

2012 Liquidity Report
Wholesale markets for natural gas and electricity

Office of Energy Regulation
Netherlands Competition Authority
The Hague, July 2012

Foreword

The 2012 Liquidity Report offers an overview of the developments in liquidity on the wholesale markets for natural gas and electricity in the period of 2009-2011.

What is liquidity? In liquid markets, standard transactions can generally be executed swiftly, and large volumes per transaction can be traded without having an appreciable effect on prices. Liquidity minimizes transaction costs and raises confidence among market participants. That in turn attracts other parties to the market, which further improves liquidity. Liquid trading hubs at the wholesale level are a prerequisite for competitive energy markets which is then also beneficial to social welfare.

Increased liquidity in gas and electricity markets implies that energy prices reflect supply and demand fundamentals better. More accurate energy prices usually lead to more efficient decisions about gas and electricity consumption, and, in addition, send the right signals for investments in infrastructure (production capacity, transport capacity, storage capacity). Liquid trading hubs at wholesale level also mean that new entrants have access to the commodity gas and electricity which increases competition on the retail level.

Why this liquidity report? This report has been drawn up as part of the monitoring duty of the Netherlands Competition Authority (NMa). Because the NMa intends to follow a more thematic approach for its monitoring activities, the wholesale market monitor will no longer be published on an annual basis. This study into liquidity covers the same issues as the chapter on trading hubs in the wholesale market monitor with an aim to explore these subjects in greater detail and more extensively. This enables the NMa to keep a close watch on market developments and, by publishing the report, increase the level of market transparency.

This study into the liquidity of gas and electricity wholesale markets is based on a questionnaire sent out to market participants. Sixty-three participants returned the gas questionnaire, of which 33 filled out the consultative questions (either partial or complete). Thirty-one participants returned the electricity questionnaire, of which 22 filled out the consultative questions (either partial or complete). The NMa used Bloomberg market data and requested data from the APX ENDEX exchange.

Structure of the report. This report covers liquidity on the wholesale gas market in the first chapter and liquidity on the wholesale electricity market in the second chapter. Both chapters have a similar set-up. First an overview is given of developments in traded volumes. These volumes are subdivided into trading hubs (exchange, OTC, bilateral) and traded products (day, month, quarter etc. ahead). Then for each trading hub the development in liquidity for the various traded products are given. The report starts with a summary of its most important findings.

Summary

In 2011, the Dutch wholesale market for natural gas was clearly heading in the right direction. Natural gas is increasingly traded in products with a duration of less than a year. Across the board, all products traded on the TTF clearly indicate an increase in liquidity. On the wholesale electricity market, liquidity levels appear to be stabilizing. Most products indicate values similar to those of last year. One trend that is worth noting is the declining trade in annual products, and, as a result, a decline in total trade volumes in the Netherlands.

Gas

Liquidity on the Dutch gas market got off to a slow start. It took several years after the introduction of the TTF trading hub before an increase in delivered and traded volumes was clearly visible. Back then the NMa proposed several measures to accelerate the development of liquidity on the TTF. This resulted in the new gas market model with accompanying balancing regime by GTS which came into effect on April 1, 2011. Now the TTF is, in principle, the delivery point of natural gas. Gas delivered on the TTF can be traded again, which should further increase liquidity on the TTF.

Indicators reveal that liquidity on the TTF increased considerably in 2011. Traded volume on gas exchange APX ENDEX has doubled compared with 2010, and OTC trade (through brokers), which involves the highest volumes, experienced unprecedented growth in 2011. A marked trend in 2011 has also been the shift in volumes from annual contracts to quarterly and monthly contracts. Within a calendar year, demand for natural gas can fluctuate greatly because the need for gas among end users, predominantly households, largely depends on the temperature. Increased liquidity in quarterly and monthly contracts is therefore a positive trend. This raises confidence of suppliers (to end users) to buy natural gas on the TTF as an alternative to flexible delivery on the city-gate. The twice-yearly NMa report on trends in the retail market¹ reveals that the offerings of gas prices to end users is starting to diverge. Improved competition in the wholesale market offers more opportunities for suppliers to end users to differentiate themselves from competitors, which should increase competition in the retail market.

The NMa pursues continued development of liquidity on the wholesale gas market. Integration with neighboring markets increases liquidity on the trading hubs, which makes it a cornerstone of NMa's activities. In anticipation of the European-wide introduction of explicit auctions for bundled cross-border capacity, GTS has already launched a pilot on the interconnectors with Germany, approved by the NMa. In addition, the NMa, together with other regulators, is looking at possible options for market-coupling (implicit auctioning of cross-border capacity) for additional welfare benefits. On the domestic market, the NMa will consult with GTS and APX ENDEX to see whether it is feasible and desirable to integrate the bid-price ladder for balancing with the TTF within-day market in order to bundle liquidity for short term products.

Electricity

Compared to the wholesale gas market, trade on the Dutch wholesale electricity market took off at an earlier stage. NMa efforts to increase liquidity are thus primarily aimed at further European market integration. Coupling of the day-ahead markets with neighboring countries has been of critical importance in this process. After the trilateral market coupling with Belgium and France, market coupling with Germany and

¹ Trend Report on Competition and Consumer Confidence in the Energy Market – Second half of 2011, NMa Office of Energy Regulation, March 2012.

Norway was realized in late 2010 and early 2011 through APX ENDEX and TenneT. In 2011, price convergence occurs 70% of the time between the Netherlands and Belgium, almost 90% of the time with Germany, and about 7% of the time with Norway. Because of congestion on the interconnectors, day-ahead prices in the remaining hours do not converge further.

The level of liquidity on the wholesale electricity market in 2011 is similar to that in previous years. For forward products, price volatility and the bid-ask spread did not change that much in 2011. A remarkable development is that traded volumes in annual contracts decreased considerably. Trading in these types of contracts stems from the need to hedge positions on an annual basis. Traders indicate that liquidity in these contracts concentrates itself in the German wholesale market. Trading in quarterly and monthly contracts, the volumes of which are relatively small, has more or less remained the same. In the Netherlands, demand for electricity does not have a season-related component. Fluctuations in electricity consumption mostly occur throughout the day. Most of the trade is therefore seen involving the day-ahead product of individual hours for the next day. Day-ahead trade volumes on the APX ENDEX energy exchange have increased further. In addition, sensitivity of day-ahead prices for additional demand has somewhat decreased. Liquidity on the electricity spot market therefore slightly improved in 2011, in part because of coupling with energy exchanges in neighboring markets.

The NMa continues to promote further integration of electricity markets in Europe. The next step in market coupling is the transition to a flow-based system, which is projected for mid-2013. Flow-based market coupling takes into account the flow patterns of electricity in the network, as a result of which additional capacity may become available to the market while retaining the network's system integrity. Due to the increasingly important role that renewables play in terms of electricity generation, the NMa aims for an increased liquid cross-border intraday market as well. Furthermore, the NMa, together with other regulators, is looking into an optimal division into price zones for Europe. From a competition point of view, it may be more efficient to define markets according to geographical regions in which limited or no congestion takes place rather than using political borders to demarcate price zones.

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1 Gas

This chapter looks into the development of liquidity on the TTF (Title Transfer Facility). The TTF is a virtual hub for the transfer of gas in the network of Dutch transmission system operator GTS. Trade transactions are completed on the exchange (APX ENDEX), through a broker (OTC) or bilaterally. Volumes reported in this study concern the trading volumes (exchange, broker, bilateral) on the TTF.²

1.1 Wholesale gas market

Figure 1: Distribution of volumes between trading platforms, 2011

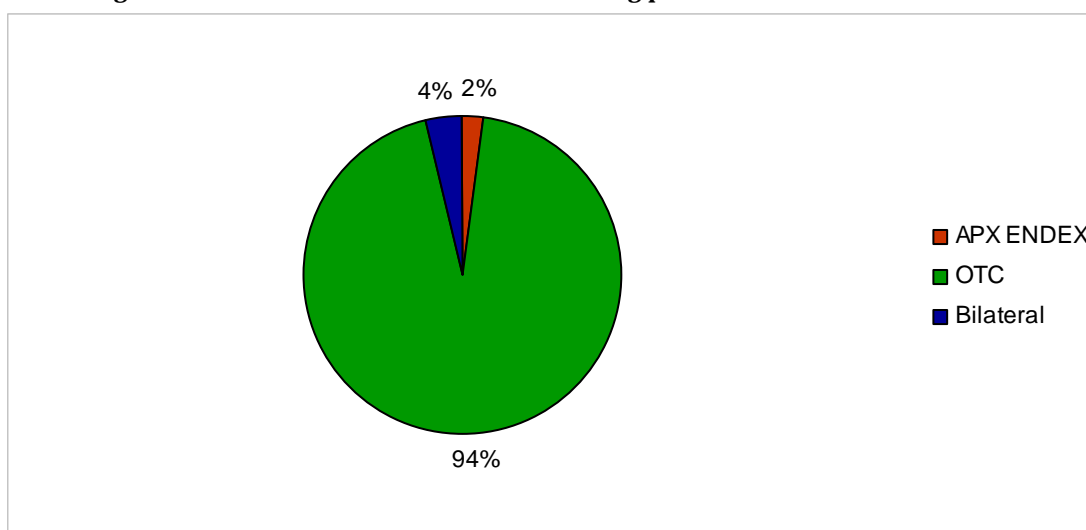
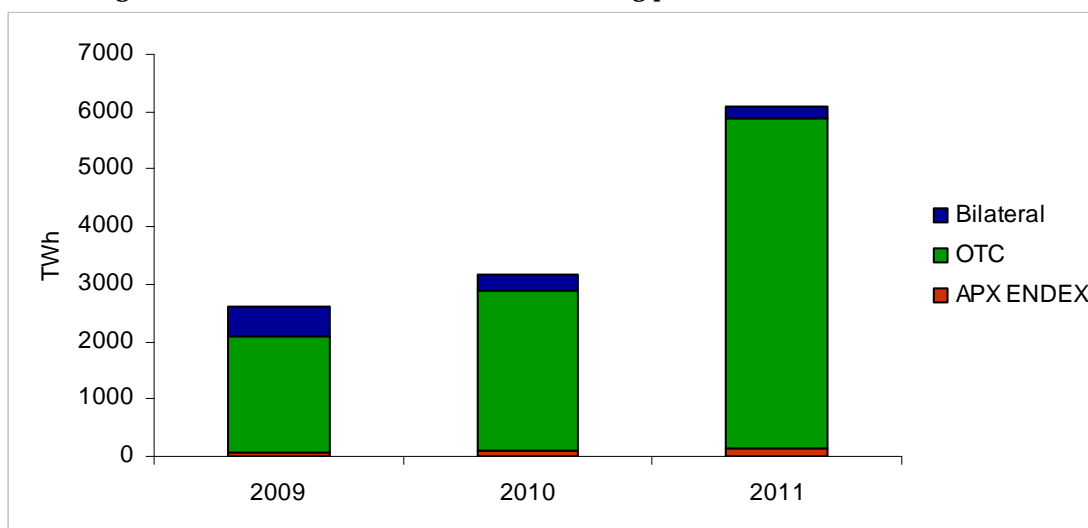


Figure 2: Distribution of volumes between trading platforms, 2009-2011



² The reported volumes come from a questionnaire conducted among market participants. Aggregation of these figures, as done here, therefore represent the lower limit of the actual market size of the TTF.

Developments in trade volumes reveal that the TTF experienced enormous growth in 2011. This increase in trade volumes acts as a huge boost to liquidity on the TTF. This is also apparent from liquidity indicators such as price volatility and the bid-ask spread that are covered in more detail later in this report. The distribution of volumes per trading platform indicates that TTF trade primarily takes place on OTC. Volumes on APX ENDEX have doubled since 2010 (see section 2.1 for more detailed figures on APX ENDEX).

Figure 3: Opinions on transparency of prices on trading platforms

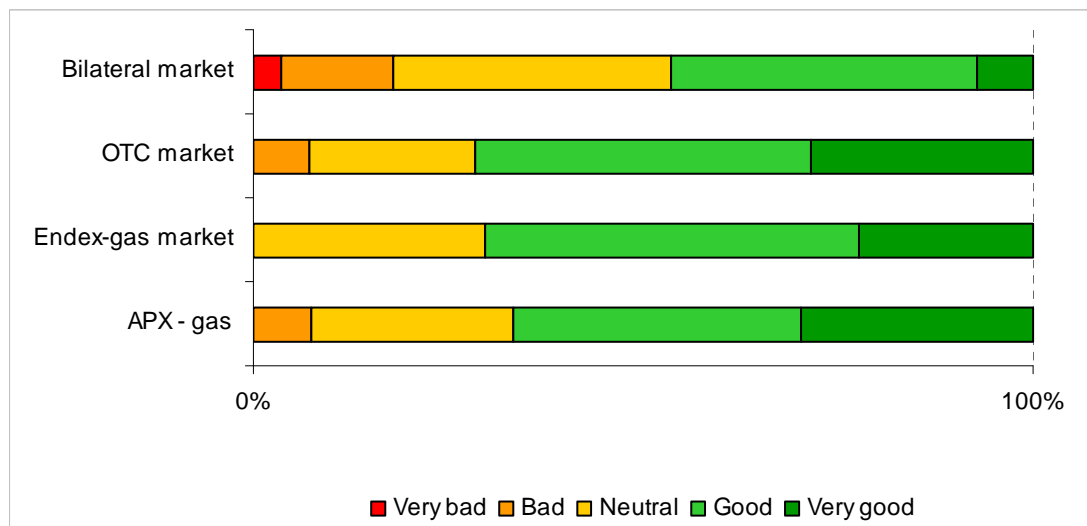
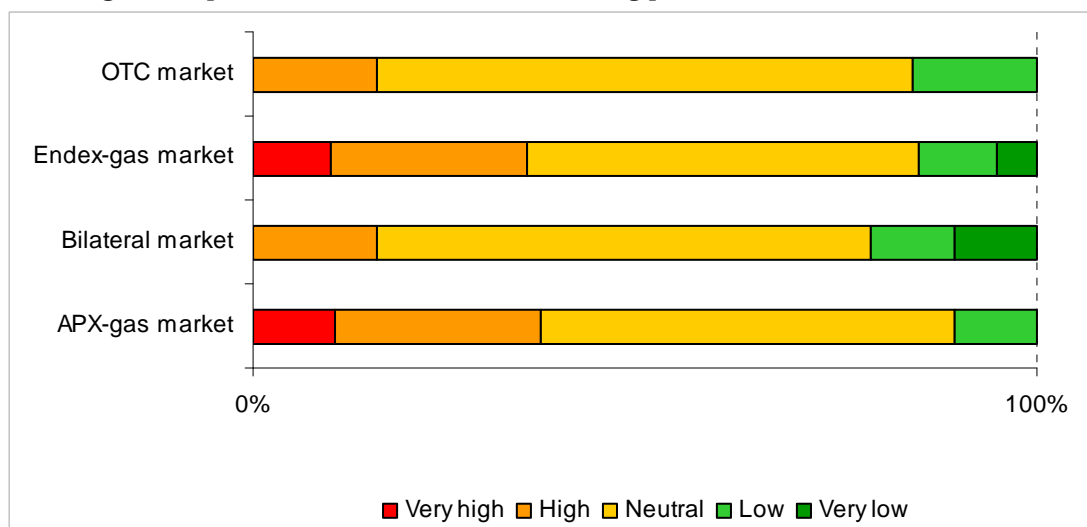


Figure 4: Opinions on transaction costs on trading platforms



Market participants generally rate transparency of gas prices as positive. Given the nature of the bilateral market, it should not come as a surprise that this market is seen as slightly less transparent. Costs associated with transactions (such as the energy exchange and brokers' fees) are perceived as high by a minority of respondents, particularly the energy exchange costs. This perception however is not shared by other respondents who rate these fees as being low. What these questionnaire results clearly show is that the level of transparency and transaction costs hardly play a role when choosing a trading platform.

Figure 5: Distribution of volumes per product, 2011

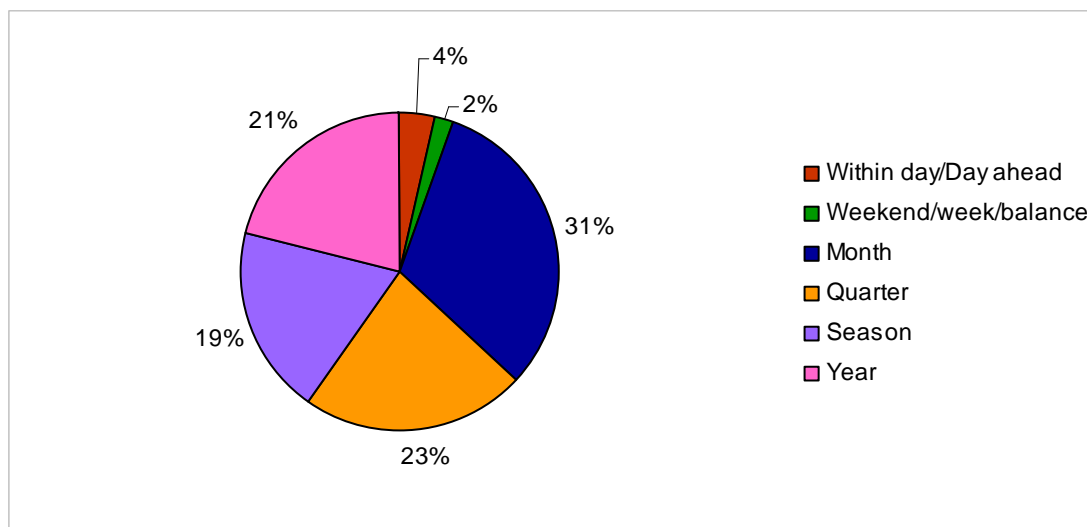
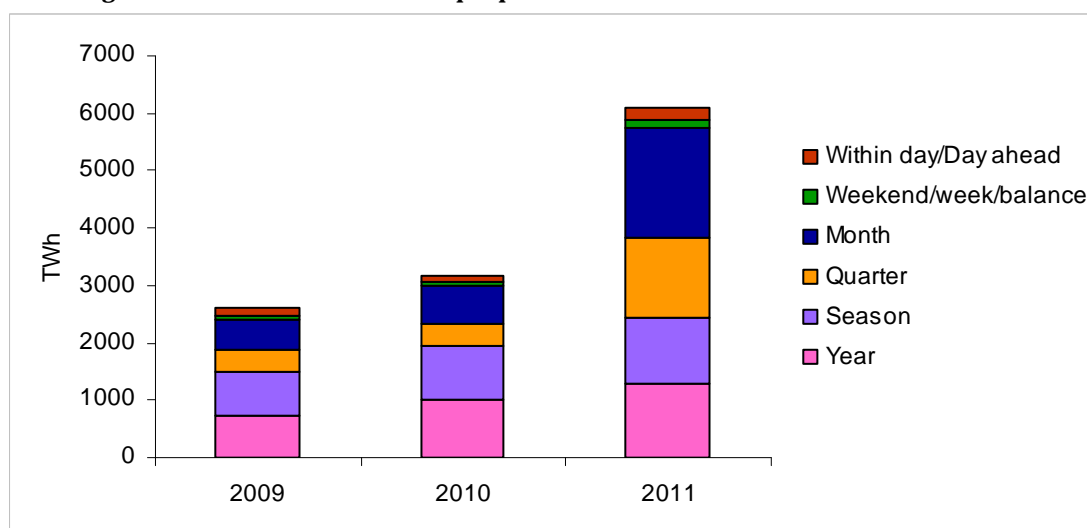


Figure 6: Distribution of volumes per product, 2009-2011



Monthly and quarterly contracts make up the TTF volumes to an increasing extent. A marked shift thus took place in 2011. Previously, the lion’s share of the volumes used to be traded in seasonal and annual contracts. The NMa sees this as a favorable development, as it offers suppliers more options to source gas in profile from TTF. The growth in volumes on the spot market (within-day, day-ahead products) is a good sign, too, for the same reason. For these products actual delivery follows closely upon trading which means these volumes cannot be resold multiple times. Strong growth rates in these products underscore the trend that more volume becomes available in products for the shorter term.

1.2 APX ENDEX

1.2.1 Trading volumes

Figure 7: APX ENDEX distribution of volumes per product, 2011

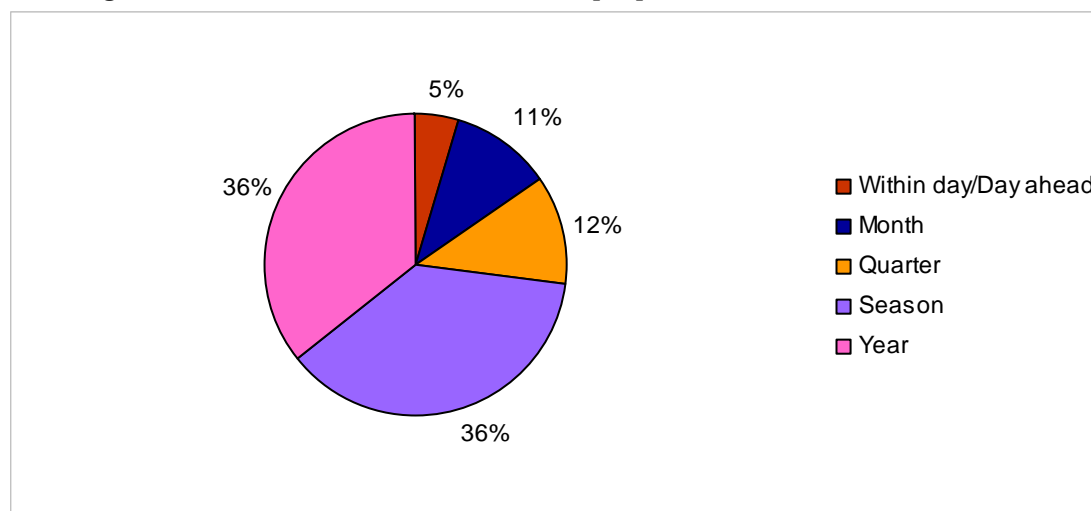
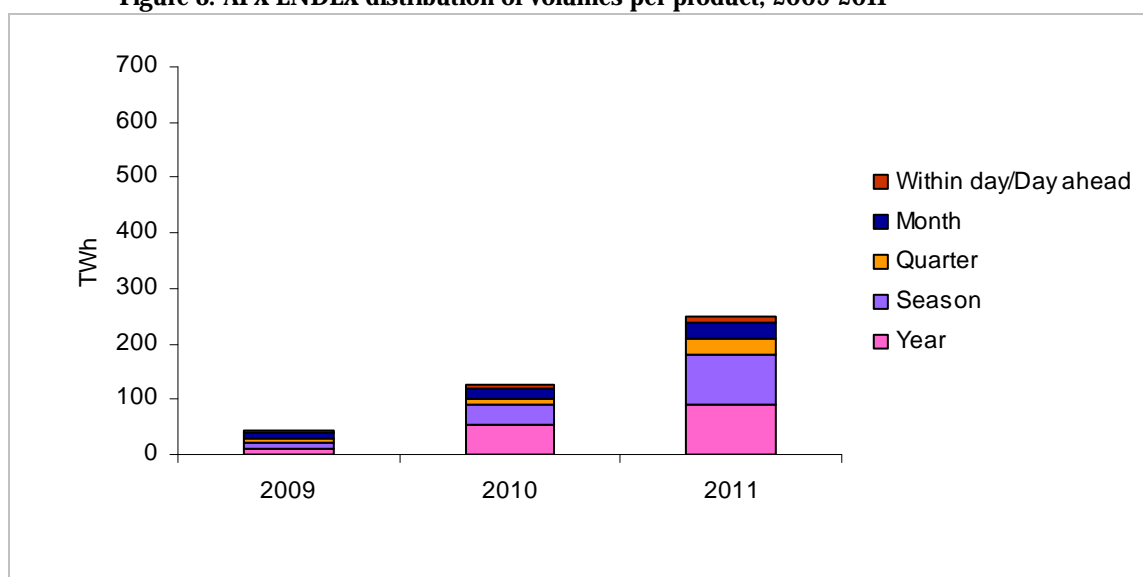


Figure 8: APX ENDEX distribution of volumes per product, 2009-2011



In recent years, APX ENDEX has shown steady growth figures in gas trade.³ This growth is seen in all products on offer. Spot market trade has increased from 5.8 TWh in 2010 to 11.9 TWh in 2011. Trading volumes of futures products has increased from 118.5 TWh to 237.7 TWh. This means that APX ENDEX trading volumes in both the spot market as well as the futures market doubled in 2011.

³ Reported trade volumes of APX ENDEX come directly from APX ENDEX, and are therefore not based on the questionnaire conducted among market participants on which the OTC and bilateral trading volumes in this report are based on.

Table 1: APX ENDEX volumes spot and futures – yearly total, 2009-2011

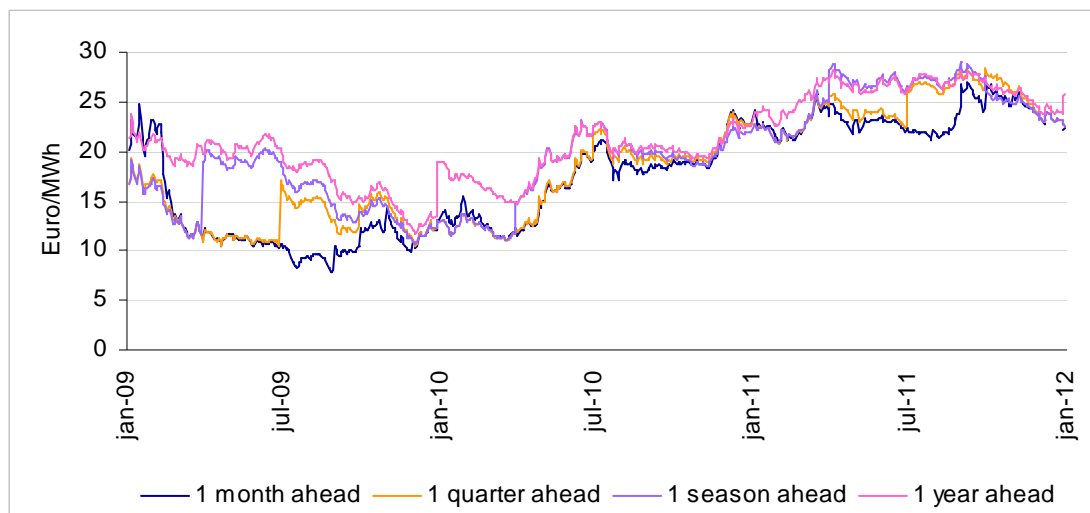
In TWh	2009	2010	2011
Within day	0,1	0,1	0,5
Day ahead	1.7	5.7	11.4
Month	10.7	16.5	27.0
Quarter	8.5	13.6	29.1
Season	9.5	34.4	92.1
Year	11.9	54.7	89.6

Table 2: APX ENDEX number of transactions spot and futures - yearly total, 2009-2011

	2009	2010	2011
Within day	125	179	3,227
Day ahead	608	2,687	6,709
Month	441	703	1,299
Quarter	162	305	648
Season	103	413	1,314
Year	125	603	1,128

The figure below shows the price development of futures traded on APX ENDEX.

Figure 9: APX ENDEX price trends of futures, 2009-2011



1.2.2 Liquidity indicators

The evident growth in traded volumes and in the number of transactions on APX ENDEX indicate an increase in liquidity on the gas exchange. The trend observed in price volatility (absolute price change compared with previous day) confirms this picture. Across the board, price volatility decreases. This means that uncertainty about prices levels is subsiding among market participants, which, in turn, results in the gas exchange becoming more attractive.

Figure 10: APX ENDEX price volatility of month-ahead contracts, 2009-2011

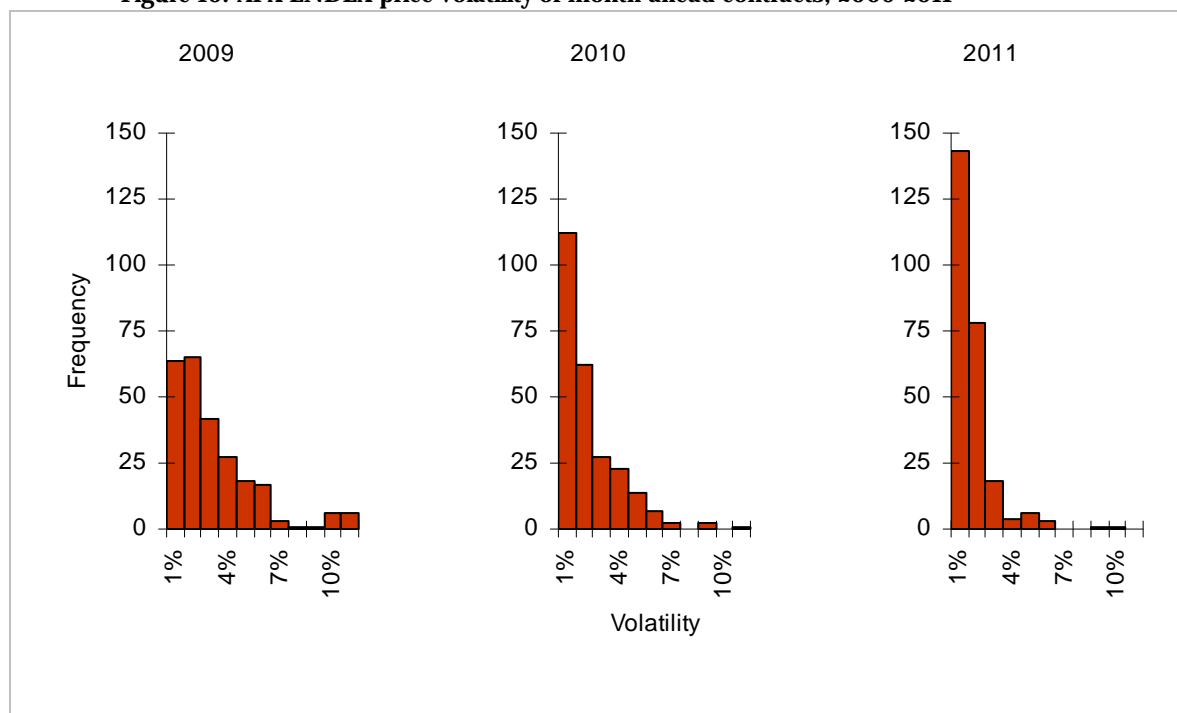


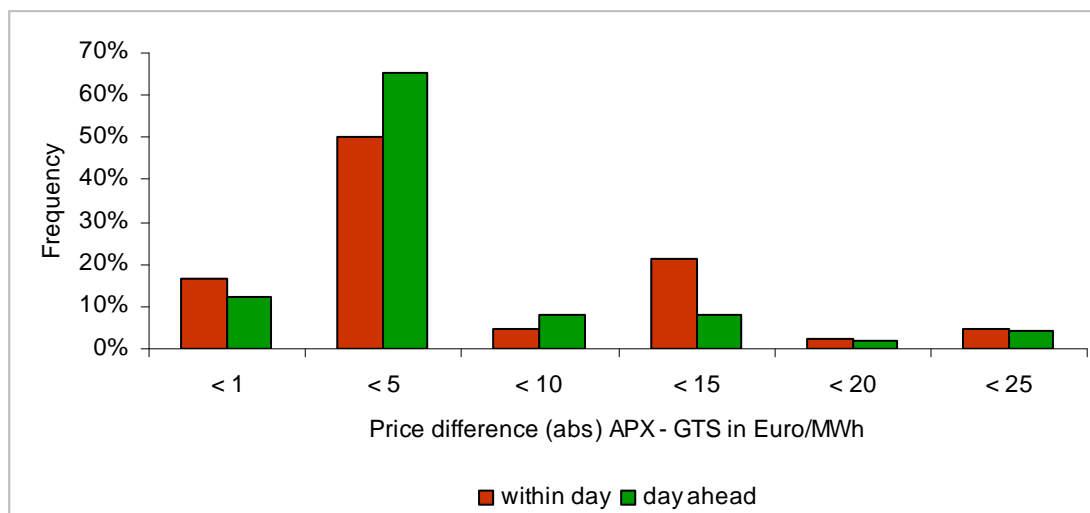
Table 3: APX ENDEX price volatility of spot and futures – average per year

	2009	2010	2011
Day ahead	3.8%	2.6%	2.2%
Month ahead	2.8%	1.7%	1.1%
Quarter ahead	2.4%	1.6%	1.0%
Season ahead	2.0%	1.5%	1.0%
Year ahead	1.6%	1.3%	0.8%

1.2.3 Comparison of spot and balancing

A comparison of spot prices on gas exchange APX ENDEX with the imbalance prices of transmission system operator GTS at times when the bid-price ladder is called (58 times in 2011) reveals that, most of the time, the difference between these two is no more than 5 Euro/MWh. Larger price differences of up to 25 Euro/MWh are regularly observed. This is a sign that liquidity of products on the very short term (within day) may need further improvement.

Figure 11: APX ENDEX spot price compared with imbalance price GTS, 2011



1.3 OTC

1.3.1 Trading volumes

Figure 12: OTC distribution of volumes per product, 2011

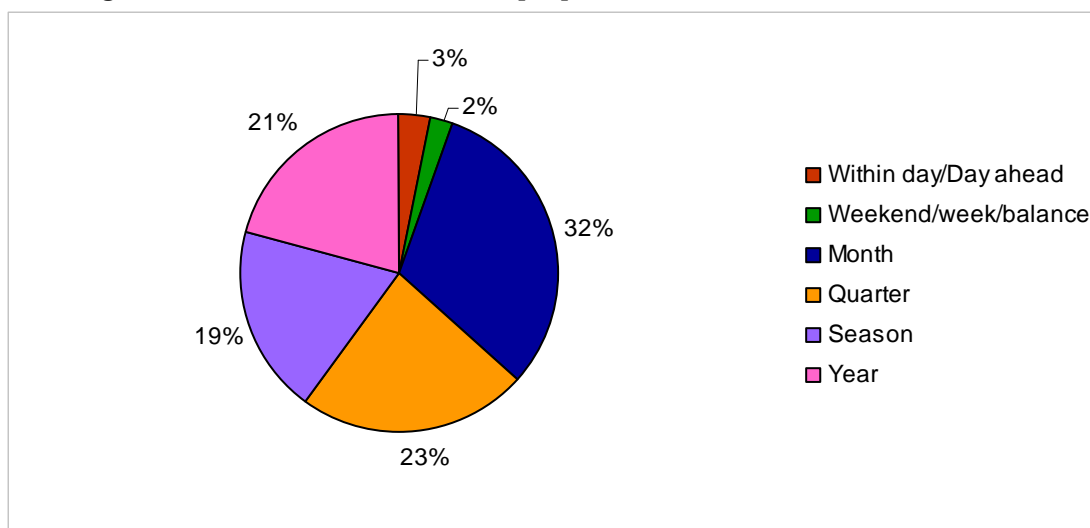
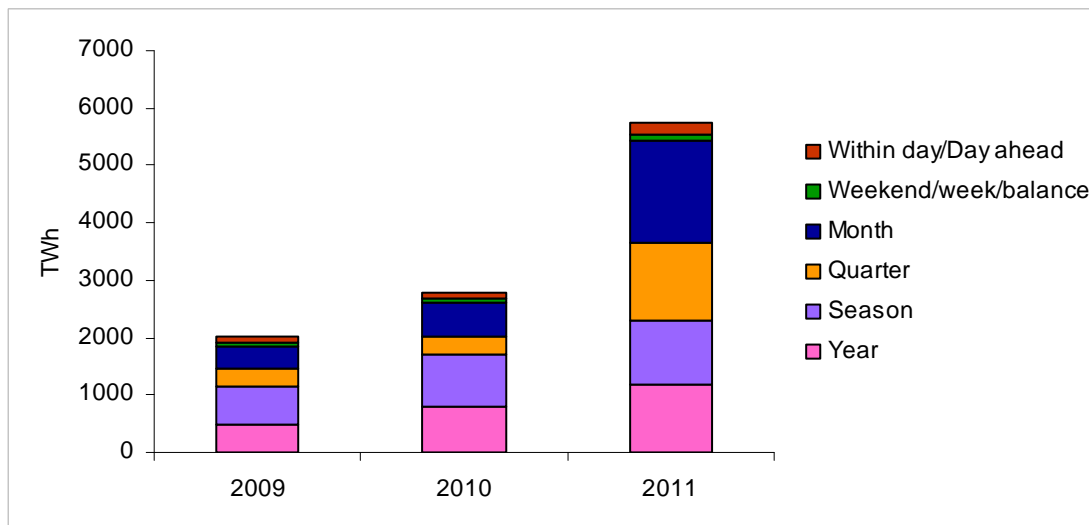


Figure 13: OTC distribution of volumes per product, 2009-2011



1.3.2 Liquidity indicators

Price volatility and the bid-ask spread are key indicators for the confidence that market participants have in a trading platform. Volatility reflects the degree of price fluctuation. Lower volatilities mean less uncertainty about prices. The bid-ask spread is an indication of the transactions costs. Lower spreads make it easier to conclude transactions.

Figure 14: OTC price volatility of month-ahead contracts, 2009-2011

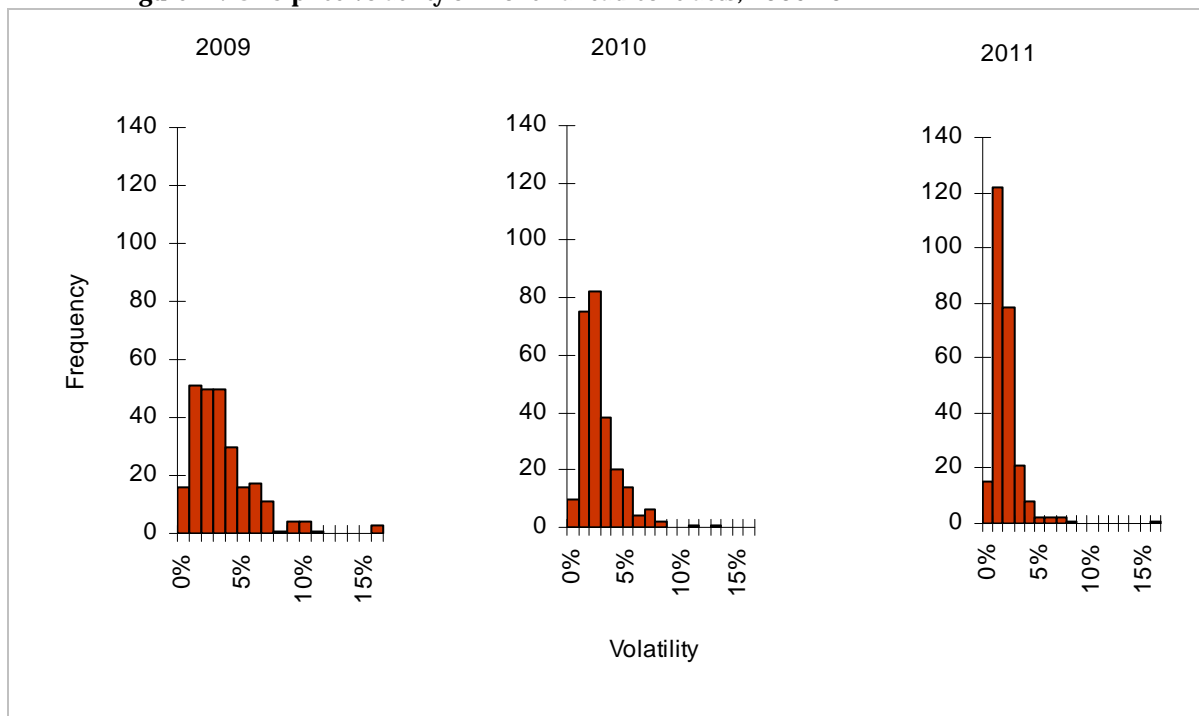


Table 4: OTC price volatility – averages per year

	2009	2010	2011
Day ahead	4.9%	3.4%	2.2%
Month ahead	2.9%	1.9%	1.2%
Quarter ahead	2.6%	1.6%	1.0%
Season ahead	2.5%	1.8%	1.1%
Year ahead	1.7%	1.4%	0.9%

Figure 15: OTC bid-ask spread of month-ahead contracts, 2009-2011

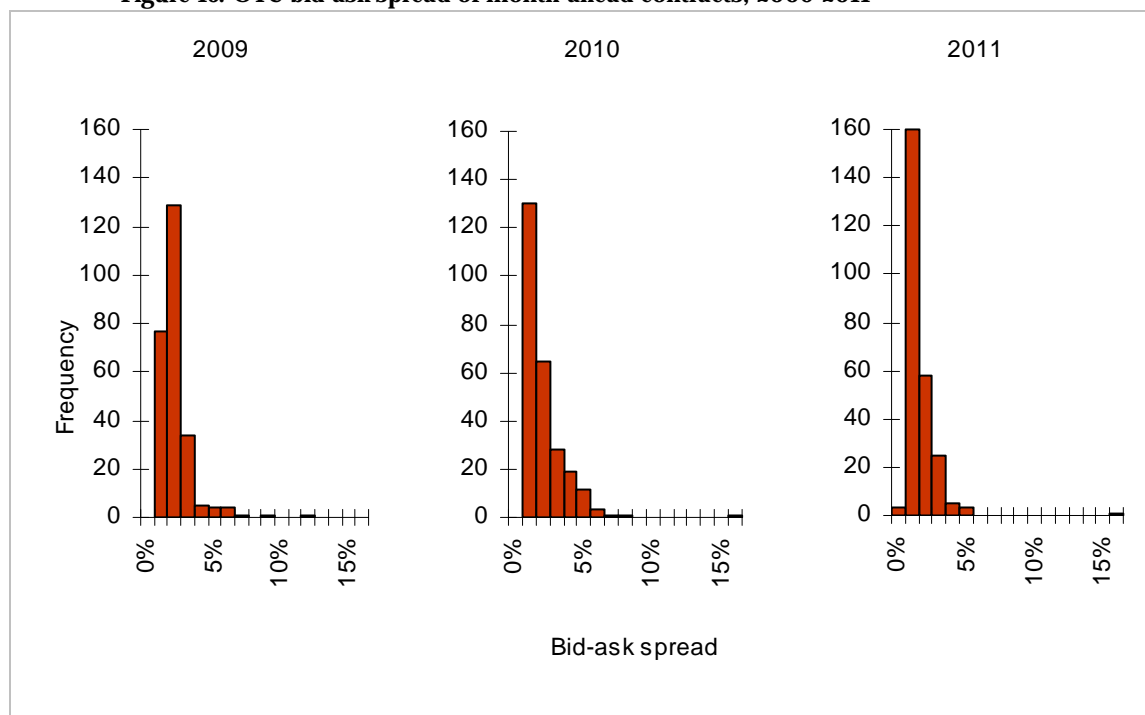


Table 5: OTC bid-ask spread – averages per year

	2009	2010	2011
Day ahead	5.3%	3.5%	2.8%
Month ahead	1.7%	2.2%	1.7%
Quarter ahead	3.2%	2.2%	1.4%
Season ahead	1.8%	1.5%	1.3%
Year ahead	1.5%	1.4%	1.2%

Price volatilities and bid-ask spreads on the TTF are heading in the right direction. These liquidity indicators indicate improvements for all contracts, both spot and futures. With regard to month-ahead contracts, the lapse in the bid-ask spread in 2010 turned out to be a temporary one. Considering the strong increase in monthly volumes, an improvement here is expected in the next few years.

Market depth and trading horizons also give an indication of the level of liquidity on the TTF. Market depth is an indication of the market's absorption capacity. The questionnaire contained a question how many lots of 30 MW market participants could trade without affecting the price. The trading horizon is an indication of how far ahead contracts are traded. The questionnaire contained a question how many periods ahead market participants would trade in contracts of different durations.

Figure 16: OTC market depth, 2009-2011

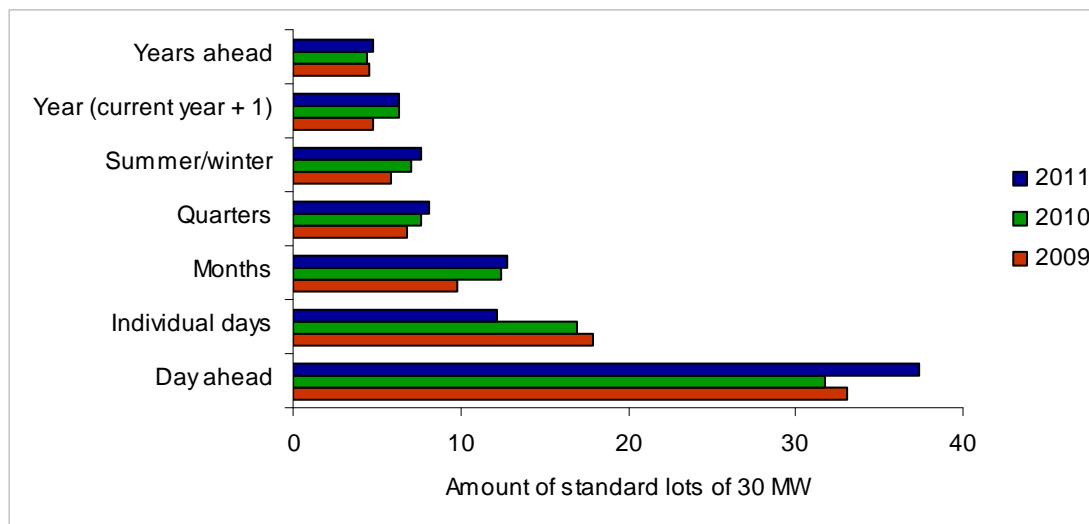
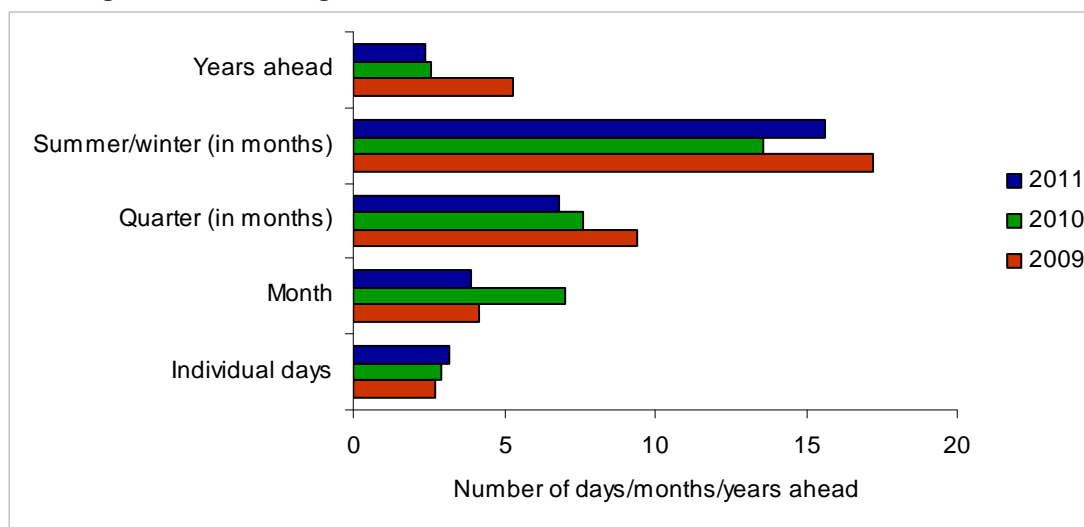


Figure 17: OTC trading horizon, 2009-2011



In 2011, market depth on the TTF increased. This trend is most evident in the day-ahead product. With regard to the annual contracts, the market is not considered as deep as in previous years. Also, the trading horizon for annual contracts is less far ahead. It seems that this a direct effect of the shift of trading volumes towards shorter durations. Market depth of monthly and quarterly contracts is improving more favorably. Market participants trading these types of contracts do so closer to the date of delivery. This concentration in liquidity is a reflection of growing confidence in the market.

Figure 18: Opinions on liquidity of within-day products

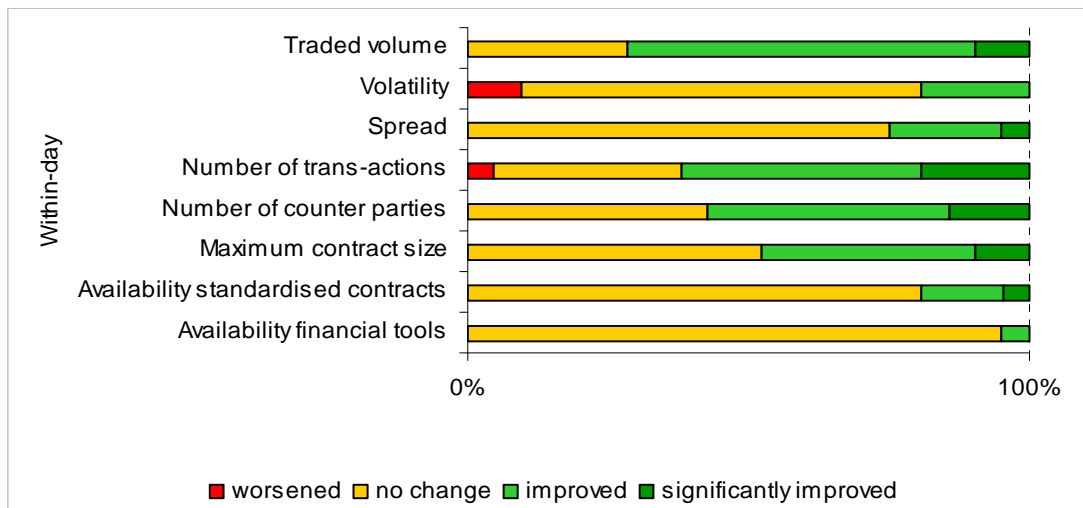


Figure 19: Opinions on liquidity of prompt products (day to week)

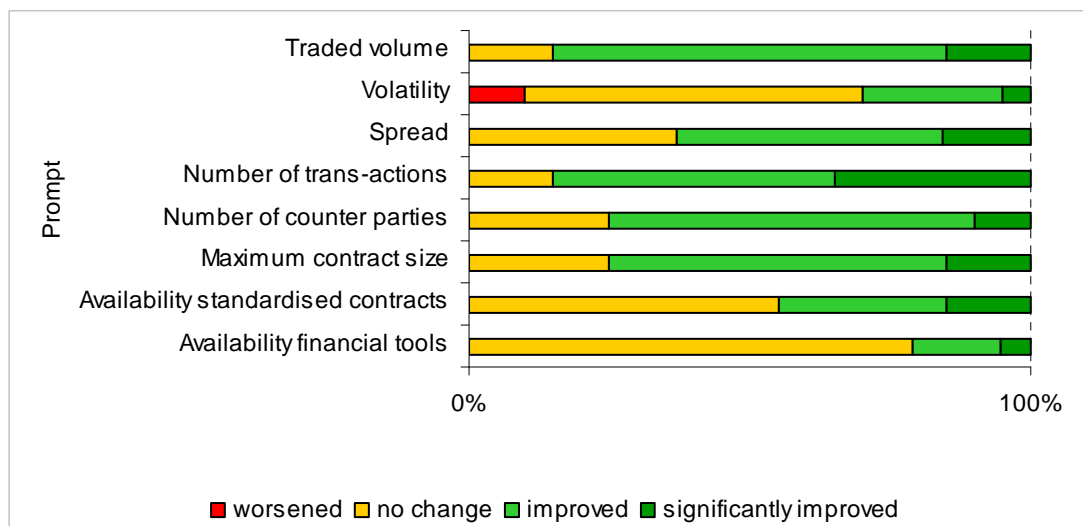
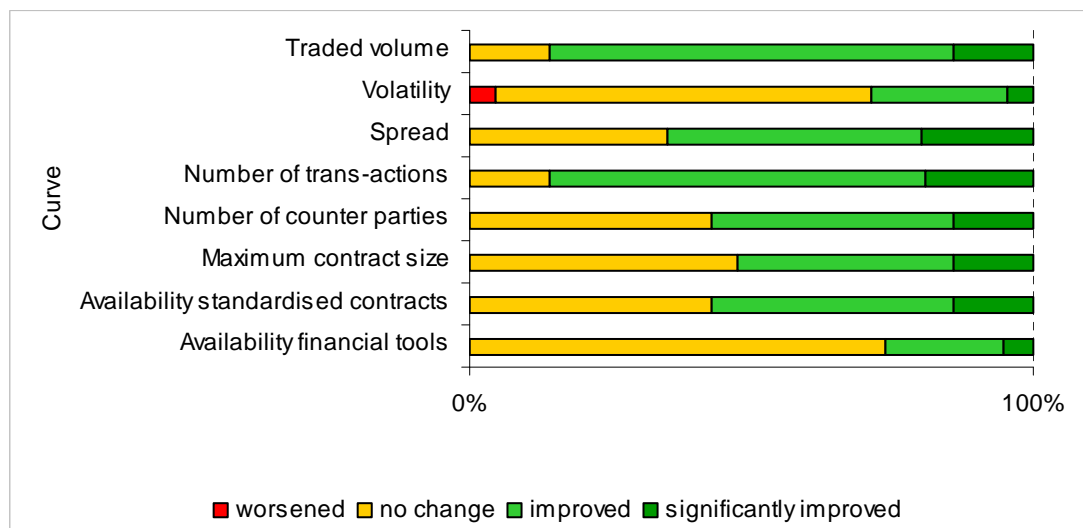


Figure 20: Opinions on liquidity of curve products (month to year)



In the questionnaire, respondents were asked about their opinions on liquidity trends based on a number of indicators, differentiating between within-day, prompt and curve products. Developments in liquidity for prompt products (day to week) is assessed the most favorably. In addition, it is worth noting that, for all products, price volatility is perceived as improving the least, whereas market data (figure 14, table 4) suggest a more favorable development.

1.3.3 International comparison

When comparing TTF prices with those of neighboring gas hubs NBP (England), Zeebrugge (Belgium) and NCG (Germany), it is clear that these follow each other to a considerable degree. Their price volatilities are similar as well, which decrease with each year in Northwestern European hubs. The bid-ask spreads decrease with each year, as well, on all hubs. However, there is a difference in terms of timing. NBP is ahead, NCG follows. The TTF development shows a smoother trend.

Figure 21: International comparison of day-ahead prices, 2009-2011

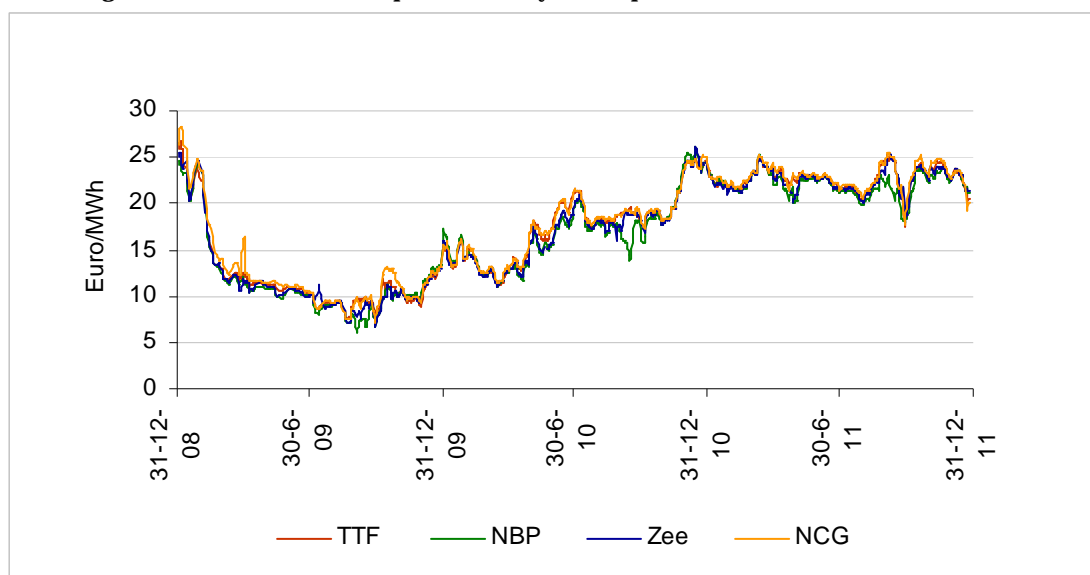


Figure 22: International comparison of price volatility of day-ahead contracts, 2009-2011

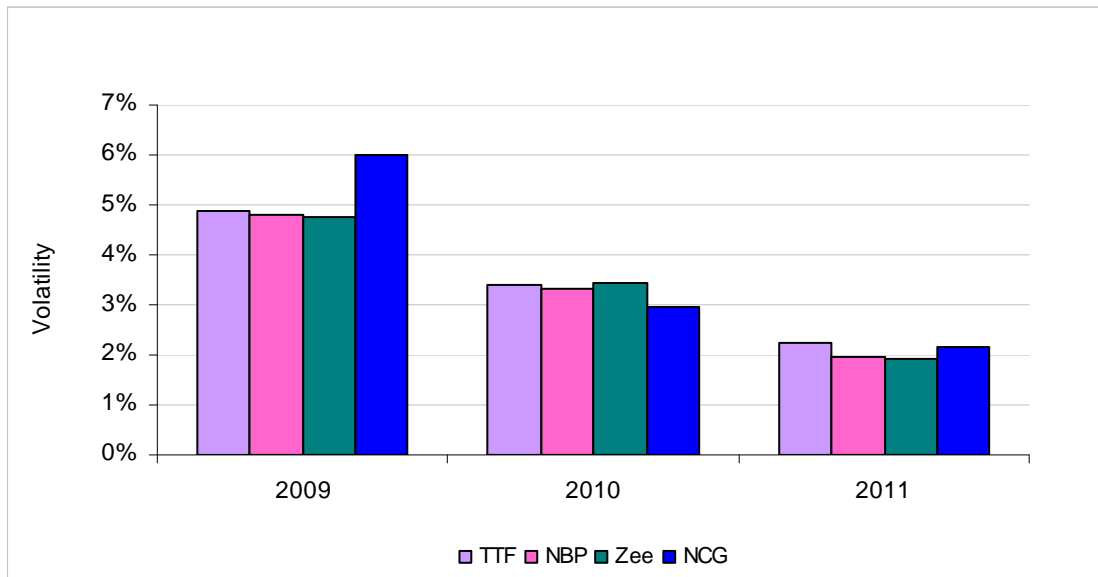
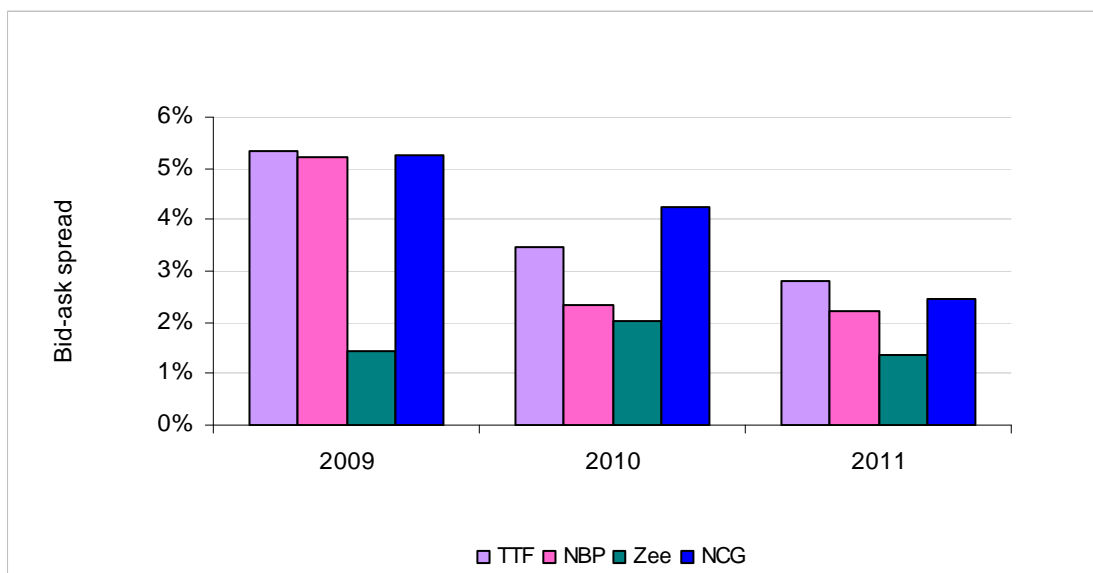


Figure 23: International comparison of bid-ask spread of day-ahead contracts, 2009-2011



1.4 Bilateral

Figure 24: Bilateral distribution of volumes per product, 2011

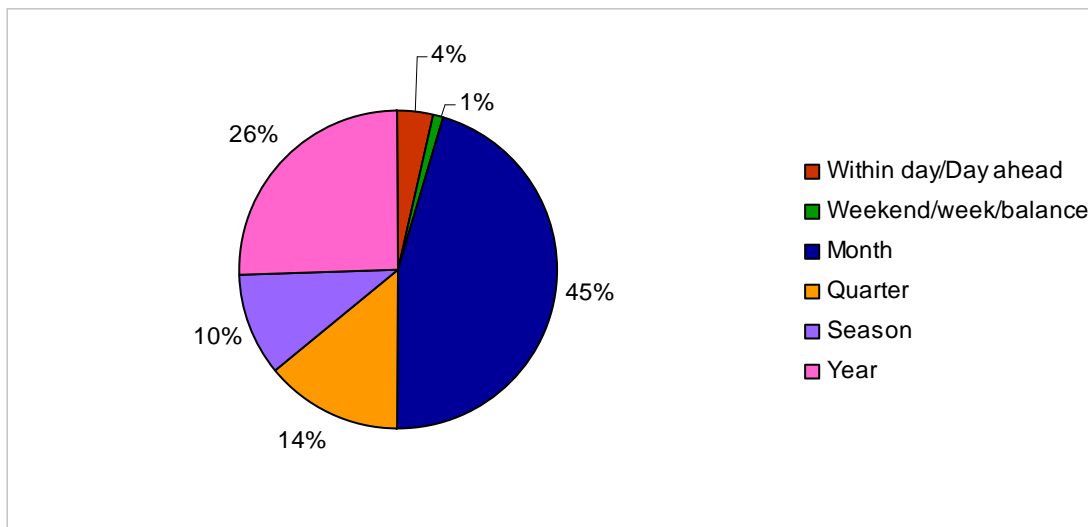
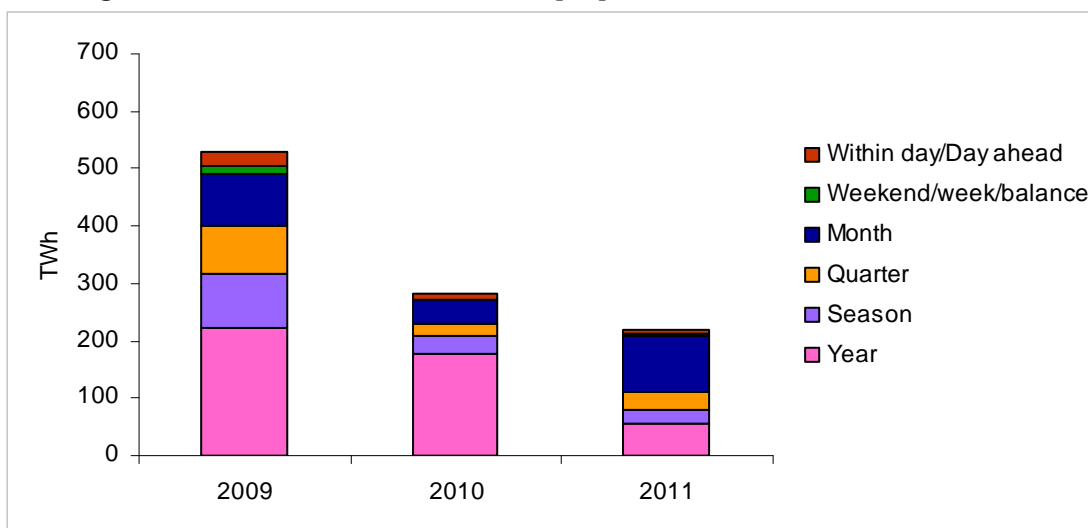


Figure 25: Bilateral distribution of volumes per product, 2009-2011



2 Electricity

2.1 Wholesale electricity market

Figure 26: Distribution of volumes between trading platforms, 2011

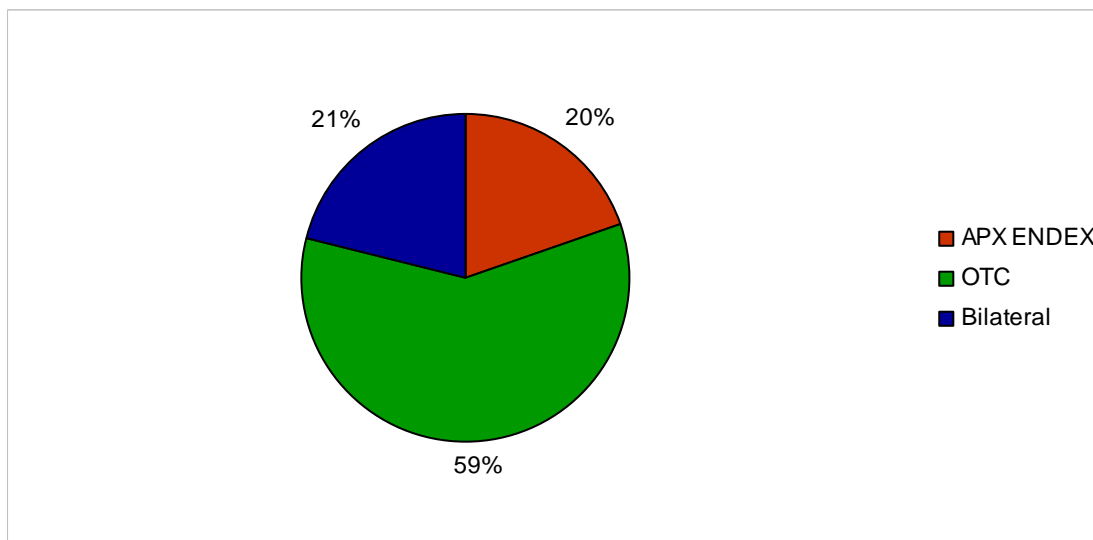
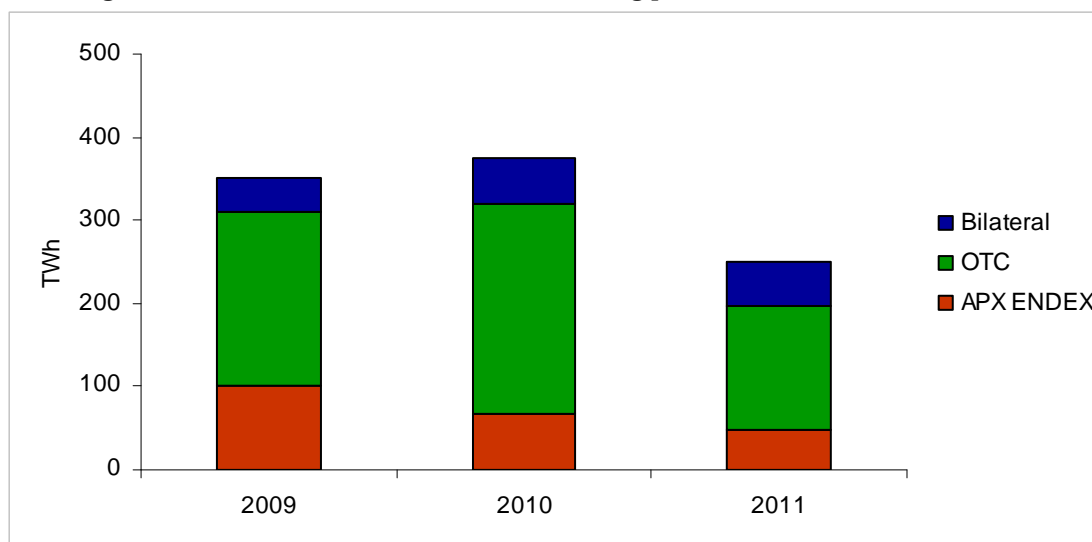


Figure 27: Distribution of volumes between trading platforms, 2009-2011



Trading volumes on the wholesale electricity market were clearly lower in 2011 than in previous years.⁴

Trading on the OTC significantly dropped, whereas there had been an increase in 2010. Traded volumes on APX ENDEX have decreased every year (see section 2.2 for detailed APX ENDEX figures).

On the wholesale electricity market, respondents consider OTC trade clearly less transparent than trading on APX ENDEX. At the same time, respondents regard administrative costs for trading on the exchanges higher than on the OTC. The ENDEX fee may be part of the reason why traded volumes in futures products on the exchanges are decreasing.

Figure 28: Opinions on transparency of trading platforms

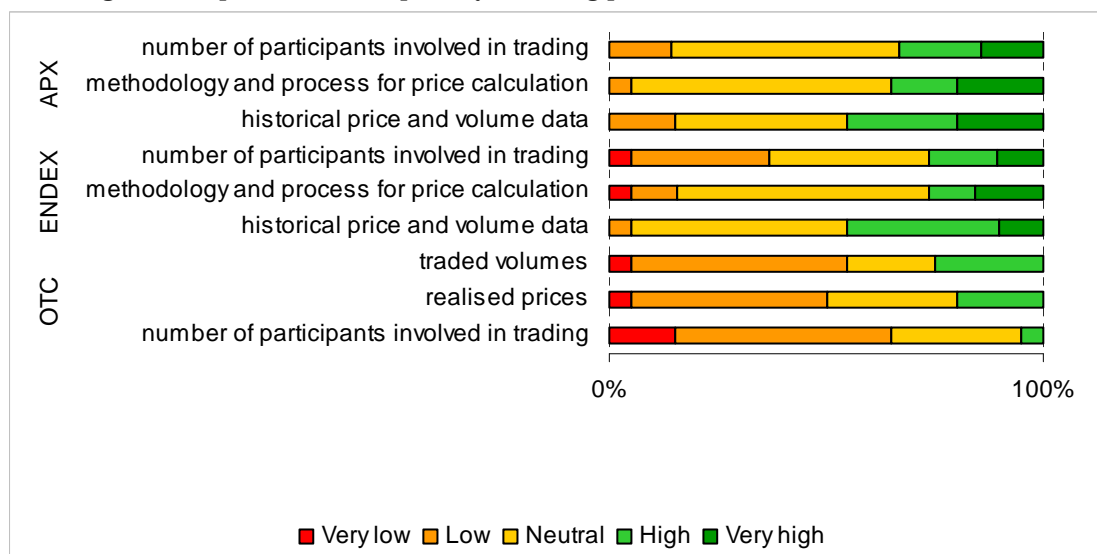
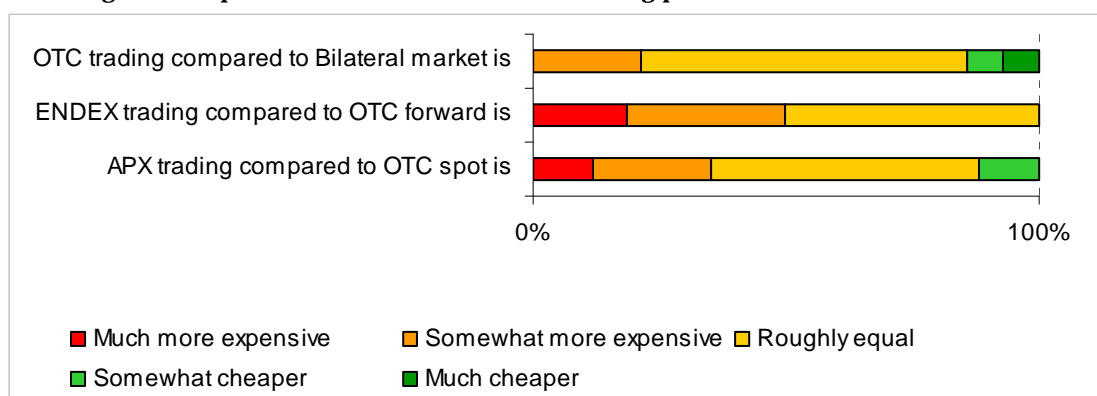


Figure 29: Opinions on transaction costs on trading platforms



⁴ The reported volumes come from a questionnaire conducted among market participants. Aggregation of these figures, as done here, therefore represent the lower limit of the actual market size.

Figure 30: Distribution of volumes per product, 2011

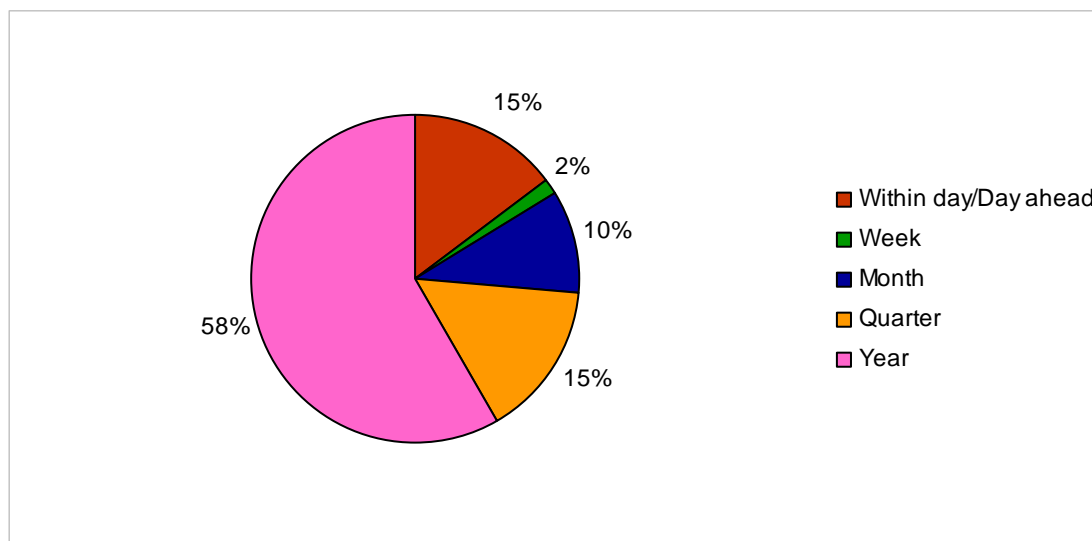
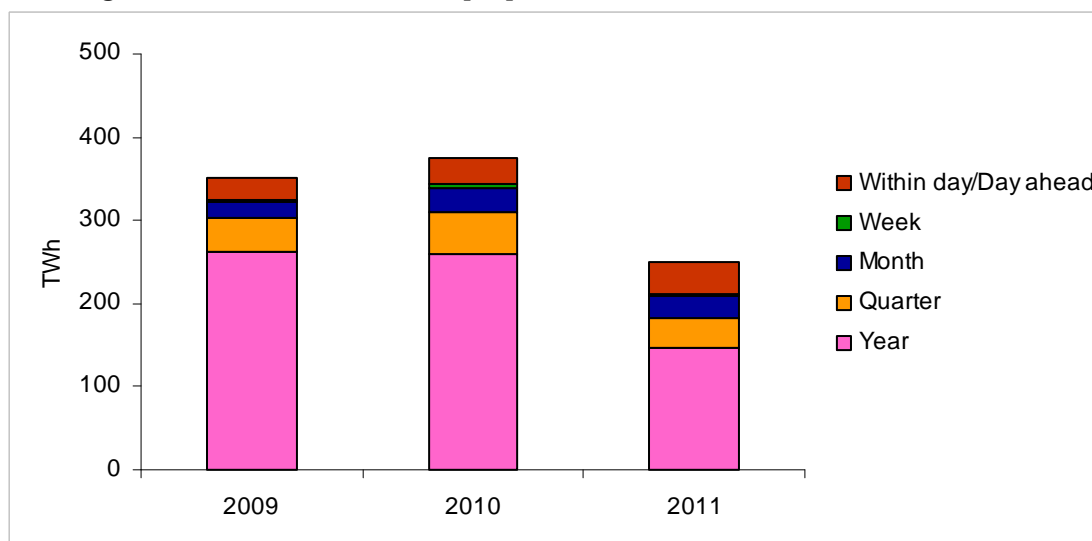


Figure 31: Distribution of volumes per product, 2009-2011



The lion's share of traded volumes on the wholesale electricity market concerns annual contracts. Trade in these products in particular dropped significantly in 2011. It appears that the decrease in trade on the Dutch wholesale market in 2011 can be fully attributed to these annual contracts. One of the primary reasons here is the shift in trade of forward products towards Germany. Liquidity in the region is concentrating on the German wholesale market, which subsequently attracts more liquidity to Germany. This shift can be regarded as a result of European market integration. Market participants are now able to hedge their positions on the market that is most attractive for that purpose. This contributes to efficient price formation on energy markets. Another effect of market integration is the hike in day-ahead volumes on APX in 2011. The coupling with the German exchange EEX in late 2010, the Scandinavian NordPool Spot on the NorNed cable in early 2011, and on the BritNed cable to the UK in 2011 all further increase liquidity on the Dutch spot market.

2.2 APX ENDEX

2.2.1 Trading volumes

Figure 32: APX ENDEX distribution of volumes per product, 2011

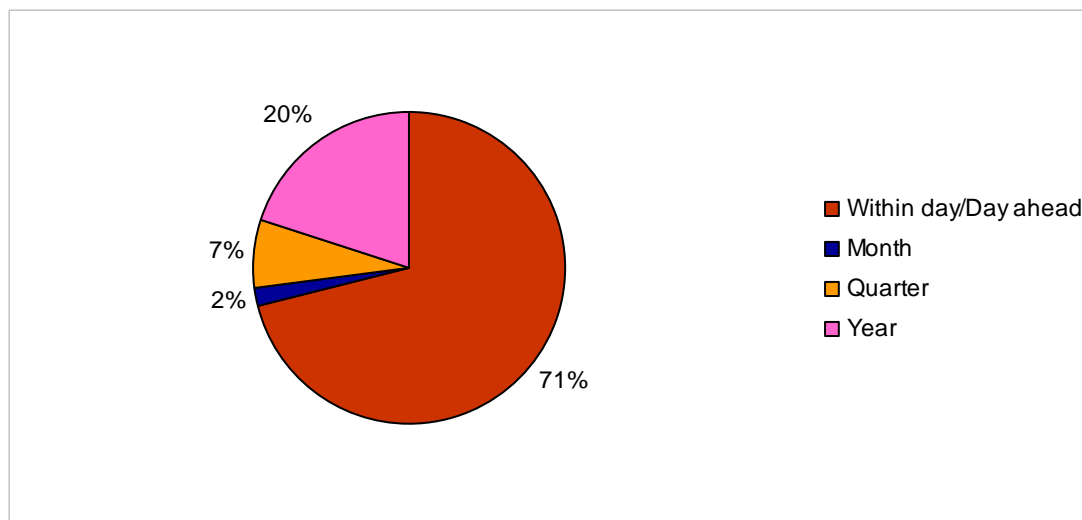
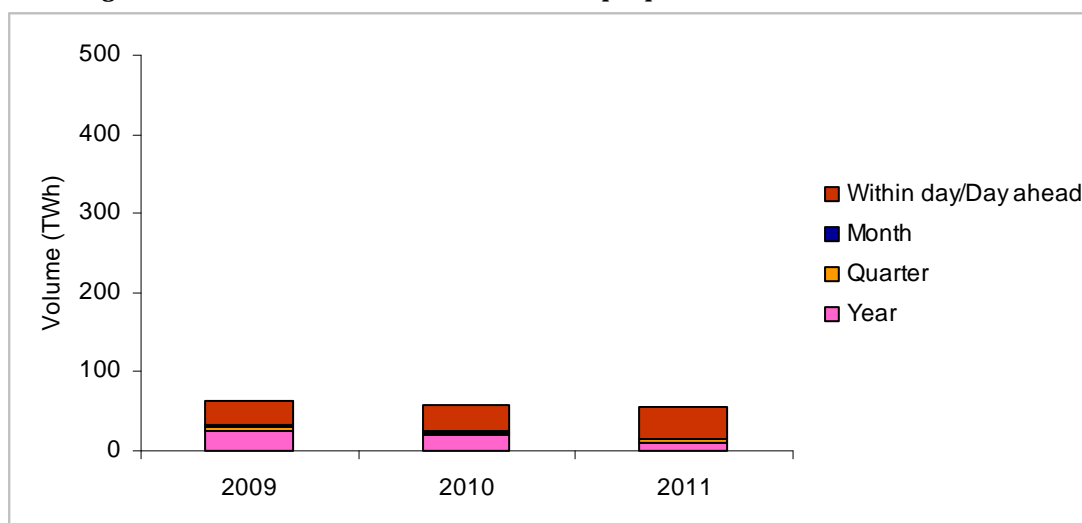


Figure 33: APX ENDEX distribution of volumes per product, 2009-2011



Almost three-quarters of the trading volumes on APX ENDEX concerns the day-ahead (and within-day) products.⁵ The spot trade in the wholesale electricity market is clearly concentrated on the exchange. With an increase of more than 6 TWh, traded volume on the spot market APX ENDEX totaled almost 40 TWh in 2011. As is the case on the OTC, a trend in the opposite direction can be observed for annual contracts. With a drop of more than 9 TWh in 2011, volumes are almost halved to 11,2 TWh.

⁵ Reported trade volumes of APX ENDEX come directly from APX ENDEX, and are therefore not based on the questionnaire conducted among market participants on which the OTC and bilateral trading volumes in this report are based on.

Table 6: APX ENDEX volumes spot and futures – yearly total

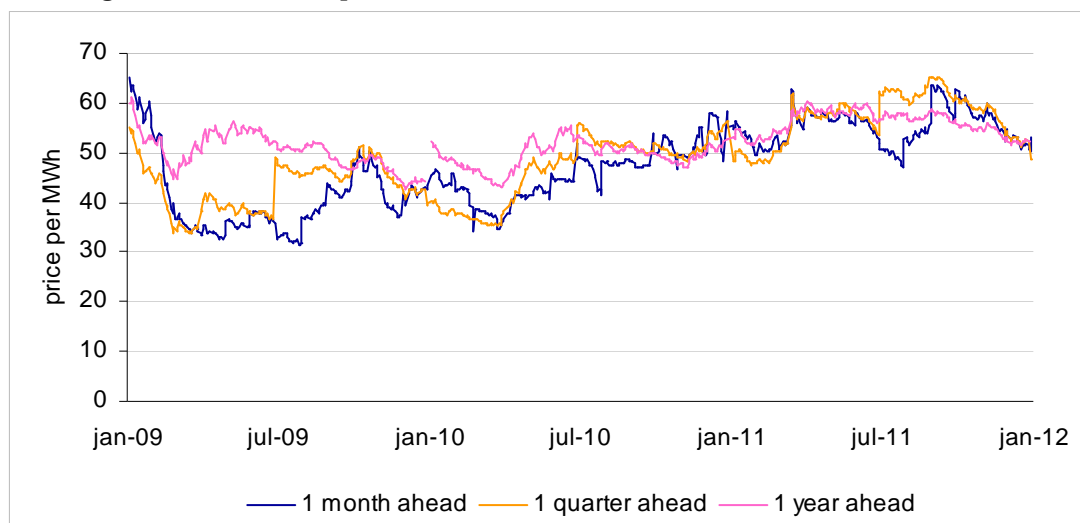
In TWh	2009	2010	2011
Within day	0.0	0.0	0.3
Day ahead	29.0	33.4	39.5
Month	2.9	0.8	1.0
Quarter	5.4	3.1	3.9
Year	25.7	20.7	11.2

Table 7: APX ENDEX transactions spot and futures – yearly total

	2009	2010	2011
Within day	2,510	1,252	2,980
Day ahead	unknown	761,581	905,655
Month	784	272	274
Quarter	545	348	365
Year	1,116	1,017	307

The figure below shows the price trends for futures products traded on APX ENDEX.

Figure 34: APX ENDEX price trends of futures, 2009-2011



2.2.2 Liquidity indicators

Price sensitivity gives an indication of the extent to which additional demand leads to price increases. It provides an insight into the amount of supply in the market that has not been called upon. It is therefore a measure of market depth on APX. Simulations of additional demand on the APX day-ahead market reveal that market depth in situations of large volumes of additional demand in 2011 is similar to that in 2010.

Additional demand of 250 MW leads to an average price increase of 1.3%, 500 MW of additional demand to a price increase of approximately 2.7%. A limited volume of 50 MW of additional demand results in a price increase of 0.1%, which is an improvement compared with 2010.

Figure 35: APX ENDEX price sensitivity of day-ahead for 250 MW extra demand, 2009-2011

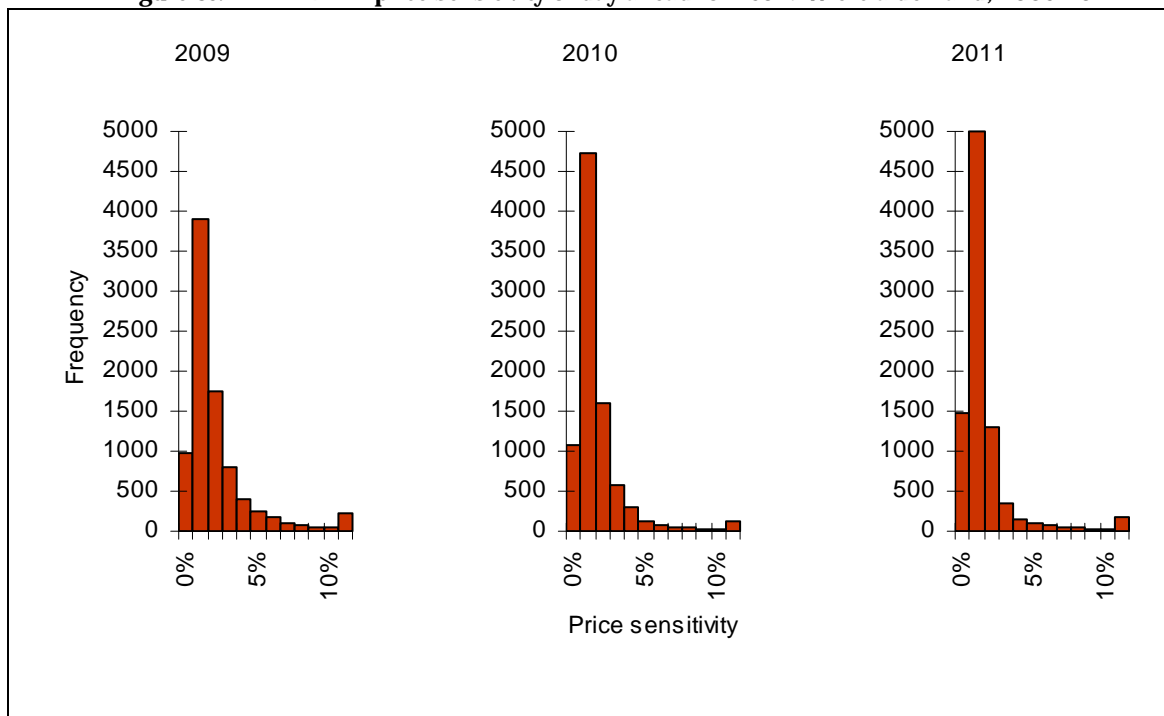


Table 8: APX ENDEX price sensitivity on spot market for extra demand – averages per year

	2009	2010	2011
50 MW extra	0.4%	0.2%	0.1%
250 MW extra	2.0%	1.3%	1.3%
500 MW extra	4.0%	2.7%	2.7%

Figure 36: APX ENDEX price volatility of quarter-ahead contract (base load), 2009-2011

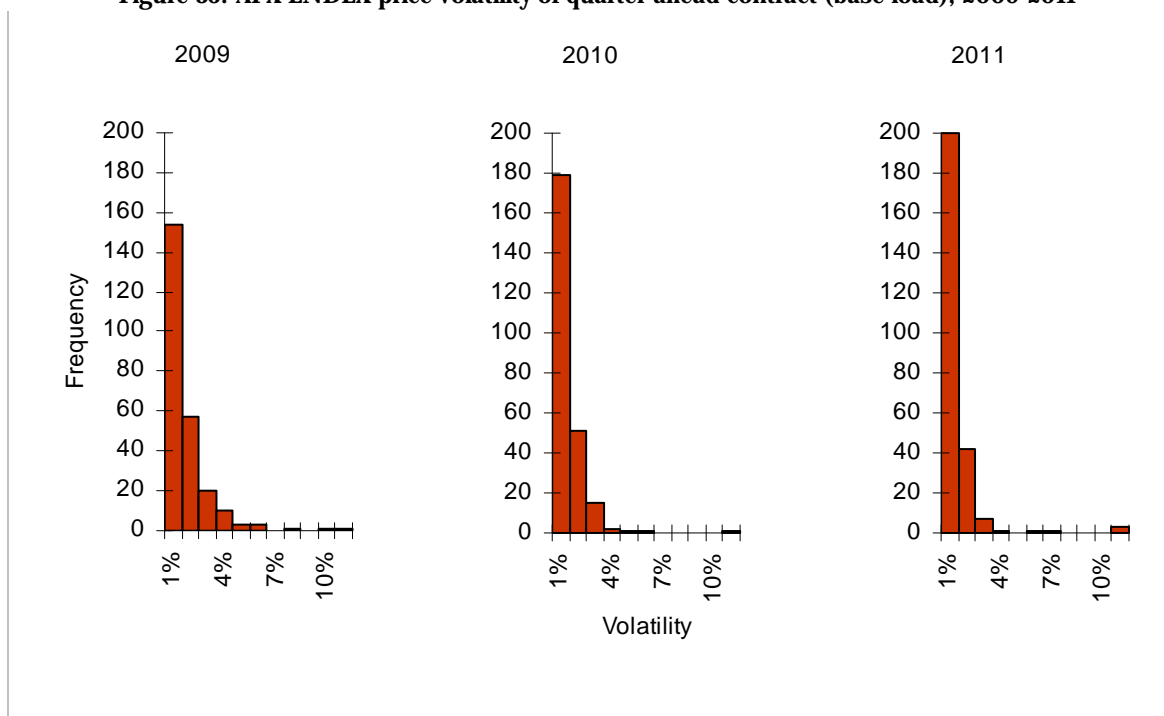


Table 9: APX ENDEX price volatility of futures (base load) – averages per year

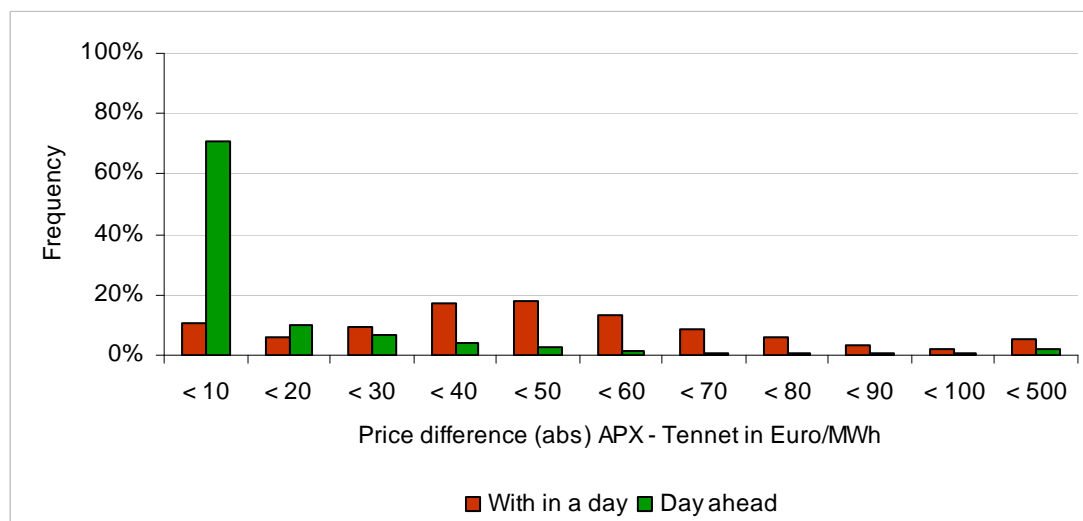
	2009	2010	2011
Month ahead	1.7%	1.3%	1.4%
Quarter ahead	1.4%	0.9%	0.8%
Year ahead	1.2%	0.8%	1.0%

Price volatility is an indication of the magnitude of price fluctuations on the electricity market. In general, the higher volatility is, the higher uncertainty is surrounding the price. Among futures products on ENDEX, only the quarterly product's volatility decreased further. Volatility of the monthly and annual contracts slightly increased. This picture is largely in line with the volume trend in which quarterly contract trading has increased, and annual contract trading decreased.

2.2.3 Comparison of spot and balancing

Based on a comparison of spot prices on electricity exchange APX with imbalance prices of transmission system operator TenneT, it is revealed that price differences between the within-day market and the imbalance market are larger than those between the day-ahead market and the imbalance market. Limited trading on the APX within-day market may be a reason. Another outcome worth noting is that price differences, including for day-ahead, can be of quite a magnitude at certain times.

Figure 37: APX ENDEX spot price compared with imbalance price Tennet, 2009-2011



2.3 OTC

2.3.1 Trading volumes

Figure 38: OTC distribution of volumes per product, 2011

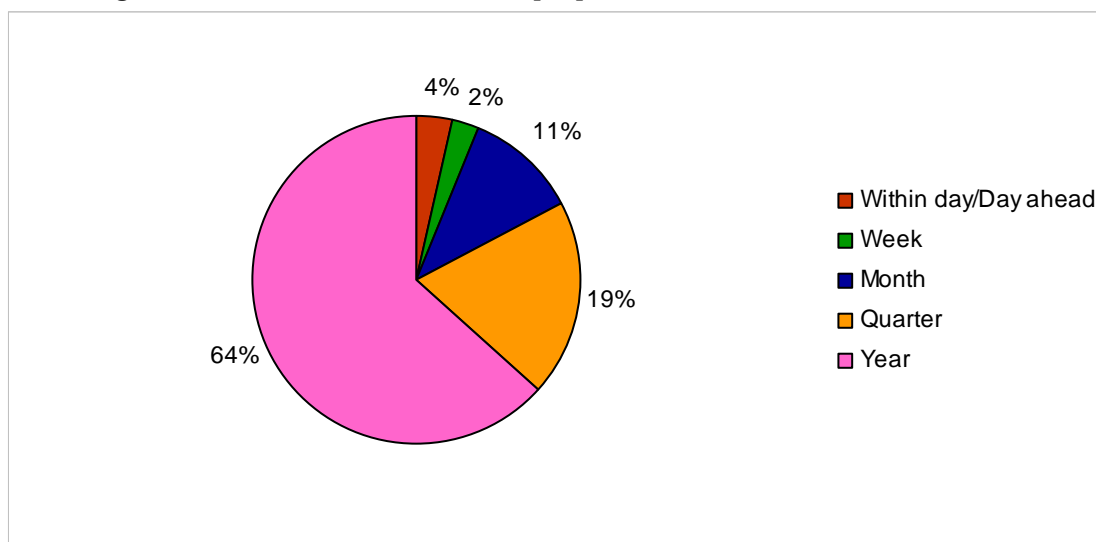
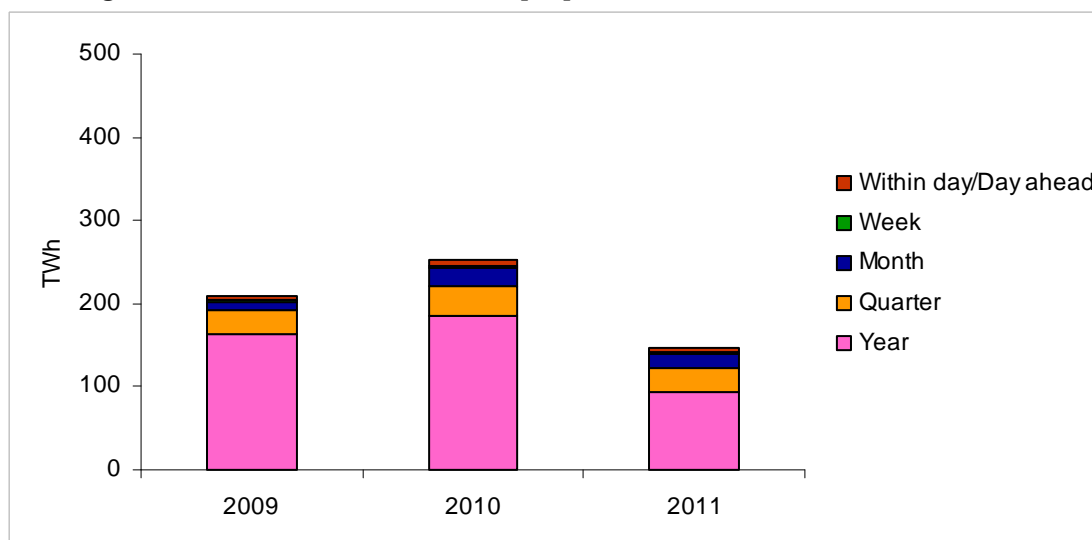


Figure 39: OTC distribution of volumes per product, 2009-2011



2.3.2 Liquidity indicators

Price volatility and the bid-ask spread are key indicators for the confidence that market participants have in the platform concerned. Volatility reflects the degree of price fluctuation. Lower volatilities mean less uncertainty about prices. The bid-ask spread is an indication of the transactions costs. Lower spreads make it easier to conduct transactions.

Figure 40: OTC price volatility of quarter-ahead contracts (base load), 2009-2011

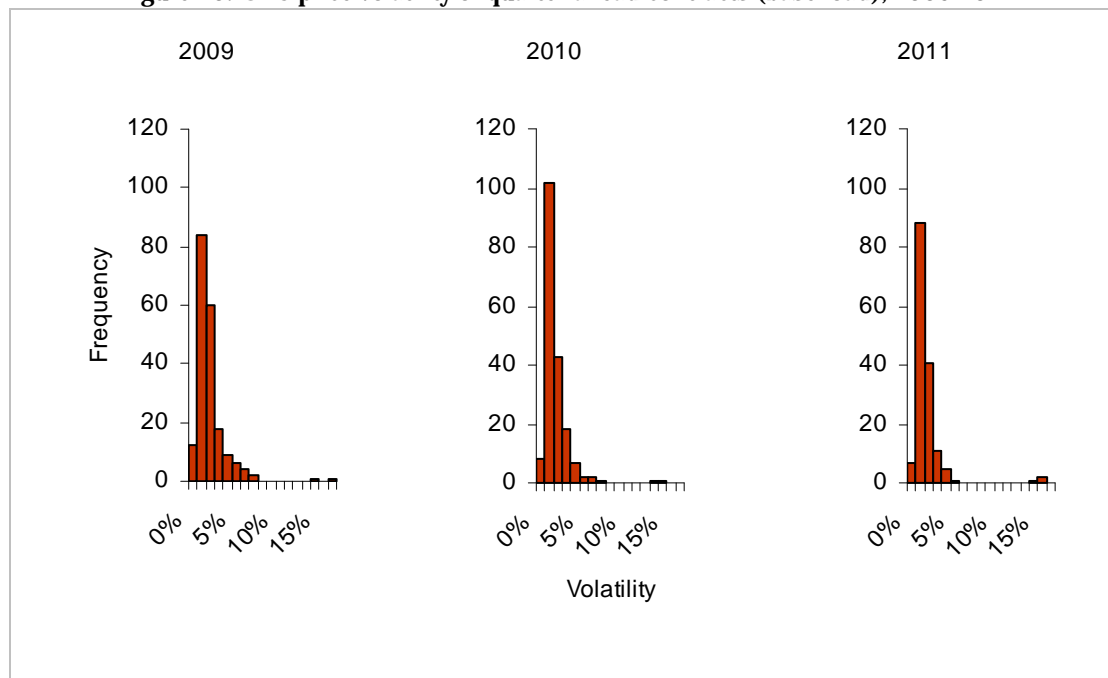


Table 10: OTC price volatility of base load contracts – averages per year

	2009	2010	2011
Day ahead	11.7%	10.9%	8.1%
Month ahead	1.8%	1.3%	1.3%
Quarter ahead	1.6%	1.2%	1.2%
Year ahead	1.3%	0.9%	0.8%

Figure 41: OTC bid-ask spread of quarter-ahead contracts (base load), 2009-2011

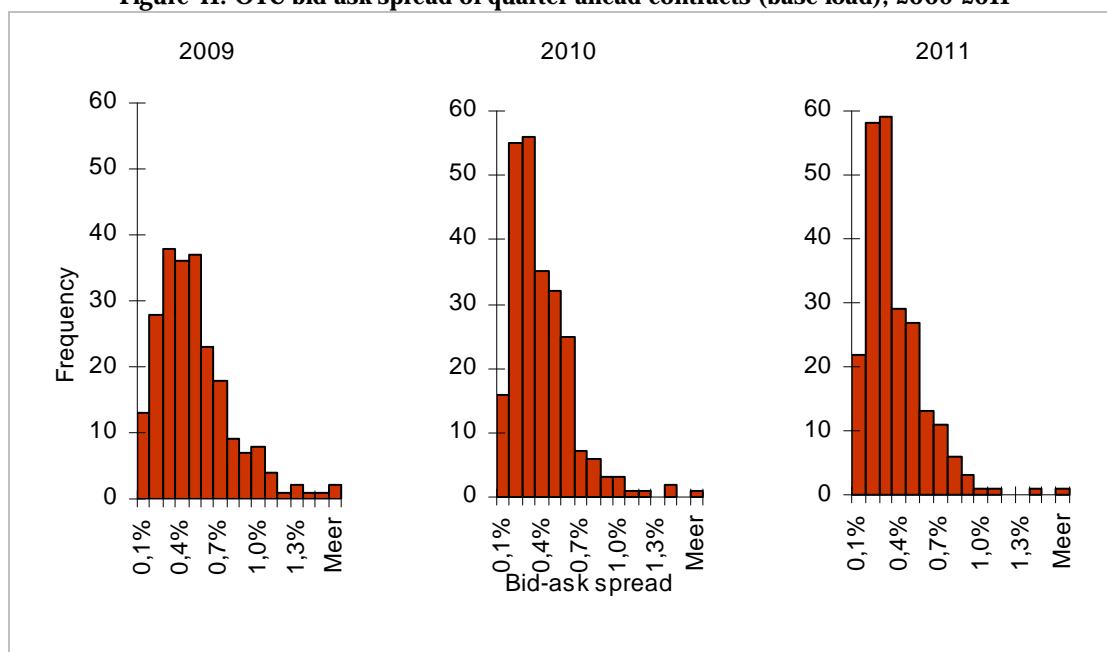


Table 11: OTC bid-ask spread of base load contracts – averages per year

	2009	2010	2011
Day ahead	1.7%	0.9%	0.8%
Month ahead	0.8%	0.5%	0.3%
Quarter ahead	0.5%	0.3%	0.3%
Year ahead	0.3%	0.3%	0.2%

Price volatility and the bid-ask spread on the OTC in 2011 are similar to those in 2010. The decline in volumes on the forward market as a result of decreased trading in annual contracts has thus not led to a worsening of these liquidity indicators.

Market depth and trading horizons also give an indication of the level of liquidity on the wholesale electricity market. Market depth is an indication of the market's absorption capacity. The questionnaire had several questions (for different products) what volumes market participants could trade without affecting the price. The trading horizon is an indication of how far ahead contracts are traded. The questionnaire had questions on how many periods in advance market participants would trade in contracts with different durations.

Figure 42: OTC market depth, 2011

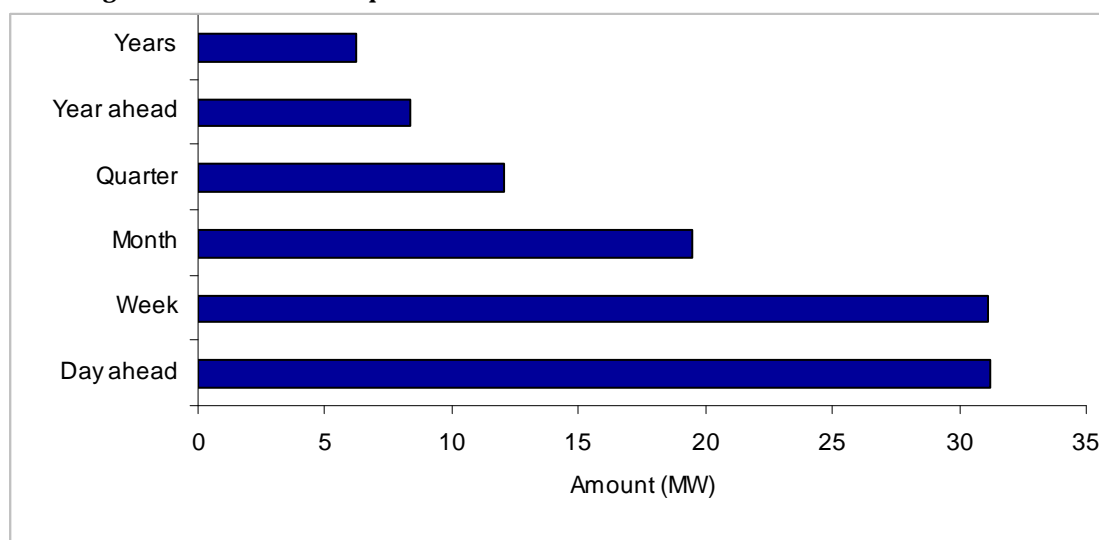
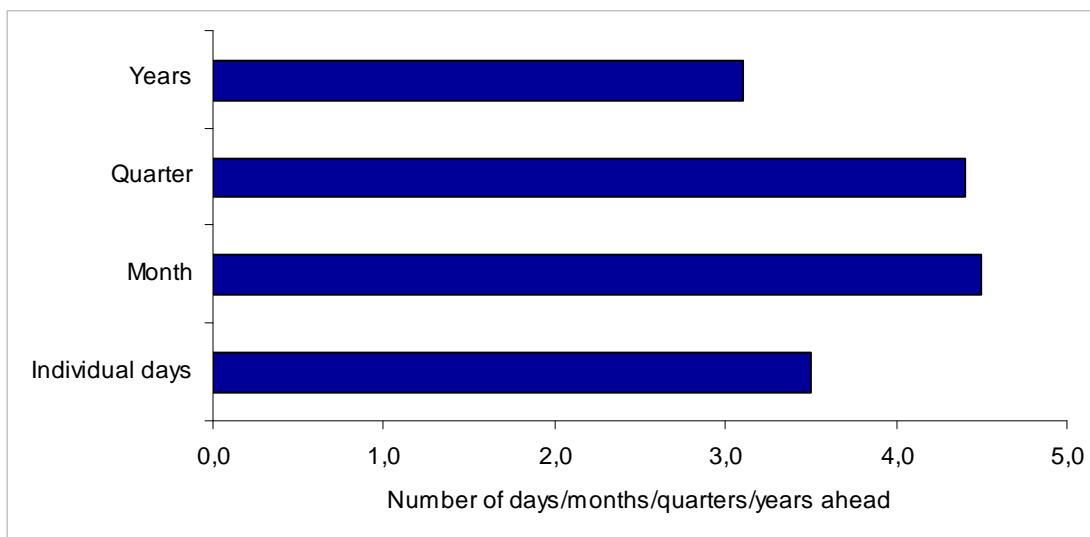


Figure 43: OTC trading horizon, 2011



In this questionnaire, questions on market depth and trading horizons on the wholesale electricity market were asked for the first time. This means a comparison with previous years is not possible. It is expected though that the market is the deepest in day-ahead products, and that it becomes less deep the longer the product's duration. Future measurements should shed some light on the OTC's market depth.

2.3.3 International comparison

When comparing OTC prices in the Netherlands, England, Germany and France, it turns out that these prices largely follow each other, but that the price levels can differ, and that individual outliers (upwards or downwards) are possible. Price volatility in the Netherlands in 2011 was higher than in Germany and England. The bid-ask spread in the Netherlands, however, was lower in 2011 than in Germany and England. This international comparison, too, shows that liquidity in the Netherlands has not decreased as a result of a drop in trading volumes.

Figure 44: International comparison of month-ahead contract prices (base load), 2009-2011

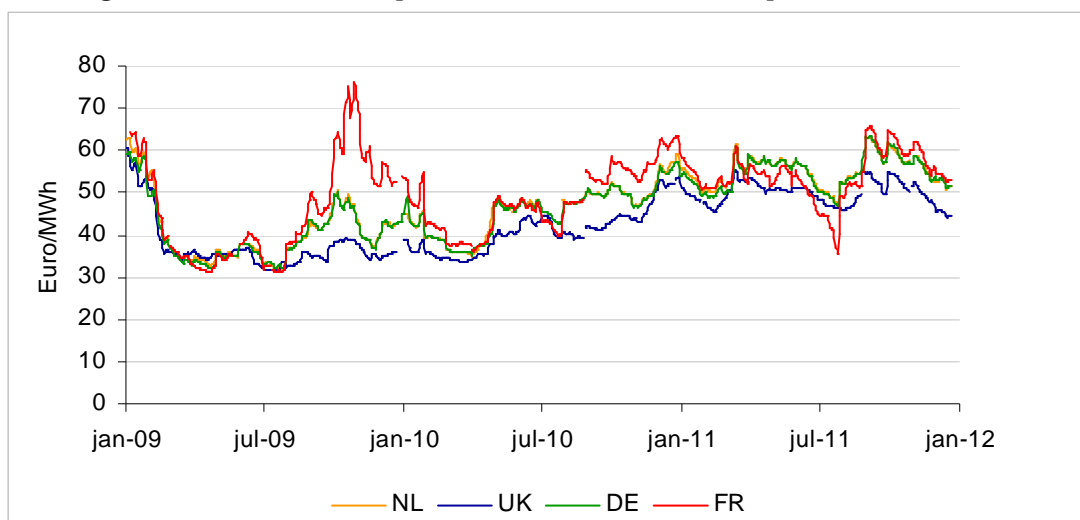


Figure 45: International comparison of price volatility of month-ahead contracts (base load), 2009-2011

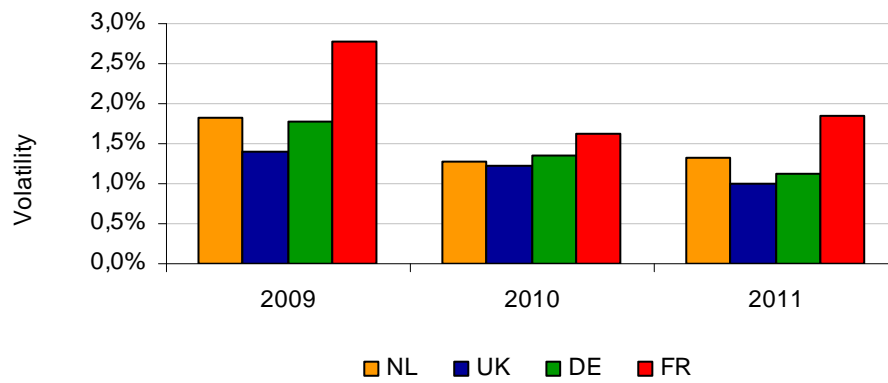
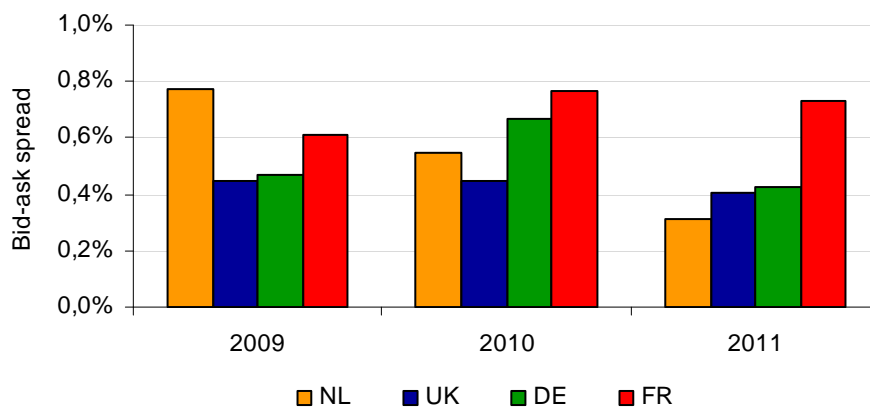


Figure 46: International comparison of bid-ask spread of month-ahead contracts (base load), 2009-2011



2.4 Bilateral

Figure 47: Bilateral distribution of volumes per product, 2011

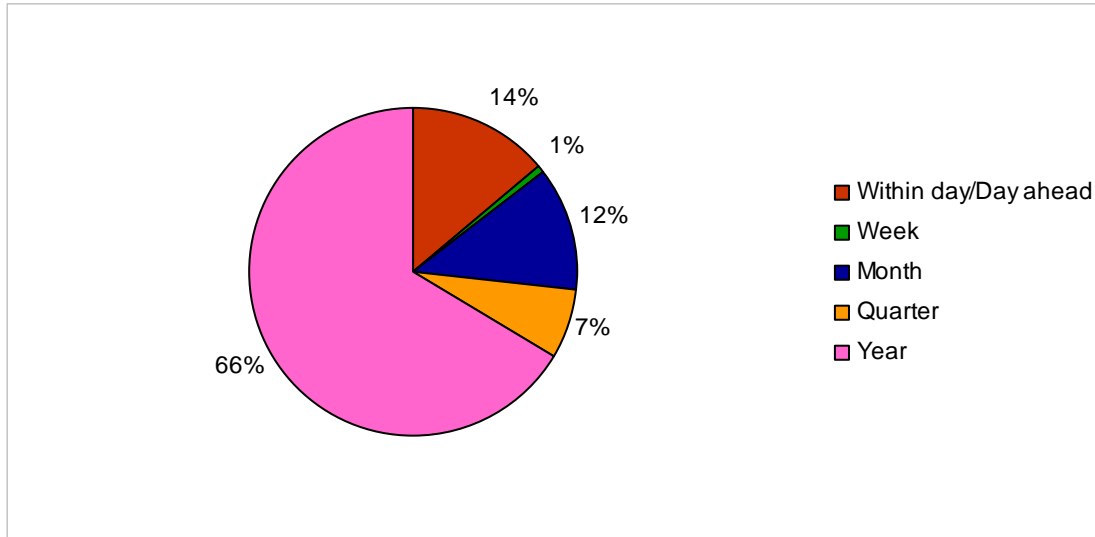


Figure 48: Bilateral distribution of volumes per product, 2009-2011

