hubs. Note that NCG – and partly Gaspool, PSV, and Zeebrugge – show somewhat better results than the remaining markets.

For the spread-related analyses in the order book, all markets except TTF and NBP have largely failed as not enough order book activity is available to conduct these analyses.

[8] The lowered requirement does not mean that the Acer Gas Target Model requirements are lowered, but serves purely informational purposes.

4.1.3 Prompt market: Front month product

4.1.3.1 Overview

The next table displays the metrics for the front month products on the prompt market as traded in the calendar year 2013.

Table 2: Wholesale market metrics (absolute values) 2013: Front month product

	Front month product Wholesale market metrics (absolute values), 2013					
	Metric 1		Metric 2	Metric 3		Metric 4
	Median volume (MW) in the order book		Average bid-offer spread (%)	Order book price sensitivity: Average price markup/markdown (%) for 120 MW on best offer/bid		Median number of deals per day
	Offer side	Bid side		Offer side	Bid side	
AT - VTP	120	120	0.6%	0.2%	n.a.	6
BE - ZEE	61	61	n.a.	n.a.	n.a.	10
BE - ZTP	0	0	n.a.	n.a.	n.a.	0
CZ - VTP	0	10	n.a.	n.a.	n.a.	0
DE - GPL	74	71	0.4%	n.a.	n.a.	14
DE - NCG	194	197	0.4%	0.2%	0.3%	35
FR - PEG Nord	31	31	n.a.	n.a.	n.a.	4
FR - PEG Sud	0	0	n.a.	n.a.	n.a.	0
IT - PSV	120	135	1.3%	0.3%	0.4%	3
NL - TTF	489	479	0.2%	0.1%	0.1%	164
UK - NBP	837	872	0.2%	0.1%	0.1%	350

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% of the trading days. Respective markets are considered to have 'failed' the corresponding category.

In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, UK - NBP, NL - TTF.

4.1.3.2 Metric 1: Order book volume

The order book volume metric examines the average availability of bid and offer volumes. The measurement is made separately for the bid and offer sides of the order book. Specifically the metric shows the median of the total order book volume (in MW) available during the trading window in the analysis period.

At the British NBP, the available bid/offer order book volumes in 2013 (837 MW and 872 MW respectively) are considerably higher than at the Dutch TTF (489 MW and 479 MW respectively).

NCG, PSV and Austrian VTP are less far behind NBP and TTF than for the forward market. They show order book volumes in the range of about 120 to 200 MW for both bid and offer side. Gaspool, Zeebrugge and PEG Nord still show volumes between 30 and 75 MW.

The new Belgium ZTP, the Czech VTP and PEG Sud show virtually empty order books.

4.1.3.3 Metric 2: Bid-offer spread

[For a description of this metric, please refer to the chapter on forward markets above.]

The lowest bid-offer spreads of 0.2% are visible at TTF and NBP, followed by the German markets with 0.4% and Austria with 0.6%. Again, bid-offer spreads at the Italian PSV of 1.3% are noticeably higher than in other markets. This means that sellers ask for prices 0.2 – 1.3% higher than buyers bid for the front month product at the same time. Bid-offer spreads are slightly smaller for front month products than for forward products.

For the other examined markets available data was not sufficient to reliably calculate this metric (for less than 80% of the trading days a bid-offer spread could be determined). These markets are considered to have failed the criterion for the functioning of gas wholesale markets based on Metric 2 and the value of the metric is labelled 'n.a.' (not available).

4.1.3.4 Metric 3: Order book price sensitivity

[For a description of this metric, please refer to the chapter on forward markets above.]

For TTF and NBP price markups and markdowns are lowest at a level of 0.1%. Slightly higher levels of 0.2% to 0.4% are observed at NCG, Austrian VTP[9] and PSV. For the PSV the relatively small markups/markdowns should be seen in combination with the relatively high bid-ask spreads (Metric 2).

For the other examined markets not enough data points were available to calculate the metric (on only less than 80% of trading days enough bid or offer volumes were available). These markets are considered to have failed the criterion for the functioning of gas wholesale markets based on Metric 3 and are labelled as 'n.a.' (not available).

[9] For the Austrian VTP only the offer side order book price sensitivity could be calculated.

4.1.3.5 Metric 4: Number of deals per day

Metric 4 shows the median number of front month deals executed per trading day.

As with the order book volumes, the British NBP shows substantially more deals per day than the Dutch TTF (350 vs. 164 deals per day). At other markets the front month product is traded 10 times a day at the most.

4.1.3.6 Summary

In general, metric results for the front month product are better than for forward products.

The British NBP significantly overtakes the Dutch TTF in deals and order volumes.

In particular NCG, Gaspool and ZEE show higher order book volumes and deal counts than on the forward market, and the gap between them and the NBP and TTF is reduced compared to forward markets.

The Belgium ZTP, the Czech VTP and the French PEG Sud rank last in this category.

4.1.4 Spot market: Day-ahead product

4.1.4.1 Overview

This table provides the metric results for the day-ahead product on the spot market as traded in the calendar year 2013.

Table 3: Wholesale market metrics (absolute values) 2013: Day-ahead product

	Day-ahead product Wholesale market metrics (absolute values), 2013					
	Metric 1		Metric 2	Metric 3		Metric 4
	Median volume (MW) in the order book		Average bid-offer spread (%)	Order book price sensitivity: Average price markup/markdown (%) for 120 MW on best offer/bid		Median number of deals per day
	Offer side	Bid side		Offer side	Bid side	
AT - VTP	530	585	0.4%	0.08%	0.08%	60
BE - ZEE	672	916	0.4%	0.03%	0.02%	97
BE - ZTP	0	0	n.a.	n.a.	n.a.	0
CZ - VTP	30	30	n.a.	n.a.	n.a.	0
DE - GPL	992	1,133	0.2%	0.03%	0.04%	217
DE - NCG	1,624	1,669	0.2%	0.03%	0.04%	393
FR - PEG Nord	390	379	0.6%	0.17%	0.15%	80
FR - PEG Sud	43	79	n.a.	n.a.	n.a.	12
IT - PSV	250	270	1.0%	0.27%	0.23%	17
NL - TTF	2,005	2,053	0.2%	0.01%	0.01%	429
UK - NBP	6,062	6,149	0.4%	0.00%	0.00%	483

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% of the trading days. Respective markets are considered to have 'failed' the corresponding category.

In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, UK - NBP, NL - TTF.

4.1.4.2 Metric 1: Order book volume

[For a description of this metric, please refer to the chapter on prompt markets above.]

Order book volumes (in MW) for the day-ahead product are considerably higher than for the front month product.

At the British NBP, they reach a level of 6,000 MW and at the Dutch TTF they reach a level of 2,000 MW on average. The German markets NCG and Gaspool nearly reach the TTF level with order book volumes of about 1,600 MW and 1,000 MW respectively.

Zeebeach, PEG Nord, the Austrian VTP and PSV show volumes of more than 200 MW; PEG Sud and Czech VTP have volumes in the range of 30 to 80 MW.

4.1.4.3 Metric 2: Bid-offer spread

[For a description of this metric, please refer to the chapter on forward markets above.]

Data requirement issues regarding Metric 2 and Metric 3 are less problematic for the day-ahead product. Hence these metrics were calculable for all markets except for Belgium ZTP, Czech VTP and French PEG Sud.

For all analysed markets except PSV, the bid-offer spread is between 0.2% and 0.6%. As already seen for forward and front month products, PSV again shows relatively high bid-offer spreads at 1.0%. However, these values are lower than for forward and front month products at the PSV.

Interestingly at the NBP the bid-offer spread for the day-ahead product is higher than for the front month product, and other markets (TTF, NCG and Gaspool) show lower bid-offer spreads than the NBP.

4.1.4.4 Metric 3: Order book price sensitivity

[For a description of this metric, please refer to the chapter on forward markets above.]

For most examined markets where the metric could be calculated, the markups and markdowns measured by Metric 3 are below 0.1% on the bid and offer side. The exceptions are PEG Nord and the PSV with slightly higher values.

The metric could not be calculated for Belgium ZTP, Czech VTP and French PEG Sud due to lack of order book activity.

4.1.4.5 Metric 4: Number of deals per day

Metric 4 shows the median number of day-ahead deals executed per trading day.

NBP, TTF and NCG score similar values on this metric at around 400 to 480 day-ahead deals per day, followed by Gaspool with 217 deals. Compared to the front month deal counts, NBP shows only slightly higher deal counts for the day-ahead product, while deal counts at the TTF are nearly three times higher in comparison and at the German markets NCG and Gaspool they are ten times higher.

PEG Nord, the Austrian VTP and Zeebeach also exhibit a higher number of deals compared to the front month product, with about 60 to 100 day-ahead deals per day.

As already observed for the front month product, PSV shows rather high order book volumes and a relatively small deal count (17).

4.1.4.6 Summary

Day-ahead trading is considerably more active than front month or forward trading.

NBP and TTF are not as far ahead in day-ahead trading. NCG and Gaspool are much closer to both markets in day-ahead trading, in comparison to prompt and forward trading.

PEG Nord, Austrian VTP and Zeebrugge also show better metric values than in prompt and forward trading but are still lagging far behind the leading markets.

4.2 Relative metric levels

4.2.1 Background

In this section the metric values per analysed market are compared with the respective metric values at the British NBP and the Dutch TTF. The rationale for this approach is, as outlined in the main body of the revised ACER Gas Target Model, that NBP and TTF are currently considered the best functioning gas markets in Europe.

The less demanding value for a particular metric of TTF and NBP respectively is used as the point of reference for all other markets. These values are referred to as the level of TTF/NBP. This means that the relative metric level of TTF and NBP respectively is 100% or higher. The relative metric levels of other markets may be below or above 100%, whereby the higher the relative metric level, the better the performance of the market with respect to the metric[10] in question.

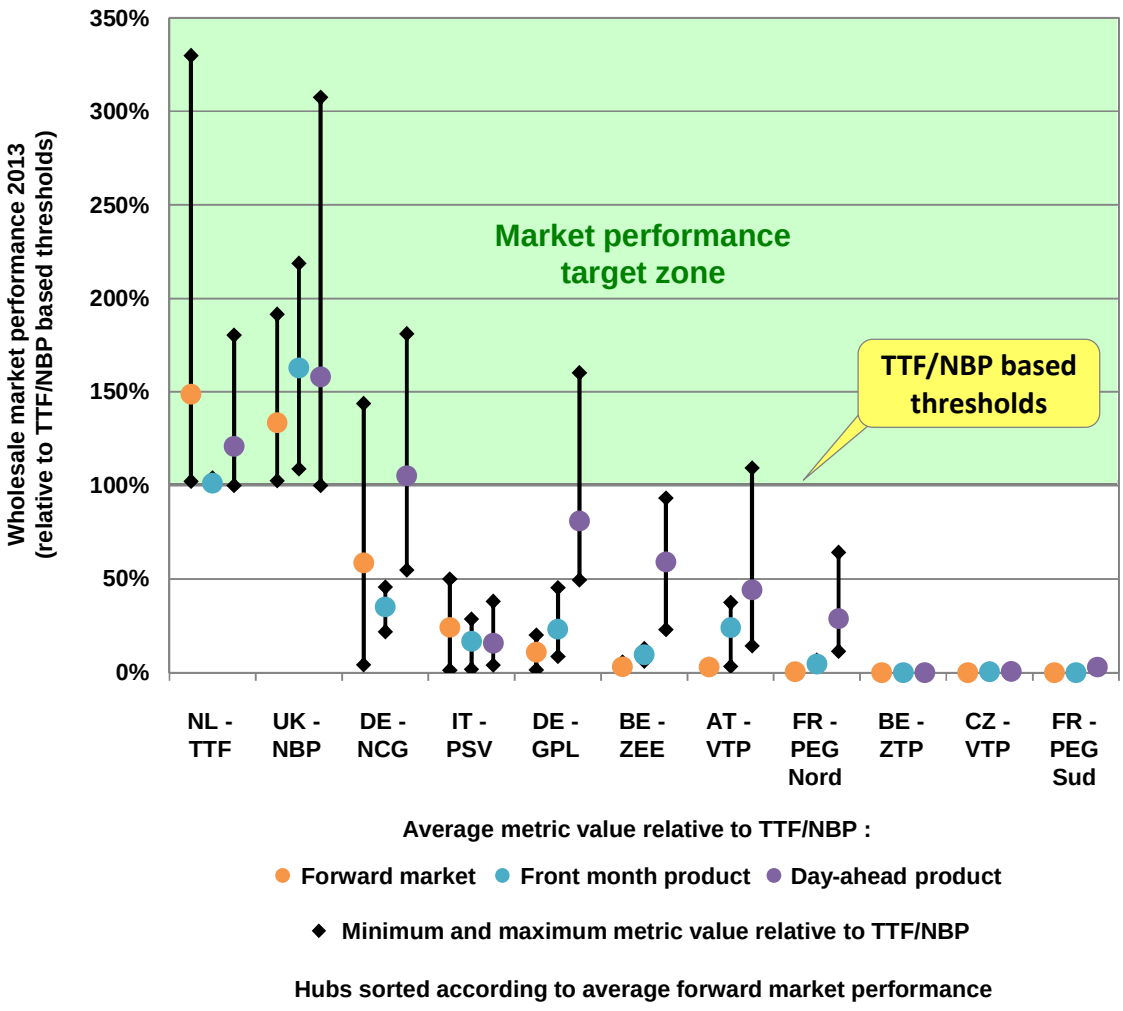
[10] Hence, for Metric 1 and Metric 4, the relative metric level shows the relationship of the hub-specific absolute metric value to the absolute value of NBP/TTF; for Metric 2 and Metric 3 it shows the inverse value.

4.2.2 Results

The following figure provides the average, minimum and maximum metric values for the analysed hubs relative to TTF and NBP for transactions in the calendar year 2013. It shows the values for forward, prompt and spot markets.

The graph is sorted from left to right based on forward metric values in descending order. (For details on relative metric levels see the appendix.)

Figure 1 Wholesale market metric values relative to TTF and NBP 2013: Forward market, front month product and day-ahead product.



For each market absolute values of the four 'market participants' needs metrics' were calculated for the forward, front-month and day-ahead sub-segment. These values were then put in relation to threshold values based on TTF/NBP's performance (→ relative metric values).
The figure above shows for the forward, front-month and day-ahead sub-segment of each hub the minimum, the maximum and the average of the respective relative metric values. Values above 100% mean that the market performs better than TTF/NBP in the respective sub-segment, values below mean the opposite.

Source: Wagner, Elbling & Company

The graph illustrates that NBP and TTF perform far better than all other markets especially in the forward and prompt market (the latter measured on the basis of the front month product). However, for day-ahead products NCG and Gaspool come close, and other hubs also show better relative metric levels.

Moreover, it can be seen that in the forward market TTF and NBP show quite similar performance, while for front month and day-ahead trading NBP takes the lead.

The results for the Italian PSV are also noteworthy. While all other hubs show significantly better values for short term products, the relative metric values do not improve for front month and day-ahead products on the PSV.

5 Appendix

5.1 Relative metric levels (tables)

5.1.1 Forward market

Table 4: Wholesale market metric levels relative to TTF/NBP, 2013: Forward products

	Forward products: Wholesale market metrics level relative to metric level of most developed hubs (TTF and NBP), 2013								
	Metric 1: Average liquid order book horizon (months) with at least 120MW in the order book		Metric 2: Average bid-offer spread (%)		Metric 3: Order book price sensitivity: Average price markup/markdown (%) on best offer/bid				Metric 4: Average trading horizon with at least 8 deals per day
					12th month:		24th month:		
	Offer side	Bid side	12th month	24th month	Offer side	Bid side	Offer side	Bid side	
AT - VTP	4%	4%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2%
BE - ZEE	1%	1%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6%
BE - ZTP	0%	0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0%
CZ - VTP	0%	0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0%
DE - GPL	2%	2%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20%
DE - NCG	4%	7%	144%	n.a.	n.a.	n.a.	n.a.	n.a.	27%
FR - PEG Nord	0%	0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1%
FR - PEG Sud	0%	0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0%
IT - PSV	22%	20%	50%	n.a.	n.a.	n.a.	n.a.	n.a.	1%
NL - TTF	113%	102%	330%	163%	121%	110%	141%	152%	110%
UK - NBP	142%	140%	192%	108%	131%	161%	140%	132%	103%

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% (12th month) or less than 60% (24th month) of the trading days. Respective markets are considered to have 'failed' the corresponding category.

In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, UK - NBP, NL - TTF.

The higher the relative metric level, the better the performance. Hence, the relative metric level measures for metric 1 and 4 the relation of the individual absolute metric value and the comparison basis; for metric 2 and 3 it measures the inverse value.

The comparison basis (100%) is the value of NL - TTF or UK - NBP whichever is less demanding for that particular metric.

5.1.2 Prompt market: Front month product

Table 5: Wholesale market metric levels relative to TTF/NBP, 2013: Front month product

	Front month product					
	Wholesale market metrics level relative to metric level of most developed hubs (TTF and NBP), 2013					
	Metric 1		Metric 2	Metric 3		Metric 4
	Median volume in the order book		Average bid-offer spread	Order book price sensitivity: Average price markup/markdown (%) for 120 MW on best offer/bid		Median number of deals per day
	Offer side	Bid side		Offer side	Bid side	
AT - VTP	26%	26%	30%	37%	n.a.	3%
BE - ZEE	13%	13%	n.a.	n.a.	n.a.	6%
BE - ZTP	0%	0%	n.a.	n.a.	n.a.	0%
CZ - VTP	0%	2%	n.a.	n.a.	n.a.	0%
DE - GPL	16%	15%	45%	n.a.	n.a.	9%
DE - NCG	41%	42%	46%	32%	31%	22%
FR - PEG Nord	7%	7%	n.a.	n.a.	n.a.	3%
FR - PEG Sud	0%	0%	n.a.	n.a.	n.a.	0%
IT - PSV	26%	29%	14%	26%	22%	2%
NL - TTF	104%	102%	100%	100%	100%	102%
UK - NBP	178%	186%	109%	136%	148%	219%

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% of the trading days. Respective markets are considered to have 'failed' the corresponding category.

In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, UK - NBP, NL - TTF.

The higher the relative metric level, the better the performance. Hence, the relative metric level measures for metric 1 and 4 the relation of the individual absolute metric value and the comparison basis; for metric 2 and 3 it measures the inverse value.

The comparison basis (100%) is the value of NL - TTF or UK - NBP whichever is less demanding for that particular metric.

5.1.3 Spot market: Day-ahead product

Table 6: Wholesale market metric levels relative to TTF/NBP, 2013: Day-ahead product

	Day-ahead product Wholesale market metrics level relative to metric level of most developed hubs (TTF and NBP), 2013					
	Metric 1		Metric 2	Metric 3		Metric 4
	Median volume in the order book		Average bid-offer spread	Order book price sensitivity: Average price markup/markdown (%) for 120 MW on best offer/bid		Median number of deals per day
	Offer side	Bid side		Offer side	Bid side	
AT - VTP	27%	29%	109%	26%	25%	14%
BE - ZEE	34%	46%	93%	80%	81%	23%
BE - ZTP	0%	0%	n.a.	n.a.	n.a.	0%
CZ - VTP	2%	2%	n.a.	n.a.	n.a.	0%
DE - GPL	50%	57%	160%	64%	54%	52%
DE - NCG	81%	83%	181%	73%	55%	94%
FR - PEG Nord	20%	19%	64%	11%	14%	19%
FR - PEG Sud	2%	4%	n.a.	n.a.	n.a.	3%
IT - PSV	13%	14%	38%	7%	9%	4%
NL - TTF	100%	103%	180%	100%	100%	102%
UK - NBP	303%	307%	112%	100%	100%	115%

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% of the trading days. Respective markets are considered to have 'failed' the corresponding category.

In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, UK - NBP, NL - TTF.

The higher the relative metric level, the better the performance. Hence, the relative metric level measures for metric 1 and 4 the relation of the individual absolute metric value and the comparison basis; for metric 2 and 3 it measures the inverse value.

The comparison basis (100%) is the value of NL - TTF or UK - NBP whichever is less demanding for that particular metric.

5.2 Supplementary information on the wholesale market metrics

5.2.1 About this section

This section provides supplementary information on the calculation of the wholesale market metrics, specifically the share of trading days for which the metric could be calculated and volumes included for the metric calculation.

5.2.2 Forward market

Table 7: Supplementary information on wholesale market metrics, 2013: Forward products

	Forward products – Supplementary information on wholesale market metrics, 2013									
	Metric 2		Metric 3							
	Share of trading days with calculable bid-offer spread		Share of trading days with calculable order book price sensitivity				Average order book volume considered in calculation (in MW)			
			12th month		24th month		12th month		24th month	
	12th month	24th month	Offer side	Bid side	Offer side	Bid side	Offer side	Bid side	Offer side	Bid side
AT - VTP	74%	0%	2%	2%	0%	0%	n.a.	n.a.	n.a.	n.a.
BE - ZEE	14%	3%	0%	1%	1%	1%	n.a.	n.a.	n.a.	n.a.
BE - ZTP	3%	0%	0%	0%	0%	0%	n.a.	n.a.	n.a.	n.a.
CZ - VTP	31%	0%	0%	0%	0%	0%	n.a.	n.a.	n.a.	n.a.
DE - GPL	50%	25%	0%	0%	1%	0%	n.a.	n.a.	n.a.	n.a.
DE - NCG	81%	40%	1%	4%	0%	0%	n.a.	n.a.	n.a.	n.a.
FR - PEG Nord	12%	0%	0%	0%	0%	0%	n.a.	n.a.	n.a.	n.a.
FR - PEG Sud	0%	0%	0%	0%	0%	0%	n.a.	n.a.	n.a.	n.a.
IT - PSV	97%	53%	15%	11%	1%	3%	n.a.	n.a.	n.a.	n.a.
NL - TTF	99%	99%	89%	92%	70%	68%	111	112	72	70
UK - NBP	100%	87%	90%	92%	60%	65%	120	120	88	88

Source: Wagner, Elbling & Company

5.2.3 Prompt market: Front month product

Table 8: Supplementary information on wholesale market metrics, 2013: Front month product

	Front month product Supplementary information on wholesale market metrics, 2013				
	Metric 2	Metric 3			
	Share of trading days with calculable bid-offer spread	Share of trading days with calculable order book price sensitivity		Average order book volume considered in calculation (in MW)	
		Offer side	Bid side	Offer side	Bid side
AT - VTP	99%	80%	77%	105	n.a.
BE - ZEE	64%	23%	19%	n.a.	n.a.
BE - ZTP	10%	0%	0%	n.a.	n.a.
CZ - VTP	34%	2%	4%	n.a.	n.a.
DE - GPL	94%	43%	39%	n.a.	n.a.
DE - NCG	100%	95%	93%	112	113
FR - PEG Nord	61%	9%	10%	n.a.	n.a.
FR - PEG Sud	18%	1%	2%	n.a.	n.a.
IT - PSV	99%	85%	84%	107	109
NL - TTF	100%	100%	100%	119	119
UK - NBP	100%	100%	100%	120	120

Source: Wagner, Elbling & Company

5.2.4 Spot market: Day-ahead product

Table 9: Supplementary information on wholesale market metrics, 2013: Day-ahead product

	Day-ahead product Supplementary information on wholesale market metrics, 2013				
	Metric 2	Metric 3			
	Share of trading days with calculable bid-offer spread	Share of trading days with calculable order book price sensitivity		Average order book volume considered in calculation (in MW)	
		Offer side	Bid side	Offer side	Bid side
AT - VTP	99%	99%	99%	119	119
BE - ZEE	99%	99%	99%	119	120
BE - ZTP	11%	6%	6%	n.a.	n.a.
CZ - VTP	42%	26%	24%	n.a.	n.a.
DE - GPL	100%	100%	100%	120	120
DE - NCG	100%	100%	100%	120	120
FR - PEG Nord	100%	100%	100%	119	119
FR - PEG Sud	74%	22%	38%	n.a.	n.a.
IT - PSV	100%	98%	99%	114	115
NL - TTF	100%	100%	100%	120	120
UK - NBP	100%	100%	100%	120	120

Source: Wagner, Elbling & Company

5.3 Absolute metric values for market merger scenarios

5.3.1 About this section

This section provides the absolute results for the 'market participants' needs' metrics for forward, prompt, and spot markets for the calendar year 2013 for three different hypothetical scenarios of market mergers in Western Europe (see the markets included in each scenario in the first column of each of the following tables).

5.3.2 Forward market

Table 10: Wholesale market metrics (absolute values) 2013: Forward products for market merger scenarios

Market merger scenario	Forward products – Wholesale market metrics (absolute values), 2013								
	Metric 1		Metric 2		Metric 3				Metric 4
	Average liquid order book horizon (months) with at least 120MW in the order book		Average bid-offer spread (%)		Order book price sensitivity: Average price markup/markdown (%) on best offer/bid				Average trading horizon (months) with at least 8 deals per day
	Offer side	Bid side	12th month	24th month	12th month: for 120 MW Offer side	12th month: for 120 MW Bid side	24th month: for 90 MW Offer side	24th month: for 90 MW Bid side	
BE - ZTP DE - GPL DE - NCG NL - TTF	19.7	18.7	0.2%	0.4%	0.2%	0.2%	0.1%	0.1%	26.2
DE - GPL DE - NCG	1.6	2.2	0.5%	n.a.	n.a.	n.a.	n.a.	n.a.	10.5
BE - ZTP DE - NCG	0.8	1.1	0.5%	n.a.	n.a.	n.a.	n.a.	n.a.	5.9

Source: Wagner, Elbling & Company

Notes:

Metric 2 and 3 labelled with 'n.a.' (not available) could only be calculated for less than 80% (12th month) or less than 60% (24th month) of the trading days. Respective markets are considered to have 'failed' the corresponding category.
In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, NL - TTF.

5.3.3 Prompt market: Front month product

Table 11: Wholesale market metrics (absolute values) 2013: Front month product for market merger scenarios

Market merger scenario	Front month product Wholesale market metrics (absolute values), 2013					
	Metric 1		Metric 2	Metric 3		Metric 4
	Median volume (MW) in the order book		Average bid-offer spread (%)	Order book price sensitivity: Average price markup/markdown (%) for 120 MW on best offer/bid		Median number of deals per day
	Offer side	Bid side		Offer side	Bid side	
BE - ZTP DE - GPL DE - NCG NL - TTF	712	691	0.2%	0.1%	0.1%	221
DE - GPL DE - NCG	255	250	0.3%	0.2%	0.2%	50
BE - ZTP DE - NCG	194	202	0.4%	0.2%	0.3%	35

Source: Wagner, Elbling & Company

Note:
In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, NL - TTF.

5.3.4 Spot market: Day-ahead product

Table 12: Wholesale market metrics (absolute values) 2013: Day-ahead product for market merger scenarios

Market merger scenario	Day-ahead product Wholesale market metrics (absolute values), 2013					
	Metric 1		Metric 2	Metric 3		Metric 4
	Median volume (MW) in the order book		Average bid-offer spread (%)	Order book price sensitivity: Average price markup/markdown (%) for 120 MW on best offer/bid		Median number of deals per day
	Offer side	Bid side		Offer side	Bid side	
BE - ZTP DE - GPL DE - NCG NL - TTF	4,152	4,273	0.1%	0.00%	0.00%	1,054
DE - GPL DE - NCG	2,424	2,617	0.2%	0.01%	0.01%	618
BE - ZTP DE - NCG	1,635	1,676	0.2%	0.03%	0.04%	394

Source: Wagner, Elbling & Company

Note:
In the calculations exchange volumes are taken into account for DE - GPL, DE - NCG, NL - TTF.