



# Quarterly Report

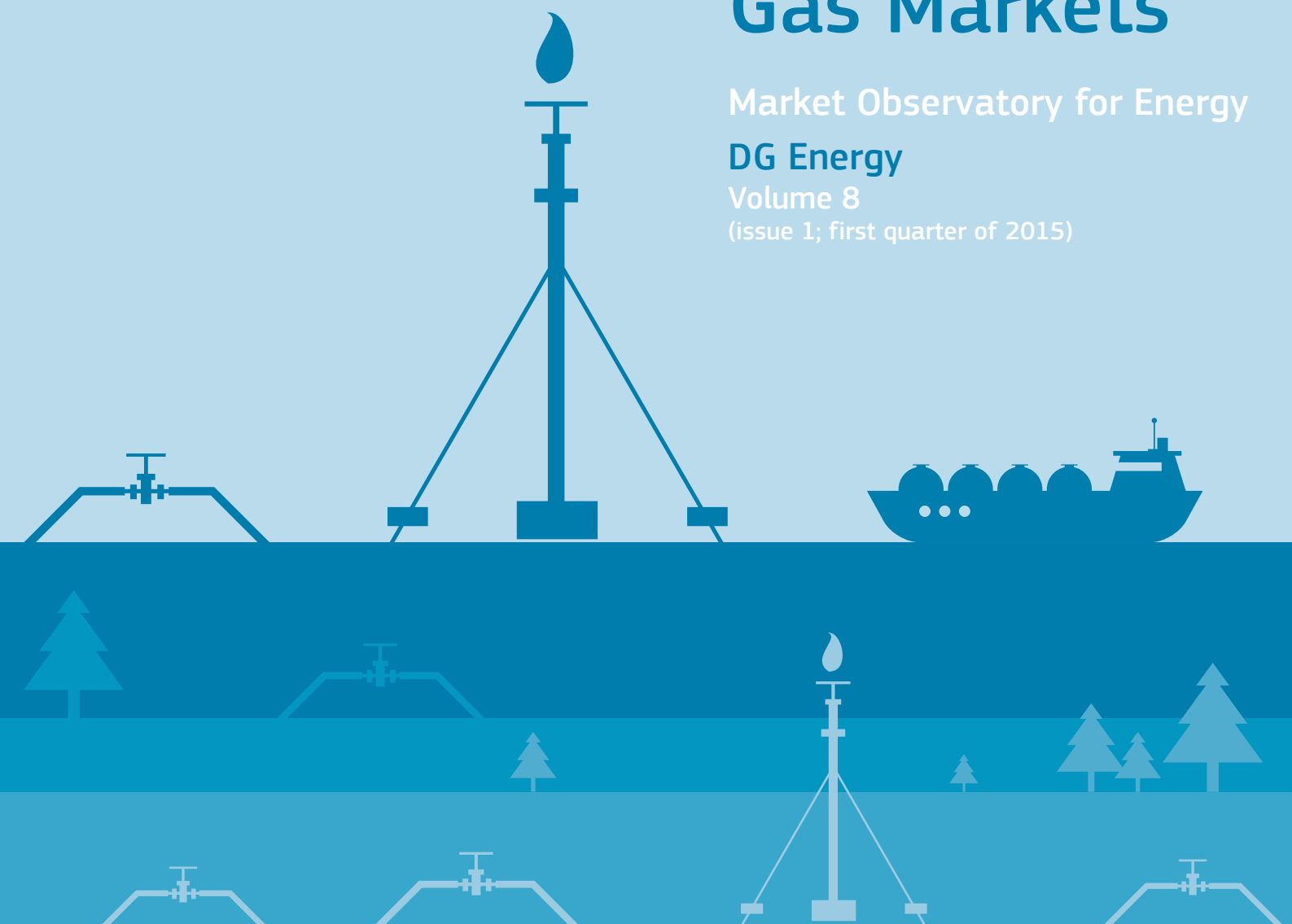
## on European Gas Markets

Market Observatory for Energy

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# Highlights of the report

- After an 11% annual decline in 2014, EU gas consumption increased by an estimated 12% in the first quarter of 2015, compared to the first quarter of 2014. Last year's demand was however exceptionally low because of mild weather.
- Russian imports continued to fall in the first quarter, compared to both the first and last quarters of 2014, although picked up in March.
- Norwegian deliveries remained robust and far surpassed imports from Russia.
- Weak Asian demand and LNG prices contributed to an increase in LNG imports to the EU by 24% year-on-year.
- Gas stocks fell below last year's level due to lower temperatures, requiring higher release from stocks to meet demand, and reduced Russian flows.
- The liquidity of European hubs reached a record level and the Dutch TTF reinforced its lead over the UK NBP.
- European hub prices increased from a historical low reached in the summer of 2014 but remained below the level seen in the first quarter of 2014.
- The fall in crude oil prices experienced in 2014 started to gradually pass through to oil-indexed contracts, thereby reducing the differential with hub prices.
- The premium of Asian LNG prices over UK NBP prices disappeared but the difference between prices on the NBP and the US Henry Hub remained high.
- Retail prices remained relatively stable.

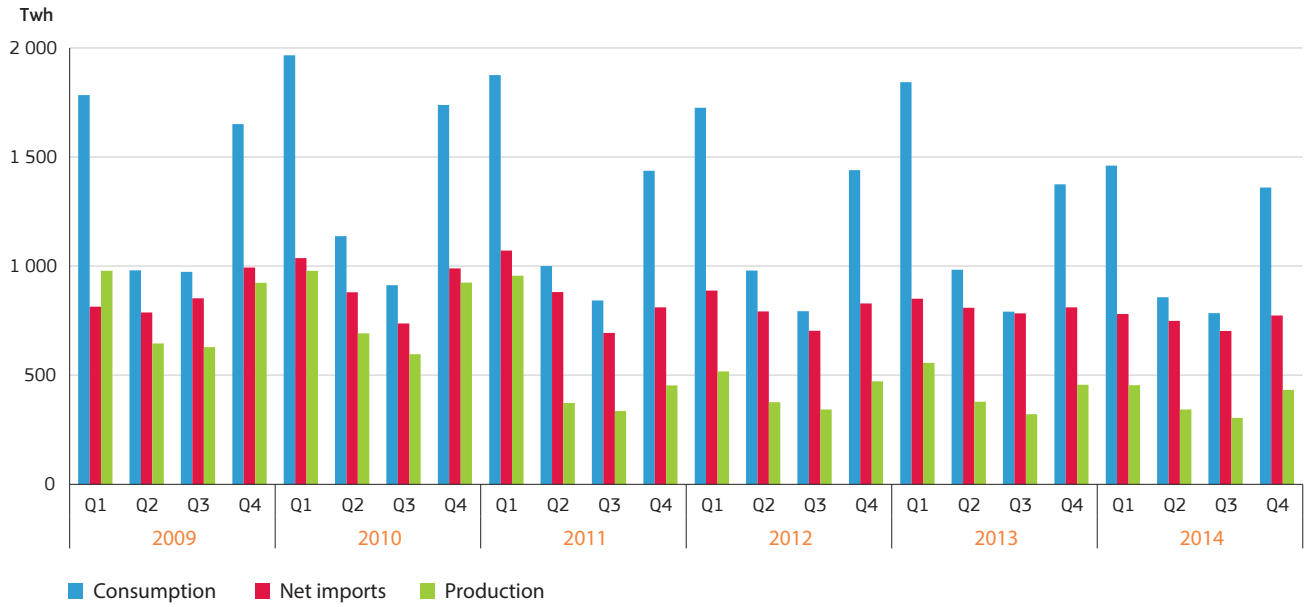
# Executive summary

- **EU gas consumption declined by 11% in 2014** compared to 2013, mainly driven by mild weather in the beginning of the year but the slow recovery of economic activity and the poor competitiveness of gas in the power sector also played a role. After a sharp 18% decrease in the first half of the year, in the third and fourth quarters the decrease was only 1% year-on-year. Production and net imports were down by 10% and 8%, respectively, in 2014.
- Preliminary Eurostat data show that **consumption increased by 12% in the first quarter of 2015** year-on-year, albeit from a very low base. Although the weather was warmer than the long-term average, temperatures were significantly lower than in the first three months of 2014.
- **Russian imports continued their decreasing trend:** in the first quarter of 2015, Russian gas represented only 29% of total imports, although deliveries picked up in March. Norwegian imports, in turn, remained robust throughout the quarter and covered 46% of EU imports. Imports from Norway had already exceeded Russian imports in the previous quarter.
- **LNG imports increased 24%** year-on-year, helped by weak Asian demand and increasing levels of supply in the global market, and reached a 15% share in total EU imports. UK and Dutch imports almost tripled, Belgian and Greek imports doubled while Italian imports increased by about 50%. Only Spain and France imported less LNG than a year earlier.
- The EU-brokered winter package allowed **Ukraine** to resume gas imports from Russia but the country **continued to rely on deliveries from EU Member States** which represented well over 50% of total imports in the first three months of 2015.
- Europe started the winter with historically high **storage** levels but the **drawdown** in the first quarter of 2015 was **significantly faster than a year earlier** when unusually high temperatures meant that demand was lower than usual. In addition to the weather factor, falling supplies from Russia also accelerated withdrawals in certain markets.
- With the loosening market conditions and the low oil prices, **LNG prices continued their downward trend** in 2015: both Asian and European LNG prices plummeted to the level of the NBP price. LNG is on average cheaper today than it was before the Fukushima accident. The fall in LNG prices has helped to narrow the gap between the prices of pipeline gas and those of EU LNG imports.
- **Spot prices at European gas hubs** remained in the 20-24 Euro/MWh range for most of the period and **were about 12% lower** compared to the first quarter of 2014.
- **Total volumes traded on European gas hubs increased by 21%** in the first quarter compared to the same period of 2014 and exceeded 10,000 TWh. Volumes traded on the **TTF**, the Dutch hub, had surpassed those on the UK NBP hub already in 2014 and, with a 44% year-on-year increase, **continued to gain share** of traded volumes in the EU in the first three months of 2015.
- **Oil-indexed gas prices started to fall** in late 2014 as falling oil prices started to pass through to such contracts. As a result, the gap between hub prices and oil-indexed prices has noticeably decreased. Oil-indexed gas prices are expected to reach their lowest levels this summer.
- While the **premium of Asian LNG prices over UK NBP prices has practically disappeared, the difference between the NBP and the US Henry Hub prices remained high**, with the NBP being around 2.5 times higher than the US Henry Hub in the first quarter of 2015.
- **Retail prices for both households and industry remained relatively stable.** While some long-term convergence can be observed, there are still significant price differences across Member States, particularly in the case of households.

# 1. Gas Consumption – Production – Imports

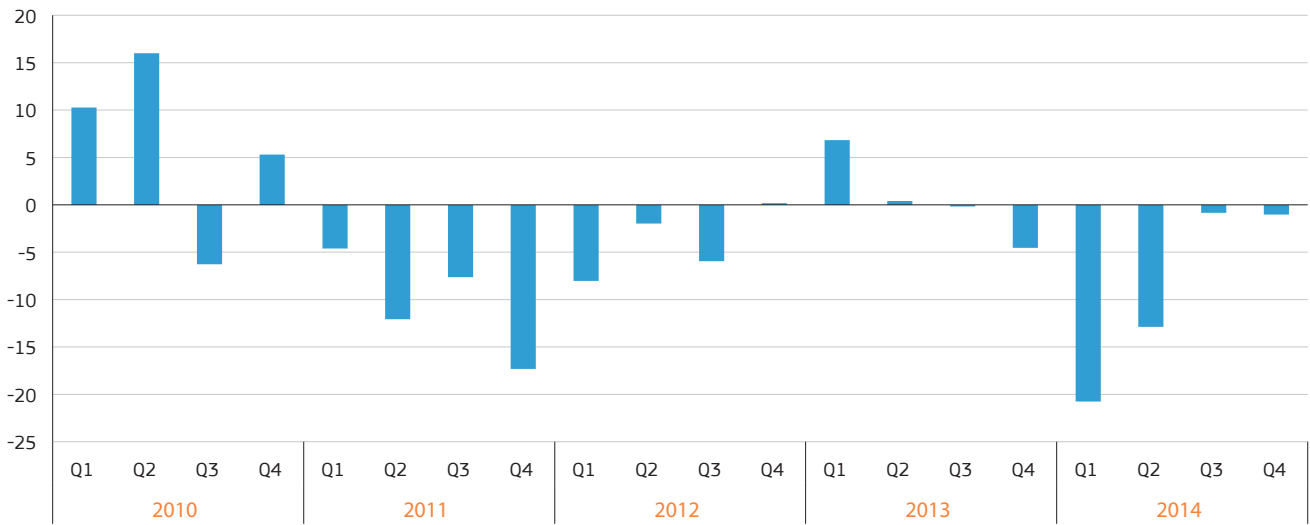
- Gas consumption in the EU declined by 11% in 2014. Consumption declined in all Member States, with the biggest decrease in Estonia (-22%), Greece (-23%) and Slovakia (-34%). Much of this decrease in consumption resulted from the mild weather in the first half of 2014 compared to an unusually cold winter and spring of 2013.
- After the sharp 18% decline in the first half of the year, in both the third and fourth quarters of 2014 consumption decreased by only 1% year-on-year.
- The relatively good performance in the last quarter of 2014 is mainly attributed to Europe's largest market, Germany. German consumption increased by a massive 21% compared to the same period of 2013, registering the highest fourth quarter consumption level since 2010. The Baltic States have also performed well, with consumption increasing by 10% in Estonia, 8% in Latvia and 24% in Lithuania. In the rest of the EU, consumption fell by 6%, with the biggest decrease in France (-10%), Greece (-23%), Italy (-11%), Slovakia (-19%) and Spain (-10%).
- According to preliminary Eurostat data, consumption increased by 12% in the first quarter of 2015 compared to the same period of 2014, driven by continued strong growth in Germany (+19%) and double-digit increase in Belgium, France and Italy. If confirmed, this would be the biggest year-on-year increase in EU consumption since the second quarter of 2010. This is a positive sign for the sector but it has to be seen in context. One has to recall that the base of comparison – the consumption in the first quarter of 2014 – was unusually low because of the mild winter. In fact, consumption in the first three months of 2015 was 8% lower than the average of the last 5 years.
- Based on a sample of eight Member States covering about 60% of EU consumption, Societe Generale estimates that consumption increased by 10% in the first quarter but the growth significantly slowed down in April and May.<sup>1</sup>
- In 2014, EU gas production continued its declining path: output fell by 10%. The Netherlands and the UK covered 42% and 28% of total EU output, respectively. While UK output was stable, Dutch gas production decreased significantly (19%), driven by the falling cap on production from the Groningen field and the declining output from small fields. On 9 February 2015, the Dutch government announced a reduced 16.5 bcm cap for the Groningen field for the first half of 2015. The EU's third producer, Romania, showcased a promising growth (+5%).
- In the 4<sup>th</sup> quarter of 2014, the decrease in EU production was 5% year-on-year. Dutch output fell by 10% but Romanian and UK production increased by 11% and 2%, respectively.
- The falling consumption helped to decrease imports in 2014: EU net imports of gas declined by 8% in 2014 compared to 2013. In the fourth quarter of 2014, net imports decreased by 5% year-on-year.
- Denmark and the Netherlands – the only net exporters in the EU – showed an opposite trend: as a result of falling output, Dutch net exports decreased by 26% in 2014 while the falling consumption helped Denmark to increase net exports in spite of the slightly decreasing production.

**FIGURE 1 - EU GAS CONSUMPTION, IMPORTS AND PRODUCTION**



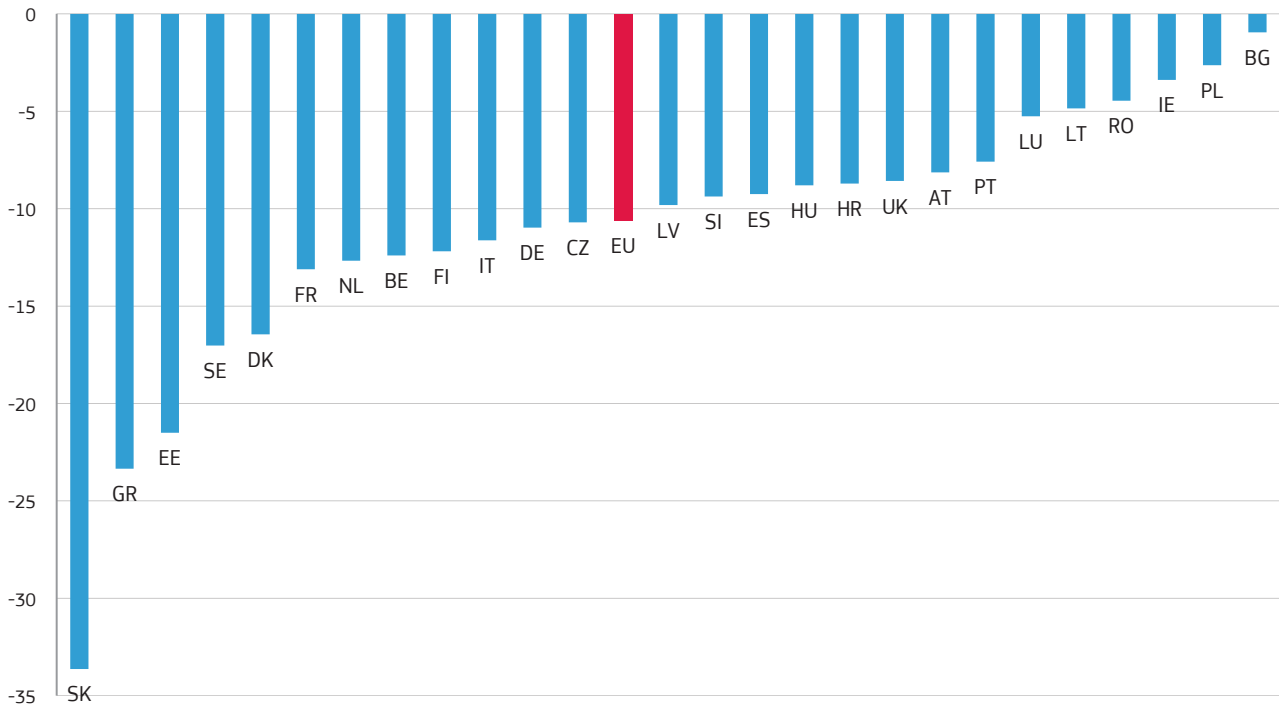
Source: Eurostat, data as of 12 May 2015 from data series nrg\_103m. Net imports refer to imports minus exports. Note: Eurostat methodological change in reporting import volumes effective as of January 2013. Before January 2013 monthly import volumes of gas were reported on country-of-origin basis. After this date, they are reported on border basis.

**FIGURE 2 - EU GAS CONSUMPTION Q/Q-4 CHANGE (%)**



Source: Eurostat, data as of 12 May 2015 from data series nrg\_103m; calculations of DG Energy

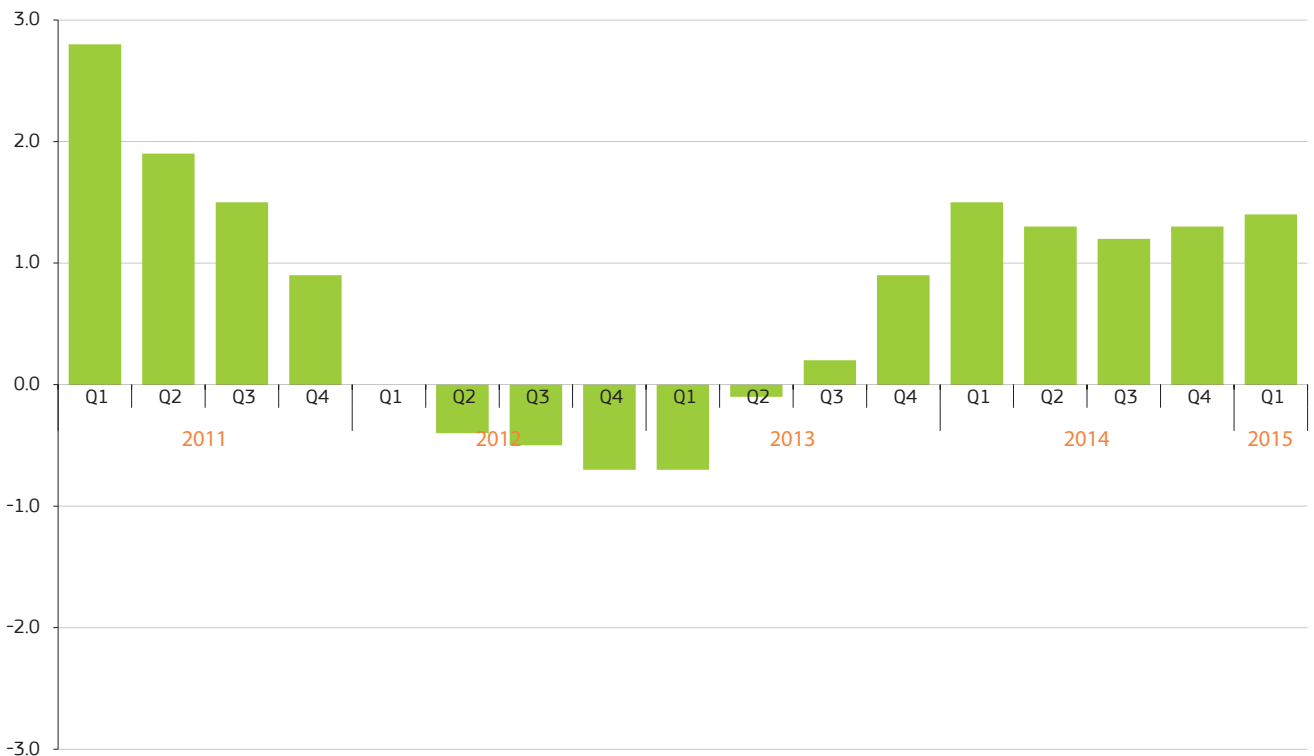
**FIGURE 3 - THE CHANGE OF GAS CONSUMPTION BY MEMBER STATE IN 2014 COMPARED TO 2013 (%)**



Source: Eurostat, data as of 12 May 2015 from data series nrg\_103m; calculations of DG Energy

- In the first quarter of 2015, the seasonally adjusted Gross Domestic Product (GDP) of the EU rose by 1.4% compared to the same quarter of the previous year which is slightly higher than the growth rate seen in the previous two quarters. Gross value added in economic sectors consuming a significant amount of energy showed only moderate growth. The growth rate in the industry segment was 0.8%, which is slightly higher than in the previous two quarters.

**FIGURE 4 - EU GDP Q/Q-4 CHANGE (%)**



Source: Eurostat



- After years of falling gas use in power generation, the first quarter of 2015 seems to indicate a turning point. Four of the five markets for which data are reported (Table 1) have seen a year-on-year increase in the gas input to the power sector in the first three months of 2015: 13% in Italy, 4% in the UK, 31% in Spain and 349% in France. The only exception is Belgium where gas consumption in the electricity sector decreased by 28% in the first quarter.
- In previous years, stagnating electricity consumption, the poor competitiveness of gas vis-à-vis other fuels and the growing penetration of renewables have all contributed to the decreasing role of gas in European power generation. Electricity consumption in the EU-28 grew modestly in the first quarter (by 0.8% in December 2014 – February 2015 compared to the same period of the previous year) but lower wholesale prices improved the competitiveness of gas. Hub prices, LNG prices and oil-indexed prices all decreased compared to the first quarter of 2014 (see details in section 3).
- UK clean spark spreads – measuring the profitability of gas-fired generation – fluctuated in the 5-15 €/MWh range in the first quarter of 2015 but remained negative in Germany (where wholesale electricity prices are lower), pointing to the unprofitable nature of German gas-fired generation.<sup>2</sup> In Germany, gas use in power plants continued to decrease in the first quarter (by 0.5% year on-year) and its share remained under 10%.<sup>3</sup>

**TABLE 1 - NATURAL GAS INTAKE IN THE POWER GENERATION SECTOR OF SELECTED EU COUNTRIES 2008-2015 (BCM)**

	2008	2009	2010	2011	2012	2013	2014	2015Q1
<b>Italy</b>	33.4	28.7	29.8	27.5	24.2	20.1	16.8	5.0
<b>UK</b>	24.8	23.1	25.3	19.5	13.2	13.1	14.2	3.2
<b>Spain</b>	16.0	13.7	11.6	9.4	7.2	4.8	4.4	1.2
<b>Belgium</b>	n.a.	n.a.	n.a.	7.1	8.4	7.4	6.4	1.1
<b>France</b>	n.a.	n.a.	2.2	2.5	1.5	1.2	0.7	0.6

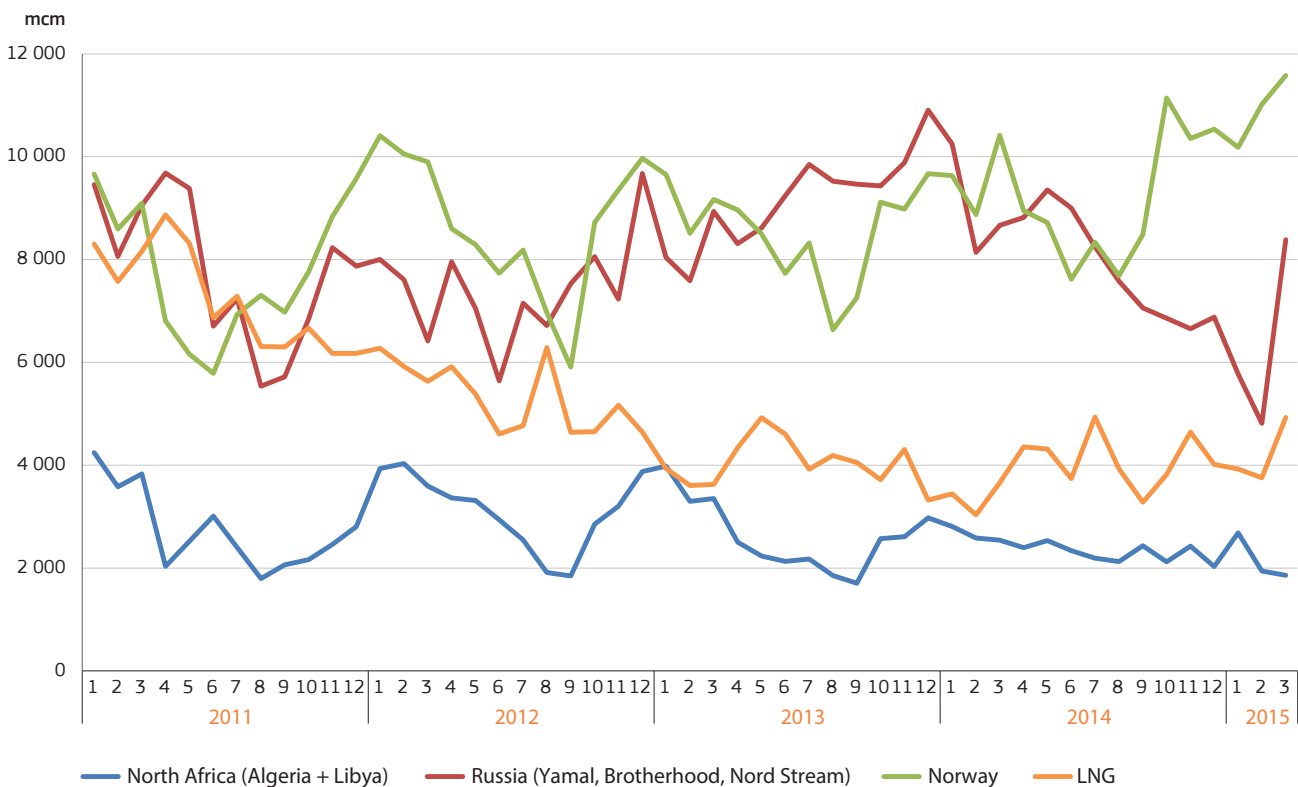
Source: Bentek/Platts

- After years of decreasing LNG imports in the EU driven by weak demand and high price differentials supporting LNG re-direction to Asia, 2014 imports were essentially flat (-3% compared to 2013) and in the fourth quarter of 2014, LNG imports actually increased year-on-year by 10%. This tendency continued in the first quarter of 2015 when imports rose by 24% compared to the same period of 2014.
- Increasing LNG imports helped to offset the decreasing pipeline imports from Russia. Total pipeline imports declined by 9% year-on-year in the first quarter of 2015; falling Russian (-30%) and North African (-18%) imports were partly offset by increasing Norwegian deliveries (+13%).
- In the fourth quarter of 2014 and the first quarter of 2015, imports from Norway clearly outperformed those coming from Russia which plunged to an unusually low level for this time of the year. Although Russian volumes bounced back in March, in the same month, Norwegian gas deliveries to the EU reached a record 11.6 bcm.

2. Charts of clean spark spreads in Germany and the UK can be found in the Quarterly Report of European Electricity Markets

3. <https://www.destatis.de/EN/FactsFigures/EconomicSectors/Energy/Production/Tables/ElectricityProductionSupply.html>

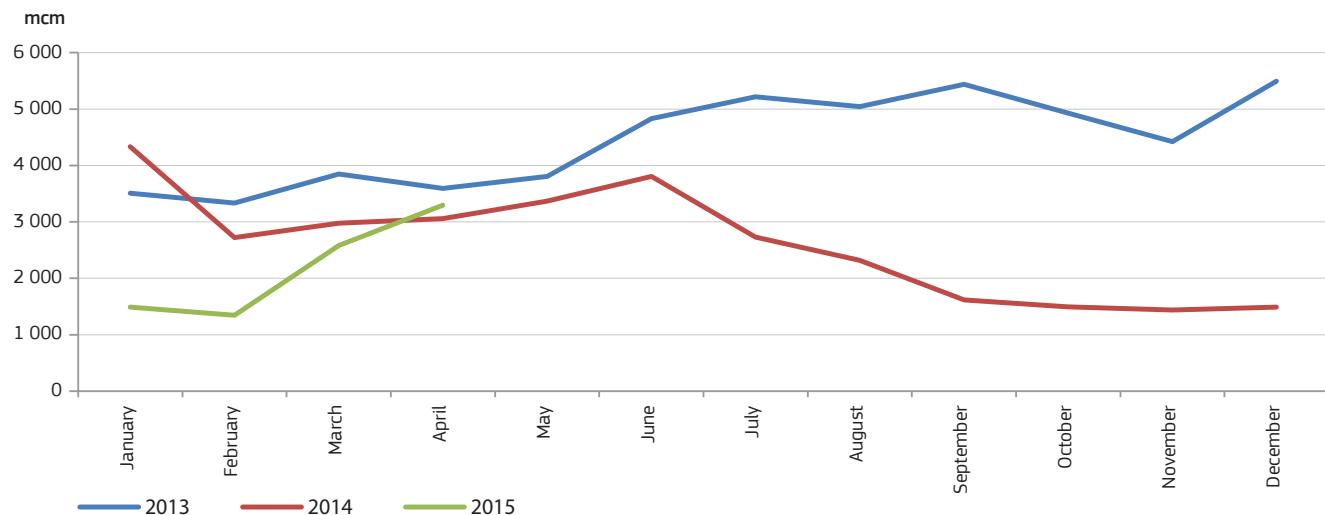
**FIGURE 5 - PHYSICAL PIPELINE FLOWS AND LNG IMPORTS INTO THE EU**



Source: Bentek/Platts, Thomson-Reuters Waterborne. Note: Russian flows include landing points Velke Kapusany, Drozdowicz, Wysokoe, Malinow, Greifswald-NEL, Nordstream Greifswald. Norwegian flows include landing points Zeebrugge, Dunkerque, Dornum, Emden, St Fergus and Easington. LNG imports to Spain, UK, France, Italy, Belgium, Portugal, Greece and the Netherlands.

- Russian imports showed a declining trend since May 2014 which continued in the beginning of 2015. The decline was driven by the falling volumes arriving through Ukraine/Slovakia which has traditionally been the main supply route of Russian gas to the EU. Deliveries on this route declined by 64% in the second half of 2014 year-on-year. While in previous years monthly deliveries regularly exceeded 5 bcm on this route, between September 2014 and February 2015 monthly volumes averaged 1.5 bcm. It is believed that Russia has limited supplies to Europe in an attempt to minimise reverse flows to Ukraine. On the other hand, in anticipation of lowering prices, importers with oil-index priced contracts nominated as little gas as the long-term contracts allow. In March and April, deliveries finally bounced back to about 3 bcm/month. Flows of Russian gas via Poland also soared from early March.
- In 2014, the decline on the Slovakian route was partly offset by the increase on the Nord Stream pipeline where volumes were 49% higher than in the previous year. In the first quarter of 2015, however, Nord Stream volumes were down 28% year-on-year because of a drop of the volumes feeding the NEL pipeline in January and February. According to reports, this was due to importers' expectations that oil-indexed supply will be cheaper later in the year.<sup>4</sup>

**FIGURE 6 - GAS FLOWS AT VELKE KAPUSANY (UKRAINE-SLOVAKIA BORDER)**



Source: Based on data from the ENTSO-G Transparency Platform

- Looking at the quarterly development of EU gas imports in 2014-2015, one can observe the continuous decrease of Russian deliveries. As a result, the share of Russia from total extra-EU imports has fallen from 41% in the first quarter of 2014 to 29% in the same period of 2015. The gap was filled by Norway and LNG: in the same period the share of Norway increased from 40 to 46% while that of LNG from 10% to 15%.
- According to preliminary figures, the trend is likely to turn in the second quarter when Norwegian imports declined while Russian deliveries started to rise.
- On an annual basis, Russia remained the EU's main gas supplier in 2014 while the combined share of Russian and Norwegian imports reached 80%. With the rise of LNG imports, this combined share receded to 75% in the first quarter of 2015.

**FIGURE 7 - EU IMPORTS OF NATURAL GAS BY SOURCE, 2014-2015**

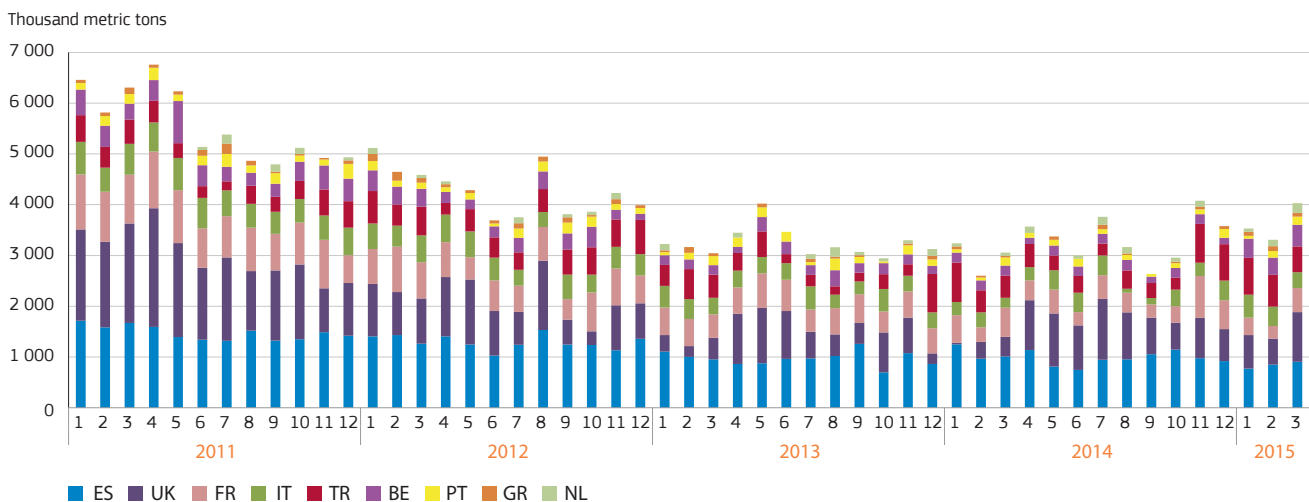


Source: Based on data from the ENTSO-G Transparency Platform  
 Russian deliveries to Estonia, Finland and Latvia are not included

- European LNG imports started to rise in the last quarter of 2014, facilitated by excess supply in the global market. Subdued LNG demand in Asia and Latin America lead to falling LNG prices in 2014 and spot cargoes looking to attract new buyers. These factors have prompted a price convergence between LNG and pipeline deliveries of gas for the first time since Fukushima set LNG spot prices on an upward trajectory. Falling Asian spot LNG prices have made Europe a more attractive destination for LNG cargoes and put pressure on European hub prices. This development highlights the increasing exposure of Europe to the global gas market through LNG trade.
- This trend is likely to continue in 2015 and the following years as Asian markets are unlikely to absorb the significant additional LNG volumes from new projects coming on stream in the rest of the decade. Several new LNG export terminals will start operating in 2015, principally in Australia, to be followed by the commissioning of a number of US terminals starting late 2015/early 2016. This will help LNG regain market share from pipeline gas in Europe in the coming years.

- As mentioned above, in the first quarter of 2015 LNG imports rose by 24% compared to the same period of 2014. Although Spanish imports decreased by 22%, the country remained the top LNG importer of the EU. French imports fell at a similar rate. All other EU importers increased their LNG imports in the same period, with particularly sharp rises in Northwest Europe; UK and Dutch imports almost tripled, Belgian and Greek imports practically doubled while Italian imports increased by about 50%. In Greece and Italy, increasing LNG imports were instrumental in replacing the falling pipeline imports from Russia.
- Lithuania received the first commercial LNG delivery from Norway in late 2015; the country has reportedly received 3 further cargoes since then. In addition to facilitating supply diversification and increasing bargaining power vis-à-vis Gazprom, the terminal also created trading opportunities in the region, with gas sold to buyers in Estonia. On 14 January 2015, the ministers responsible for energy policy in Estonia, Latvia and Lithuania have signed a Declaration on Energy Security of Supply of the Baltic States in which they committed to establish a Regional Gas Market Coordination Group in view of developing an effectively functioning regional gas market.<sup>5</sup>
- Poland's Swinoujscie LNG terminal which was originally due to come on stream in mid-2014 is now expected to be ready by the end of 2015 but its startup may be delayed to 2016 or even 2017. Poland's PGNiG already has a long-term LNG contract in place with Qatargas, signed in 2009 and amended in 2014.

**FIGURE 8 - LNG IMPORTS TO EUROPE BY COUNTRY**



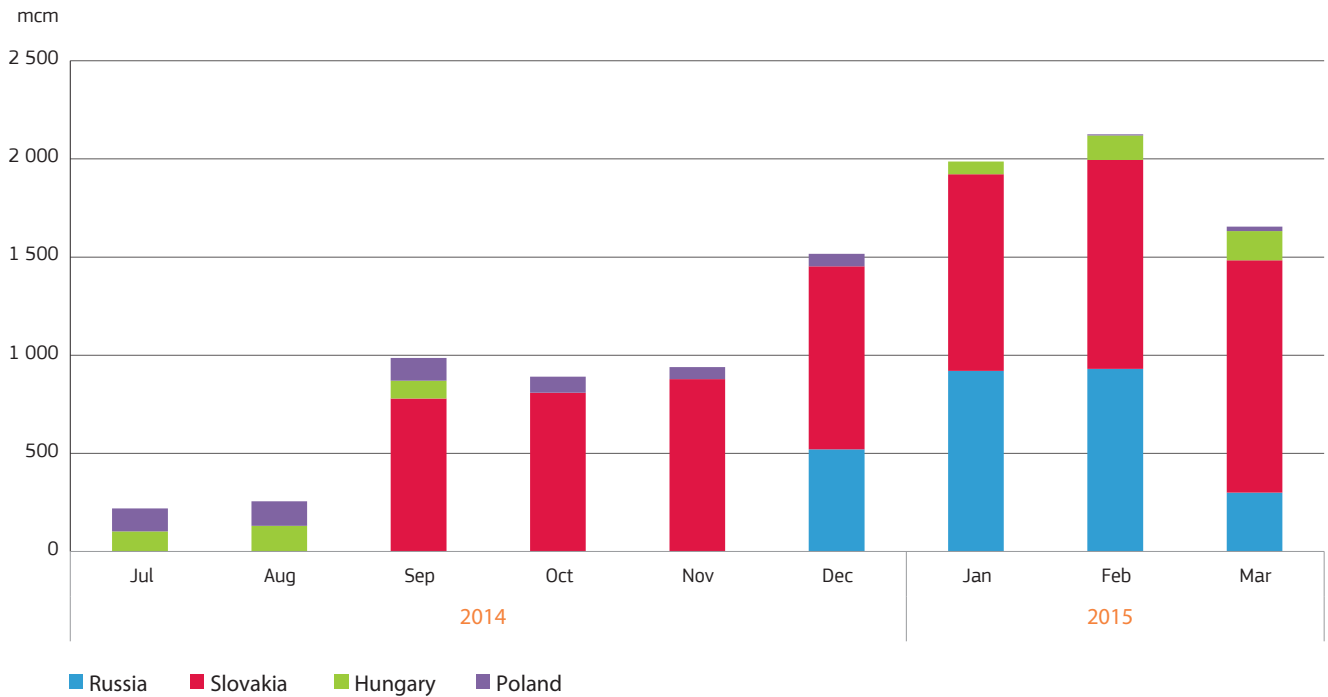
Source: Thomson-Reuters Waterborne  
Lithuania is not included

- As a result of the «winter package» agreement signed on 30 October 2014, gas deliveries from Russia to Ukraine – which were cut off on 16 June 2014 due to Ukraine's increasing gas debt – resumed on 9 December. Such deliveries are subject to advanced, monthly payments by Ukraine. The agreement has no take-or-pay clause and the price is calculated according to an oil-indexed formula minus a discount equivalent to the Russian export duties. In anticipation of lowering oil-indexed prices, Ukraine minimised gas purchases from Russia and monthly imports remained below 1 bcm.
- On the other hand, Ukraine continued buying gas from European suppliers and the combined gas flows arriving from Hungary, Poland and Slovakia have consistently exceeded the Russian deliveries. The capacity of the Vojany pipeline from Slovakia to Ukraine was increased by a further 8.5 mcm/day from 23 January, allowing increased flows on the main Europe to Ukraine supply route. Deliveries from Slovakia alone represented 56% of Ukrainian gas imports in the first quarter of 2015. Gas flows from Hungary resumed in January 2015 after a three and a half month interruption; gas flows from Poland also halted for about one and a half month in January-February.
- In the end of February, tensions increased between Ukraine and Russia, with Naftogaz accusing Gazprom of not complying with the «winter package» by failing to deliver the full requested gas volumes. The tensions have not affected the transit flows to Europe but provided support to European hub prices. Trilateral talks restarted in March where Ukraine, Russia and the European Commission agreed to fully implement the «winter package». In early April the parties agreed on similar supply terms for the second quarter of 2015.

5. [http://www.enmin.lt/Energy\\_Security\\_of\\_Supply\\_declaration\\_20150114.pdf](http://www.enmin.lt/Energy_Security_of_Supply_declaration_20150114.pdf)

- In December 2014, Polish and Ukrainian transmission system operators GAZ-SYSTEM and Ukrtransgaz signed a cooperation agreement on the development of cross-border transmission capacity between the two countries, involving a new bi-directional pipeline with a capacity of 8 bcm/year from Poland to Ukraine and 7 bcm/year from Ukraine to Poland. In the future this could allow Ukraine to import gas via the Polish LNG terminal currently under construction.<sup>6</sup>

**FIGURE 9 - GAS IMPORTS TO UKRAINE FROM RUSSIA AND THE EU, JULY 2014 – MARCH 2015**



Source: Data from ENTSO-G Transparency Platform and Naftogaz

6. ICIS Heren European Gas Markets, 31 March 2015

## **FOCUS ON: CENTRAL AND SOUTH EASTERN EUROPE GAS CONNECTIVITY**

The results of the stress tests<sup>7</sup> performed in 2014 and the announcement by the Russian Federation and Gazprom to stop the South Stream project put the gas supply security of Central and South Eastern Europe in the spotlight and prompted the Commission and the concerned Member States to take action.

On 9 February 2015, representatives of Austria, Bulgaria, Croatia, Greece, Hungary, Italy, Romania, Slovenia and Slovakia as well as European Commission Vice-President for Energy Union Maroš Šefčovič and Commissioner for Climate Action and Energy Miguel Arias Cañete have held the first meeting of the High Level Group on Central and South Eastern Europe Gas Connectivity (CESEC) in Sofia. The objective of the High Level Group is to establish a regional priority infrastructure roadmap and advance its implementation in order to develop missing infrastructure, enhance market integration and facilitate the diversification of gas supplies to the region.

The region's vulnerable situation was demonstrated in the 2009 gas crisis and more recently by the stress tests. The countries of Central and South Eastern Europe are heavily reliant on Russian gas arriving via Ukraine; there is no substantial import infrastructure for alternatives and intra-regional interconnections are also largely lacking or not reversible. The Commission's key objective is to allow all Member States of the region to have access to at least three different sources of gas.

In the Sofia meeting, the High Level Group adopted its Terms of Reference which define the specific scope of its activities and governance structure. The discussions covered both external and internal aspects of the supply situation in the region, with a specific focus on interconnections and on the optimal use of existing infrastructure. Further expert level analyses is carried out in technical sub-groups looking at specific infrastructure corridors with the aim of identifying missing links and other barriers hindering effective market integration.

Neighbouring countries, in particular the Energy Community Contracting Parties, are also involved to ensure a regional approach beyond the borders of the EU. Input from national energy regulatory authorities, the European Network of Transmission System Operators for Gas (ENTSOG), the Agency for the Cooperation of Energy Regulators (ACER), the Energy Community Secretariat and project promoters as well as International Financial Institutions provide the basis for a solid assessment.

The High Level Group is scheduled to meet in July and adopt a Memorandum of Understanding and an action plan with concrete deliverables to accelerate realisation of the identified projects. The implementation of the action plan will be regularly monitored by the High Level Group itself, thus building on the political momentum to end market fragmentation and prevent potential future supply crises.<sup>8</sup>

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7. <http://ec.europa.eu/energy/node/955>

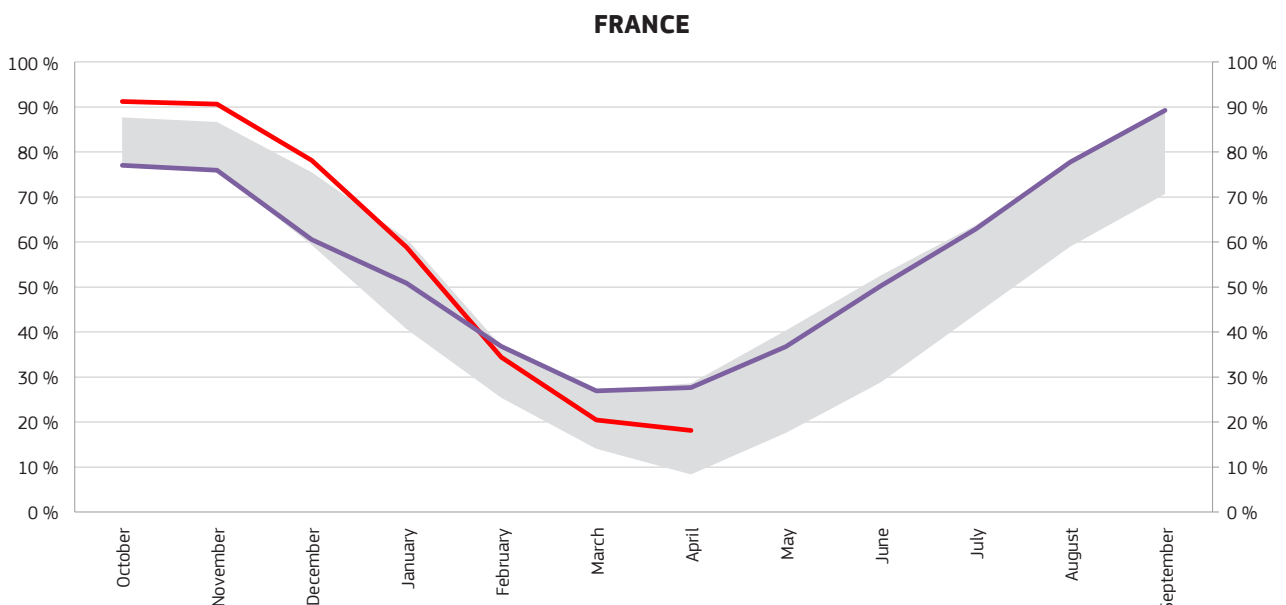
8. Further details can be found at <http://ec.europa.eu/energy/en/topics/infrastructure/central-and-south-eastern-europe-gas-connectivity>



# 2. Gas Storage and heating degree days

- Europe started the 2014/2015 winter with record storage levels: by the end of October, storage levels exceeded 78 bcm, equivalent to 94% of storage capacity. High storage levels provided a robust energy security buffer in the context of uncertainty about Russian supplies through Ukraine.
- In the first part of winter, as a result of the mild weather, storage levels remained relatively high: until the end of January 2015 the average filling rate remained above the 2013 and 2014 levels. However, February and March has been markedly colder than a year earlier. As a result, after months of above-average stocks, by February gas storage levels dipped below the 5-year average in the biggest markets.
- In Germany, storage withdrawals were accelerated by the reduced supplies from Russia on the Nord Stream pipeline in January and February. Expectations of lower prices in summer, with oil-indexed prices set to bottom out in June/July, also provided an incentive to reduce storage levels and make space to inject cheaper gas in the summer.
- On 31 March 2015, storage level stood at 24 bcm (26% of storage capacity), 12 bcm below the year-ago level. While in 2014 stock levels bottomed out already in late March, at 35 bcm (45%), this year the lowest point was reached on 9 April, with 23 bcm (25%).
- In early April, Europe's largest third-party access gas storage, the Gas Storage Bergermeer facility in the Netherlands, reached full capacity. The 4.1 bcm site doubled the Netherlands' seasonal gas storage capacity. The facility is fully contracted for the 2015/2016 storage season running from 1 April 2015 to 31 March 2016.<sup>9</sup>

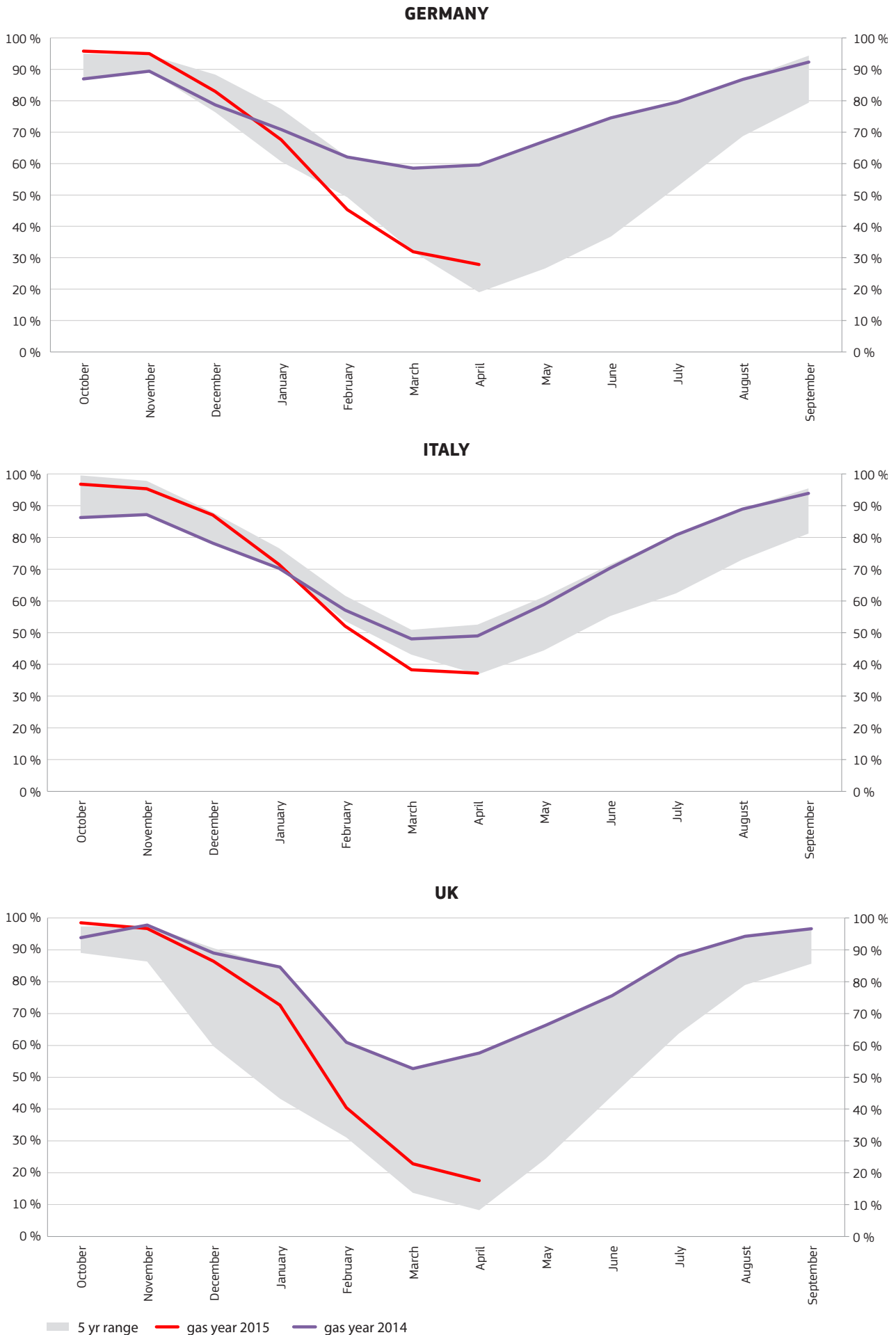
**FIGURE 10 - GAS STORAGE LEVELS AS % OF MAXIMUM GAS STORAGE CAPACITY IN SELECTED COUNTRIES**



9. <http://www.gasstoragebergermeer.com/europes-largest-third-party-access-gas-storage-reaches-full-capacity/>



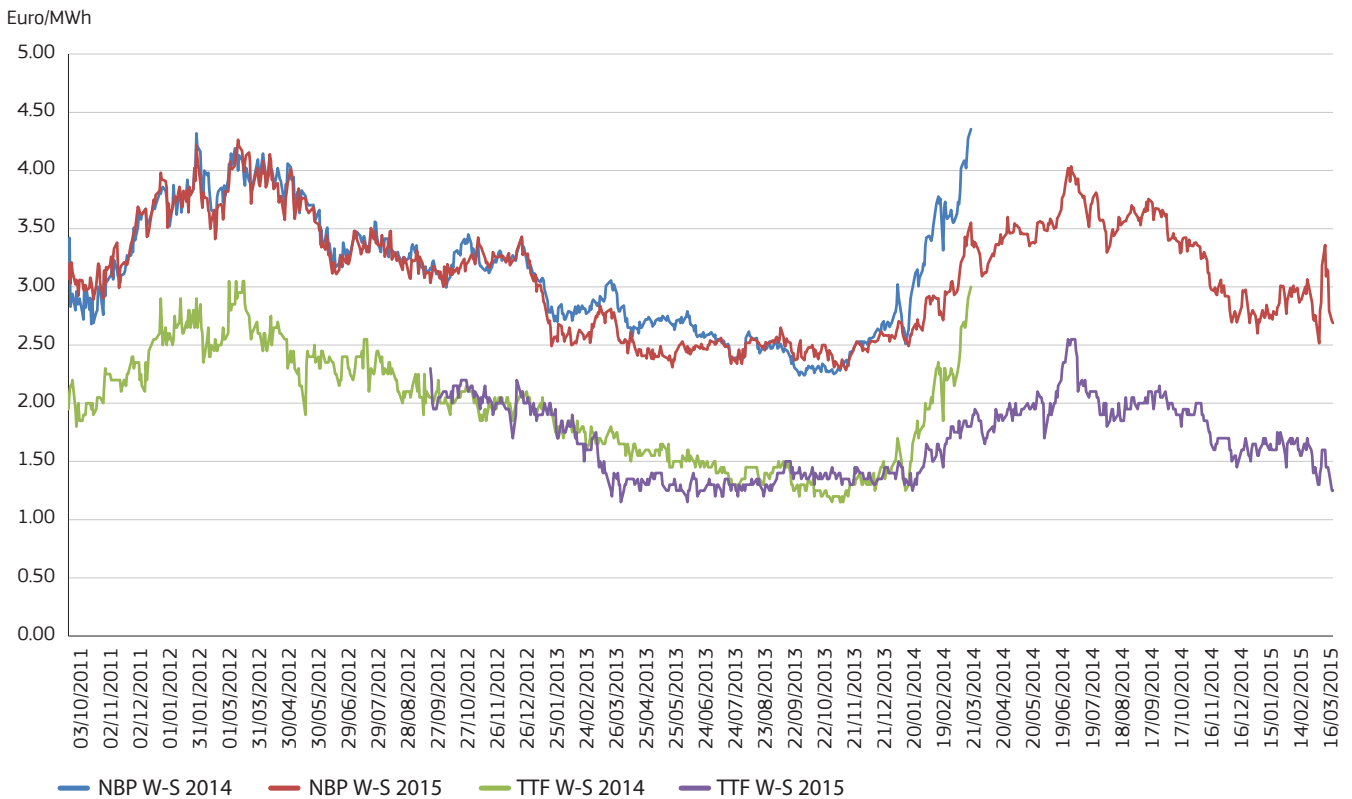
**FIGURE 10 - GAS STORAGE LEVELS AS % OF MAXIMUM GAS STORAGE CAPACITY IN SELECTED COUNTRIES**



Source: Gas Storage Europe, Thomson-Reuters

- A high seasonal price spread between winter and summer contracts on the major hubs indicates a financial incentive to inject gas into storage. Figure 11 shows that the seasonal price spread on contracts at the NBP and TTF fell during 2012 and 2013. In the first half of 2014, seasonal spreads significantly increased, in line with the falling spot prices in the summer of 2014 and concerns about winter supplies in the wake of the Ukrainian crisis. This contributed to the high storage levels seen in 2014. In the second half of 2014, as spot prices recovered, spreads decreased again but remained higher than in 2013.
- By the first quarter of 2015, seasonal price spreads receded further and were hardly above the levels seen in 2013, before the Ukrainian crisis. If seasonal price spreads remain low, this may curb much-needed storage injections during 2015.

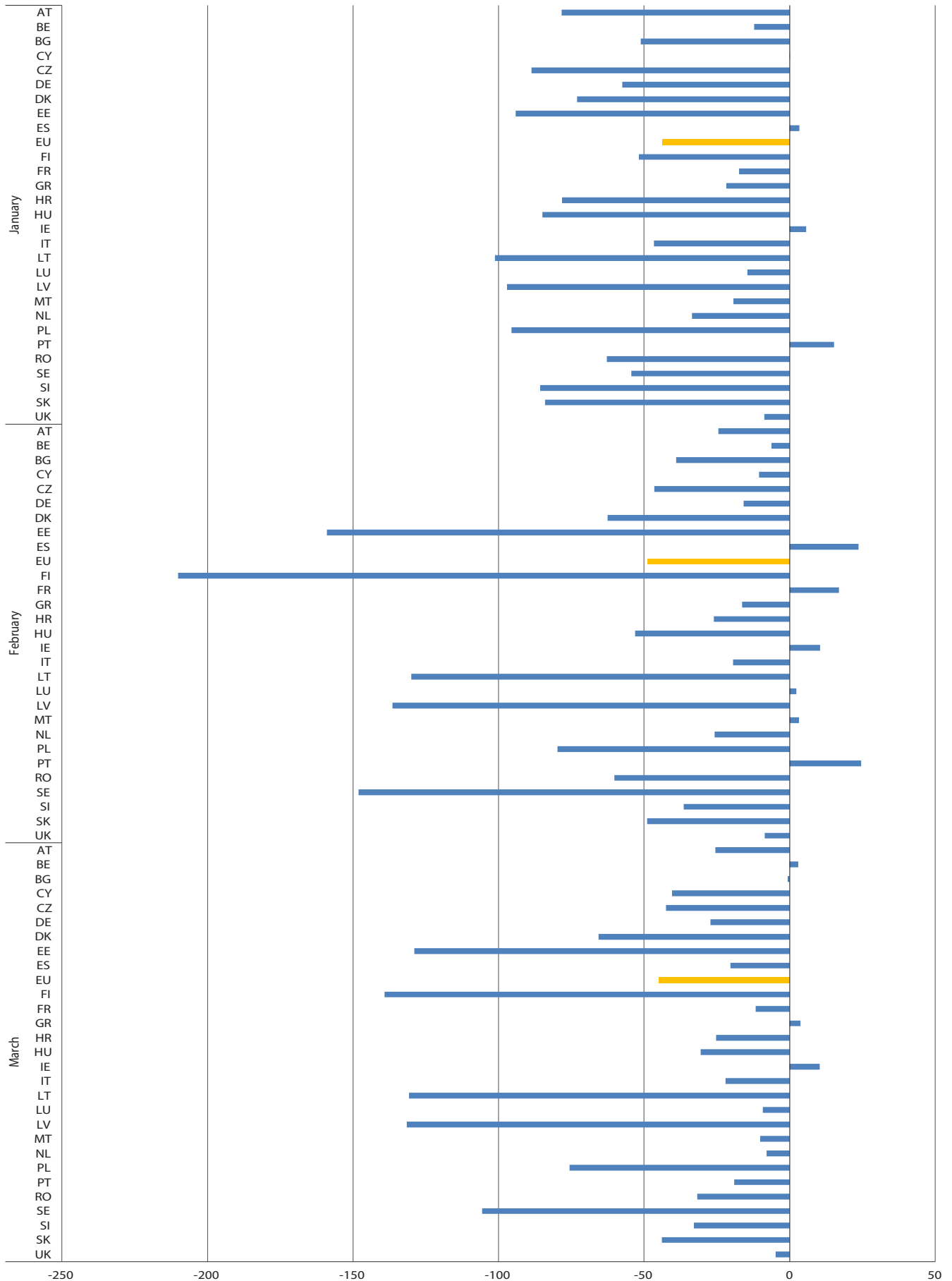
**FIGURE 11 - WINTER-SUMMER SPREADS IN THE DUTCH AND BRITISH GAS HUBS**



Source: Platts

- Figure 12 shows the monthly deviation of actual Heating Degree Days (HDDs) from the long term average in individual EU Member States in the first three months of 2015. With the exception of Ireland, Portugal and Spain, the number of actual heating degree days was below the long term average in this period, implying that temperatures were higher than the seasonal averages. For the EU as a whole, the number of heating degree days was 9% lower than the long-term average.
- However, the first quarter of 2015 (especially February and March) was colder than the unusually warm 2014 winter, with 7% more heating degree days in first three months of 2015 than in the same period of 2014. Probably this is the main reason for the increase in gas consumption in the first quarter of 2015.

**FIGURE 12 - DEVIATION OF ACTUAL HEATING DEGREE DAYS (HDDs) FROM THE LONG TERM AVERAGE, JANUARY-MARCH 2015**



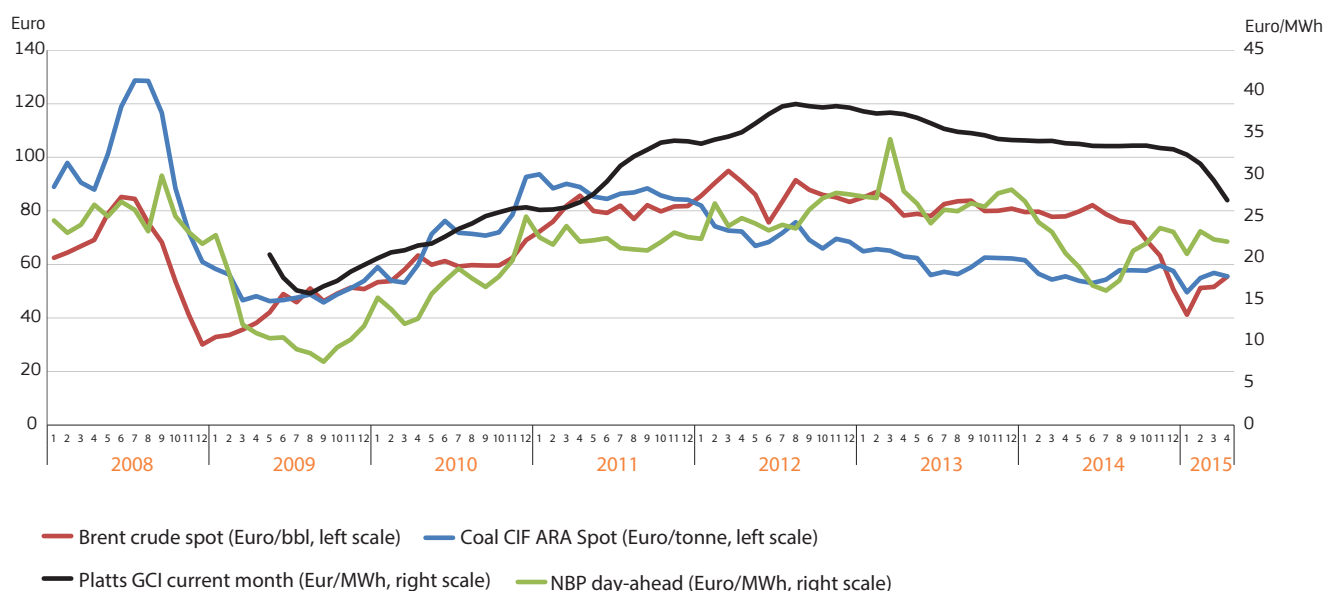
Source: Eurostat/JRC. The colder the weather, the higher the number of HDDs.

# 3. Wholesale Gas markets

## 3.1 The broader energy commodity picture: comparisons between oil, gas and coal prices in the EU

- The fall of oil prices, driven by weak demand and robust supply growth, which started in mid-2014 continued until mid-January 2015. On 13 January Brent dropped to 45 USD/barrel, its lowest level in 6 years. In February and March, Brent bounced back to the 50-60 USD/barrel range as the falling number of active rigs in the US and the news about oil companies cutting upstream spending have raised expectations that supply growth could soon ease. However, it takes time for these developments to affect production. A tightening market is foreseen in the second half of the year which is expected to lead to a rebound of prices, although not to levels seen in previous years.
- After an increase from 16.1 Euro/MWh, a 4-year low, in July 2014 to 23.7 Euro/MWh in November 2014, the NBP spot price remained relatively stable: it has been fluctuating in the 20-24 Euro/MWh range and averaged 22.0 Euro/MWh in the first quarter of 2015, 11% lower than a year earlier. Increasing LNG imports and storage withdrawals during the winter months helped to stabilize prices despite the rise of seasonal demand. Section 5.3.2 looks at the main drivers of European wholesale gas prices.
- The falling oil price has a delayed impact on oil-indexed gas prices because of the time-lagged pricing mechanisms of such contracts. Russian export prices are typically based on the price of gas oil and fuel oil, applying a 6-9 months lag. Accordingly, the oil price drop seen in the second half of 2014 filters through to such gas contracts gradually and oil indexed-priced are expected to bottom out in the summer. The decrease of Platt's North West Europe Gas Contract Indicator (GCI), a theoretical index showing what a gas price linked 100% to oil would be, became noticeably steeper in the first quarter of 2015 and its premium over NBP has significantly reduced.
- Coal prices continued their declining trend driven by the global oversupply. In January 2015, the CIF ARA Spot price of coal reached its lowest level in the last five years. In the last couple of months, the development of European spot prices of coal and gas show a remarkable similarity, suggesting that the relative competitiveness of the two fuels has stabilized.

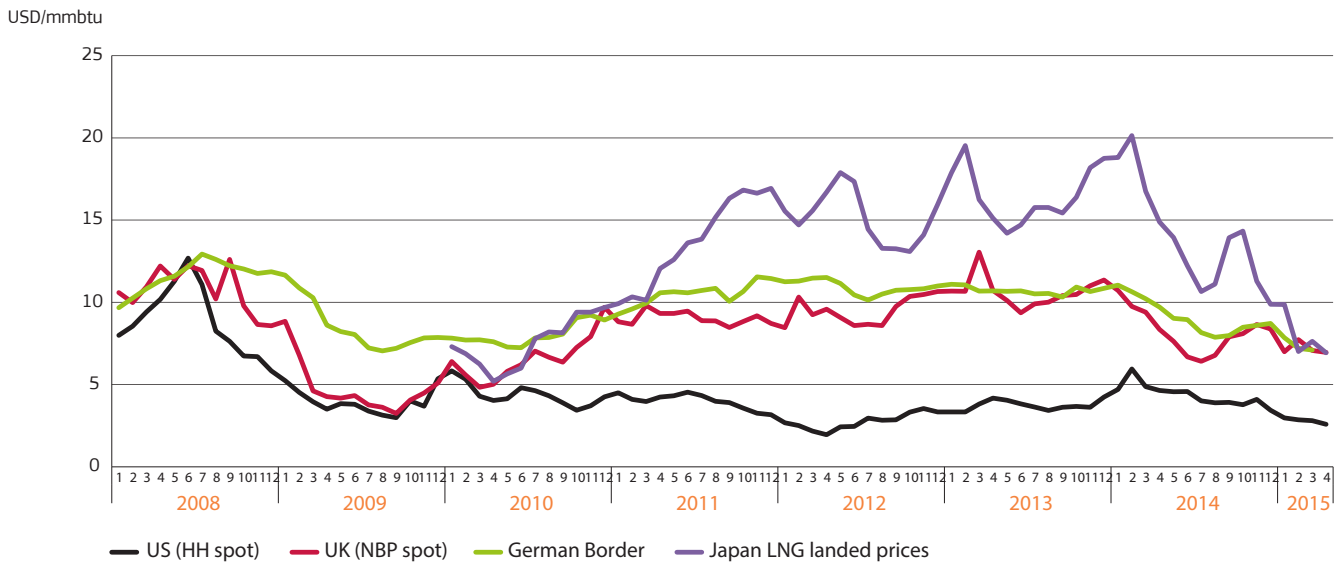
**FIGURE 13 - SPOT PRICES OF OIL, COAL AND GAS IN THE EU**



## 3.2 International gas markets

- Figure 14 shows an international comparison of wholesale gas prices. Over 2014, wholesale prices decreased in all regions and the trend continued in early 2015.
- LNG prices showcased the biggest decrease, with Japanese landed prices decreasing by 65% between February 2014 and February 2015. LNG prices started to fall at the end of the 2013/2014 winter, mainly because of weak demand in Asia, the biggest LNG market, coupled with the commissioning of the Papua New Guinea LNG plant. Unlike in previous years, the 2014/2015 winter failed to reverse the downward trend and after a rebound in September-October prices continued to fall.
- Since February 2015, Asian spot LNG prices are on a par with the price at NBP, the UK gas hub. This is a major change compared to previous years when the LNG price had a premium of 3-10 USD/mmbtu over the NBP price. The parity helped to move excess supply from the Asia Pacific to the Atlantic from LNG producers like Nigeria and Qatar. The NBP price is likely to provide a floor for LNG prices but possible supply disruptions and warmer than average summer temperatures in Asia can potentially push LNG prices up in the coming months.
- European prices significantly decreased in the first half of 2014. After a partial recovery in the autumn months, prices have been relatively stable in spite of the onset of winter. In the first quarter of 2015, NBP averaged about 7 USD/mmbtu (22 €/MWh). German border prices remained above NBP for most of 2014, with the premium exceeding 5 EUR/MWh in June, but this premium almost disappeared by the beginning of 2015.
- The average monthly Henry Hub price remained below 3 USD/mmbtu in the first quarter of 2015, the lowest level since mid-2012. While the fall of the oil price cut the production of associated gas from oil shale plays, the resulting cost deflation helps the gas producers as they focus on gas-rich fields.
- International gas prices continued to converge in the first quarter of 2015. The ratio of the Japanese LNG price and US Henry Hub has fallen to 2.5 in February while in 2013 this indicator was in the 4-5 range. The NBP/Henry Hub ratio slightly increased in early 2015 (to about 2.5) but remained below 2012-2013 levels. The price convergence was partly driven by exchange rate developments: the Euro weakened by 12% compared to the US dollar during 2014 and by a further 11% in the first three months of 2015, thereby lowering European prices expressed in dollars.

**FIGURE 14 - INTERNATIONAL COMPARISON OF WHOLESALE GAS PRICES**

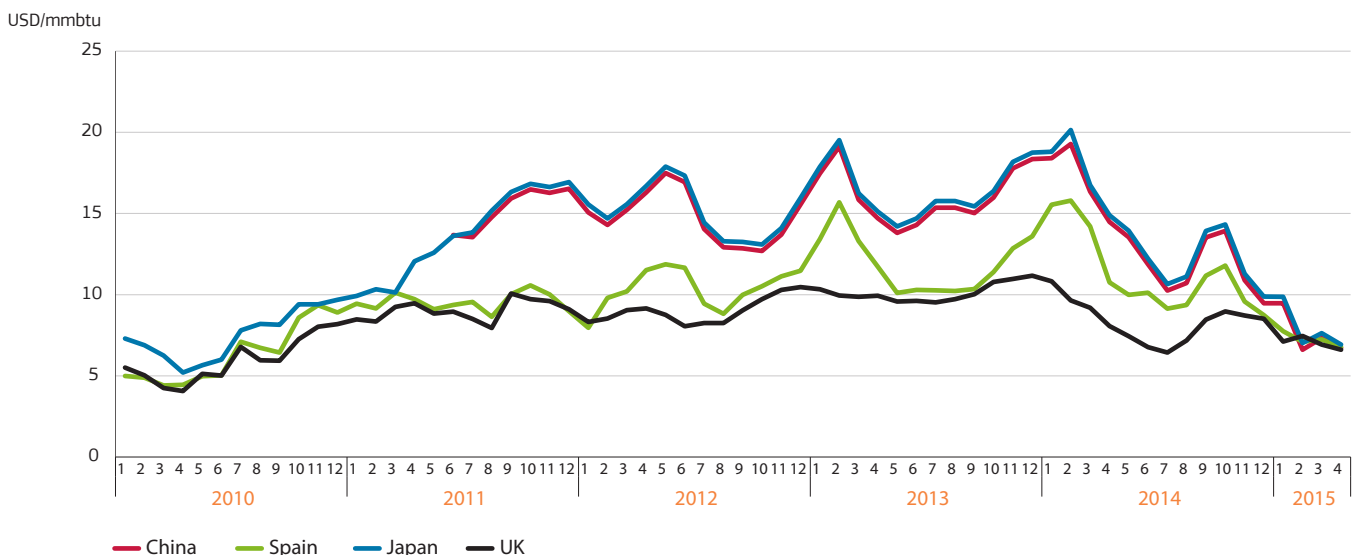


Sources: Platts, Thomson Reuters, BAFA

### 3.2.1 LNG markets

- LNG prices have significantly decreased over 2014: by the end of the year the Japanese spot price fell to 10 USD/mmbtu, the level seen before the Fukushima accident. The price fall continued in 2015 when both European and Asian LNG prices plummeted to 7 USD/mmbtu, the level of the NBP price. LNG prices generally pick up in winter but there was no sign of that this year. The premium of Asian LNG prices over European ones, which regularly exceeded 5 USD/mmbtu in previous years, has disappeared.
- Falling prices are driven by weak demand in Asia, the main LNG market (representing more than 70% of global demand), where mild temperatures and modest economic performance curbed gas consumption. Asian demand remained subdued during the 2014/2015 winter, thereby extending the trend of falling prices. In the first quarter of 2015, LNG imports to Korea decreased by 20% year-on-year, mainly because of decreased gas intake in the power sector after the restart of some nuclear capacity. To a smaller extent, LNG imports also decreased to China, as a result of the slower economic growth and increased pipeline imports from Turkmenistan. Imports in India were flat on last year. While the delayed nuclear comeback helped Japanese imports to slightly increase, this was not enough to offset the decrease in Korea and China and the combined imports of Asian countries decreased by 4% in the first three months of 2015.
- All 43 of Japan's operable nuclear reactors are currently offline. The Sendai nuclear plant is the first to be brought back into service, according to the latest reports in mid-August 2015. However, it is likely that the plant will replace oil-fuelled generation and therefore will not have an impact on Japan's LNG imports.
- Falling oil prices also contributed to the price decline: in certain Asian markets LNG is directly competing with oil products as a fuel in power generation.
- Latin American imports also decreased in the first quarter of 2015, especially in Argentina and Mexico, contributing to the weak global demand picture.
- Weak demand in Asia and Latin America can be partly offset by the appearance of new LNG buyers like Egypt, Jordan, Pakistan, Lithuania and Poland.
- While demand is weak, supply is expanding. The Papua New Guinea (PNG) LNG project started production in April 2014 and a number of plants are set to come on stream in Australia in 2015 which are expected to keep LNG prices at a subdued level. The Queensland Curtis LNG (QCLNG) project officially started commercial operations in May 2015 and three further projects (AP LNG, Gladstone and Gorgon) are supposed to come on stream in the second part of the year. The Sabine Pass project in the US is also set to start producing before the end of 2015.
- Most long-term LNG contracts continue to be indexed to oil and, in addition to the arrival of new supplies to the market, low oil prices should also keep LNG prices moderate. Asian oil-indexed LNG prices, which are typically lagged 3-4 months, have fallen significantly and are expected to reach a bottom in the summer at around 9 USD/mmbtu. This is still above Asian spot prices that were around 7 USD/mmbtu in the first quarter of 2015.
- Weak demand in Asia and Latin America allowed European buyers to increase LNG imports. In the first quarter of the year, LNG deliveries significantly increased, particularly to Northwest Europe which has ample pipeline and LNG import capacities and therefore has a flexibility to switch between pipeline and LNG imports.

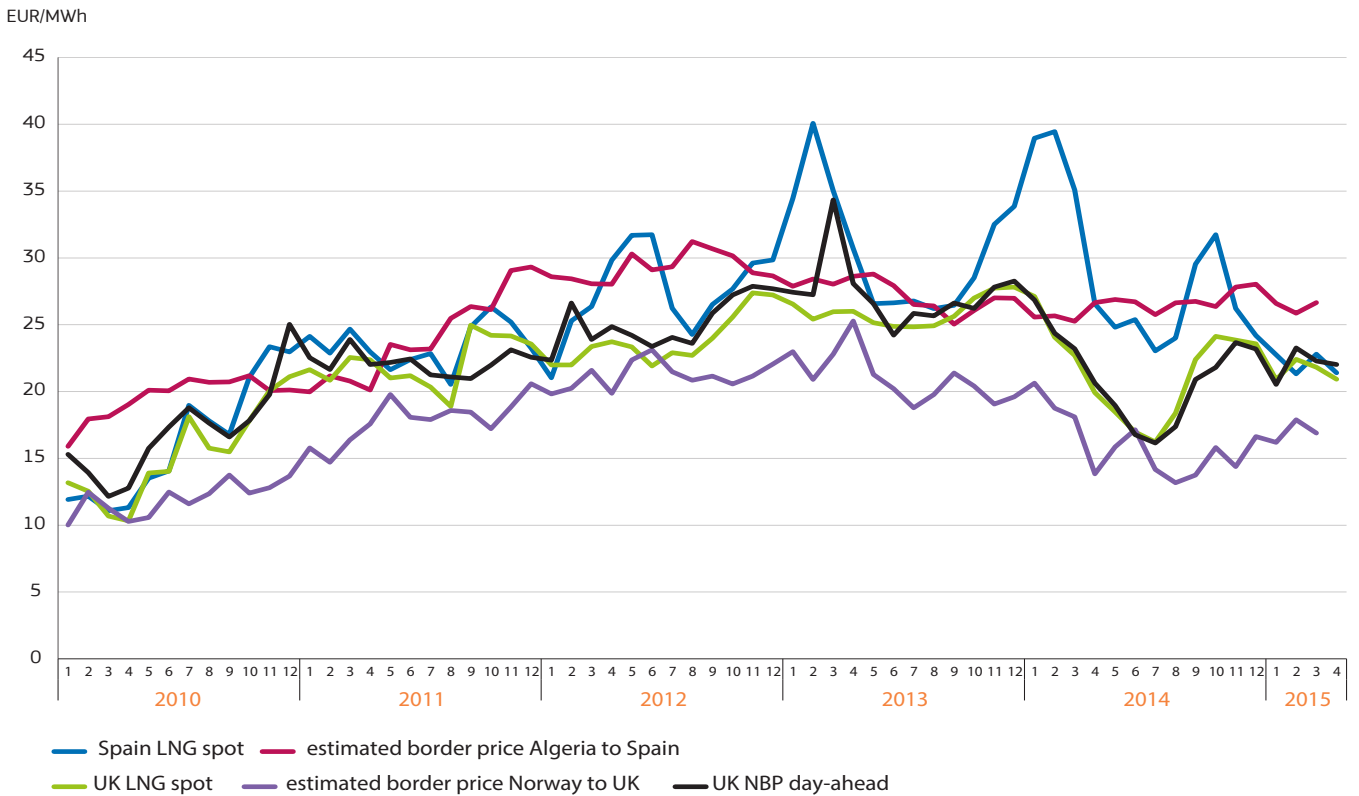
**FIGURE 15 – LNG PRICES IN THE EU AND ASIA**



Note: Landed prices for LNG. Source: Thomson-Reuters Waterborne

- The fall in LNG prices has helped to narrow the gap between the prices of pipeline and LNG imports in the EU. Figure 16 shows the evolution of spot LNG prices paid in the UK and Spain vis-à-vis the evolution of estimated border prices for pipeline imports from Norway and Algeria, which account for the major part of pipeline imports in the UK and Spain, respectively. The evolution of the day-ahead prices on the UK NBP hub is also presented.
- In the UK, spot LNG prices closely follow the NBP price and for most of the time have been above the estimated price of Norwegian imports. However, in the summer of 2014, when the UK LNG price was at its lowest, for a short period the premium of LNG over Norwegian pipeline supplies disappeared. Since then, the premium has reappeared and in the first quarter of 2015 it stayed in the 4-5 Euro/MWh range.
- In Spain, there seem to be seasonal differences in the price development of Algerian pipeline imports and spot LNG: in previous years, LNG had a high premium during the winter months but was cheaper than Algerian pipeline gas in summer. In the autumn months of 2014, LNG prices rose again but to a lesser extent than in previous years. By the end of the year, in spite of the winter season, LNG prices have plummeted, and remained consistently below the price of Algerian pipeline imports; in the first quarter of 2015, the difference was about 4 Euro/MWh.

**FIGURE 16 – PRICE DEVELOPMENTS OF LNG AND PIPELINE GAS IN THE UK AND SPAIN**



Note: Landed prices for LNG.

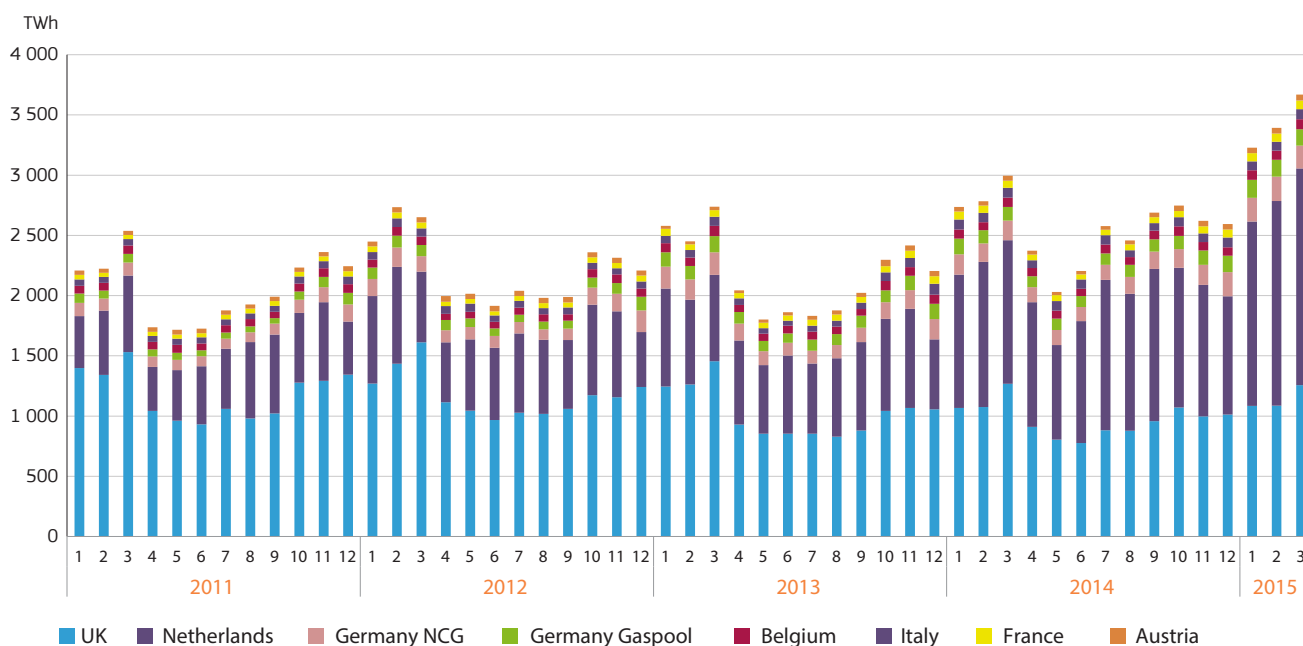
Source: Platts, Thomson Reuters, European Commission estimates based on Eurostat COMEXT data

## 3.3 European gas markets

### 3.3.1 Wholesale markets in the EU

- Gas hub liquidity reached record levels in the first quarter of 2015: total volumes traded on the main European gas hubs exceeded 10,000 TWh, an increase of 21% over the same period of 2014. In 2014, the annual increase was 18%. The UK NBP and Dutch TTF virtual trading points continue to have a dominant position.
- In 2014, the TTF overtook the UK NBP as the most liquid hub and this trend continued in 2015. In the first quarter of the year, traded volumes at the Dutch hub increased by a robust 44% year-on-year while they were flat at the NBP. In addition to the factors highlighted in the previous report, the TTF benefited from its closer proximity to Central Eastern Europe in the context of the Ukrainian crisis.<sup>10</sup>
- On the NBP, exchanges and over-the-counter (OTC) markets share the traded volumes equally while on the continental hubs most trades are concluded on the OTC market. On the Dutch hub, for example, only 13% of total traded volumes was executed on exchanges in the first quarter of 2015 with the rest traded on the OTC market.<sup>11</sup>

**FIGURE 17 – TRADED VOLUMES ON EUROPEAN GAS HUBS**



The chart covers the following trading hubs: UK: NBP (National Balancing Point); Belgium: Zeebrugge beach; Netherlands: TTF (Title Transfer Facility); France: PEG (Point d'Echange Gaz); Italy: PSV (Punto di Scambio Virtuale); Germany: GASPOOL, NCG (NetConnect Germany); Austria: CEGH (Central European Gas Hub)

Sources: National Grid (UK), GTS (Netherlands), Huberator (Belgium), Gaspool (Germany), NCG (Germany), GTTGaz (France), Snamrete (Italy), CEGH (Austria)

Note: CEGH volumes after January 2013 are not directly comparable with the values before that date due to the entry into force of entry/exit system. Previously TTF volumes were reported based on GTS nominations only; the figures have been now revised to also include OTC and exchange traded volumes.

10. ICIS Heren EGM, 16 March 2015

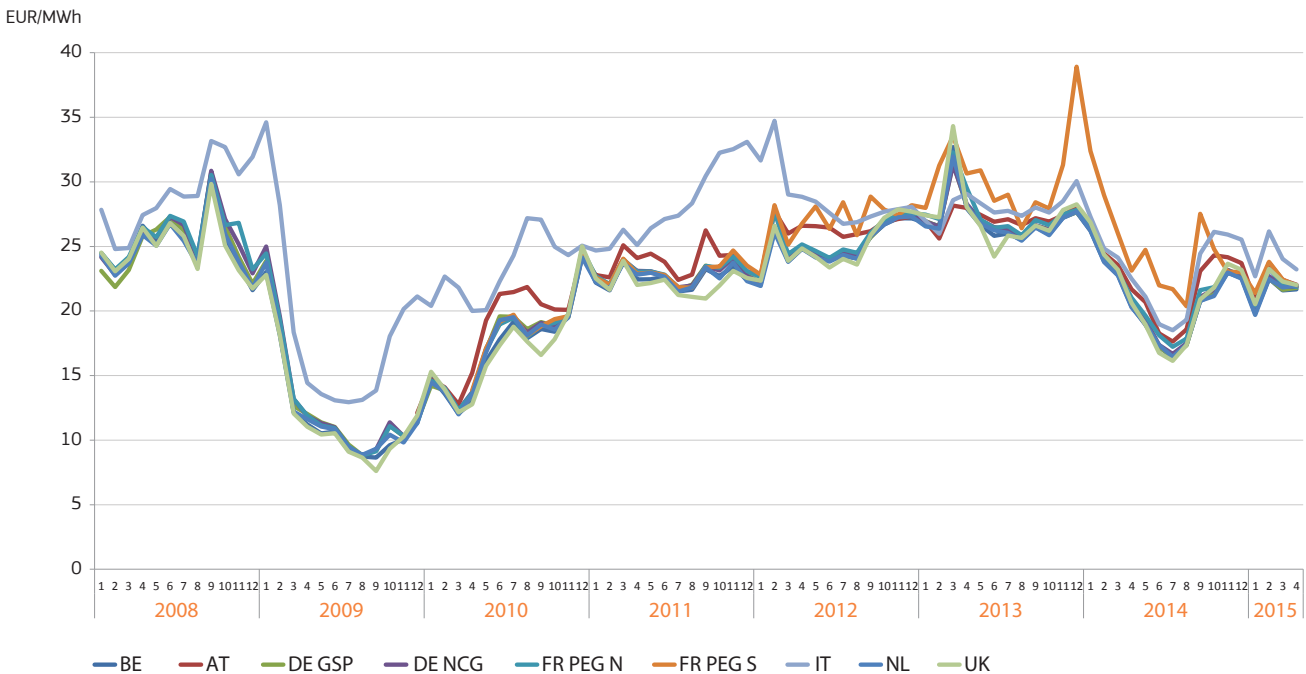
11. Trayport Euro Commodities Market Dynamics Report, March 2015



### 3.3.2 Wholesale price developments in the EU

- Figure 18 presents the evolution of European hub day-ahead natural gas prices in the period from January 2008 until April 2015, showing the convergence in the day-ahead price on major European gas hubs.
- Day-ahead gas prices on European hubs plunged to an unusually low 16-18 Euro/MWh level during the summer of 2014, mainly because of weaker than usual demand for storage injection after a mild winter across Europe. With the approach of the new gas year, uncertainty about Ukraine and concerns about the possible disruption of Russian gas flows, prices started to increase from the lows of summer and reached 23-26 Euro/MWh in November.
- For most of the winter, prices remained in the 22-24 Euro/MWh range. In January 2015, however, prices reached a low of about 20 Euro/MWh as mild weather and high storage levels kept demand at relatively low levels. From February, the weather became colder compared to the previous year and storage withdrawals accelerated. News about the reduced Dutch production cap and renewed tensions between Ukraine and Russia also provided support to prices.
- Average day-ahead gas prices in the first quarter of 2015 were about 12% lower than in the same period of 2014.
- If Italy is not taken into account, the difference between the highest and the lowest priced hub in North-West Europe has been 0.8-1.7 Euro/MWh in the first three months of 2015 and decreased to 0.4 Euro/MWh in April.
- Prices at the Italian PSV hub remained relatively high throughout the winter; the premium was 2-3 Euro/MWh above NBP and TTF in the first quarter of 2015. In the beginning of February, Italian prices spiked to above 30 Euro/MWh as imports and storage withdrawals were not sufficient to meet the weather-related demand surge.
- France's PEG Sud has traditionally been disconnected from North-West European markets due to a combination of factors such as the bottleneck of the North-South link within France and heavy reliance LNG import flows. The premium of PEG Sud over PEG Nord averaged 4 Euro/MWh in January-October 2014 but has almost disappeared during the past winter as a result of the high volume of incoming LNG to the southern terminals at Fos. In addition to the increasing LNG flows, high storage levels and relatively weak demand during winter also helped to reduce congestion of the North-South link.

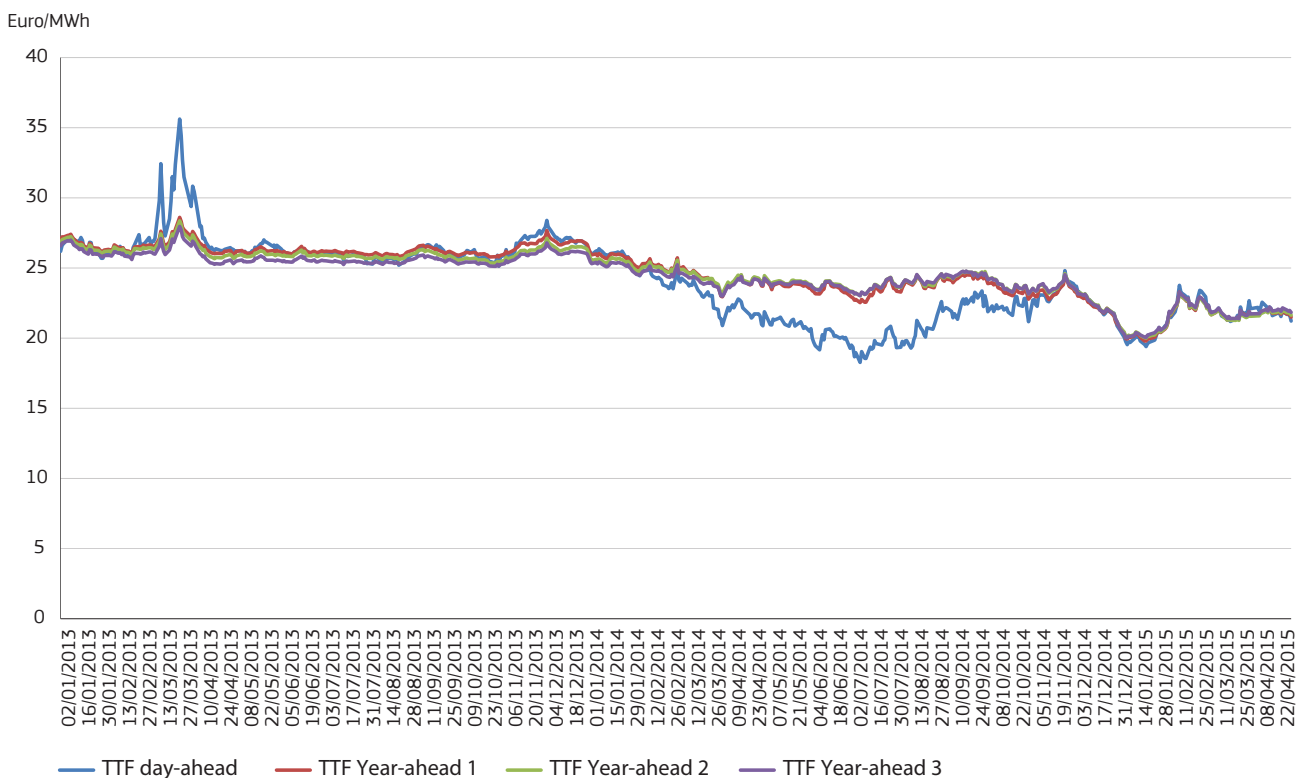
**FIGURE 18 – WHOLESALE DAY-AHEAD GAS PRICES ON GAS HUBS IN THE EU**



Source: Platts

- Figure 19 looks at the development of forward prices one, two and three years ahead in comparison to the development of the day-ahead price on the Dutch TTF. For most of 2014, there has been a situation of contango, whereby closer to the present date prices are lower than prices for future deliveries. With seasonally high stock levels and ample physical supply, spot prices significantly decreased in the first half of the year, while higher forward prices reflected the general uncertainty about future developments, in particular the Russia-Ukraine conflict. Since the end of 2014, however, day-ahead and forward prices are at more or less parity, helped by the signature of the winter package agreement between Russia and Ukraine.

**FIGURE 19 – FORWARD GAS PRICES ON THE DUTCH GAS HUB**

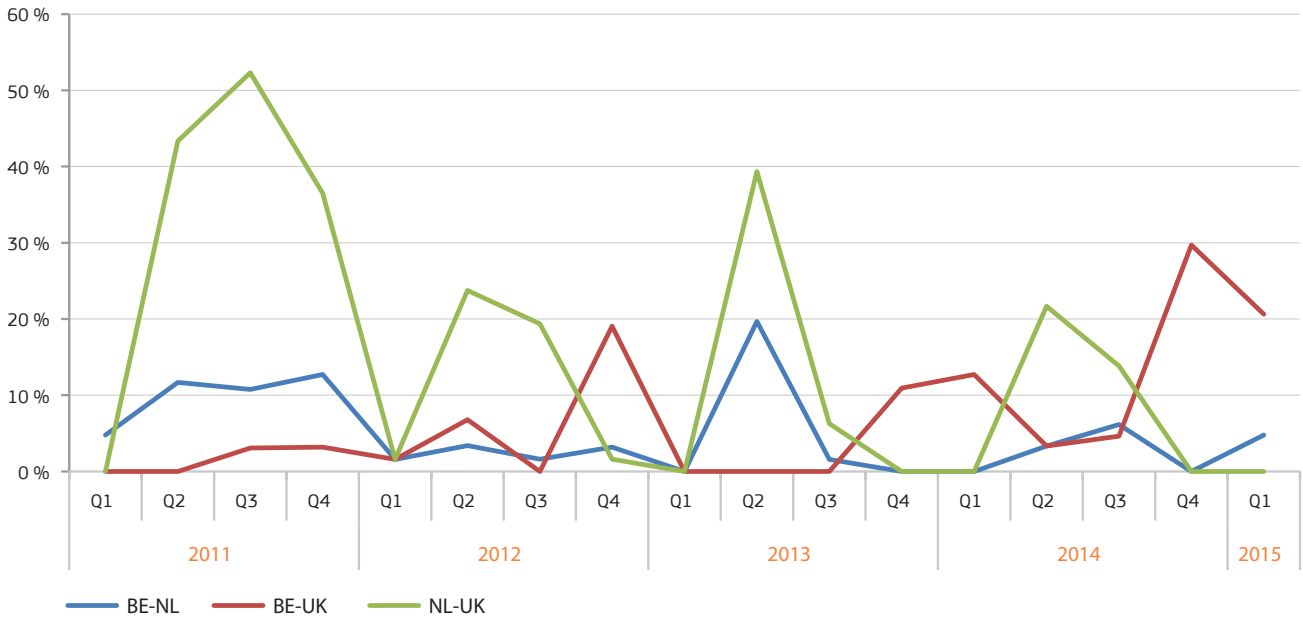


Source: Platts

- Figure 20 traces the occurrence of adverse nominations – the so-called flow against price differential events (FAPD)<sup>12</sup>– in North Western Europe (NWE) since 2011. Day-ahead nominations of flows from a high price area to a low price area are not frequent for adjacent areas with active hub trading. The number of FAPD events in the NWE region decreased in 2012 and 2013 but slightly increased in 2014.
- In the first three months of 2015, similarly to the previous quarter, there have been no FAPD events between the Netherlands and the UK. Most of the capacity of the BBL pipeline connecting the Netherlands and the UK is covered by long-term contracts, preventing price signals to have an impact. However, the offering of a backhaul virtual capacity has clearly decreased the occurrence of adverse nominations.
- A relatively high number of FAPD events were observed between Belgium and the UK. On 13 occasions, i.e. on 21% of traded days net flows went from the more expensive area, the UK, to the cheaper area, Belgium. Similarly to the previous quarter, the likely reason is the increase in the commodity charge levied by the National Grid on gas entering the UK system from 1 October 2014. On average, the UK NBP price has been 0.7 Euro/MWh higher during the first quarter of 2015 which is slightly less than the commodity charge applicable to gas entering the UK from October 2014 to March 2015 (0.616 GBP/MWh).

12. See the glossary for a definition of the FAPD event.

**FIGURE 20 – FAPD EVENTS IN THE NORTH-WESTERN EUROPEAN REGION**

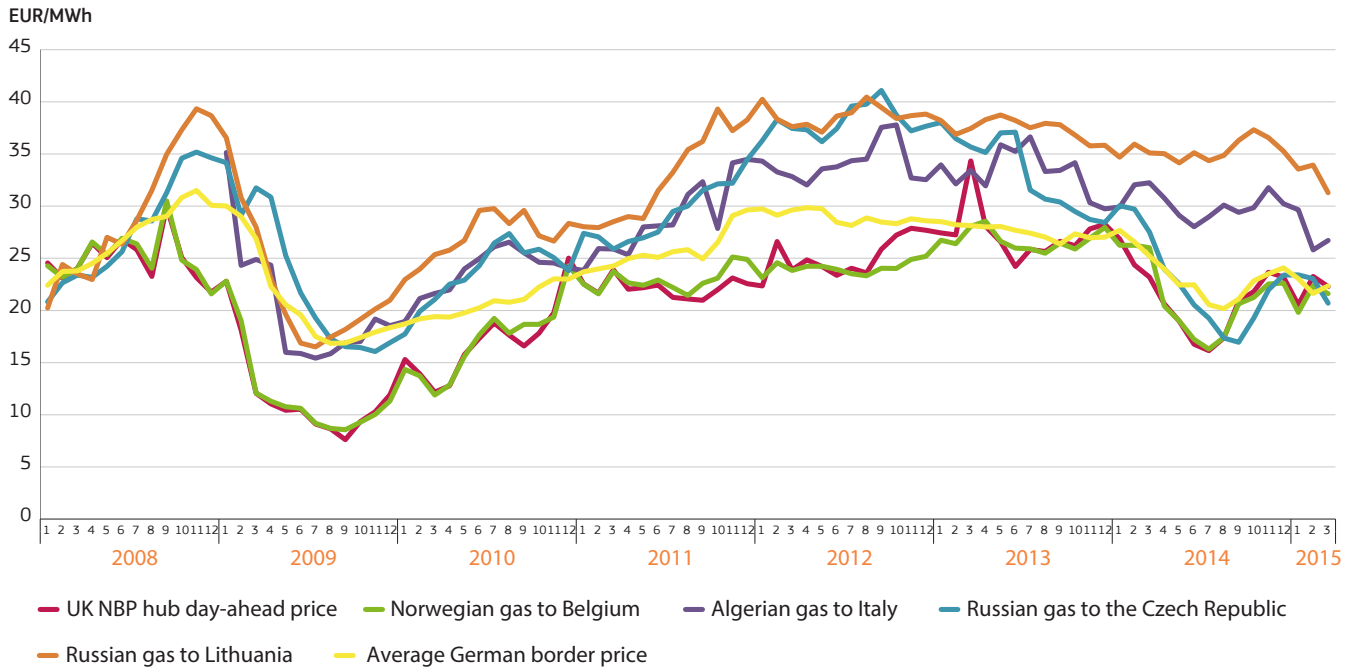


Sources. (1) Price data: Platts; (2) Flow nomination data: Fluxys, BBL

### 3.3.3 Comparing the prices of different contracts for gas in the EU

- A comparison of a selection of estimated border prices of gas deliveries from the main exporters to the EU – Norway, Russia and Algeria – shows significant variation in price levels and, to a smaller extent, in price dynamics.
- Estimated prices of most of the contracts reported on Figure 21 decreased in the first half of 2014 but bounced back in the second half of the year. Hub-based prices were relatively stable in the first quarter of 2015 while oil-indexed prices clearly decreased. The estimated price levels of Russian gas to Lithuania and Algerian gas to Italy remained the highest but their premium to the other – mainly hub-based – prices has shrunk. The other contracts more or less followed the movement of the NBP price, albeit in some cases with a delay.
- The difference between the estimated prices of Russian gas delivered to the Czech Republic and Lithuania remained high but decreased in the first quarter of 2015 as falling oil prices passed through to the Lithuanian contract. In March 2015, the estimated price in Lithuania was about 50% higher than in the Czech Republic while in September 2014 it was more than twice as expensive. Since mid-2013, estimated Czech prices are well below the theoretical pure oil-indexed contract, indicating that the Czech-Russian contract now has a significant hub pricing element. Although the estimated price of Russian gas in Lithuania decreased, the estimated price of LNG arriving to the country has been lower in the first quarter of 2015.
- After the increasing price divergence in 2014, prices converged again in the first three months of the year as oil-indexed prices started to decline. Oil-indexed prices are set to bottom out in the summer of 2015, projecting a continuation of price convergence in the coming months.

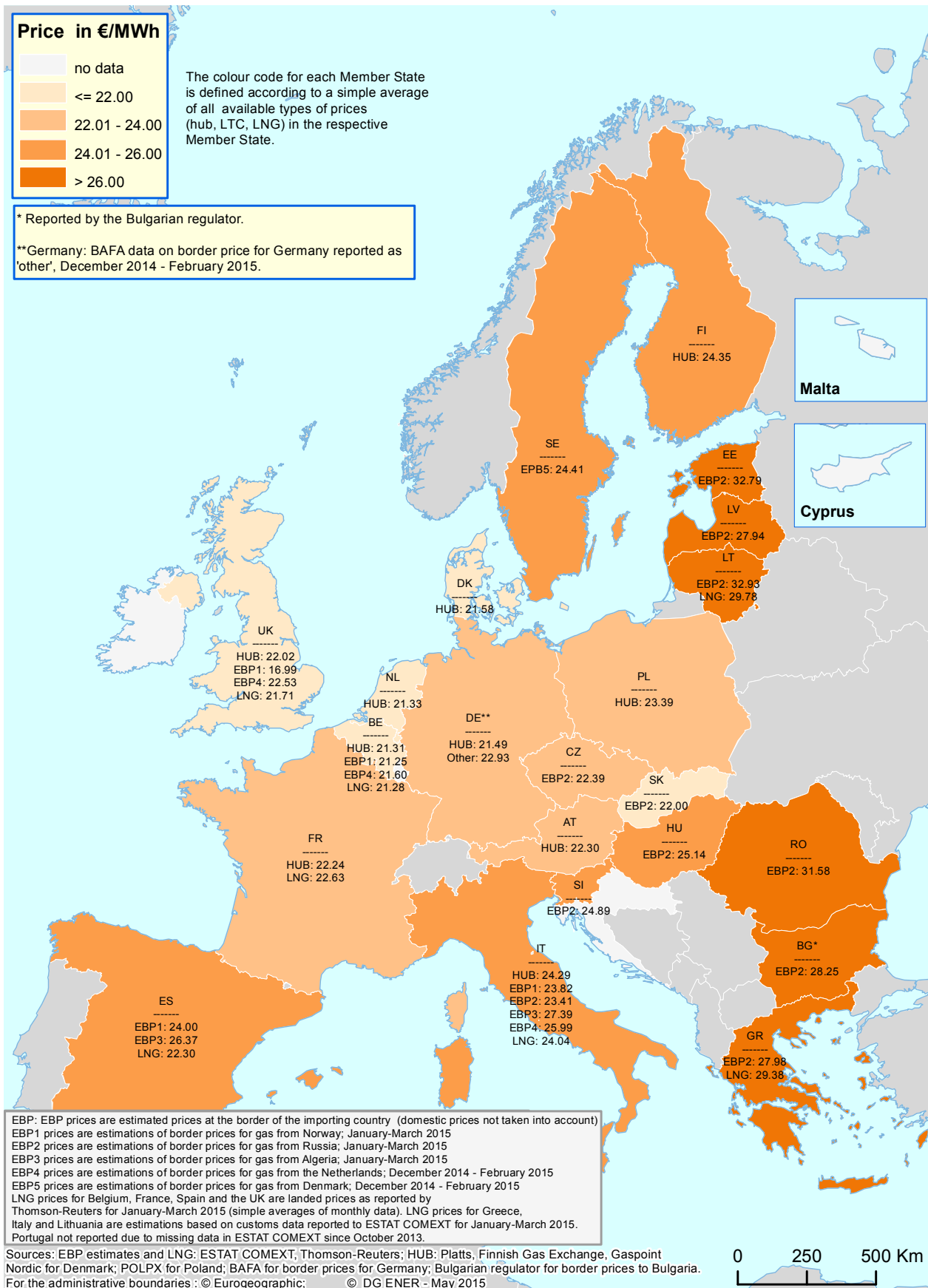
**FIGURE 21 – COMPARISON OF EU WHOLESALE GAS PRICE ESTIMATIONS**



Source: Eurostat COMEXT and European Commission estimations, BAFA, Platts

Note: Border prices are estimations of prices of piped gas imports paid at the border of the importing country, based on information collected by customs agencies, and are deemed to be representative of long-term contracts.

**MAP 1 – COMPARISON OF EU WHOLESALE GAS PRICES IN THE FIRST QUARTER OF 2015**

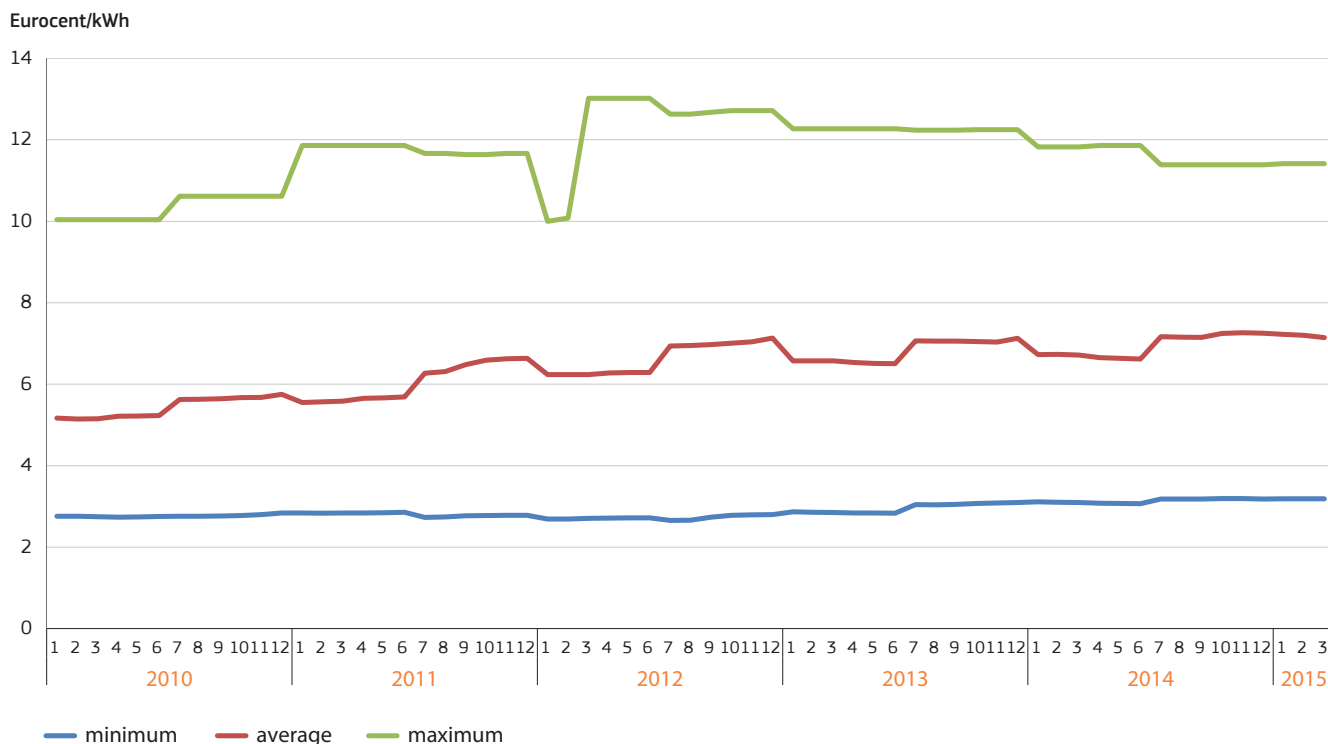


Note: Border prices are estimations of prices of piped gas imports paid at the border of the importing country, based on information collected by customs agencies, and are deemed to be representative of long-term gas contracts.

# 4. Retail gas prices in the EU

- Figures 22 and 23 show the retail gas price ranges for household and industrial consumers since 2012 for selected consumption bands. Monthly retail prices are estimated by using half-yearly prices from Eurostat (with the latest available figures relating to the second half of 2014) and Harmonised Consumer Price Indices (HICP) for the household prices and Producer Price Indices (PPI) for industrial consumers.
- For household consumers, the estimated average retail price (including all taxes) showed an increasing trend. The estimated price in March 2015 in consumption band D2 was 6% above the March 2014 level but prices decreased during this period in about half of the Member States.
- There are significant differences in retail gas prices across the EU: in March 2015, the lowest estimated household price in consumption band D2 could be observed in Romania (3.19 Eurocent/kWh), while the highest price was recorded in Sweden (11.42 Eurocent/kWh), resulting in a price differential ratio of 3.6 between the cheapest and the most expensive Member State in the EU. While this ratio is rather high, it shows a clear declining trend since March 2012 when it was 4.8. The differences persist even if one excludes taxes.

**FIGURE 22 - RANGES OF GAS PRICES PAID BY HOUSEHOLD CONSUMERS IN CONSUMPTION BAND D2 (5.56 MWh < CONSUMPTION < 55.6 MWh) IN EU MEMBER STATES**

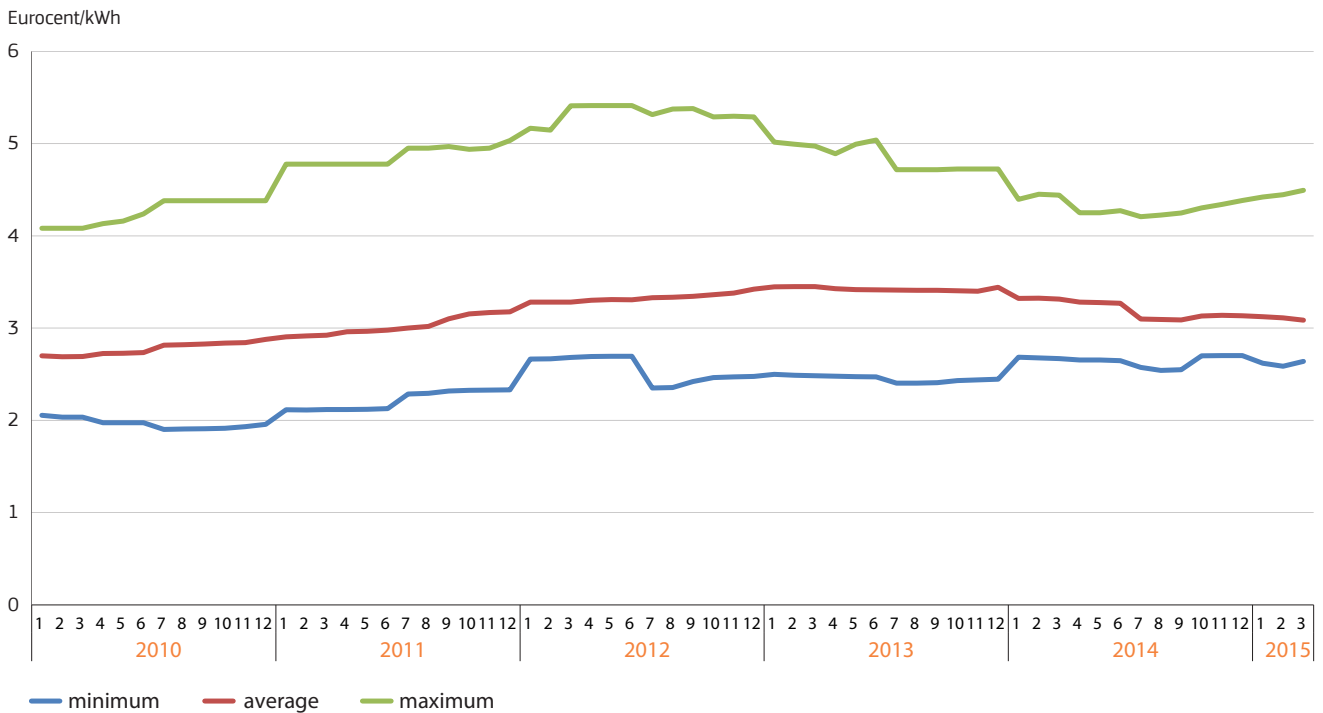


Note: all taxes included.

Source: European Commission estimates based on Eurostat data on consumer prices adjusted by the HICP

- Estimated industrial prices decrease since 2014, with the average March 2015 price (VAT and other recoverable taxes excluded) in consumption band I4 being 7% below the March 2014 level. Prices decreased in this period in the majority of Member States. In Lithuania and the Netherlands the decrease exceeded 20% but Croatia bucked the trend with a price increase of 23%
- In March 2015, Belgium had the lowest estimated industrial price in consumption band I4 (2.64 Eurocent/kWh), while the highest price was observed in Greece (4.49 Eurocent/kWh), resulting in a price differential ratio of 1.7 between the cheapest and the most expensive Member State of the EU. This ratio decreased noticeably over the last three years, indicating a gradual convergence of industrial prices, but in the first quarter of 2015 the ratio increased, driven by the rising price in the most expensive market, Greece.

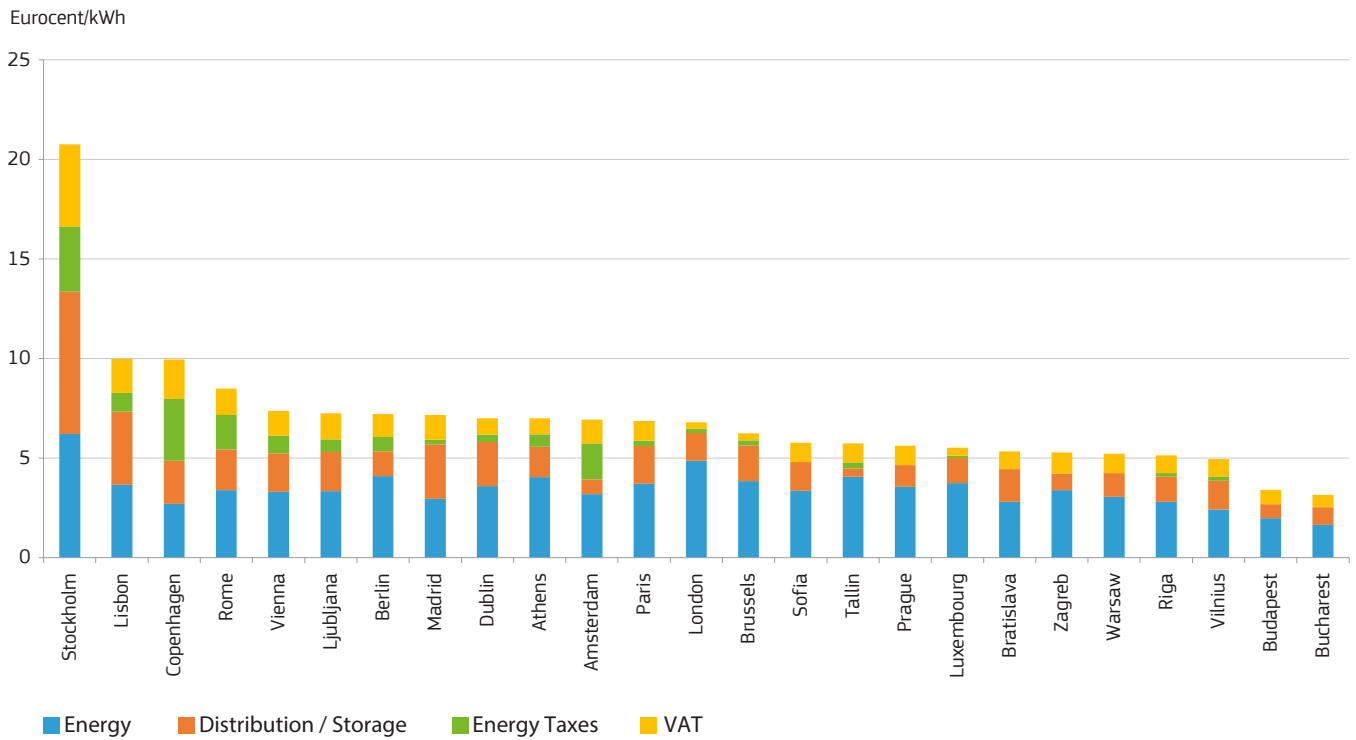
**FIGURE 23 - RANGES OF GAS PRICES PAID BY INDUSTRIAL CONSUMERS IN CONSUMPTION BAND I4 (27 780 MWH < CONSUMPTION < 277 800 MWH) IN EU MEMBER STATES**



Note: Excluding VAT and other recoverable taxes.  
 Source of data: European Commission estimates based on Eurostat data on industrial prices adjusted by the PPI

- Figure 24 shows the level and the breakdown of residential end-user gas prices, paid by typical households in European capitals. On average, 50% of the price covers the gas itself, while the other half covers distribution/storage costs (25%), energy taxes (9%) and VAT (16%). However, there are significant differences across Member States, with the share of energy cost ranging from 27 to 72%, the share of distribution/storage costs ranging from 7 to 38% and the share of taxes ranging from 8 to 51%.

**FIGURE 24 - THE BREAKDOWN OF GAS PRICE PAID BY TYPICAL HOUSEHOLD CUSTOMERS IN EUROPEAN CAPITALS, MARCH 2015**



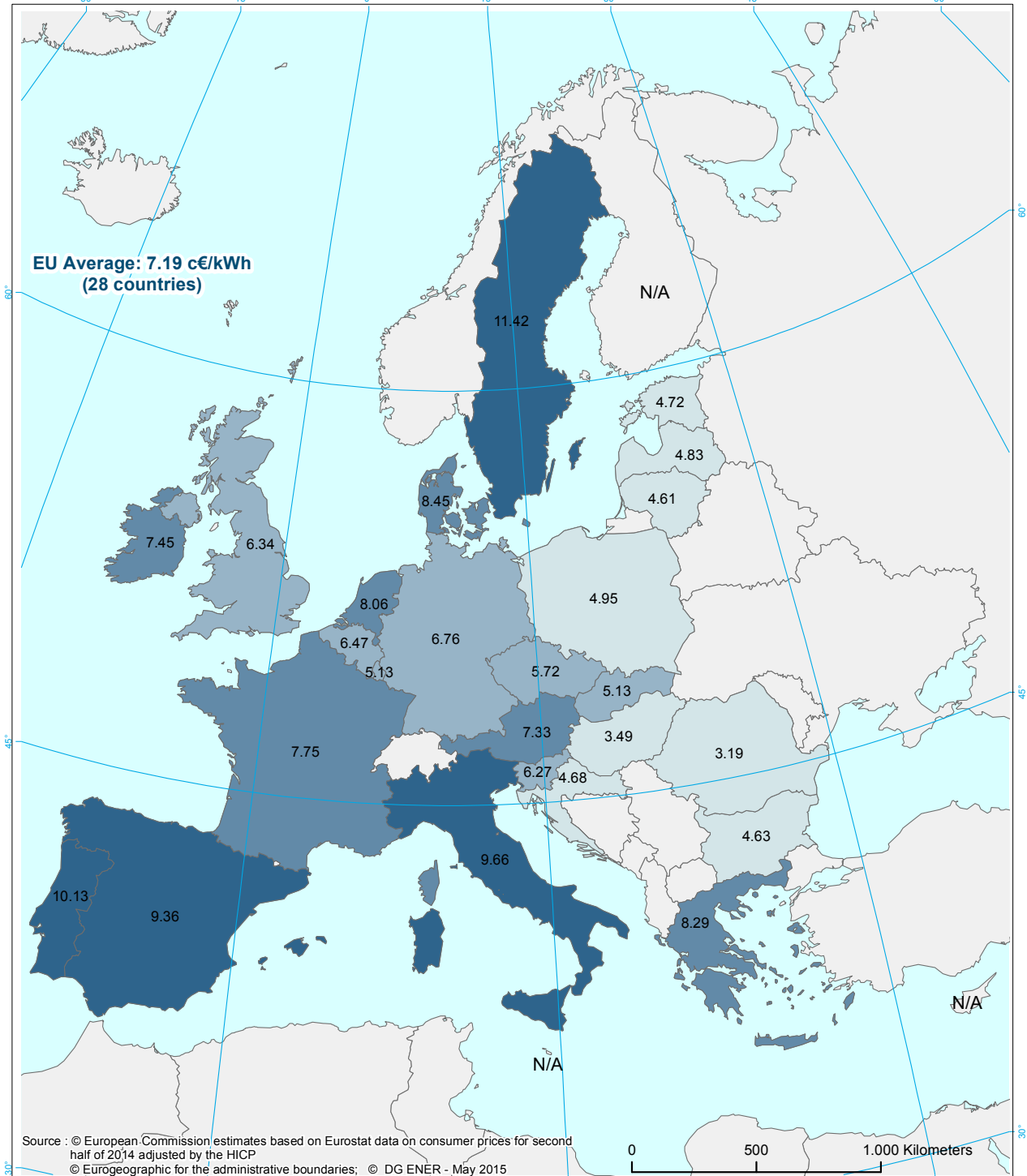
Note: VaasaETT

- Maps 2 and 3 show the estimated retail gas prices paid by households and industrial consumers in the fourth quarter of 2014.

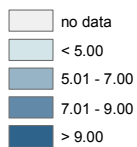


**MAP 2 - RETAIL GAS PRICE ESTIMATES FOR HOUSEHOLDS IN THE EU – 1ST QUARTER OF 2015**

Band D2: 5.56 MWh < Consumption < 55.6 MWh

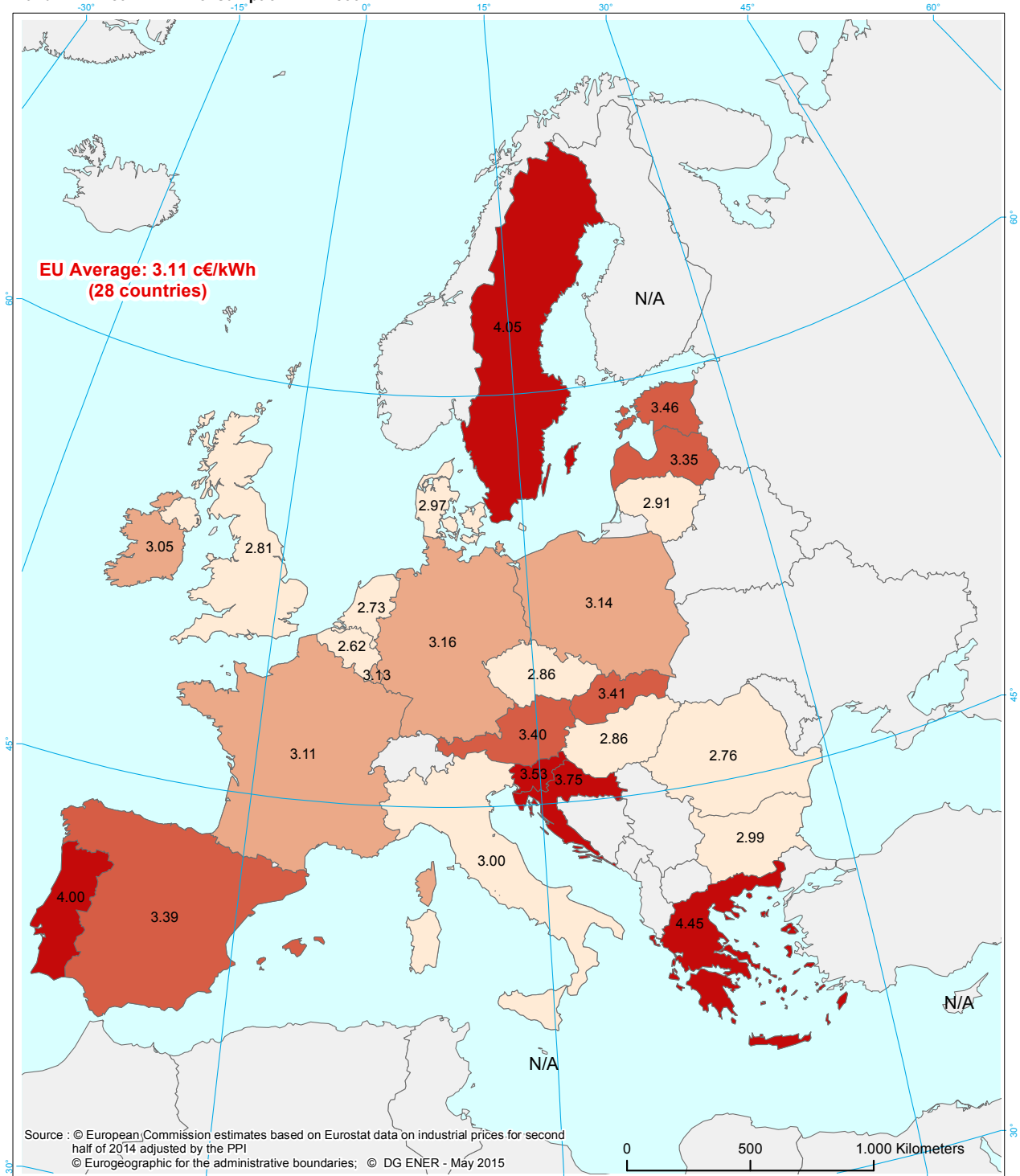


Prices in Eurocents/kWh, all taxes included



**MAP 3 - RETAIL GAS PRICE ESTIMATES FOR INDUSTRIAL CONSUMERS IN THE EU - 1ST QUARTER OF 2015**

Band I4: 27 780 MWh < Consumption < 277 800 MWh



Prices in Eurocents/kWh, excluding VAT and other recoverable taxes

- no data
- < 3.00
- 3.00 - 3.25
- 3.26 - 3.50
- > 3.50



# 5. Glossary

**Backwardation** occurs when the closer-to-maturity contract is priced higher than the contract which matures at a later stage

**Clean dark spreads** are defined as the average difference between the price of coal and carbon emission, and the equivalent price of electricity. Dark spreads are reported as indicative prices giving the average difference between the cost of coal delivered ex-ship and the power price. As such, they do not include operation, maintenance or transport costs. Spreads are defined for a coal-fired plant with 35 % efficiency. Dark spreads are given for UK and Germany, with the coal and power reference price as reported by Platts.

**Clean spark spreads** are defined as the average difference between the cost of gas and emissions, and the equivalent price of electricity. Spark spreads are indicative prices showing the average difference between the cost of gas delivered on the gas transmission system and the power price. As such, they do not include operation, maintenance or transport costs. The spark spreads are calculated for gas-fired plants with standard efficiencies of 50% and 60%. This report uses the 50% efficiency. Spreads are quoted for the UK, German and Benelux markets.

**Contango:** A situation of contango arises in the when the closer to maturity contract has a lower price than the contract which is longer to maturity on the forward curve.

**Flow against price differentials (FAPDs):** By combining daily price and flow data, Flow Against Price Differentials (FAPDs) are designed to give a measure of the consistency of economic decisions of market participants in the context of close to real time operation of natural gas systems. With the closure of the day-ahead markets (D-1), the price for delivering gas in a given hub on day D is known by market participants. Based on price information for adjacent areas, market participants can establish price differentials. Later in D-1, market participants also nominate commercial schedules for day D. An event labelled as an FAPD occurs when commercial nominations for cross border capacities are such that gas is set to flow from a higher price area to a lower price area. The FAPD event is defined by the minimum threshold of price difference under which no FAPD is recorded. The minimum threshold for gas is set at 0.5 €/MWh. After the day ahead market closes, market participants still have the opportunity to level off their positions on the balancing market. That is why a high level of FAPD does not necessarily equate to irrational behaviour. In addition, it should be noted that close-to real time transactions represent only a fractional amount of the total trade on gas contracts. The FAPD chart provides detailed information on adverse flows. It has two panels: The first panel estimates the ratio of the number of days with adverse flows to the total number of trading days in a given period. It also estimates the monetary value of energy exchanged under adverse flow conditions (mark-up) compared to the total value of energy exchanged across the border. The mark-up is also referred to as «welfare loss». A colour code informs about the relative size of FAPD events in the observed sample, going from green if less than 10% of traded days in a given period are FAPDs to red if more than 50% of the days are FAPDs. The second panel gives the split of FAPDs by sub-category of pre-established intervals of price differentials. It represents the average exchanged energy and relative importance of each sub-category on two vertical axes.

**Heating degree days (HDDs)** express the severity of a meteorological condition for a given area and in a specific time period. HDDs are defined relative to the outdoor temperature and to what is considered as comfortable room temperature. The colder is the weather, the higher is the number of HDDs. These quantitative indices are designed to reflect the demand for energy needed to heat a building.

**LNG sendout** expresses the amount of gas flowing out of LNG terminals into pipelines.

