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Part I

COMMISSION STAFF WORKING DOCUMENT

Energy Markets in the European Union in 2011

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Making the internal energy market work

{COM(2012) 663 final}
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PART I: EXECUTIVE SUMMARY

1. BACKGROUND TO THIS REPORT

This Staff Working Document contains important background information relevant to the Communication on the Internal Energy Market 'Making Energy Markets Work'. It consists of four parts: an Executive Summary (Part I), an overview of the EU electricity and gas markets which includes key statistical data of the European energy markets (Part II), a country chapter (Part III) that provides country-specific analysis for all of the 27 Member States of the EU and a state of play with infrigement procedures (Part IV).. The Commission is legally bound to report on the progress towards the creation of the internal energy market on the basis of Article 47(6) of the Electricity Directive and Article 52(6) of the Gas Directive.

The purpose of the country reports (Part III) is to take stock, in quantitative terms, of the state of the market in terms of energy mix, the renewables target, the development of trade, wholesale and retail markets, consumers' rights and empowerment and, finally, infrastructure in each Member State. As far as the implementation of the Third energy package is concerned, the document assesses the status of notification by Member States of transposition measures by 1 October 2012. Part IV provides an overview of all infringement cases, including information as to whether they are pending or closed. The Commission is conducting compliance checks on all notified transposition measures. The reports also contain, for each Member State, the action points that are most urgent, in the Commission's view and also in line with the Council recommendations on the National Reform Programmes 2012[1].

The bulk of the information provided in the country reports is based on the national monitoring reports as submitted by the national regulatory authorities in the second half of 2011, monitoring the year 2010. Data on renewables, energy mixes and energy import and export volumes are mostly based on Eurostat data, and also refer to 2010. Where possible and appropriate, more recent data have been taken into account. Annual average wholesale prices and traded volumes of electricity and gas refer to 2011 and are derived either from commercial data providers or from the national regulators. Electricity and gas retail prices and a breakdown of price bewteen energy costs, network costs and taxes are also taken from Eurostat and refer to year 2011. Data in the 'Key indicators' table are derived from Eurostat, the European Energy regulators database, the national regulators and ACER, backed up by own estimations.

2. MAIN MESSAGES

Message 1: increasing share of RES and energy savings achieved

While crude oil and petroleum products still dominated energy consumption in 2010 in the EU, their share continued to fall between 2009 and 2010. Over the same period, the share of nuclear and solid fuels was stable, while that of natural gas and renewables increased. Renewables accounted for 12.5% of the EU's energy consumption in 2010, an increase of four percentage points in five years[2].

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1 http://ec.europa.eu/europe2020/making-it-happen/country-specific-recommendations/index_en.htm

2 Share of renewables in gross final consumption (indicator used for the 2020 target of 20%). The share of renewables in gross inland consumption (energy mix) was 10% in 2010.

The production of crude oil and petroleum products in the EU also declined in 2010, continuing the trend of recent years. While the production of solid fuels declined slightly, that of natural gas and nuclear energy posted moderate increases. Production of renewables grew by 12% in 2010 alone.

In power generation, only oil experienced negative growth between 2009 and 2010, while renewables registered the highest rate of growth (13%), with solar power generation registering particularly high growth (63%). Positive growth in both renewables and nuclear power generation led to almost half of the EU's electricity being produced from low carbon sources in 2010 (21% and 27% respectively).

In addition, there was evidence of energy savings achieved in the EU in 2010, and in particular energy saving measures that contributed to lower electricity consumption, mainly by industry.

Message 2: slight fall in import dependency and falling LNG imports

Between 2009 and 2010, overall energy import dependency in the EU fell slightly, due to falling import dependency registered in solid fuels and natural gas. The EU's import dependency had also fallen between 2008 and 2009, due to falling import dependency of both crude oil and solid fuels. The EU's overall energy import dependency in 2010 was 52.7%, compared to the historic high of 54.6% recorded in 2008.

Falling import dependency of solid fuels and crude oil in 2009 can be explained in terms of both falling net imports as well as falling consumption at a time of economic recession.

Falling import dependency in natural gas in 2010 occurred despite both rising net imports and consumption; this was mainly due to big reductions in gas storage levels to meet steep increases in demand during the fourth quarter of 2010. In the case of solid fuels, substantial storage withdrawals were also made to meet the much higher demand. Thus, the fact that a large proportion of the - largely unexpected - increases in demand in both solid fuels and natural gas in 2010 were met by domestically stocked resources explains the falling dependency on imports in these two energy sources.

However, between 2010 and 2011, this was followed by a fall in natural gas consumption, which registered its lowest level since 2000. Alongside this fall in consumption, there was also evidence of falling imports in natural gas in 2011. In particular, LNG imports fell heavily (-26%) in the second half of 2011, relative to the first half of the year, in contrast to rising import levels between the 1st and 2nd half of the previous year.

Having risen to represent an important share of natural gas imports by 2011 (20%), a fall in LNG imports occurred, together with a continuing rise in the difference between the superior prices paid for LNG deliveries to Japan and Asia relative to LNG prices in the EU. Parallel to this growing premium, there were significant increases in demand for LNG from Japan, following the Fukushima nuclear outages earlier in the year due to the Tsunami.

Together with the growing domestic production of shale gas in the US, events in Japan have therefore contributed - in a relatively short period of time - to a shift from the EU being primarily in competition with the US for LNG supplies, to competing with Asia.

Message 3: increased gas-to-gas competition alongside increases in oil-indexed gas prices

Another key issue in the EU gas markets in 2011 was the continued increases in oil-indexed prices of Long Term Contracts (LTC) for gas. Relative to stable traded spot prices, this signified a reversal in the narrowing of the gap between the two pricing mechanisms in 2010.

This renewed divergence in gas price contracts coincided with reports of pressure being put by importers on gas producers to reflect movements of hub-traded gas prices in their LTC contracts. If the price of gas purchased via LTC contracts were to continue to exceed the price of spot gas in the EU in the future, it would continue to give cause for concern on the part of European utilities who would have to buy gas under long term, oil-indexed contracts, while being pressured by their own customers to sell at lower spot levels.

Competitive prices of traded gas provided a boost to spot traded volumes in continental EU, which registered a significant, double digit (27%) increase between 2010 and 2011. They also contributed to a significant fall in the share of oil-indexed gas contracts in 2010 in Europe (accounting for 68% of natural gas consumption in 2009, down to 59% in 2010), as the proportion of spot purchased gas increased significantly (from 27% of natural gas consumption in 2009 to 37% in 2010).

In 2010 and 2011 there were therefore further signs of the continued emergence of true gas-to-gas competition, whereby the price of gas is ultimately determined by gas market fundamentals and by the interplay of gas supply and demand, traded over a variety of different periods, rather than by oil and oil product markets.

Message 4: increasing liquidity & higher integration of EU power markets

While traded volumes of power in the EU have not grown to the same extent as traded volumes of gas in recent years, power market liquidity[3] has increased almost continuously between 2005 and 2011. Increasing market liquidity is indispensable for the proper functioning of a wholesale market and for the formation of competitive prices, thereby ensuring welfare benefits for consumers.

The increasing role of wholesale power trading markets in Europe has meant that electricity prices are increasingly being determined by the relationship of demand and supply in the market.

In the process of integrating wholesale electricity markets among neighbouring countries, market coupling is playing an increasingly important role in the EU. Market coupling allows players to trade directly between markets by benefiting automatically from cross-border capacities, without having explicitly acquired the required transmission capacity in individual markets. Market coupling has been spreading steadily from the North-West of the EU to other regions, and there are currently 18 Member States which have such a system in place[4].

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[3] See definition under section 3.1

[4] Central Western Europe (Germany, France, the Netherlands, Belgium and Luxembourg); Nordpool (Sweden, Finland, Denmark, Estonia, Lithuania and Norway), Czech Republic/Slovakia/Hungary, Slovenia/Italy, Spain/Portugal, Poland/Sweden. Central Western Europe and Nordpool are also coupled.

In the Central West European (CWE) power markets, where market coupling took place in November 2010, a steep fall in adverse power flows (flows going from a high price area to a low price area) occurred in Q4 2010 and, from the first quarter of 2011, adverse flows became virtually non-existent in the region. Disappearing adverse flows and a high ratio of hourly converging prices within an observed time period both indicate a well-functioning, integrated wholesale power market.

The lack of market coupling prevents prices from acting as effective signals for the direction of power flows between markets. It should therefore be regarded as an effective, market-based, tool contributing to the achievement of a single European wholesale electricity market.

Better integration of European wholesale power markets, which has enabled more convergent wholesale power prices, could be a factor explaining why power prices did not follow the sharp increase in fossil fuel prices in the last couple of years. This achievement also underlines the importance of European-level electricity market policy and the need to fully implement the successive energy packages.

Message 5: competition in place, but room for improvements. Switching rates still too low

Gas

Between 2009 and 2010, the number of operators on the transmission and distribution grid of the gas system in most Member States remained stable. By 2010, there were more than ten gas supplying companies in the majority of Member States.

As regards the number of gas importers, less than half of the Member States had more than ten gas importing companies. Furthermore, the market share of the largest gas importers exceeded 50% in 14 out of the 20 Member States for which information was available (and over 80% in five Member States). On the gas retail side, while all but six Member States had ten or more companies supplying natural gas to final consumers, the market share of the largest retailer exceeded 50% in 13 Member States (and it even exceeded 80% in eight Member States).

The available data show that switching rates continued to be low across all categories of consumers in 2010, with few exceptions (such as the UK and Italy). In addition, switching rates continue to be typically the lowest in the small industry and household category.

Power

In power markets, concentration in power generation continues to be high in most Member States, while the total number of power generation companies present in the market reached a three-digit to four-digit figure in a few Member States. The market share of the largest generators is however larger than 50% in 11 Member States (and larger than 80% in six Member States).

There were 18 Member States in the power retail markets which had more than 20 electricity suppliers, while there were three or more main electricity suppliers in 20 Member States (i.e. selling more than 5% of the total national electricity consumption).

By 2010, most of the EU Member States had only one TSO, while six Member States had two or more. In addition, ownership unbundling had occurred in about half of the EU Member States.

As for the gas sector, switching between power suppliers in 2010 remained low, and was more apparent among medium to large size industrial consumers. In the case of household consumers, the ratio of households that switched suppliers was low in all Member States of the EU.

In both the gas and the power markets, the data on switching rates therefore seem to suggest that the issue of cost-effectiveness is still a cause for concern, mainly among industrial customers. Lack of knowledge about the potential for switching also still seems to prevail among household consumers.

Message 6: retail prices on the increase, with little convergence between Member States

Gas

Both EU households and industries experienced average increases in excess of 10% in gas retail prices in 2011 relative to 2010.

Comparisons between the retail prices for gas across the EU in 2010 reveal significant differences between Member States, with the price paid in the most expensive Member State representing several times the price paid in the cheapest. In addition, the difference is greater for households than for businesses, while the gap in the case of households has actually been widening in recent years.

However, retail prices in some Member States are artificially low. Indeed, some Member States continue to regulate the retail prices of natural gas for groups of industrial and household consumers.

Power

With some exceptions, there were increases in retail power prices for both households and industrial customers throughout the EU in 2011, although on average by slightly lower than for gas retail prices.

As with gas retail prices, major differences persist between prices in different EU Member States, with no significant change being observed in the case of household prices in recent years.

Variations in retail prices between Member States can be explained by differences in network costs and taxation, as the latter fall within the remit of the national legislations in each Member State. In addition, the practice of indexing retail electricity price to fossil fuel prices still exists in some countries, which prevents falls in wholesale prices from being reflected in retail prices.

PART II: OVERVIEW OF ENERGY MARKETS IN THE EUROPEAN UNION

1. ENERGY POSITION OF THE EU

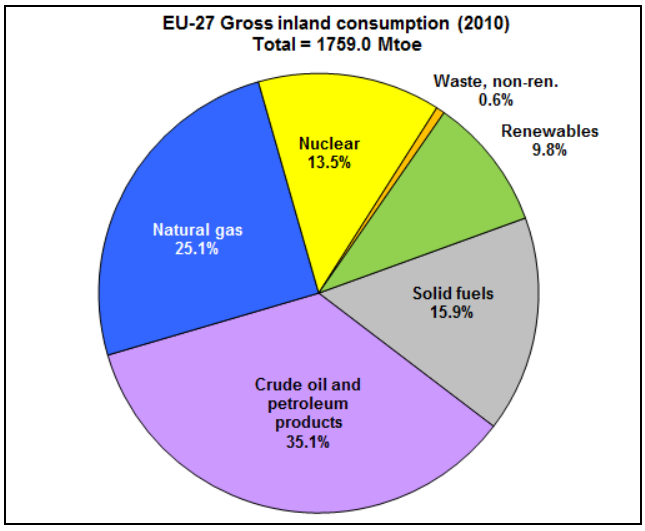
1.1. EU ENERGY CONSUMPTION

1.1.1. Gross inland consumption (energy mix)

Gross inland consumption increased by 3.3% in 2010, compared to 2009. Crude oil and petroleum products continued to dominate the energy mix, although their share dropped from 36.6% in 2009 to 35% in 2010 as a result of a fall in consumption (from 623 Mtoe to 617 Mtoe). By 2030, this share is likely to drop further to 32%[5].

As far as natural gas is concerned, an increase in consumption was observed, in both relative and absolute terms, between 2009 and 2010. The share rose from 24.5% to 25.1% and the quantity consumed rose from 417 Mtoe to 442 Mtoe. Nuclear energy maintained the same share (13.5%), but increased from 231 Mtoe to 237 Mtoe overall. Similarly, there was also an increase (by 12 Mtoe to 280 Mtoe) in the quantity of solid fuels consumed, although maintaining the same percentage share (16%). In comparison, solid fuels accounted for 27% of gross inland consumption in 1990. This could indicate a shift from CO2-intensive solid fuels to other, less-CO2-intensive energy sources, thereby contributing to the objective of a less CO2-intensive economy.

Figure 1: EU-27, Gross inland consumption (in %) (2010) Total = 1759.0 Mtoe



Source: Eurostat

One such energy source is renewables, the consumption of which increased by 12.6% from 2009 to 2010, to reach 172 Mtoe. This represents a continuation of the rising consumption of

[5] According to the PRIMES baseline scenario.

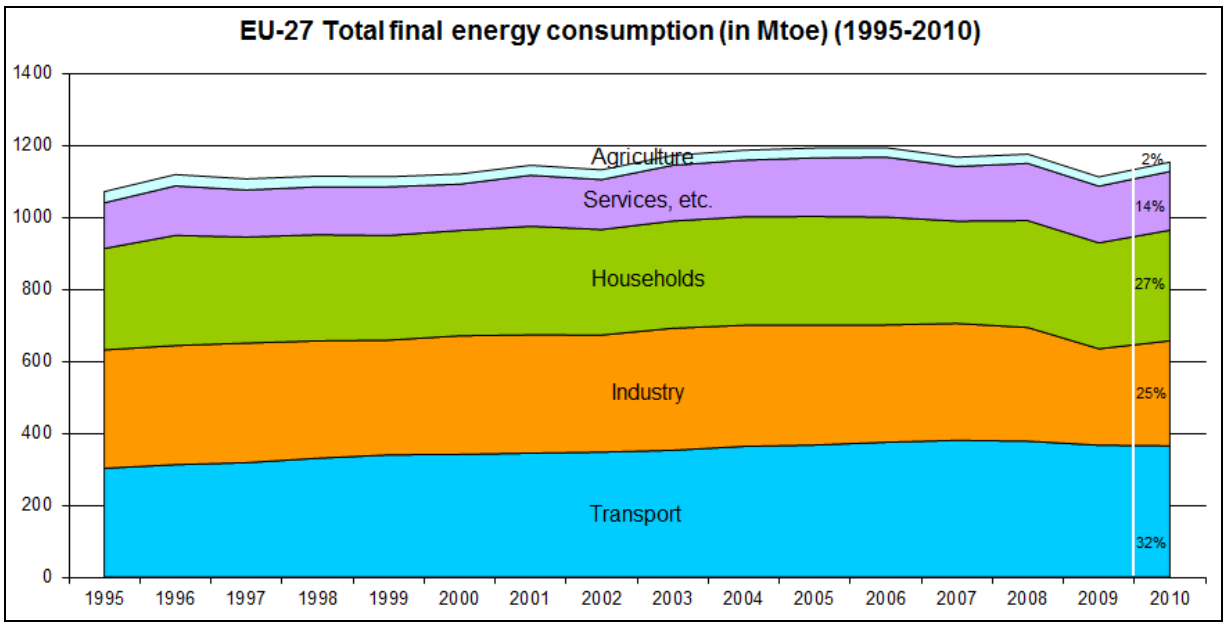
renewables that has been experienced in recent years, which is itself a consequence of the policy of greening the energy mix. This growing trend is projected to continue in the future.

Overall, the share of fossil fuels was down from its 2009 level by 0.7 of a percentage point to 76.1%. In absolute terms this amounted to 31 Mtoe less consumption of fossil fuels.

1.1.2. Uses of energy sources by sectors

As in previous years, transport continued to be the largest consumer of energy in 2010, followed by households and industry. However, compared to 2009, the share of transport was down by 1 percentage point.

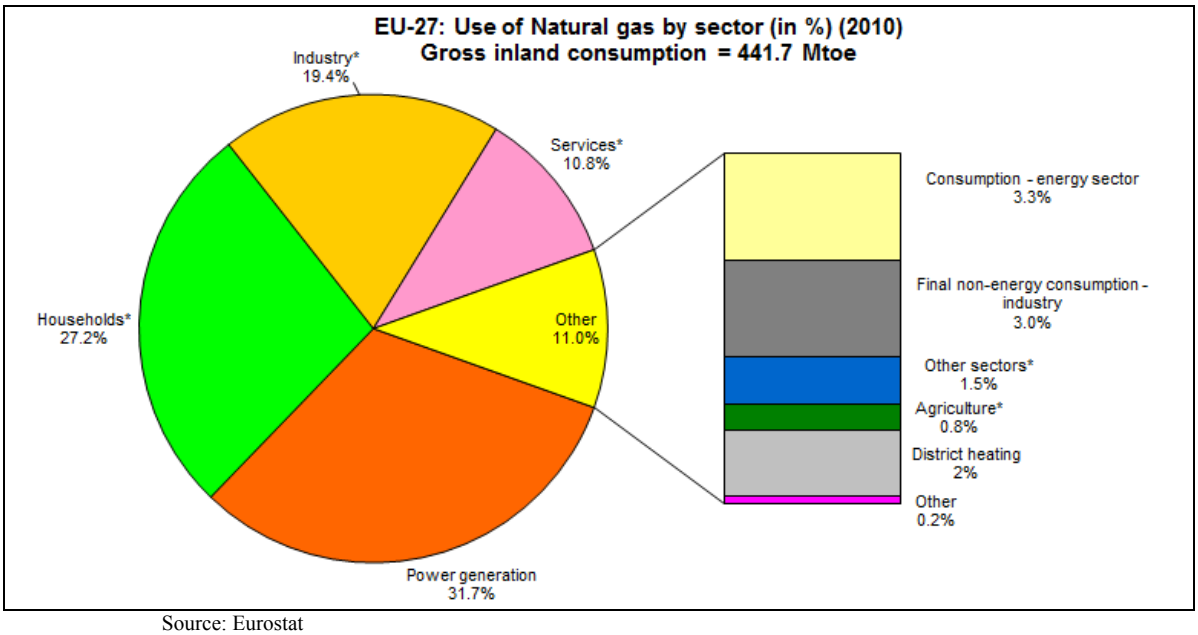
Figure 2: EU-27, Total final energy consumption (in Mtoe) (1995-2010) and final energy consumption by sector (in %) (2010) Total = 1153.2 Mtoe



Source: Eurostat

As far as the consumption of energy sources in different sectors was concerned, natural gas was mostly used for power generation and in households. The percentages were at similar levels to those of 2009. However, absolute values were up in all categories. Consequently, the total gross inland consumption of natural gas in 2010 was 6% higher than the previous year.

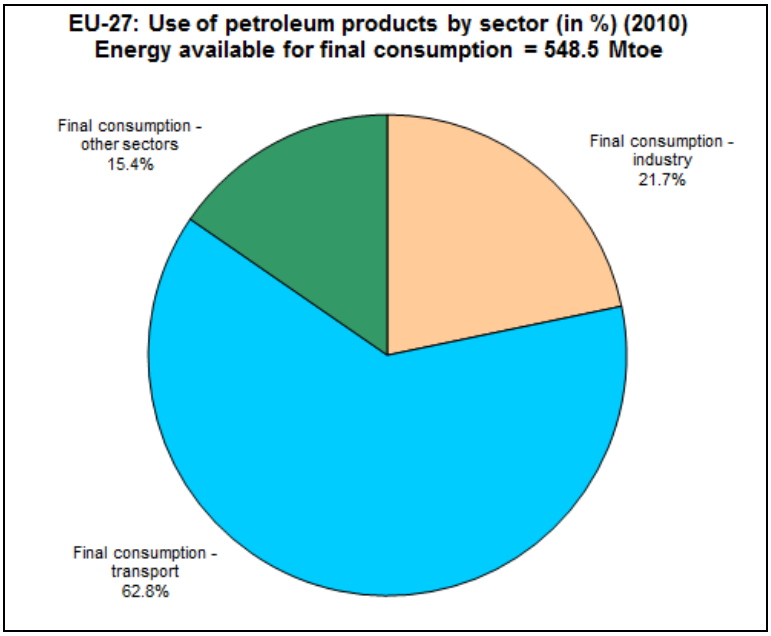
Figure 3: EU-27, Use of natural gas by sector (in %) (2010) Total = 441.7 Mtoe



Source: Eurostat
Note: * final energy consumption

In the area of petroleum products, transport was responsible for almost two thirds of final consumption in 2010. Petroleum products were also used in power plants, but to a much lesser extent than natural gas (20 Mtoe vs. 139 Mtoe).

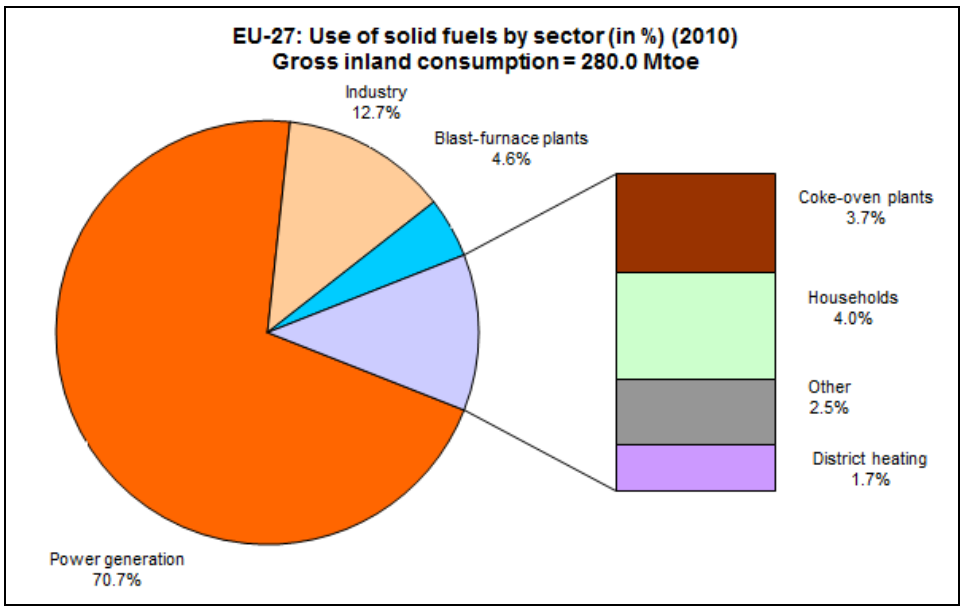
Figure 4: EU-27, Use of petroleum products by sector (in %) (2010) Energy available for final consumption = 548.5 Mtoe



Source: Eurostat

Unlike petroleum products, solid fuels and nuclear are predominantly used for power generation.

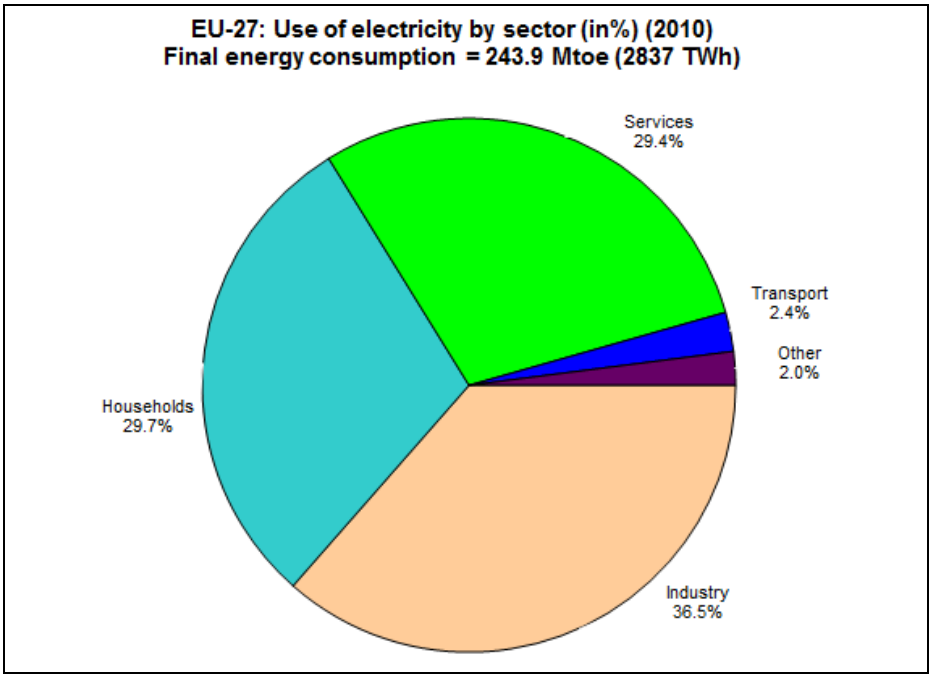
Figure 5: EU-27, Use of solid fuels by sector (in %) (2010) Gross inland consumption = 280.0 Mtoe



Source: Eurostat

Turning now to electricity consumption, industry continued to be the largest consumer. Household consumption increased by 21 TWh (surpassing the quantity consumed in 2008 by 27 TWh)., Consumption was higher in the services sector than in 2008 and 2009 (by 43 TWh and 37 TWh respectively), whereas in the other sectors it was still below 2008 levels. Total final consumption of electricity was lower than in 2008 (by 1%), but higher than in 2009 (by 4.6%).

Figure 6: EU-27, final use of electricity by sector (in %) (2010)
Final electricity consumption = 243.9 Mtoe



Source: Eurostat

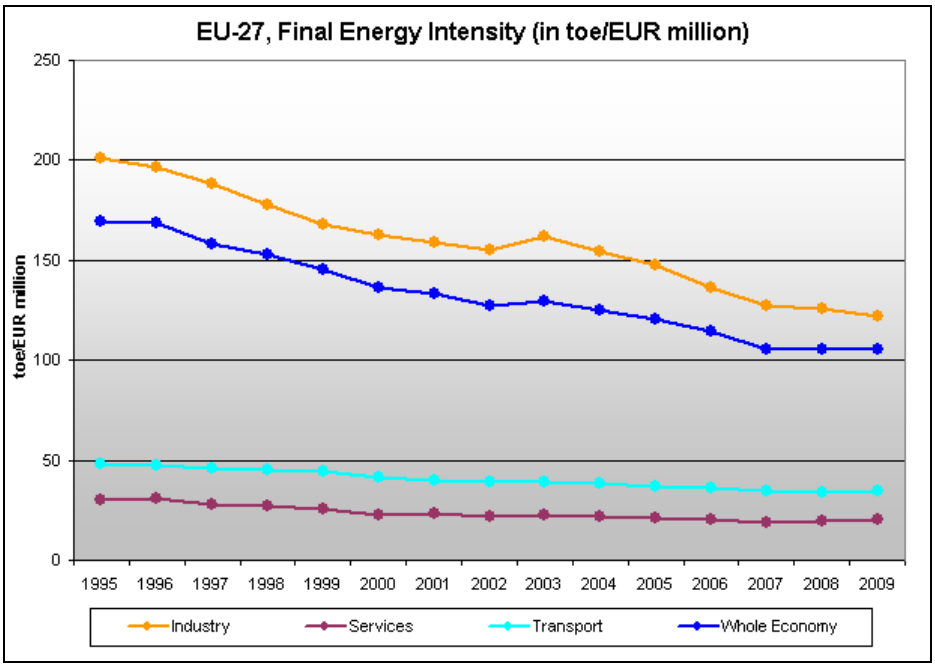
1.1.3. Energy intensity

Energy intensity is a measure of how much energy is used to produce a unit of economic output. Final energy intensity measures the energy efficiency of the economy against final energy consumption, i.e. the amount of energy finally available to different sectors after conversion of energy sources. The chart below shows that final energy intensity has been decreasing over time, although in 2009 it increased slightly for the economy as a whole, as a result of increases in transport and services. Nevertheless, the energy intensity of industry continued to decline in 2009.

According to information provided by the Member States in their second National Energy Efficiency Action Plans, total final energy savings in the EU reached 60 Mtoe in 2010. This number can be broken down as follows: electricity savings (20%), thermal energy savings (58%) and transport energy savings (22%).

This means that, without energy saving measures in the energy end-use sector, the consumption of electricity itself in the EU-27 in 2010 would have been higher by some 10-12 Mtoe, mainly consumed by industry.

Figure 7: EU-27, Final energy intensity (in toe/EUR million) (1995-2009)



Source: Eurostat

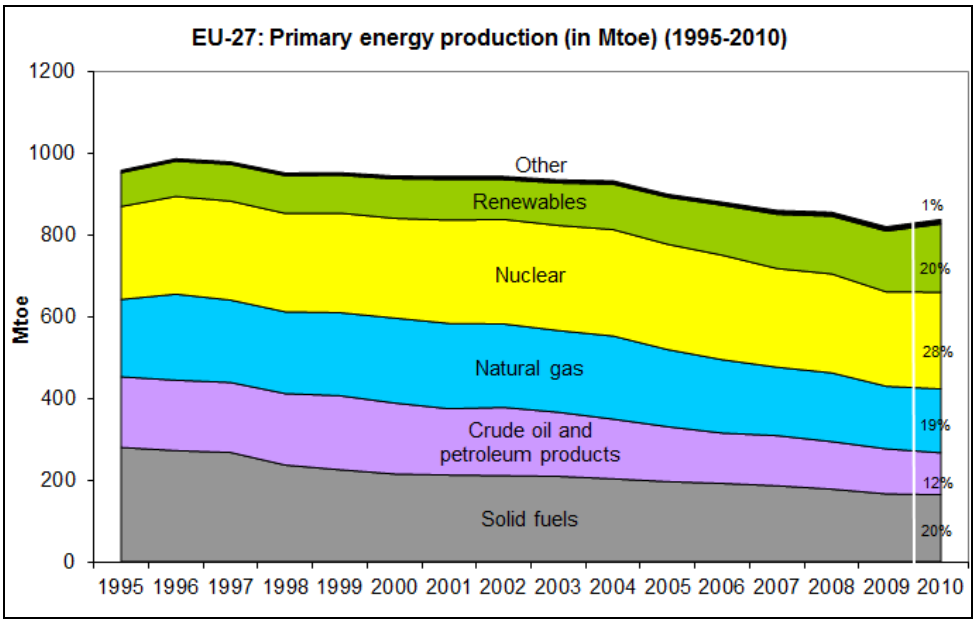
1.2.

1.3. EU ENERGY SUPPLY

1.3.1. EU primary energy production

After years of decline, EU energy production picked up again in 2010, albeit to a level lower than in 2008 (837 Mtoe vs. 855 Mtoe). The decrease of recent years is primarily due to lower levels of fossil fuel production.

Figure 8: EU-27, primary energy production (in Mtoe) (1995-2010)



Source: Eurostat

Renewables production grew by 12% between 2009 and 2010. During the same period, moderate increases were recorded in the production of natural gas (2%) and nuclear energy (2.5%), while the production of crude oil and petroleum as well as solid fuels both fell (by 7% and 1% respectively). These growth rates indicate the ongoing transition towards a low-carbon economy.

Although the production of natural gas remained stable in 2010, the declining trend from the earlier years is projected to continue. Between 1995 and 2010 the decrease reached 18%. The biggest producers in the EU are the Netherlands and United Kingdom. In 2010 their shares in total EU natural gas production were 41% and 33% respectively. Germany, the third largest producer, had a share of 6%.

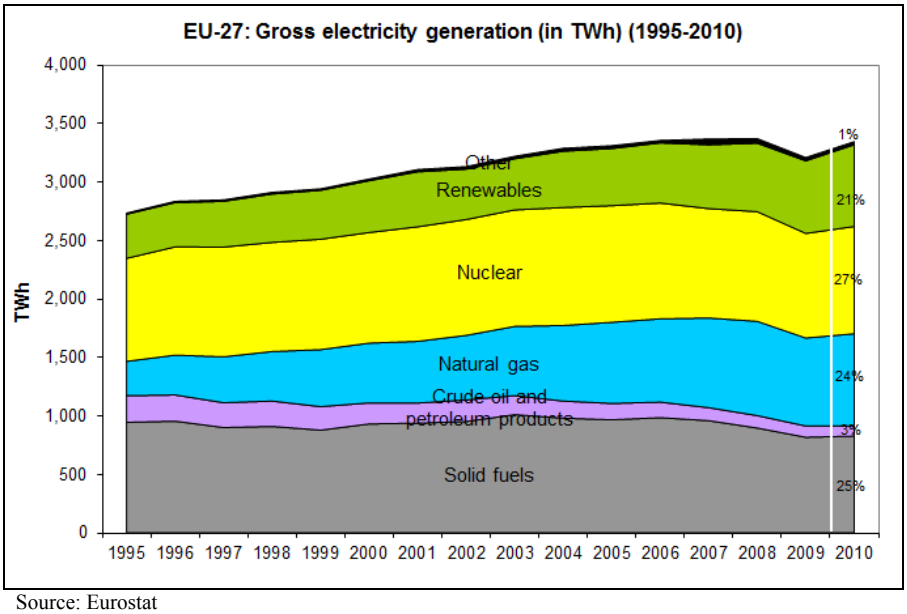
The production of oil decreased at an even faster rate, i.e: by 40%, between 1995 and 2010. The United Kingdom is by far the largest producer of crude oil in the EU, with a 67% share of total EU oil production in 2010. Denmark is the EU's second largest producer, with a share of 14% of total EU production.

1.3.2. EU electricity generation

Total gross electricity generation in 2010 was 3,346 TWh, i.e. 4% higher than in 2009 when it contracted due to the economic slowdown. Prior to the crisis, electricity generation had been growing steadily. It then fell in 2009 to its 2003 level. However, as the chart shows, the changes after the crisis were visibly different from one type of fuel to another.

Renewables experienced the highest rate of growth, up by 13% between 2009 and 2010. The most important source remains hydro power, representing more than half of green electricity, followed by wind (21% of green generation). Solar power grew by 63% between 2009 and 2010.

Figure 9: EU-27, Gross electricity generation (in TWh) (1995-2010)



Source: Eurostat

Nuclear energy became the most important source of power production in 2008, and remained so in 2010. Due to variations in electricity production, it had often alternated with solid fuels in the past. As an example, the PRIMES baseline scenario projections reveal that solid fuels could once again contribute to the largest amount of electricity produced by 2020 due to a decrease in installed nuclear capacities. However, with new capacities installed by 2030, nuclear power could once again play a major role.

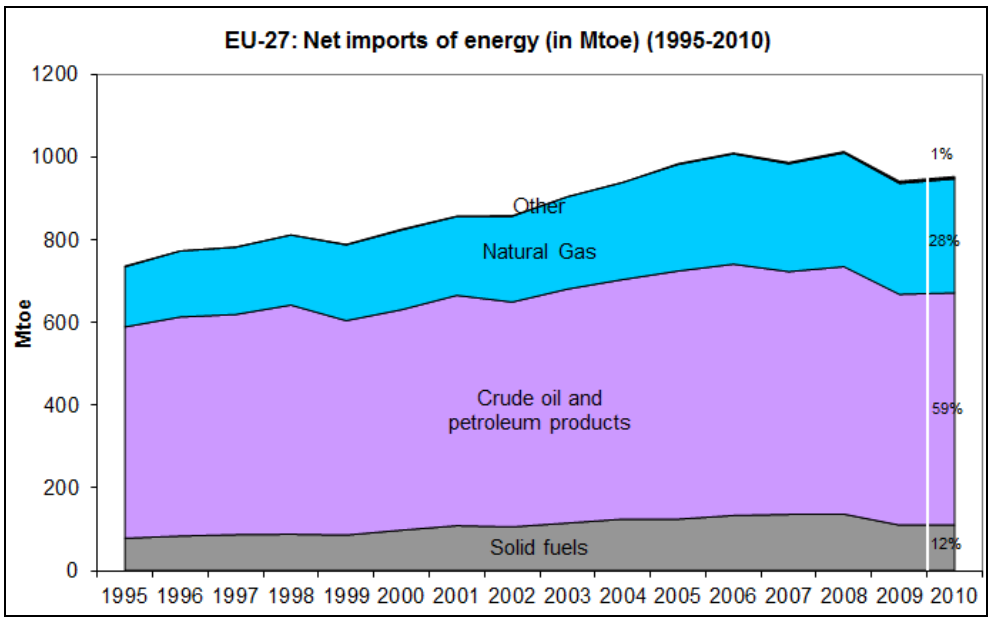
The importance of natural gas has been rapidly increasing since 1995,. This is due to the significantly greater importance of gas in some Member States to provide the necessary back-up supply for variable generation from renewables. During the observation period, its use in electricity generation more than doubled. Oil, on the other hand, continued to register a negative trend, and is likely to become even more marginal in the future. Cyprus and Malta, due to their geographical location, are the only two Member States which rely almost entirely on this source of electricity production.

Almost half of the EU's electricity was produced from CO_2-neutral sources (renewables and nuclear). When natural gas is added, this covers more than two thirds of generated electricity. Compared to 1995, these shares were 46% and 57% respectively[6].

1.3.3. EU energy imports

Following a rise in 2008, energy imports fell sharply in 2009: by 7% to 941 Mtoe, which was close to the 2004 level. The decrease is in line with lower energy consumption and electricity generation during the economic recession. With recovering economic activity, net imports increased in 2010, but by only1%.

Figure 10: EU-27, Net imports of energy (in Mtoe) (1995-2010)

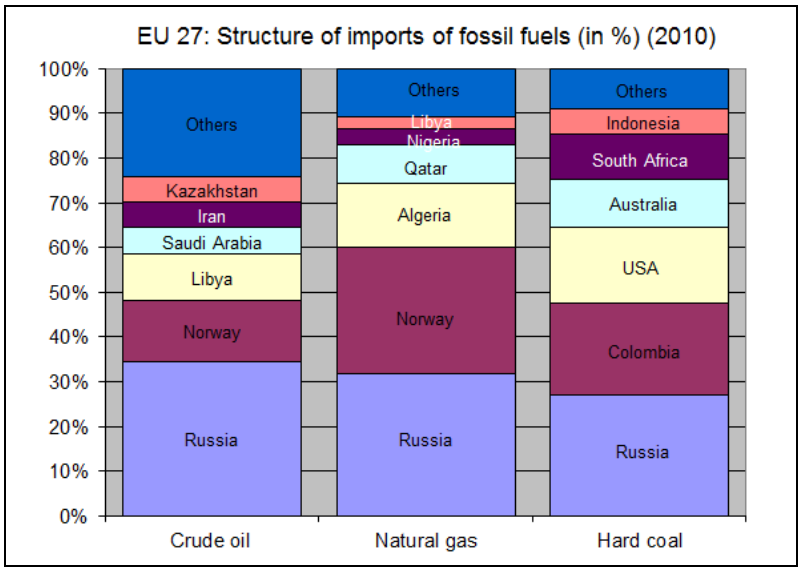


Source: Eurostat

In the category of solid fuels, hard coal experienced the largest decrease – 18% in 2009. It posted a further slight fall the year after, which was not the case for other categories, where net imports increased in 2010. 59% of total energy imports consisted of crude oil and petroleum products in 2010. Renewables again registered the biggest annual increase (28%), although their share in total imports was very low, given that the EU relies mostly on indigenous renewable sources (see the box on renewables for more details). Fossil fuels account for 99% of EU energy imports. Partner countries differ from fuel to fuel, although some of them are key partners in a number of fuel categories. In 2010, Russia was the main exporter of crude, natural gas and hard coal to the EU, while Norway was the second most important exporter of both crude oil and natural gas.

[6] Due to revisions of statistics, these numbers are not necessarily the same as presented in previous annual reports.

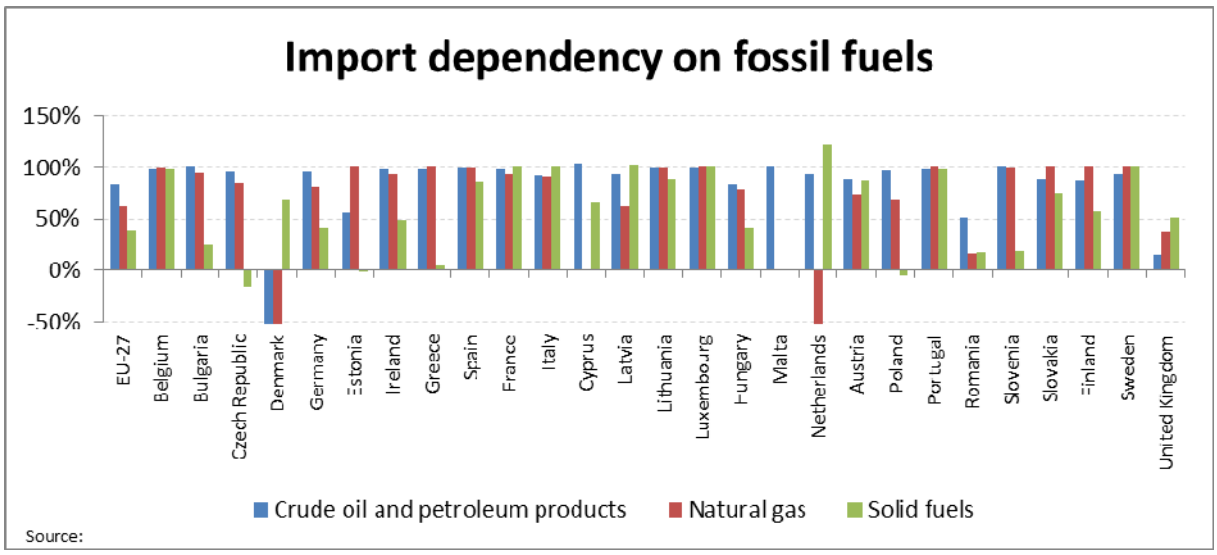
Figure 11: EU-27, Structure of imports of fossil fuels (in %) (2010)



Source: Eurostat

The list of the top six countries which exported hard coal in 2010 was the same as in 2009, although long-term developments have shown a changing picture. Since 1990, imports from Colombia, the second largest exporter of hard coal to the EU, have been increasing. Imports from South Africa, on the other hand, have been dropping, while in the case of the US, imports have started to pick up again after years of decline. The increased US exports of coal can be attributed to the growing production, and consumption, of unconventional gas. As far as South African exports are concerned, these are being redirected towards the Pacific basin, due to increasing demand from China and India. The same trends can be observed for Australian and Indonesian coal and, in the latter, growing domestic demand is having a large influence on the quantities available for exports.

Figure 12: Import dependency by fossil fuels and by MS (2010)



Source: Eurostat.
Note: Import dependency is defined as the ratio of net imports and the sum of gross inland consumption and bunkers. Negative numbers indicate that the country is a net exporter. Values over 100% are possible due to changes of stocks.

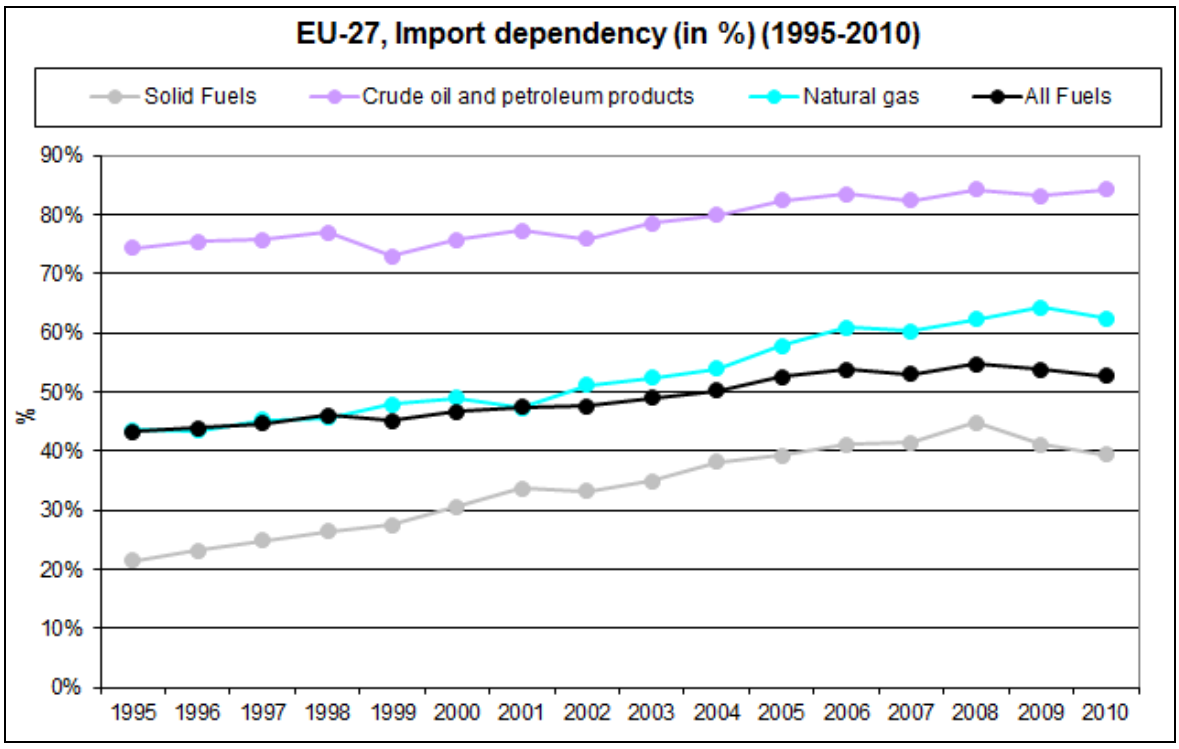
1.3.4. EU import dependency

The overall energy import dependency[7] of the EU fell slightly between 2009 and 2010, due to the falling import dependency registered in solid fuels and natural gas. The EU's import dependency had also fallen between 2008 and 2009, due to a drop in the import dependency of both crude oil and solid fuels. The overall energy import dependency of the EU in 2010 was 52.7%, compared to the historic high of 54.6% recorded in 2008.

Falling import dependency of solid fuels and crude oil in 2009 can be explained by both falling net imports and falling consumption, unlike in 2010 for the former, when falling import dependency occurred, although net imports remained stable as consumption increased.

Falling import dependency in natural gas in 2010 occurred in spite of both rising net imports and consumption; this was mainly due to major reductions in gas storage levels to meet high increases in demand during the fourth quarter of 2010. In the case of solid fuels, substantial storage withdrawals were also made to meet the much increased demand. Thus, the fact that a large proportion of the - largely unexpected - increases in demand in both solid fuels and natural gas in 2010 were met by domestically stocked resources explains the drop in import dependency in these two energy sources.

Figure 13: EU-27, Import dependency (in %) (1995-2010)



Source: Eurostat

The overall import dependency of the EU has grown at a lower rate in recent years. Although it increased by 3.5 percentage points between 1995 and 2000, and by 5.8 percentage points between 2000 and 2005, the increase in the period between 2005 and 2010 was only 0.2

[7] Import dependency is measured as the ratio of net imports to gross inland consumption plus international marine bunkers.

percentage points. The impact assessment of the Energy Roadmap 2050 indicates that EU's import dependency will not change significantly until 2030 (56.4% according to the reference scenario)[8].

The majority of the EU Member States are highly dependent on imports of oil and gas. In 2010, there were a few Member States with significant production that made a considerable contribution to the EU energy balance. Denmark and Netherlands were important net exporters of gas, while the United Kingdom and Romania were able to satisfy most of their needs through domestic production. Denmark was also a net exporter of crude oil and petroleum products, whereas the United Kingdom was close to being self-sufficient in oil and petroleum products.

[8] SEC(2011)1565 final p136

Box

1.4. EU-27 – RENEWABLE ENERGY SOURCES

RES consumption

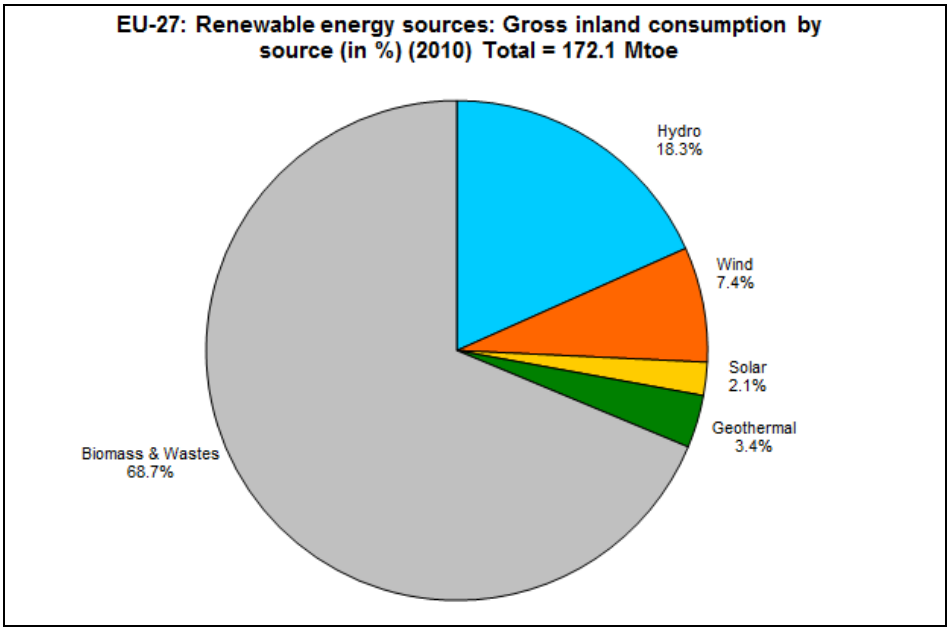
Gross inland consumption of renewable energy sources (RES) reached 172 Mtoe in 2010, representing an annual increase of 13%, while the share of RES in the EU's total gross final energy consumption accounted for 12.5% of the EU's energy consumption in 2010, compared to 8.5% in 2005[9].

Biomass has been by far the largest source of RES consumed in the EU. Consumption of biomass was up 13% in 2010, accounting for 69% of the total consumption of renewables. Most of this was used for power generation and in households.

Solar power was the renewable source with the highest growth in consumption, up by 48% to 3.7 Mtoe. This was mainly due to the big increase in photovoltaics, which saw consumption increase by 60% compared to 2009.

The use of wind power rose by 12%, while that of geothermal power increased only by 1.2%, although hydropower is still the second most important renewable source in the European energy mix.

Figure 14: EU-27, Renewable energy sources: Gross inland consumption by source (in %) (2010) Total = 172.1 Mtoe



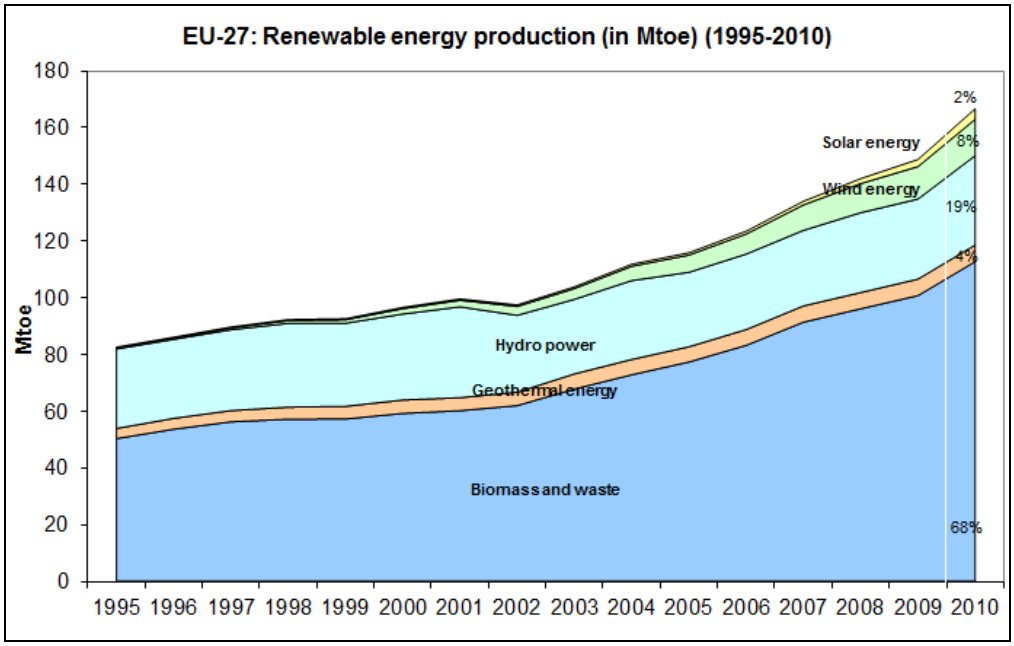
Source: Eurostat

[9] See definition in Directive 2009/28/EC- Article 2 f). The objective set in the Directive is to achieve a 20 % share of energy from renewable sources in the EU's gross final consumption of energy and a 10 % share of energy from renewable sources in each Member State's transport energy consumption by 2020.

RES production

In 2010, the production of renewables reached 167 Mtoe, representing a 12% increase compared to 2009 and a 100% increase compared to 1995. As production was lower than consumption, the difference was covered by imports. In 2010, half of the imports were solid biomass and the other half biofuels, primarily biodiesels.

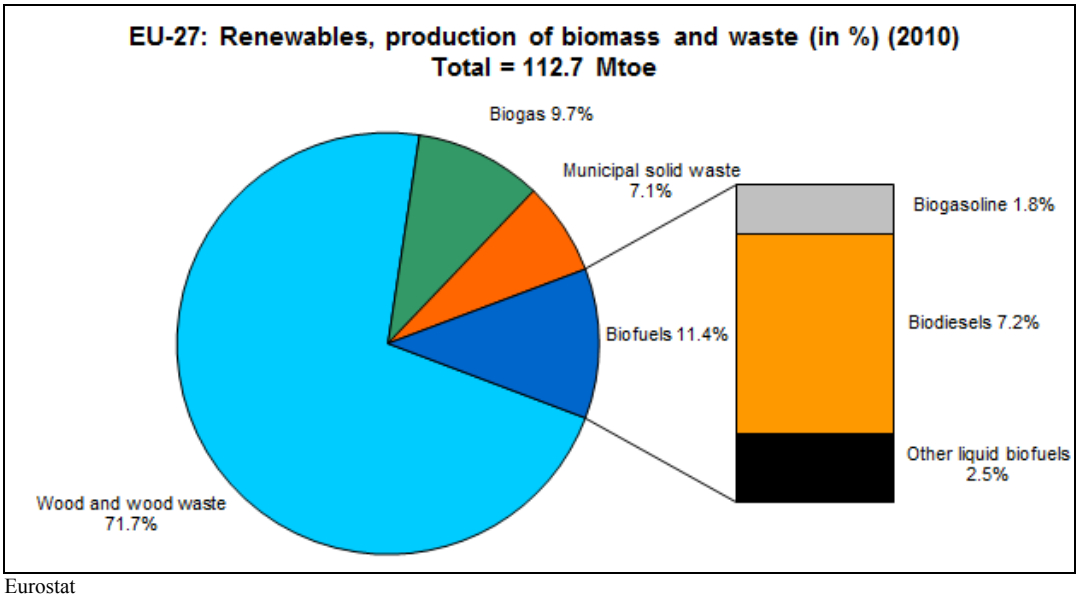
Figure 15: EU-27, Renewable energy production (in Mtoe) (1995-2010)



Source: Eurostat

Biomass and wastes have been the main driver behind the growth in renewable energy production. As figure 16 shows, solid biomass has the largest share. This is mainly due to its increased use in power generation.

Figure 16: EU-27, Renewables: Production of Biomass and Wastes (in Mtoe and %) (2010) Total=112.7 Mtoe



Source: Eurostat

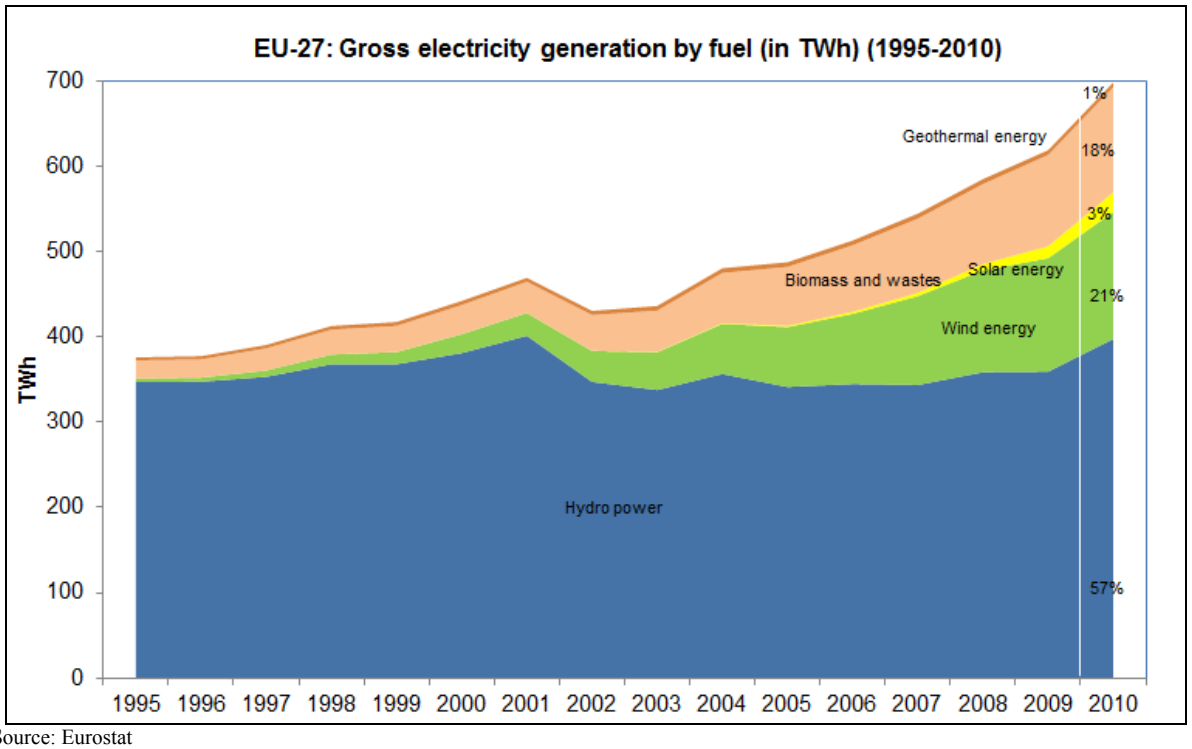
Wind and solar energy also grew strongly in recent years (see again figure 15). In 2010, the production of wind energy was up by 12% over the previous year, while solar energy grew by 48%. There are two categories of solar energy: solar thermal and solar photovoltaic. In 2000, the share of solar thermal accounted for 98% of the solar energy produced, while in 2010 photovoltaics had grown to represent 52% of solar energy produced.

Electricity from RES

Renewable energy sources are playing an ever increasing role in European electricity generation. In the period under review, their share increased from 14% in 1995 to 21% in 2010.

Contrary to the total gross inland consumption of RES, where biomass and wastes are the most important fuels, hydro power plays by far the most important role in electricity generation. Nevertheless, the importance of RES other than hydro has grown considerably. In 1995, they contributed only 8% of green electricity. By 2010, this had risen to 43%.

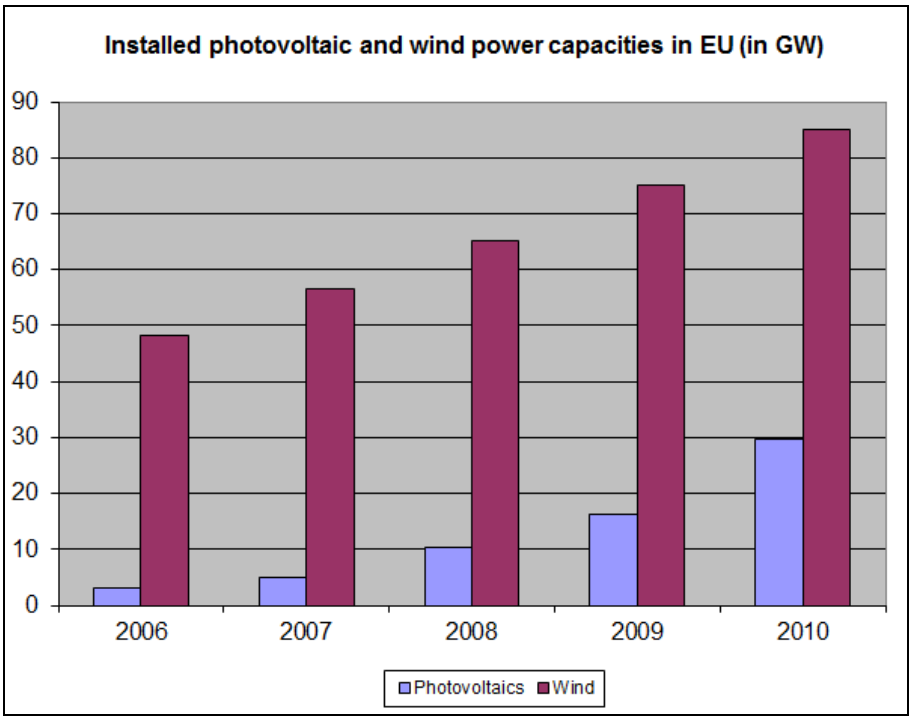
Figure 17: EU-27, Gross electricity generation (in TWh) (1995-2010)



Source: Eurostat

As figure 18 shows, between 2006 and 2010 the installed capacities of wind and photovoltaic power experienced a rapid growth. In 2010, the installed capacity of wind turbines was 75% higher than in 2006, representing an average annual growth of 15%. Installations of photovoltaic panels grew even more rapidly, ending at a level of capacity nine times higher than in 2006. The average annual growth rate was 75% within the observed period.

Figure 18: EU-27, Evolution of installed capacities for photovoltaics and wind (in GW)



Source: EurObserv'ER

Germany (27.2 GW) and Spain (20.8 GW) accounted for 56% of installed wind power capacity in 2010. In the case of photovoltaic power, Germany accounted for 59% (17.4 GW) of the EU's net maximum capacity.

2. MARKET DEVELOPMENTS IN THE EU GAS SECTOR

2011 was an eventful year for natural gas markets, marked by political unrest in the Middle East and the nuclear outages caused by the devastating tsunami in Japan. Markets were concerned about the implication of these events on the supply of gas. In the case of the former, the fear was the possibility of interruption of important gas pipelines, and in the latter case, the concern was the likely diversion of EU-bound LNG cargoes to Japan in order to compensate for the loss of nuclear energy in Fukushima and elsewhere in Japan.

Middle Eastern exports of gas were affected in the form of the complete shut-down of Libyan supplies to Europe. Only Italy – as the biggest importer of Libyan gas – was liable to be affected to any significant degree, although additional supplies from Russia to Italy ultimately made up for the shortfall. More importantly, disruptions in Tunisia did not affect transiting Algerian supplies to Europe, and unrest in Egypt did not cause blockages of the Suez Canal, which is a key LNG supply route.

Prices were only temporarily affected by fears that flexible LNG spot cargoes might be diverted to Japan. In the period following the outages, it quickly became evident that exports of LNG from Qatar could match the increasing demand from Japan in the short term, supported by diversions of LNG from other parts of Asia, without there being any immediate impact on European LNG imports. Markets were also reassured by signs of continued healthy supplies of natural gas in the EU in the second quarter of 2011, thereby keeping price rises. in check. The announcement in May that all nuclear capacity in Germany would be retired by 2022 also did not appear to have any lasting effect on day-ahead traded gas prices.

However, increases in the price of LNG deliveries sounded the first alarm bells in terms of the pressures likely to come from heightened Asian demand in the future. These price increases contributed to reducing the gap between day-ahead prices and prices of LNG deliveries to the EU, which have been low in recent times, partly as a result of ample gas supplies in the US.

Indeed, by the second half of 2011, marked falls in imports of LNG into the EU were observed. Overall, 26% less LNG was imported into the EU in the second half of 2011 compared to the first half of 2011, in contrast to a rise in imports between the first and second halves of the previous year

Another key issue in EU gas markets in 2011 was the continued increases in oil-indexed prices of Long Term Contracts (LTC) for gas. Relative to stable traded prices, this denoted a reversal in the narrowing of the gap between the two pricing mechanisms that had been observed in 2010. This meant that, by the end of 2011, the issue of renegotiating LTC gas contracts between suppliers and EU importers was still very firmly on the table.

The end of 2010/ beginning of 2011 was an important period for EU gas-related policy. In a Communication published in November 2010, the European Commission outlined the energy infrastructure priorities for 2020 and beyond, as well as the new approach envisaged for the EU support of energy infrastructure during the period 2014-2020.

The Commission's proposals seek to address a number of issues with regard to the integration and development of the EU's gas infrastructure, in particular the absence of interconnections between the national and regional gas markets, the need for more LNG terminals and storage facilities for security of supply, sustainability and system resilience, and the need to push ahead with the diversification of sources, routes and suppliers. Planned investment in new gas transmission and import pipelines, storages and LNG terminals are likely to be of the order of EUR 70 billion by 2020[10].

In addition, an important new regulation on the Security of Gas Supply entered into force on the 2nd of December 2010. It calls on Member States and gas companies to be fully prepared in the event of disruption of supply, by putting in place clear and effective emergency plans involving all stakeholders and fully incorporating the EU dimension of any significant disruption in a spirit of solidarity. In addition, Member States and gas companies are encouraged to coordinate their preventive actions and emergency plans at regional and European levels, while companies will need to be able to deliver gas for at least 30 days of average demand, as well as in the case of an infrastructure disruption under normal winter conditions. The regulation should enable the EU to cope more effectively in the event of disruption of gas imports by fostering a more coordinated approach, in order to guarantee a stable and secure energy supply to citizens across the EU.

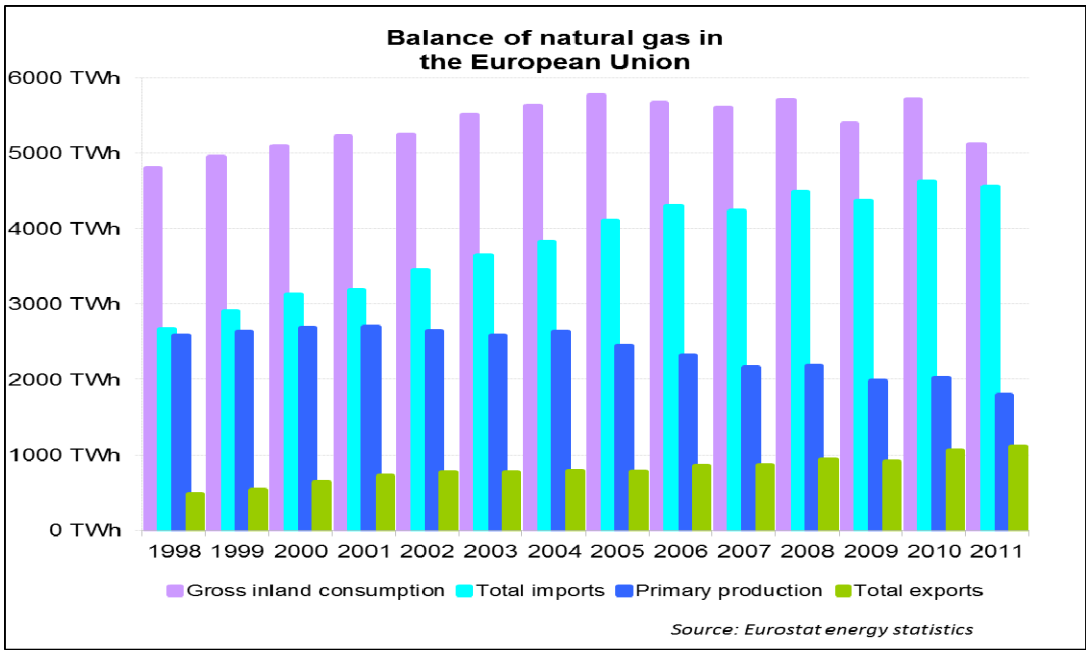
2.1. Wholesale markets

Continuing the trend which began in the first quarter of 2011, natural gas consumption in the EU in the 4th quarter 2011 fell year-on-year, contributing to a full year 2011 level of gas consumption for the EU which was less than any of the years since the effects of the crisis were observed (2009+), and even registering the lowest level since 2000.

By the fourth quarter of 2011, falling imports of natural gas were also observed along with falling consumption. This is in contrast to trends observed in the three previous quarters of the year, when there was positive year-on-year growth in imports. This contributed to a marginal decrease in imports of natural gas between 2010 and 2011, although 2011 levels of imports were higher than in 2009 and even 2008.

[10] Reference to the SWD on Investment projects in energy infrastructure

Figure 19. Balance of natural gas in the European Union



Falls in consumption and imports of natural gas occurred alongside a prolonged period of sluggish economic growth[11]. By Q1, EU GDP growth in 2012 hit its lowest level since the fourth quarter of 2009 – when the EU economy was in recession.

The mild weather conditions across the continent in Q4 2011 contributed to the relatively low demand for gas for heating. As a result, withdrawals from underground storages started much later than usual during the winter season. Storage levels proved to be an important factor in bringing the much needed flexibility during the cold snap which occurred in February 2012.

As far as EU domestic production of natural gas is concerned, a continued decline was observed in 2011, with the rate of fall since the year of peak production (2001) to 2011 amounting to 34%, significantly exceeding the reduction of gross inland consumption (of 19%) during the same period.

According to *Eurostat* data, gas imports into the EU totaled 4,621 TWh in 2010, with the most important trading partners being the Russian Federation (32%), Norway (28%) and Algeria (14%). The combined share of Nigeria, Libya, Qatar, Egypt and Trinidad & Tobago was less than 18%.

The EU's dependency on natural gas imports[12] increased from 48% in 2000 to 58% in 2005, to 62% in 2010. As the first section of Table 1 shows, European Member States - except for Denmark, the Netherlands and to a lesser extent also Romania and the United Kingdom - tended to rely on imports as their major source of gross inland consumption.

[11] See also section 1.2.4. Throughout 2011 the EU GDP growth rate was steadily decelerating, with every quarter recording annual growth lower than the previous quarter.

[12] Import dependency is defined as the ratio of net imports over the sum of gross inland consumption and bunkers. The EU import dependency is net of intra EU trade; calculated at national level however, it includes the intra EU trade.

Table 1.* Gas *Security of Supply -2010

	Gross Inland Consumption (1)	National Production (2)	Transit quantitiy	Peak (3)	Maximal tech availability Pipeline importing capacity	Peak hourly import gas flow
	TWh/yr	TWh/yr	TWh/yr	TWh/day	TWh/h	TWh/h
Belgium	197.24		240.00	1.10	0.19	0.081
Bulgaria	26.07		N/A	0.14	0.03	0.005
Czech Republic	93.26	1.94	338.00	0.60		0.031
Denmark	51.45	85.41	N/A	0.26		N/A
Germany	853.71	112.74	287.70	N/A		N/A
Estonia	6.54		0.00	0.05	N/A	
Ireland	54.61	3.68		N/A		N/A
Greece	37.61	0.08		N/A		N/A
Spain	362.71	0.60	22.40	1.85	0.02	0.070
France	494.74	7.51	53.70	3.28	0.09	
Italy	791.50	80.07	3.68	4.90	0.13	0.110
Cyprus						
Latvia	17.00			N/A		
Lithuania	28.98		12.90	0.19	0.01	0.009
Luxembourg	13.92		N/A	0.07	0.01	0.003
Hungary	114.15	25.99	41.35	0.69	0.04	0.014
Malta						
Netherlands	457.16	738.90		2.50	N/A	0.038
Austria	95.53	17.28	336.98	0.54	0.08	0.075
Poland	148.92	42.95	284.60	0.75	N/A	0.015
Portugal	52.20		0.00	0.22	0.01	0.005
Romania	125.47	100.23	155.50	N/A	0.02	N/A
Slovenia	10.03	0.07	10.52	0.06	N/A	0.003
Slovak Republic	58.22	1.03	686.40	0.35	0.15	0.110
Finland	44.63		N/A	0.21	0.01	0.008
Sweden	15.27		0.00	N/A	N/A	N/A
United Kingdom*(4)	994.40	598.57	413.09	4.86	2.72	N/A

Sources: National Regulators data, Eurostat, * DECC (UK)

Notes:

(1) Gross Inland Consumption = Production + Imports - Exports + Storage variations

(2) All dry marketable production within national boundaries, including offshore production. Production is measured after purification and extraction of NGLs and sulphur. Excludes extraction losses and quantities reinjected, vented or flared.

(3) Maximum quantity of gas consumed in a day during the year

(4) UK numbers include Great Britain only as gas demand from Northern Ireland and the Republic of Ireland is not possible to differentiate

In the second section of Table 1, it can be seen that peak daily consumption was higher than the maximal technical availability of the capacity of the importing pipeline or the peak daily import flow in Member States such as Spain, France, Italy and Poland,. In these Member States, gas storages and market based measures, such as interruptible consumption and cross border swaps, play an important part in balancing the gas system.

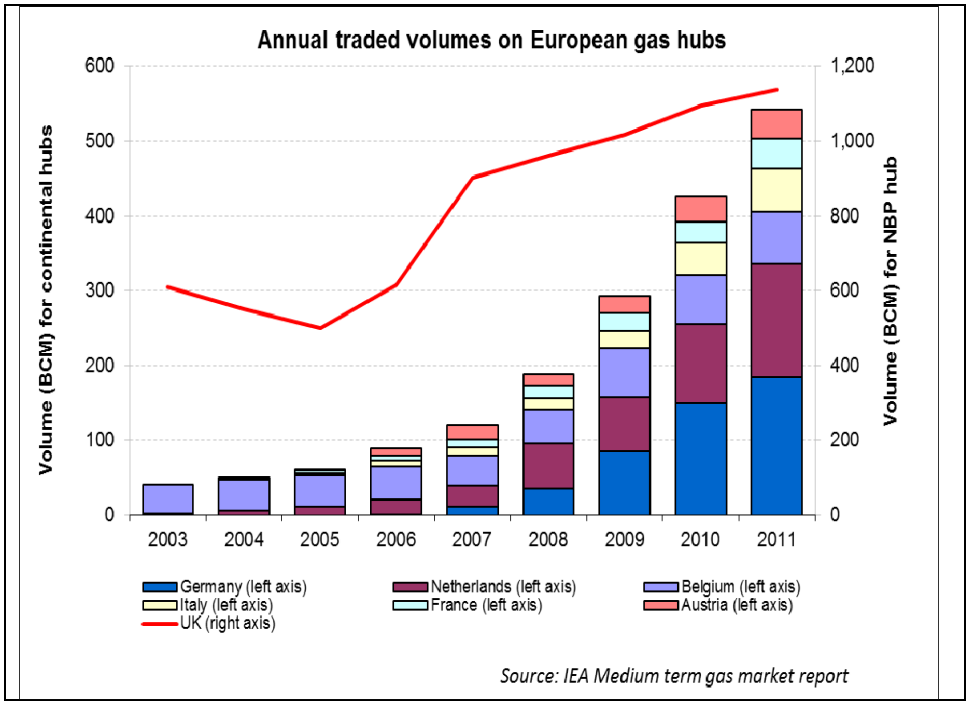
Turning to developments in the trading of natural gas on European hubs, the volume of total spot traded gas was 1,640 BCM in 2011. The UK NBP – the largest hub in Europe – traded 1,137 BCM in 2011, compared to 152 BCM in the Netherlands - the next biggest hub in Europe - and a total of 542 BCM for all continental hubs, which shows that there is still considerable scope for further growth, contributing to greater liquidity of European wholesale gas markets in Europe.

There has been a significant increase in traded volume on the continental hubs. The amount of exchanged spot natural gas increased more than tenfold between 2003 and 2011, and registered a 27% increase between 2010 and 2011. In 2011, the volumes physically delivered on continental hubs covered 58% of the total demand for natural gas in the corresponding countries. This compares with only 35% in 2009 and 6% in 2006[13]. This shows that the role of trading hubs as an instrument for exchange of natural gas ownership in the EU is already considerable and is on the increase. Total traded (spot) volumes in the EU are around three times higher than physical consumption (six times including the UK NBP hub).

[13] IEA Medium Term Gas Market Report 2012.

As far as imports of liquefied natural gas (LNG) are concerned, in addition to the increasing volumes of gas being imported into the EU, the share of LNG deliveries has risen from 10% twenty years ago to just under 20% in 2011, as Figure 21 shows.

Figure 20. Annual traded volumes on* European *gas hubs



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

Reporting on 2011, the first signs of falling gas imports which we highlighted above could be observed in the third quarter of 2011, as LNG imports fell by 14% year on year, after having risen by 20% in the previous quarter. By the fourth quarter of 2011, all exporters of LNG cut back considerably on exports, with the result that 26% less LNG was imported into the EU in the second half of 2011 compared to the first half of 2011, in contrast to the rising levels of imports between the first and second halves of the previous year (see also table 2 for a comparison of LNG capacities among Member States in 2011).

The outcome for the full year 2011, based on data for contracted volumes, pointed to some slight growth between 2010 and 2011. Volumes contracted via long term purchasing arrangements were about 100 bcm (1,040 TWh) higher than what was actually imported, indicating that some market participants were making good use of the flexibility clauses in their contracts (using the so-called 'take or pay' clause). Based on data from *Eurostat* and *Gas Strategies,* the gap between contracted and actually imported gas exceeded 20% in 2011.

Figure 21. Imports of natural gas in the EU (contracted volumes)

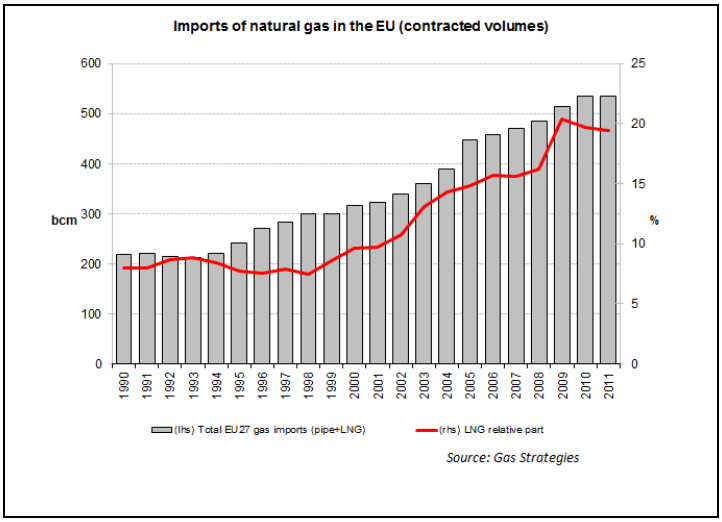


Table 2.* LNG *capacities in the EU -2011

	MAX HOURLY CAPACITY MCM (N) / HOUR	NOMINAL ANNUAL CAPACITY BCM (N) / YEAR	LNG STORAGE CAPACITY MCM (LNG)
Belgium	1.70	9.00	0.38
Greece	0.75	5.30	0.13
Spain	6.86	60.11	2.94
France	3.91	23.75	0.84
Italy	1.54	10.96	0.35
Netherlands	1.65	12.00	0.54
Portugal	1.13	6.50	0.24
United Kingdom	6.23	46.50	1.87

Source: Gas Infrastructure Europe; Gas LNG Europe

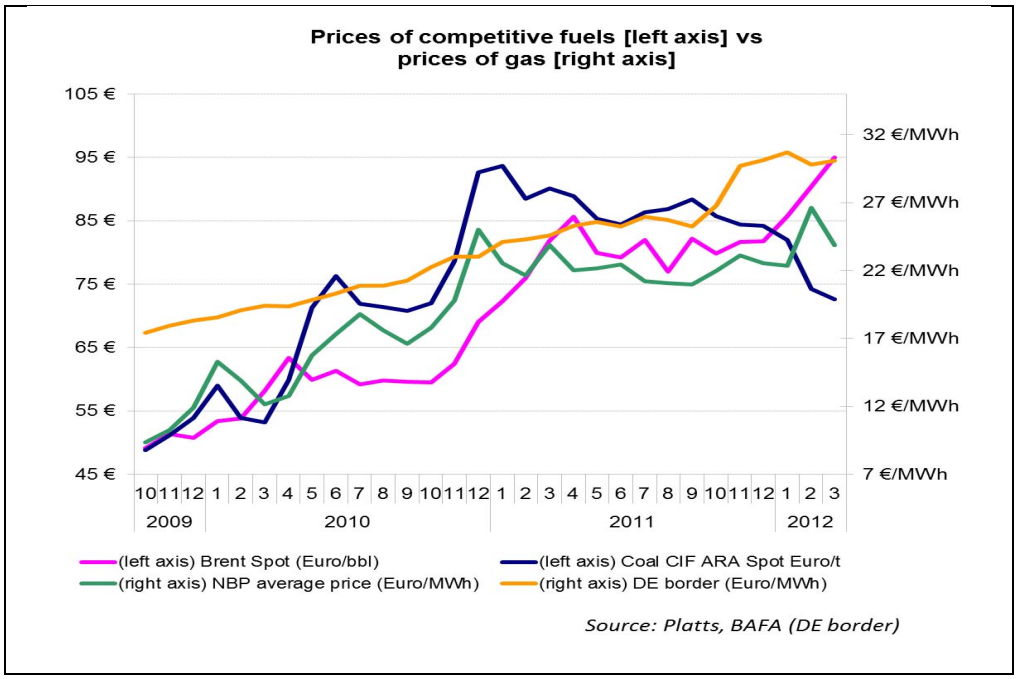
(N): Normal

Figure 22 below compares the trend of the price of natural gas contracts (as represented by the UK NBP hub day-ahead average price and the German border price) with the price of the Brent spot and Coal CIF Ara[14] spot prices. The graph shows that, after the major correction in all energy commodity prices during the second half of 2008/first half of 2009, there had been a period of renewed growth which lasted until the last quarter of 2010/first quarter of 2011.

By that point, the price of Brent crude had hit a daily record average (of 87.8 €/bbl), while both the price of coal and natural gas had also risen significantly, reaching 95.2 €/tonne and 25.7 €/MWh respectively − somewhat short of their historic daily highs of 135.8 €/tonne and 32.1 €/MWh respectively, in August 2008. Thus, in the period between late 2008 and early 2011, the prices of energy commodity prices followed a similar upward trend.

[14] Price for a metric tonne of coal (calorific value of 6 000 kcal / kg) delivered at the Amsterdam- Rotterdam-Antwerp area with cost, insurance and freight covered.

Figure 22. Prices of competitive fuels vs prices of gas



However, there has been a clear decoupling between coal prices on the one hand, and oil and gas prices on the other, since the beginning of 2011. Coal has followed a slightly downward course throughout 2011, reaching a level of 85.9 €/tonne at year end. It fell more sharply in the first quarter of 2012, reaching a daily level of 76.5 €/tonne by the end of March 2012. Coal CIF ARA prices were kept low due to the growing availability and supplies of US-produced coal, on account of declining US demand for coal due to strong competition from shale gas on the US power markets.

In contrast to coal, the price of Brent stabilised at around 80 €/bbl during 2011, but then picked up again, reaching a new record daily level of 97.7 €/bbl by mid-March 2012.

Similarly, the price of the NBP day-ahead contract for gas remained within a range of between 20 and 24 €/MWh during 2011, but then temporarily hit new record levels of 40.7 €/MWh in early February 2012, as a result of a sudden and unexpected cold snap. By the end of March 2012, a price level of 25.2 €/MWh was recorded which, not counting the exceptional February levels, was the highest price attained by the NBP day-ahead since the first quarter of 2011.

The above graph also shows the price of actual gas imports at the German border, as published by the German Federal Office of Economics and Export Control (BAFA). This price has traditionally been taken as an indicator of oil-index priced gas into Europe.

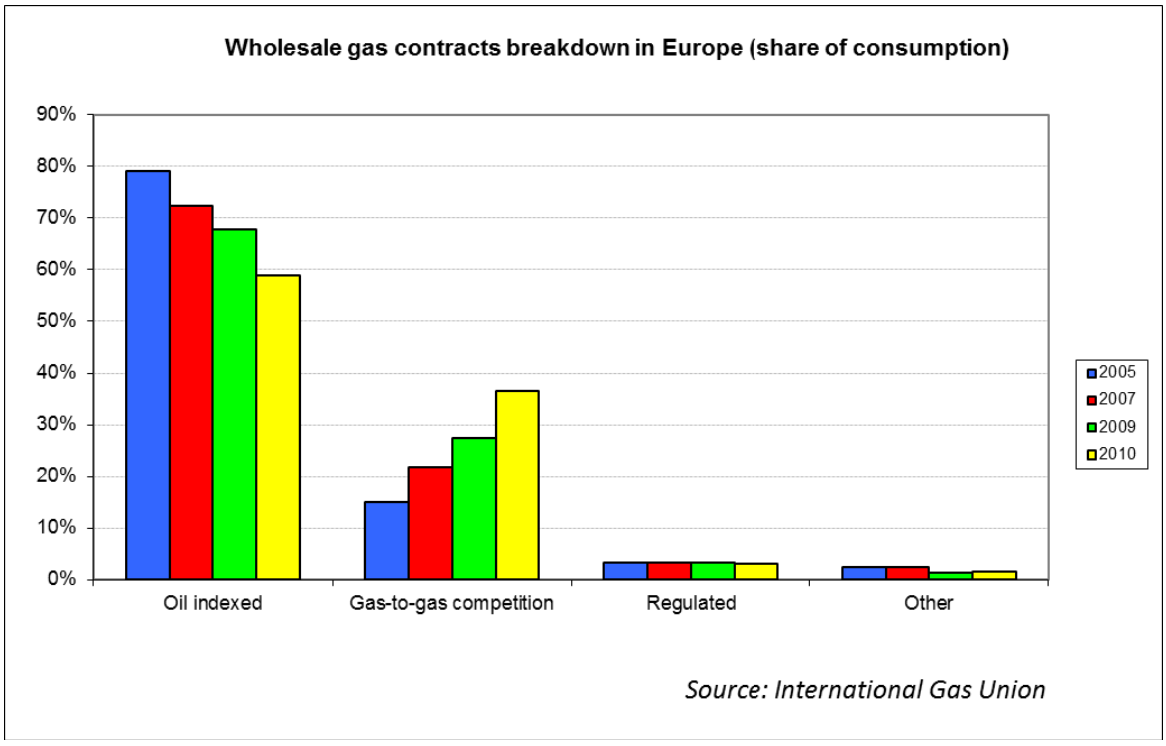
By comparing these two gas prices, it can be seen that the German border price was briefly comparable to the NBP spot price at the end of 2010, when high levels of demand for gas in the EU sent hub prices soaring to levels close to the pre-crisis levels of 2008. Since then, however, relatively low demand levels throughout 2011 have ensured the stability of the NBP price, while the oil-indexed German border price has continued to rise in line with the increases in oil prices of the previous months.

The UK NBP average monthly price represented 75% of the German border price in December 2011, compared to 89% in June 2011 and 94% in January 2011. The difference between the long-term oil-indexed and spot prices for gas has therefore been growing throughout 2011, in spite of reports that importers have won concessions to reflect movements of hub-traded gas prices in their long-term contracts. If such a large gap in the future between the two types of contracts were to persist, it would continue to cause concern among European utilities that have to buy gas under long term, oil-indexed contracts, but continue to be pressured by their own customers to sell at lower spot levels.

The difference in prices between the different gas contracts is an important issue, because the EU is continuing to buy a large proportion of its gas under long-term, oil-indexed contracts. However, according to surveys conducted by the International Gas Union since 2005 (see figure 23), it would appear that − along with the increase in traded gas volumes reported previously − the share of oil-indexed gas contracts is falling (representing 68% of natural gas consumption in 2009 and only 59% in 2010) and is expected to decrease further. At the same time, the proportion of spot purchased gas has increased significantly (from 27% of natural gas consumption in 2009 to 37% in 2010). The disparity between the prices of LTC contracts and hub prices has clearly been a driving force behind this trend.

This paves the way for the gradual emergence of true gas-to-gas competition, where the price of gas is ultimately determined by gas market fundamentals and by the interplay of gas supply and demand, traded over a variety of different periods, and no longer by oil and oil product markets.

Figure 23. Wholesale gas* contracts *breakdown in Europe (share of consumption)



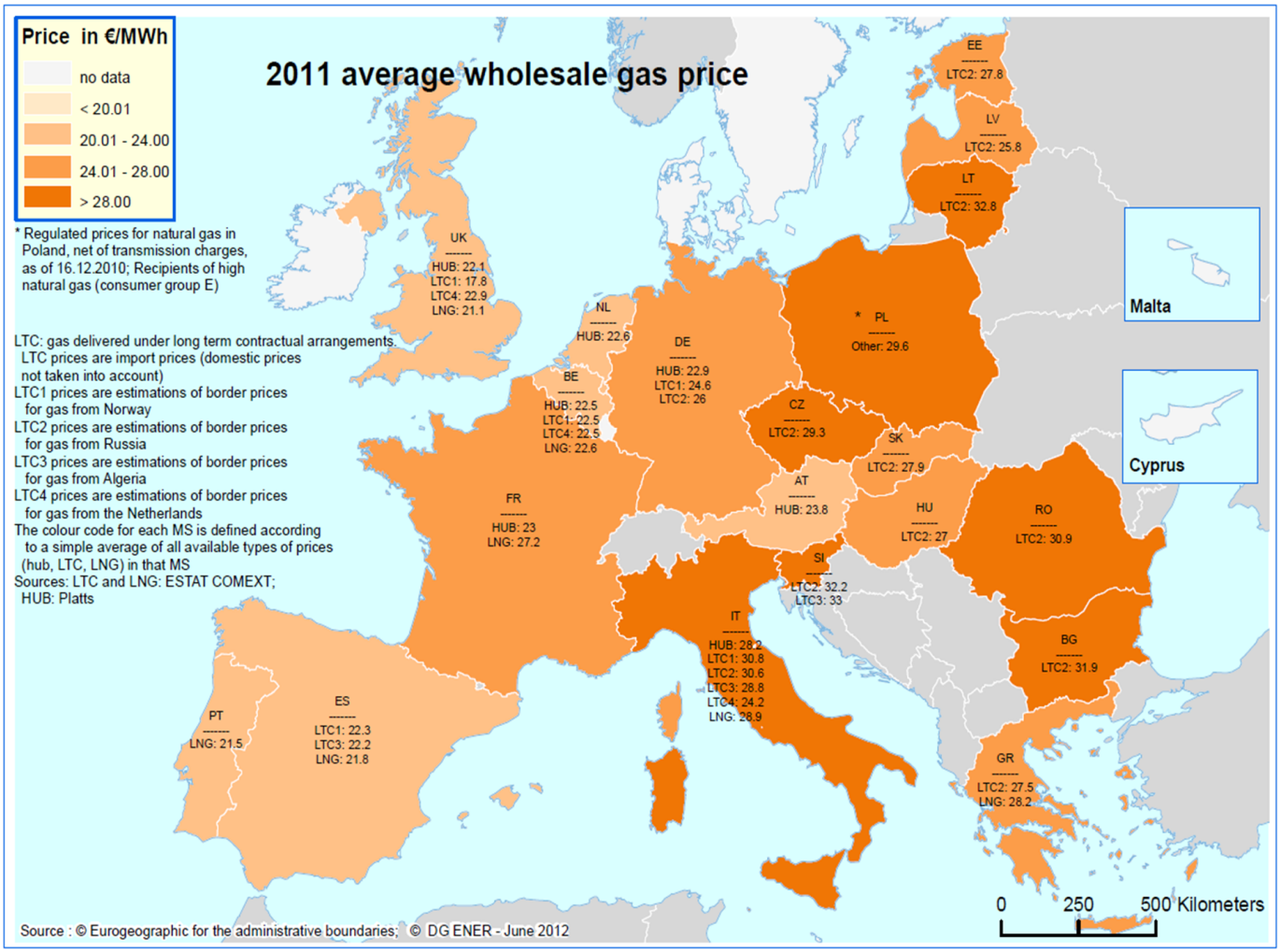
An additional key contributing factor of the development of hubs, and of gas-to-gas competition, is in terms of adding to the diversity of gas contracts available in the EU. As Map 1 shows, this diversity is important, because markets with access to multiple sources of

gas and competitive trading arrangements (e.g. North-West Europe, UK) have benefitted from lower prices in recent years. By contrast, Eastern European countries that depend predominantly on long-term, oil-linked contracts have paid relatively higher prices.

It is worth noting, however, that not all EU markets have been equally affected by the sharp rises in the oil price, which have pushed up natural gas prices. EU Member States with well-developed gas hubs have not only enjoyed the benefit of greater price stability; the prices of piped gas imported under long-term contracts in these markets have also been lower. This further underlines the importance of developing hub-trading in the EU.

Therefore, markets with more supply diversity not only enjoy greater security, they also enable consumers in those markets to benefit from greater competition and lower prices.

Map 1. Average wholesale price of natural gas in the EU in 2011

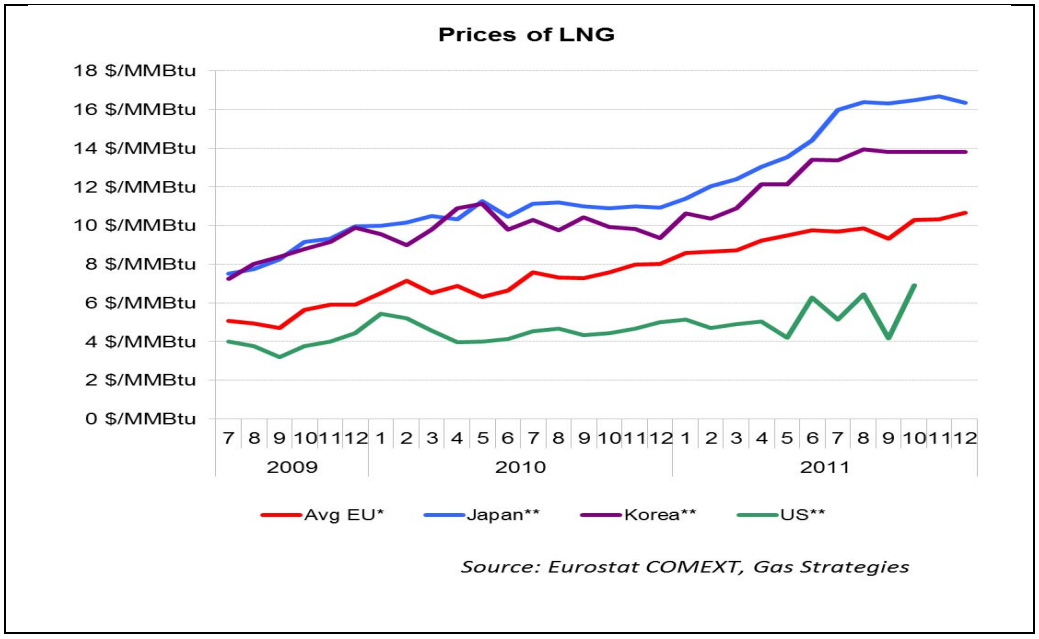


Turning now to LNG prices, the continuing increases in the production of unconventional gas in the United States (US) in 2011 ensured that the US remained well supplied in gas, with the result that the discount between the price for LNG deliveries in the US and the EU continued to increase, as shown in Figure 24.

In spite of that, the difference between the prices paid for LNG deliveries to Japan and Korea on EU LNG prices increased further in 2011. This premium was attractive to LNG producers,

and explains the declining imports of LNG in the EU that were observed in the second half of 2011, as reported previously. The significant increases in demand for LNG from Japan, following the Fukushima nuclear outages earlier in the year caused by the tsunami, also provided a fresh opportunity for LNG exporters, following the loss of much of the US market. This combination of events in the US and Japan has led to a shift, in a relatively short period of time, from the EU being primarily in competition with the US for LNG supplies, to competing with Asia and the Far-East.

Figure 24. Prices of LNG



Notes:
* "Average EU" is a weighted average price for monthly LNG deliveries in Belgium, Portugal, Spain, UK, Italy (from January 2009) and France (from January 2010) as reported by Eurostat.
** The formula for calculating monthly prices in Japan, Korea and the US was modified in Q4 2009. Previously these prices were an average of prices charged by different suppliers. Starting from October 2009, the averages are weighted by the monthly LNG deliveries of each supplier.

More detailed information on developments in the EU markets for natural gas can be found in the European Commission's *Quarterly Reports on European Gas Markets (QREGaM)*[15].

2.2. Market structure and unbundling

For the majority of Member States the number of operators working on the transmission and distribution grid of the gas system remained stable between 2009 and 2010. By 2010, most Member States had 10 or more gas-supplying companies.

[15] Publicly available at : http://ec.europa.eu/energy/observatory/gas/gas_en.htm

Table 3. Unbundling of transmission system operators (TSOs) in Gas - 2010

	Number of TSOs	Ownership unbundled TSOs	% of public ownership	% of private ownership	Legally unbundled TSOs	
					with network assets	without network assets
Belgium	1	1	89.97	10.03	1	0
Bulgaria	1	1	100	0	1	0
Czech Republic	1	0	0	100	1	0
Denmark	1	1	100	0	1	0
Germany	18	2	0	100	9	9
Estonia	1	0	0	100	0	1
Ireland	0	0	0	0	0	0
Greece	0	0	0	0	0	0
Spain	17	1	5	95	17	0
France	2	0	36	64	2	0
Italy	3	1	1.6	98.4	3	0
Cyprus	0	0	0	0	0	0
Latvia	0	0	0	0	0	0
Lithuania	1	0	17.7	76	0	0
Luxembourg	1	0	42.5	57.5	1	0
Hungary	1	1	0	100	1	0
Malta	0	0	0	0	0	0
Netherlands	2	2	100	0	NA	NA
Austria	3	0	31.5	68.5	5	2
Poland	1	1	100	0	1	0
Portugal	1	1	51	49	1	0
Romania	1	1	73.51	26.49	1	N/A
Slovenia	1	0	0	100	1	0
Slovak Republic	1	0	51	49	0	1
Finland	1	0	24	76	N/A	N/A
Sweden	2	2	0	100	2	0
United Kingdom	1	1	0	100	1	0

Source: CEER database

As far as the number of gas importers is concerned, fewer than half of the gas importing Member States had more than ten gas importing companies. Furthermore, the market share of the largest gas importers was over 50% in 14 out of the 20 Member States for which information is available (and over 80% in five Member States). On the gas retail side, while all but six Member States had ten or more suppliers of natural gas to final consumers, the market share of the largest retailer exceeded 50% in 13 Member States (it also exceeded 80% in 8 Member States).

Table 4. Unbundling of* distribution *system operators (DSOs) in Gas - 2010

	Number of DSOs	Ownership unbundled DSOs	Legally unbundled DSOs	Application of 100.000 customer exemption	DSOs with less than 100.000 customers
Belgium	18	5	18	NO	8
Bulgaria	31	N/A	0	YES	31
Czech Republic	77	0	6	YES	71
Denmark	3	0	3	NO	1
Germany	713	N/A	146	YES	643
Estonia	25	N/A	1	YES	25
Ireland	0	0	0	0	0
Greece	0	0	0	0	0
Spain	24	1	24	NO	13
France	25	0	3	YES	22
Italy	247	128	243	YES	205
Cyprus	0	0	0	0	0
Latvia	0	0	0	0	0
Lithuania	6	0	0	YES	5
Luxembourg	4	0	1	YES	4
Hungary	10	0	5	YES	5
Malta	0	0	0	0	0
Netherlands	8	6	8	NO	1
Austria	20	0	9	YES	14
Poland	6	0	6	YES	1
Portugal	11	0	4	YES	7
Romania	39	2	2	YES	37
Slovenia	19	0	0	YES	19
Slovak Republic	49	0	1	YES	48
Finland	23	0	0	YES	23
Sweden	5	0	5	YES	5
United Kingdom	19	14	5	NO	8

Source: CEER database

As a rule, local consumers in the majority of Member States have access to a restricted number of offers, and those local suppliers may have difficulties in negotiating competitive conditions with the importing company. Regulated prices are another reason why competition appears limited.

Table 5. Structure of the gas market in 2010

	Number of entities bringing natural gas into country	Number of main gas entities (1)	Market share of the largest entity bringing natural gas	Number of retailers sending natural gas to final customers	Number of main natural gas retailers (2)	Market share of the largest natural gas retailer
Belgium	4	3	70%	41	5	31%
Bulgaria	3	1	97%	18	2	94 (*)
Czech Republic	24	3	73%	28	2	62%
Denmark	2	2	N/A	13	5	N/A
Germany	22	7	N/A	820	2	25%
Estonia	1	1	100%	22	1	97%
Ireland	13	6	36%	8	5	65%
Greece	4	3	88%	4	3	85%
Spain	18	5	44%	32	6	27%
France	16	3	73%	50	3	65%
Italy	63	3	39%	305	5	N/A
Cyprus	N/A	N/A	N/A	N/A	N/A	N/A
Latvia	1	1	100%	1	1	100%
Lithuania	5	4	51%	5	1	98%
Luxembourg	4	1	N/A	8	4	N/A
Hungary	22	6	33%	28	10	16%
Malta	N/A	N/A	N/A	N/A	N/A	N/A
Netherlands	N/A	N/A	N/A	N/A	3	N/A
Austria	15	4	N/A	40	3	43%
Poland	17	1	97%	52	1	93%
Portugal	7	2	96%	18	6	36%
Romania	19	2	48%	63	5	26%
Slovenia	4	2	94%	19	4	70%
Slovak Republic	7	3	78%	14	3	76%
Finland	1	1	100%	25	1	95%
Sweden	2	2	52%	5	4	47%
United Kingdom	25	6	22%	19	6	55% (**)

Source Eurostat, 2010 data and National Regulators.
(1) Entities are considered as main if they deal with at least 5% of the natural gas (indigeneous production or import).
(2) Retailers are considered as "main" if they sell at least 5% of the total natural gas consumed by final customers
(*) aggregated share of top 2 retailers
(**) aggregated share of top 3 retailers

Table 6 below illustrates the importance of having guidelines and network codes for access conditions to gas transmission networks. Member States tend to apply a varied range of tariff models, congestion management procedures, capacity allocation mechanisms and balancing models, which are not always friendly to market operators and do not send efficient market signals about the value of existing and new capacity that the market may need.

Table 6. Access Conditions to Gas Transmission Networks in 2010

	Tariff model	Congestion management	Capacity allocation mechanism	Balancing model applied
	1 = Entry exit coupled	1 = auction	1 = First come first served	1 = TSO buys balancing gas on the regular gas market
	2 = Entry exit uncoupled	2 = pro rata	2 = Auction	2 = TSO contracts sources of balancing gas
	3 = Point to point	3 = lottery	3 = Pro rata	3 = TSO uses storage for balancing
		4 = capacity buy back	4 = Allocation on deadline	
		5 = UIOLI	5 = Capacity goes with the customer	
		6 = secondary market		
		7 = interruptible capacity		
		8 = use it or sell it		
Belgium	1;2 See note (1)	4;5;6;7;8 See note (3)	1 See note (8)	See note (13)
Bulgaria	post stamp	7	1	1;3
Czech Republic	2;3	1 See note (4)	3;5 See note (9)	1;2
Denmark	2	5;6;7	1;3	2 See note (14)
Germany	2	6;7	1	1,2,3
Estonia	1	-	1	NAP
Ireland	0	0	0	0
Greece	0	0	0	0
Spain	2 (1 for big consumers)	1;2;5;6;7	1;2;3;5	2;3
France	2	1;2;5;6;7	1;2;3;5 See note (10)	1;3
Italy	2	2;6;7	3	3
Cyprus	0	0	0	0
Latvia	0	0	0	0
Lithuania	NAP	7	1	1
Luxembourg	1	5 See note (6)	1 See note (11)	1
Hungary	1	1;2;5;6;7	1;2;3;5	1;2;3
Malta	0	0	0	0
Netherlands	2	6;7	1	1
Austria	3	NAP	5	2;3 See note (12)
Poland	3	2;5;6;7;8	1	2;3
Portugal	2	1;5	4;5	3
Romania	See note (2)	See note (7)	1	3
Slovenia	0	2;6;7	4	1
Slovak Republic	2	6;7	1	2
Finland	3	NAP	NAP	2
Sweden	2	0	5	2
United Kingdom	2	4;5;6;7	2;1;5	NA

Source: National Regulators data

Notes:

(1) BELGIUM: Inland transmission: tariff based on an average distance Border-to-border transmission: tariff is distance related

(2) ROMANIA: The mechanisms for calculation of prices and regulated tariffs are of Revenue cap type for regulated underground storage, and price-cap for regulated distribution and supply. For the second regulatory period (2007-2012), until the entry-exit pricing system shall be introduced, the tariff for the transmission through the national transmission system is unique and has a binomial structure.

(3) BELGIUM: Rucksack-principle for inland transmission, secondary market, day-ahead market, interruptible capacity, UIOSI

(4) CZECH REPUBLIC: supplementary 6,7

(5) FRANCE: UIOLI long term and short term

(6) LUXEMBOURG: UIOLI with priority for non-incumbent suppliers

(7) ROMANIA: In order to settle the congestions, the approved but unused capacity may make up the object of: a)Voluntary return to the TSO; b)Capacity transfer facility (CTF); c)Mandatory transfer from one network user to another by the TSO

(8) BELGIUM: Inland transmission: yearly organised subscription period procedure Border-to-border transmission: LT allocation via open season procedures

(9) CZECH REPUBLIC: 3+OSP; 5 between TSO and DSOs

(10) FRANCE: GRTgaz and TIGF use the First come first served rule and organise Open Subscription Periods with pro rata to allocate their capacity. GRTgaz sells day ahead capacity according to the FCFS rule in the first place and then through an auction mechanism. Capacity goes with the customer is used for the regional transmission network. Open season procedures are used for the allocation of new capacity.

(11) LUXEMBOURG: New capacity allocation mechanism in 2012

(12) AUSTRIA: TSO uses balancing market

(13) BELGIUM: Balancing is the responsibility of the individual shippers. TSO offers balancing services.

(14) DENMARK: TSO uses storage and linepack for balancing

2.3. Retail markets

Switching rates

Data on switching rates are incomplete for many EU Member States, as Table 7 shows. The available data show that, in 2010, switching rates remained relatively low in most Member States across all categories of consumers. In Member States for which data are available across the three industry groups, there are signs that switching rates are lowest in the small industry and household category.

Table 7. Switching rate Gas (by meter points, values are in %)

	whole retail market			large industry			medium sized industry			small industry and households		
	2008	2009	2010	2008	2009	2010	2008	2009	2010	2008	2009	2010
Belgium	N/A	8.40	11.15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Czech Republic	0.02	1.16	2.97	6.70	8.70	12.23	1.20	4.00	9.60	0.20	1.15	2.94
Denmark	0.60	1.10	0.90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Germany	2.85	3.48	6.70	15.81	4.21	8.42	8.63	3.86	10.31	2.78	3.47	6.67
Estonia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.10	N/A	N/A
Ireland	N/A	1.30	N/A	N/A	12.80	0.00	N/A	20.70	0.00	N/A	1.27	0.00
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spain	4.10	5.50	11.60	9.00	15.00	24.00	8.00	15.00	24.00	4.00	5.60	11.50
France	9.81	4.00	3.50	N/A	13.20	N/A	N/A	N/A	N/A	9.82	4.00	3.50
Italy	1.20	2.00	4.50	28.80	34.40	38.20	3.70	7.60	8.60	1.10	1.90	4.40
Cyprus	N/A	N/A	N/A	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00
Latvia	0.00	0.00	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lithuania	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Luxembourg	0.04	0.02	0.05	0.00	0.00	0.00	73.00	12.00	0.00	0.01	0.01	0.05
Hungary	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Malta	0.00	0.00	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	9.10	11.80	8.90	N/A	N/A	N/A	N/A	N/A	N/A	9.10	11.80	8.90
Austria	0.50	0.90	0.70	6.70	17.50	7.80	5.80	7.50	7.50	0.50	0.90	0.70
Poland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Portugal	0.00	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Romania	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Slovenia	0.06	0.13	0.15	11.76	17.64	2.63	1.20	2.53	10.53	0.32	0.00	0.00
Slovak Republic	0.00	0.00	0.21	0.00	4.40	10.10	0.00	0.40	2.70	0.00	0.00	0.20
Finland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sweden	0.80	1.20	1.05	8.70	11.90	5.80	8.70	11.90	5.80	0.30	0.50	0.40
United Kingdom	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.90	17.30	16.10

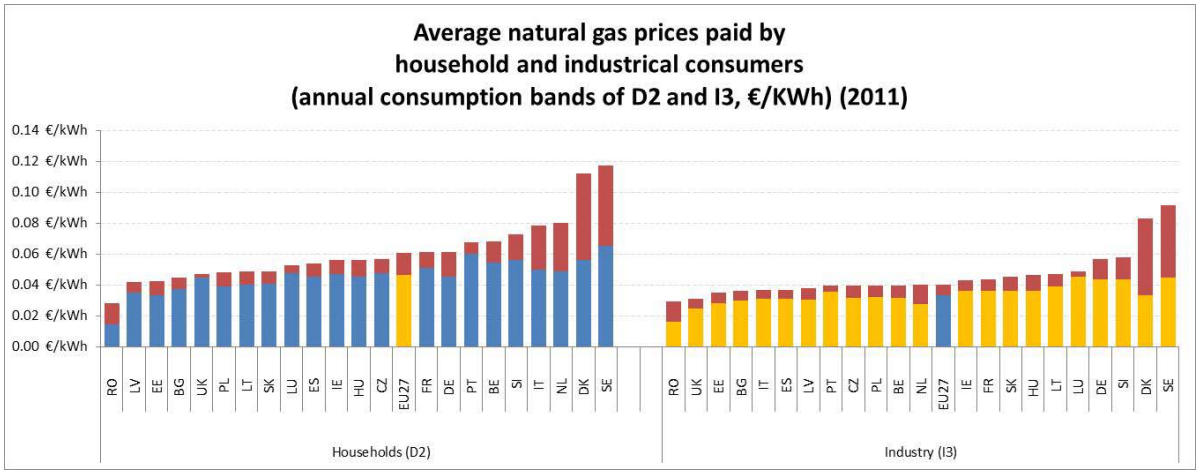
Source: CEER database and National Regulators

Retail prices for natural gas

As far as retail prices for natural gas are concerned, households across the EU paid 0.06 Euro/kWh on average for gas in 2011, while industrial consumers paid 0.04 Euro/kWh. In absolute terms, households and industries in Romania paid the lowest gas prices, while households and industries in Sweden paid the highest prices[16]. The ratio of the highest and the lowest gross price among the EU Member States was 4.2 in the case of households and 3.1 in the case of industrial users. The range between the highest and lowest household price was 0.09 Euro/kWh for households and 0.06 Euro/kWh for industrial users.

[16] The data in this section refers to consumption band D2 for households [annual consumption 5,56 MWh – 55,6 MWh] and I3 for industry [annual consumption 2,77 GWh – 27,8 GWh].

Figure 25* Gas *retail prices paid by households and industrial consumers in 2011 (in EUR/kWh



Source: Eurostat Energy Statistics
Note: Data for Austria (industrial consumers), Finland (domestic consumers) and Greece (domestic and industrial consumers) is not available.
Range for annual consumption of :
Household group D2 : [5,56 MWh – 55,6 MWh] ;
Industry group I3 : [2,77 GWh – 27,8 GWh]

The ratio of the highest to lowest household prices has been increasing since 2008: from 2.9 in 2008 to 4.2 in 2011[17]. Over this period, Romanian households have been paying the lowest prices for natural gas, while households in Denmark and Sweden have paid the highest prices.

The ratio of highest to lowest consumer prices for industry fell from 2.9 in 2008 to 2.6 in 2009, but then went back up to 2.9 in 2010 and to 3.1 in 2011[18]. During the period 2008-2011, industry in Sweden consistently paid the highest prices for natural gas. The lowest industrial prices were paid by industry in Bulgaria (2008), Romania (2009 and 2011) and the UK (2010).

Decreasing highest to lowest price ratios may be interpreted in different ways. For those Member States with established retail markets, this points to greater price convergence. On the other hand, the interpretation of the trend in highest to cheapest price ratios is limited by the existence of regulated retail prices for industrial users who are still paying according to an oil-indexed formula.

During the period under review, some Member States continued to regulate retail prices of natural gas for groups of industrial and household consumers. Cross subsidisation across consumer groups distorts prices and is usually detrimental to competition. The Commission is

[17] Consumption bands D2, all taxes included. The ratio of highest to lowest price in the same consumption band excluding taxes increased, from 2.74 in 2008 to 4.47 in 2011.

[18] Consumption band I3, all taxes included. The ratio highest to lowest price in the same consumption band excluding taxes increased from 2 in 2008 to 2.8 in 2011.

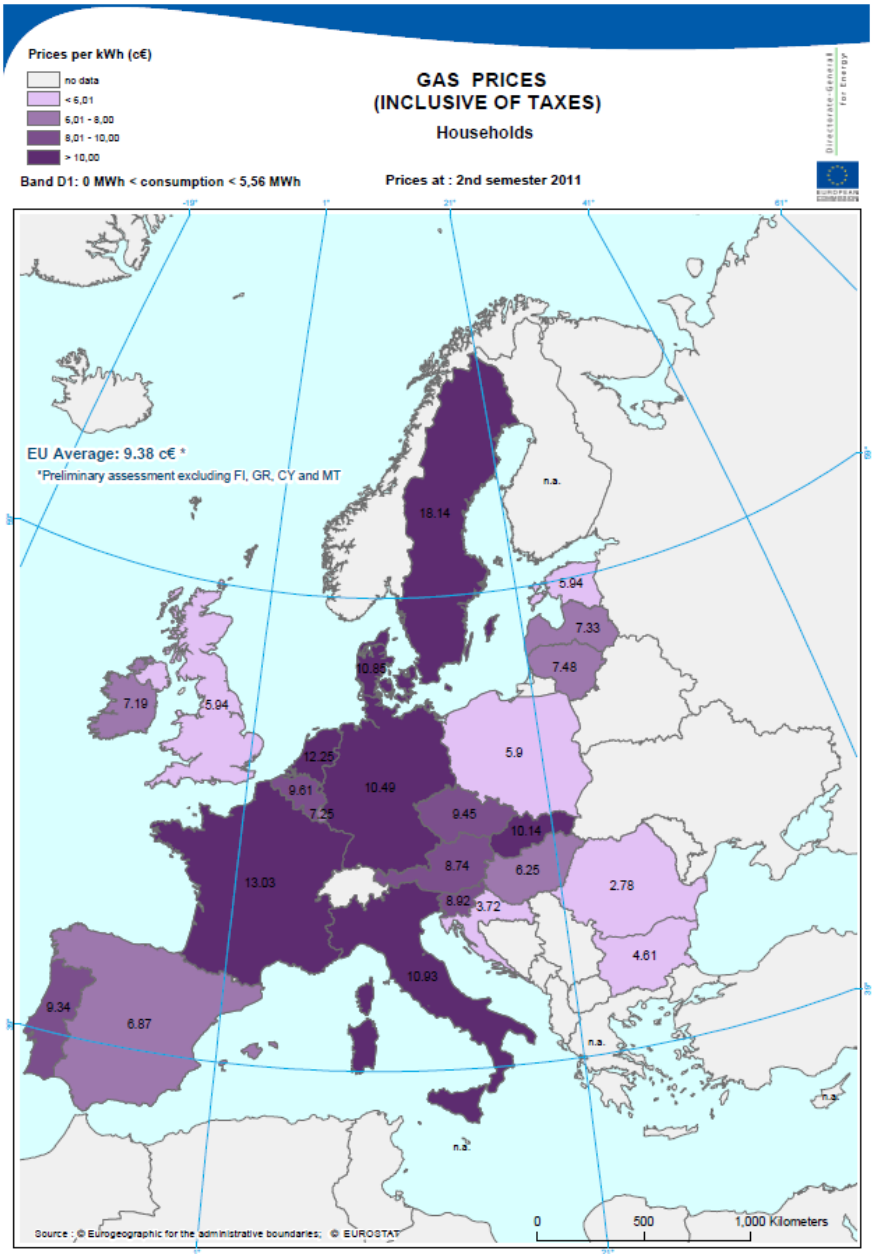
against such practices, as they are not in line with internal market principles. A number of infringement procedures have therefore been launched.
When correcting retail prices for purchasing power standard (PPS), the picture is much more balanced, with Bulgaria, Hungary, Sweden and Slovenia being the three countries where household consumers paid the highest prices in 2011. The lowest consumer prices corrected for PPS were paid by households in Luxembourg, the UK, Romania and Ireland.

As far as taxation is concerned, household and industrial consumers in Luxembourg paid the lowest taxation on gas in absolute terms in 2011, while consumers in Denmark paid the highest absolute levels of taxation. Taxation as a share of consumer prices was lowest in the UK for households and in Luxembourg for industrial consumers. The highest share of taxation for both categories of consumers was in Denmark.

As Map 2.1 below shows, in the smallest household consumption band[19] the average consumer price in the second half of 2011 was 0.094 Euro/kWh, with households in Belgium, Czech Republic, Denmark, Germany, France, Italy, the Netherlands, Slovakia and Sweden paying higher than average prices,.

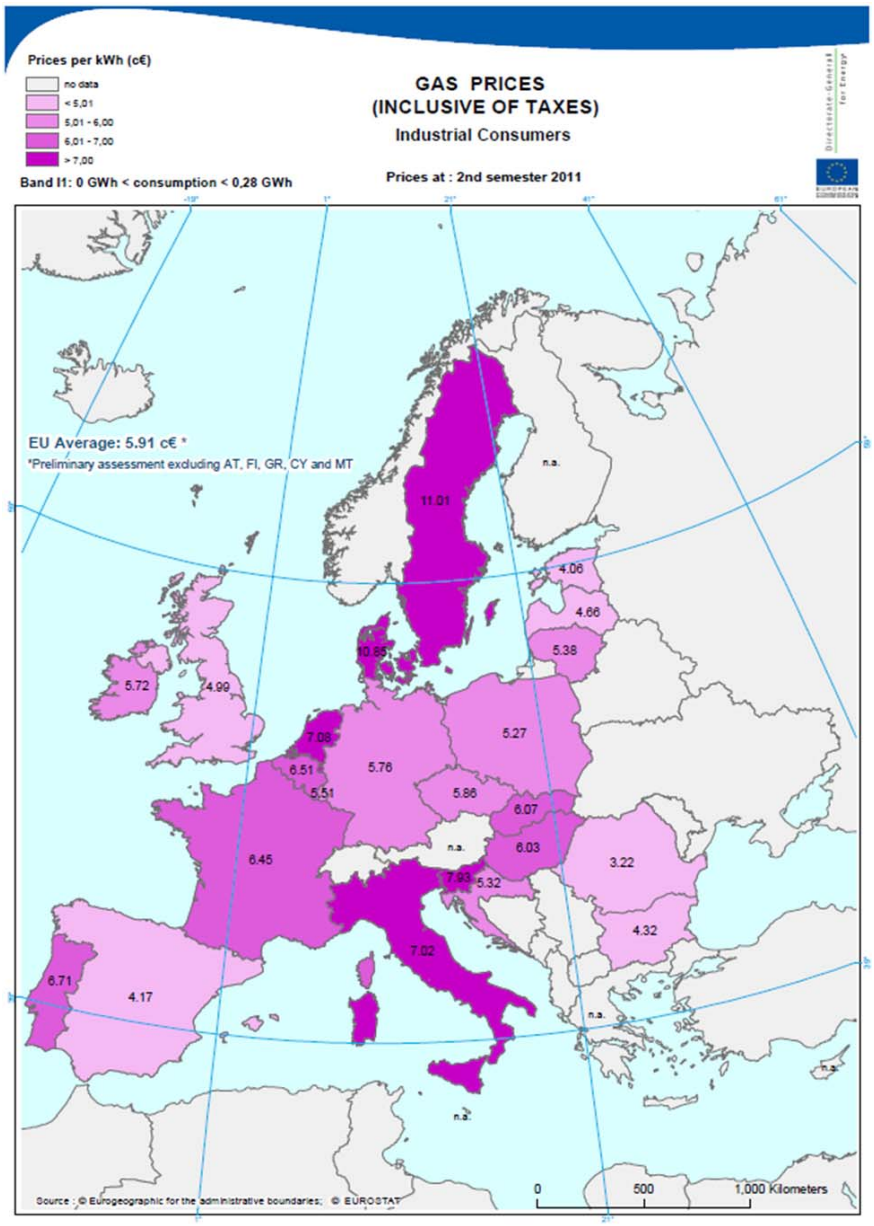
[19] Consumption band D1 for households: annual consumption up to 5,56 MWh.

Map 2.1 Gas prices (inclusive of taxes) for Households



Map 2.2 illustrates the case of the smallest industrial consumption band[20], where the average consumer price in the second half of 2011 was 0.059 Euro/kWh, and where industries in Belgium, the Czech Republic, Denmark, France, Hungary, Italy, the Netherlands, Portugal, Slovakia, Slovenia and Sweden were paying higher than average prices.

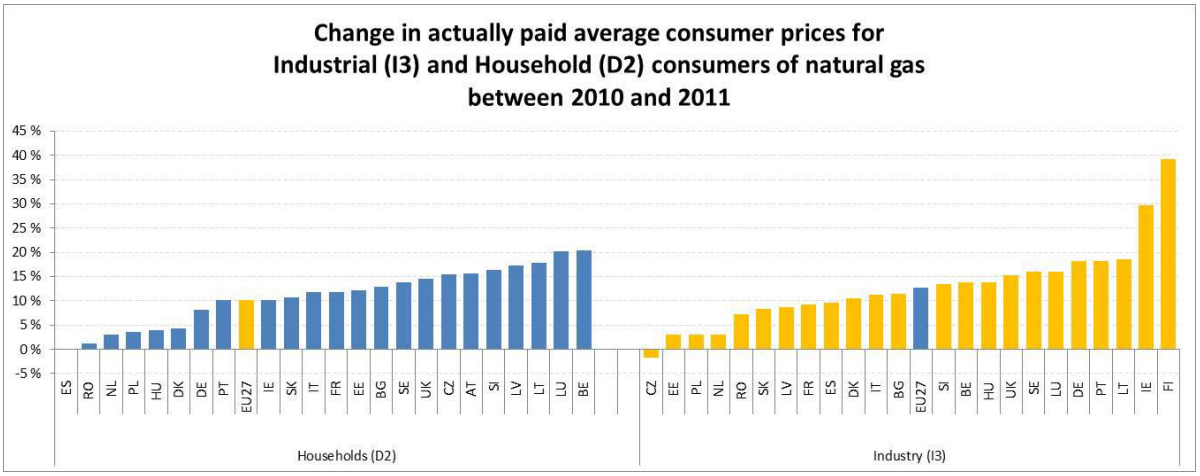
Map 2.2 Gas prices (inclusive of taxes) for Industrial consumers



Over the period 2010-2011, households across the EU saw consumer prices increase by an average of 10%, while industry experienced a 13% increase over the same period (Figure 25 and Figure 26). At the same time, consumers living in seven Member States were faced with a 15% or higher price increase, with the biggest increases in prices being seen in Belgium and Luxembourg. Industries in Finland and Ireland experienced price increases of 30% or more.

[20] Consumption band I1 for industry: annual consumption up to 0.28 GWh.

Figure 26. Change* in *gas retail prices between 2010 and 2011



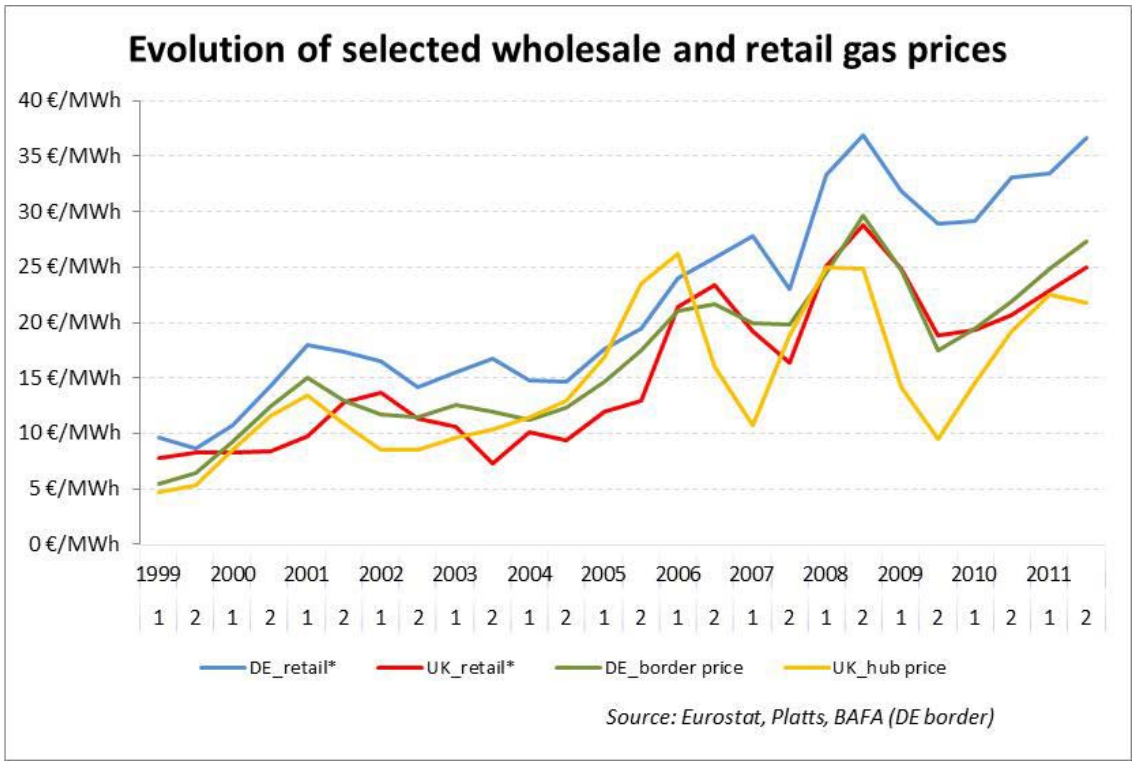
Source: Eurostat Energy Statistics
Note: Prices for households are all taxes included. Prices for industrial consumers are VAT-excluded. Data for Austria (industrial consumers), Finland (domestic consumers) and Greece (domestic and industrial consumers) is not available.
Range for annual consumption of :
Household group D2 : [5,56 MWh – 55,6 MWh] ;
Industry group I3 : [2,77 GWh – 27,8 GWh]

Figure 27 shows the trend in wholesale and retail gas prices in the UK and Germany. During the last decade, German retail prices (blue line) have largely moved in step with German border prices (green line). After peaking in the second half of 2008, the second half of 2009 saw German wholesale border prices drop to a level hitherto not experienced. The same trend was reflected in retail prices. All quarters of 2010 and 2011 saw an upward trend, which was more pronounced in the case of border prices than in retail prices.

The pattern of wholesale and retail prices in the UK during the past decade is somewhat less straightforward, and does not seem to exhibit the same degree of correlation as that between the German border and retail prices. Until 2004, hub and retail prices had often moved in opposite directions.

Between 2005 and 2007, UK retail prices followed the same evolution of hub prices with a certain time lag. The retail price peak in 2008 came at a time of initially stable, and then falling, hub prices. There was then a better alignment between the evolution of hub and retail prices in the UK in 2009. Since then, both hub and retail prices have been pursuing an upward course, with convergence over the second half of 2010 and the first half of 2011, and decoupling during the second half of 2011.

Figure 27. Evolution of selected wholesale and* retail *gas prices



Note: Prior to 2008 the following Eurostat end consumer categories were used: Industry - I4-1(Annual consumption: 418 600 GJ; load factor: 250 days, 4 000 hours). From 2008 on, the following Eurostat end consumer category is used: Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ
All retail prices are net of taxes.

3. EUROPEAN ELECTRICITY MARKETS

While traded volumes of power in the EU have not grown to the same extent as traded volumes of gas in recent years, power market liquidity[21] showed an almost continuous increase between 2005 and 2011. Increasing market liquidity is essential for the proper functioning of a wholesale market and for the formation of competitive prices, ensuring welfare benefits for consumers.

As a direct result of the increasing role of wholesale power trading markets in Europe, electricity prices are increasingly being determined by the relationship of demand and supply in the market.

In the process of integration of wholesale electricity markets among neighbouring countries, market coupling in the EU is playing an increasingly important role. Market coupling enables players to trade directly between markets by benefiting automatically from cross-border

[21] See definition under section 3.1

capacities without having explicitly acquired the necessary transmission capacity in individual markets.

In the power markets of Central West European (CWE), where market coupling took place in November 2010, a steep drop in adverse power flows (flows going from a high price area to a low price area) was observed in Q4 2010, and adverse flows became virtually non-existent in the region from the first quarter of 2011 onwards. The disappearance of adverse flows and a high ratio of hourly converging prices within an observed time period both point to a properly functioning, integrated wholesale power market.

The lack of market coupling prevents prices from acting as effective signals for the direction of power flows between markets. It should therefore be regarded as a market-based and effective tool contributing to the achievement of a single European wholesale electricity market.

Better integration of European wholesale power markets, which has enabled more convergent wholesale power prices, could be one reason why power prices did not follow the sharp increase in fossil fuel prices in the last two or so years. This achievement also underscores the importance of European-level electricity market policy, and the need to fully implement the successive energy packages adopted in the last couple of years.

3.1. Power supply sources and wholesale markets

Table 8 provides information on the most important factors that influence the electricity import dependency/exporting capacity of each Member State of the EU. It is plain to see that the ratio of both power import and export flows are low compared to the electricity consumption in those countries which are either geographically isolated from other European markets, or have only few interconnections (islands such as Cyprus, Malta, the UK or Ireland) On the other hand, smaller countries (such as Luxembourg, Slovenia or the Baltic States), with good power grid connections to their neighbours, have high import or export power flow ratios compared to their annual electricity demand.

Table 8. Electricity generation, flows and consumption - 2010

	Electricity generation, flows and consumption - 2010				
	Demand (consumption) (TWh)	Import load flows/ consumption (%)	Export load flows/ consumption (%)	National annual max. load (GW)	Maximum generation capacity (GW)
AUSTRIA	73.46	27.1%	23.9%	10.76	21.09
BELGIUM	95.67	13.0%	12.4%	14.17	18.69
BULGARIA	38.21	3.1%	25.2%	7.27	12.07
CYPRUS	5.35	0.0%	0.0%	1.15	1.47
CZECH REPUBLIC	70.96	9.4%	30.4%	10.38	18.94
DENMARK	37.65	28.2%	31.2%	6.35	13.38
ESTONIA	9.71	11.3%	44.8%	1.59	2.48
FINLAND	91.17	17.2%	5.7%	14.59	17.08
FRANCE	538.25	3.6%	9.3%	96.71	123.51
GERMANY	612.96	7.0%	9.4%	79.90	152.20
GREAT BRITAIN	383.79	1.9%	1.2%	60.10	79.71
GREECE	63.10	13.5%	4.5%	9.79	13.93
HUNGARY	42.57	23.3%	11.0%	6.06	8.75
IRELAND	29.08	2.6%	1.0%	5.09	8.47
ITALY	346.22	13.3%	0.5%	56.43	106.49
LATVIA	7.50	53.0%	41.3%	1.32	2.46
LITHUANIA	11.74	69.6%	18.6%	1.71	3.61
LUXEMBOURG	8.66	84.1%	37.2%	1.11	1.73
MALTA	2.11	0.0%	0.0%	0.71	0.87
NETHERLANDS	120.92	12.9%	10.6%	17.73	25.47
POLAND	156.30	4.0%	4.9%	23.58	33.31
PORTUGAL	56.71	10.3%	5.6%	9.40	17.91
ROMANIA	58.35	1.3%	5.2%	8.46	17.05
SLOVAK REPUBLIC	28.88	25.4%	21.8%	4.34	7.78
SLOVENIA	14.31	56.0%	70.8%	1.97	3.04
SPAIN	294.76	1.8%	4.6%	44.49	96.31
SWEDEN	150.69	9.9%	8.5%	26.69	35.70

Source: Eurostat, ENTSO-E

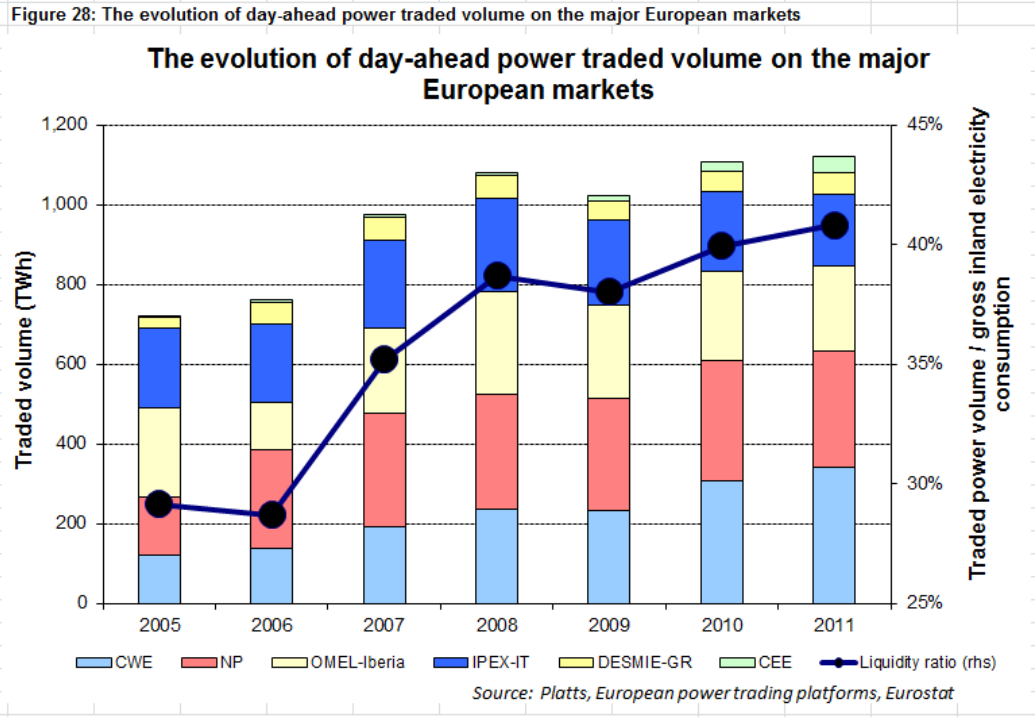
Maximum generation capacity plays an important role in import dependency, because Member States that have large generation capacities (e.g. Germany, France, Italy or Spain,) are able to produce more electricity than they consume, and to export the surplus power that they generate.

According to the data presented above, a distinction can be made between net electricity exporting countries (e.g.Bulgaria, Estonia, Czech Republic) and net electricity importing countries (e.g.Hungary, Lithunania or Latvia). The position of a given country as a net exporter or importer position depends on the availability of cheap domestic power generation sources, the size of the generation capacities compared to the annual power demand and the cost of importing electricity from neigbouring countries.

The trend in the traded volume of power in the European wholesale markets also serves as a useful pointer to how the European internal electricity market is evolving. The next chart shows the combined traded volume of the European wholesale day-ahead power markets, including data from all available trading platforms. Between 2005 and 2008 the combined traded volume of power showed dynamic growth and, after a transitory decrease triggered by the economic downturn in 2009, it stabilised in 2010-2011 at a level slightly higher than the pre-crisis peak of 2008.

Between 2005 and 2011, there was an almost continuous increase in market liquidity, which is measured as the ratio of the traded volume of wholesale day-ahead power contracts and the annual gross inland electricity consumption in a given country (or group of countries).. Increasing market liquidity is essential to the proper functioning of a wholesale market and for the formation of competitive prices, ensuring welfare benefits for consumers. Although there was no significant increase in power traded volumes between 2008 and 2011, there was a rise in the liquidity ratio during that period as a result of decreasing power consumption, which was due to the sluggish economic recovery and to the increasing efficiency of electricity use in many European economies.

Figure 28: The evolution of day-ahead power traded volume on the major European markets

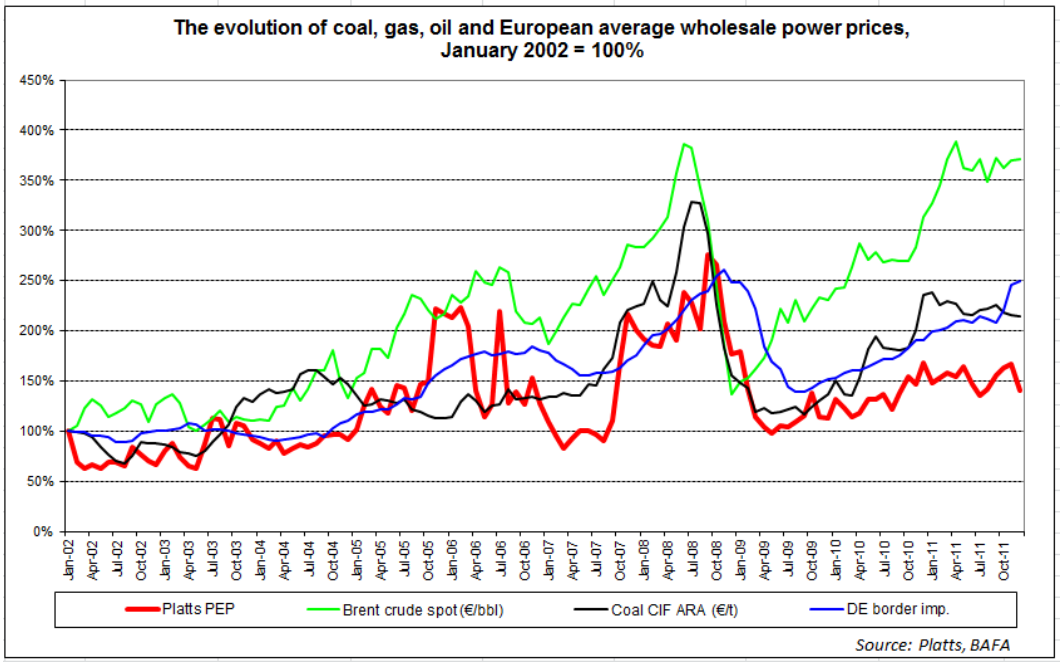


Central Western Europe (CWE): Germany, France, Belgium, Netherlands, Luxembourg and Austria.
Nor pool (NP): Norway, Sweden, Finland, Denmark and Estonia
OMEL: Spain and Portugal
IPEX: Italy
Central Eastern Europe (CEE): Poland, Czech Republic, Slovakia, Hungary, Romania
DESMIE: Greece

The broadening role of wholesale power trading markets in Europe has meant that electricity prices are increasingly being determined by the relationship of demand and supply in the market.

The next chart shows the trend of the Platts European Power Index (PEP, which is a composite price index of the major European markets) side-by-side with developments in prices of the Brent crude oil spot, German import gas and coal import contracts between 2002 and 2011. Although the first half of the period exhibited a strong correlation between the evolution of wholesale power prices and fossil fuel prices, the increase in fossil fuel prices in more recent years substantially exceeded the rise in the PEP index. Moreover, although both power and fuel prices did recover from the lows recorded in the first half of 2009, the increase in power prices was relatively modest compared to those of coal, gas and – especially – oil.

Figure 29: The evolution of coal, gas, oil and European average wholesale power prices,January 2002 = 100%



Platts PEP: Pan European Power Index
Brent crude spot: Benchmark price for crude oil in Europe
Coal CIF ARA: Principal coal import price benchmark in North Western Europe
DE border imp. long term contract based import natural gas price on the German border

Better integration of European wholesale power markets, which has helped wholesale power prices to converge, could be a factor explaining why power prices did not follow the sharp increase in fossil fuel prices in the last couple of years. This achievement also underlines the importance of European-level electricity market policy, and the need to fully implement the successive energy packages during that period. Apart from market integration, the increasing deployment of renewable energy sources − mainly solar and wind power generation − also had a beneficial impact on power generation costs, further weakening the link between power prices and fossil fuels.

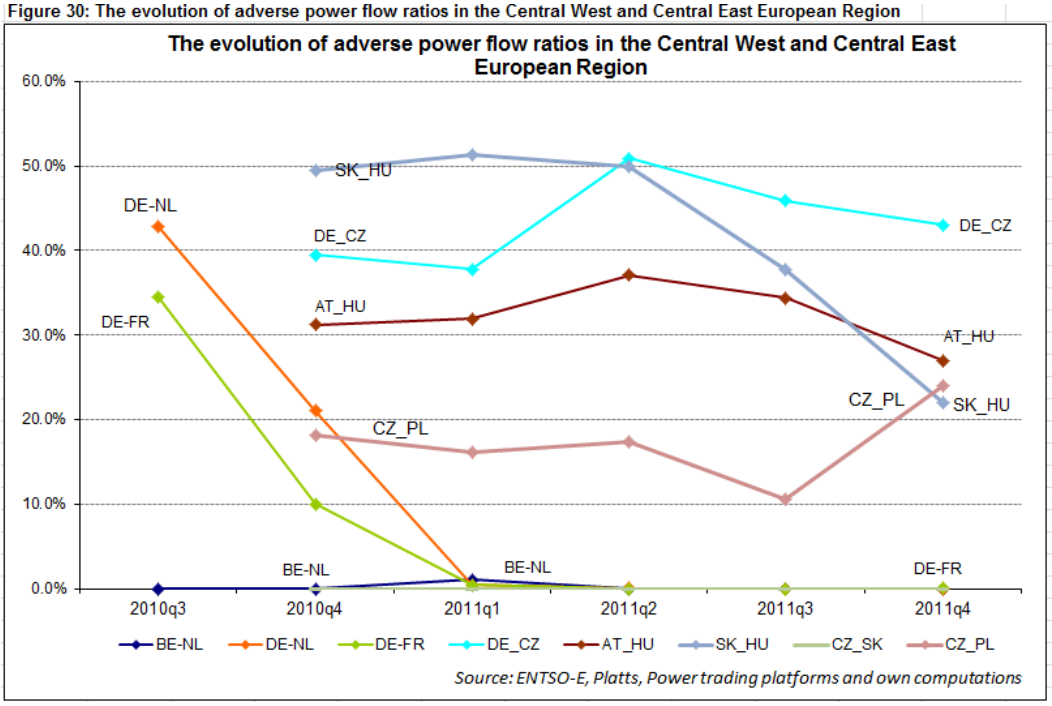
Market coupling plays an important role in the process of the integration of wholesale electricity markets among neighbouring countries. Market coupling refers to the integration of two or more electricity markets from different areas through an implicit cross-border allocation mechanism. Instead of explicitly auctioning the cross-border transmission capacities among the market parties, the capacities are implicitly made available on the power exchanges of the various areas. In this way, market coupling enables players to trade directly between markets by benefiting automatically from the cross-border capacities, without having explicitly acquired the requisite transmission capacity across markets.

The next chart illustrates the benefits of market coupling. It shows the quarterly trend of adverse power flow ratios between neighbouring European markets in 2010-2011. Adverse cross border flows occur when commercial nominations for cross border capacities are such that power is set to flow from a higher price area to a lower price area. Adverse power flow ratios are calculated as the number of hours during which adverse flow occurred in a quarter compared to the number of hours of available power flow data for that quarter.

In those Central West European (CWE) markets where market coupling took place in November 2010, a steep fall in adverse power flows was observed in Q4 2010, and adverse flows were virtually non-existent in the region from the first quarter of 2011 onwards.

Disappearing adverse flows and a high ratio of hourly converging prices within an observed time period both point to a properly functioning, integrated wholesale power market. In 2011, the difference in hourly power prices in the CWE region was less than 1% between all participating markets in 64% of all hourly price observations.

Figure 30: The evolution of adverse power flow ratios in the Central West and Central East European Region



Note: The Market Coupling took place on the 9th of November 2010 in the Central West European Region

By contrast, in the Central Eastern European (CEE) region, where market coupling exists only between the Czech Republic and Slovakia, adverse flow ratios remained permanently high during the period presented in the above chart. The absence of market coupling prevents prices from acting as effective signals for the direction of power flows between markets. In practice, it prevents flows being directed from low price to high price areas, even in cases where there are considerable price differentials between neighbouring markets. Besides high adverse flow ratios, the CEE region can also be characterised by a low proportion of price-converging hours among the different markets. The difference in power prices in the CEE region was less than 1% in only 3-15% of the total hourly observations in 2011, which was significantly lower than in the case of the CWE region.

The obvious difference between the CWE and the CEE regions, as far as the number of 'price-converging' hours and adverse flow frequencies is concerned, further underlines the importance of promoting market coupling in those power regions where it does not exist at present. Market coupling should be regarded as a market-based and effective tool contributing to the achievement of a single European wholesale electricity market.

The next table provides an overview of the trend in the annual average day-ahead baseload power prices in the European power markets between 2009 and 2011., Prices in most of the observed markets in 2010 showed a significant upturn compared to 2009, mainly as a result of the increasing demand for power, in parallel with the economic recovery and increasing fossil fuel prices. In 2011, prices rose further in many markets, although they fell in the Nordic countries due to a milder winter and better hydro availability. Annual average wholesale power prices in the CWE region rose in 2011 compared to 2010; this was also due to the impact of the German government's decision to immediately take eight nuclear reactors out of

the power grid in spring 2011, following the Fukushima nuclear power plant accident in Japan. Although Austria is not part of the market coupling in the region, its price trends closely those of the German market, due to the agreement between EXAA and EPEX markets that enables market participants to trade on both platforms.

The Nordpool spot market is the other large market coupling area in Europe where prices were among the lowest on the continent, since the abundant hydro-based power generation in Norway and Sweden had a beneficial impact on the whole region. However, this effect was more limited in those countries (e.g. Finland or Denmark) which have fewer direct interconnections to these cheap hydro-power sources.

Annual average prices in the Central East European region increased between 2009 and 2011, following their West European peers and responding to increasing demand, as the economies of these countries started to recover. Prices in Hungary, Romania and Slovenia were severely affected during certain periods by the volatile demand for power in the Balkan countries; thereby providing the power utilities of these three countries with excellent power exporting opportunities, but resulting in higher wholesale prices in their domestic markets.

Spanish and Portuguese power prices were strongly influenced by the availability of renewable energy sources (hydro, wind and solar). In the UK and Italy, where gas fired power generation dominates the power mix, rising natural gas prices led to power prices which were higher than in major West European markets. Lastly, markets in Member States which have more limited capacity for electricity interconnections to neighbouring countries that have a functioning wholesale power market (such as Greece and Ireland) were normally characterised by higher power prices than in other European markets.

Table 9. Annual average day-ahead baseload power prices (€/MWh)

Annual average day-ahead baseload power prices (€/MWh)			
	2009	2010	2011
British Isles and Ireland			
United Kingdom - APX	59.4	56.6	56.9
Ireland - SEMO	-	55.0	62.3
Central West Europe			
Germany - EPEX	38.9	44.5	51.1
Belgium - BPX	39.4	46.3	49.4
Netherlands - APX	39.2	45.4	52.0
France - EPEX	43.1	47.6	48.9
Austria - EXAA	39.2	44.9	51.9
Nordic markets			
Nordpoolspot system price	35.1	53.0	46.8
Norway system - NP	36.6	55.8	45.7
Sweden - NP	37.1	58.5	48.4
Finland - NP	36.9	56.6	49.3
Denmark - NP	37.7	52.4	49.4
Estonia - NP	-	47.2	43.4
Iberian peninsula			
Spain - OMEL	37.8	40.4	50.8
Portugal- OMEL	37.6	37.3	45.5
Appennine peninsula			
Italy - IPEX	63.7	64.1	72.2
Central and Eastern Europe			
Poland - TGE	39.1	48.0	52.2
Czech Republic - OTE	37.8	43.7	50.6
Slovakia - OTE	39.2	43.8	50.9
Hungary - OTE	-	53.2	55.8
Romania - OPCOM	34.3	36.4	52.1
Slovenia - BSP	-	46.2	57.2
South East Europe			
Greece - DESMIE	43.4	45.7	59.4

Source: Platts, European power trading platforms

More detailed information on developments in the EU markets for electricity can be found in the European Commission's *Quarterly Reports on European Electricity Markets*[22].

3.2. Market structure and unbundling

There are significant differences between Member States in terms of the structure of the electricity generation and retail distribution markets. Although there are between one and

[22] Publicly available at : http://ec.europa.eu/energy/observatory/electricity/electricity_en.htm

eight electricity utilities with more than 5% share of total national generation, the total number of power generation companies representing at least 95% of national generation reached a three-digit or even a four-digit figure in certain EU countries (e.g. Germany, Netherlands and Denmark, see next table). However, such a low concentration of electricity generation is unusual in the EU. As the table also shows, concentration in electricity generation is high in most of the EU Member States.

On the retail side, there is a similar picture as far as the number of market participants that provide at least 5% of the national electricity consumption - and also the number of retail companies - are concerned. However, the link between the concentration in power generation and in the retail sector is not particularly strong, as there are many countries where higher concentration in power generation does not necessarily involve a high concentration in the retail sector or vice-versa.

Table 10 Structure of the *electricity* market

2010	Number of companies representing at least 95% of net electricitry generation	Number of main electricity companies (1)	Market share of the largest generator in the electricity market	total number of electricity retailers to final consumers	Number of main electricity retailers (2)
Austria	126	4		129	6
Belgium	4	3	79.1%	37	3
Bulgaria	22	5		36	5
Cyprus	1	1	100.0%	1	1
Czech Republic	24	1	73.0%	324	3
Denmark	> 1000	2	46.0%	33	
Estonia	6	1	89.0%	41	1
Finland	29	4	26.6%	72	3
France	> 5	1	86.5%	177	1
Germany	> 450	4	28.4%	> 1000	3
Greece	4	1	85.1%	11	1
Hungary	68	3	42.1%	38	5
Ireland	8	6	34.0%	8	5
Italy	217	5	28.0%	342	3
Latvia	45	1	88.0%	4	1
Lithuania	17	5	35.4%	15	3
Luxembourg	3	2	85.4%	11	4
Malta	1	1	100.0%	1	1
Netherlands	7	5		36	3
Poland	68	5	17.4%	146	7
Portugal	107	2	47.2%	10	4
Romania	10	6	35.6%	56	8
Slovakia	8	1	80.9%	77	5
Slovenia	3	2	56.3%	16	7
Spain		4	24.0%	202	4
Sweden	24	5	42.0%	134	5
United Kingdom	19	9	20.0%	22	6

Source Eurostat, 2010 data and National Regulators
(1) Companies are considered as main if they produce at least 5% of the national net electricity generation
(2) Retailers are considered as "main" if they sell at least 5% of the total national electricity consumption

The next two tables provide information on the unbundling solutions applied for the Transmission System Operators (TSOs) and for the Distribution System Operators (DSOs) in the EU Member States.

According to data from the national regulators for 2010, the majority of EU Member States have only one TSO. The exceptions are: the Netherlands (two), Austria, the UK and Portugal (where there are three), Germany (four) and Italy, which has eleven TSOs. Ownership unbundling has taken place in about half of the EU Member States. The share of public and

private ownership in unbundled TSOs reveals a wide range of situations among the EU Member States in 2010.

There are at least 800 DSOs present in Germany, many of which could be linked to the so-called "Stadtwerke", which perform electricity distribution functions and other public services. In most of the EU Member States, legal unbundling seems to be more typical than ownership unbundling in the case of DSOs. With the exception of Hungary and Slovenia, there are DSOs in the EU Member States providing electricity for less than 100,000 customers. In the majority of these countries, exemptions from DSO unbundling rules provided for in Article 26 of the Electricity Directive (2009/72/EC) are applied in the cases of DSOs which have fewer than 100,000 customers.

Table 11: Unbundling of *transmission* system operators (TSOs) in Electricity - 2010

2010	Number of TSOs in the country	Number of TSOs that are ownership unbundled	% of public ownership	% of private ownership	TSOs with network assets	TSOs without network assets
AUSTRIA	3	0	75.6	24.4	2	1
BELGIUM	1	1	47.9	52.1	1	0
BULGARIA	1	0	100	0	0	1
CYPRUS						
CZECH REPUBLIC	1	1	100	0	1	0
DENMARK	1	1	100	0	1	0
ESTONIA	1	1	100	0	1	0
FINLAND	1	1	12	88	1	0
FRANCE	1	0	84.48	15.52	1	0
GERMANY	4	2	0	100	2	0
GREECE						
HUNGARY	1	0	0.01	99.99	1	0
IRELAND						
ITALY	11	1	30	70	11	0
LATVIA						
LITHUANIA	1	0	97.5	2.5	0	1
LUXEMBOURG	1	0	42.5	57.5	1	0
MALTA	0	0	0	0	0	0
POLAND	1	1	100	0	1	0
PORTUGAL	3	1	51	49	1	0
ROMANIA	1	1	73.69	26.31	1	0
SLOVAK REPUBLIC	1	1	100	0	1	0
SLOVENIA	1	1	100	0	1	0
SPAIN	1	1	20	80	1	0
SWEDEN	1	1	100	0	1	0
THE NETHERLANDS	2	2	100	0	NA	NA
UK	3	1	0	100	3	0

Source: CEER database

Table 12: Unbundling of distribution system *operators* (DSOs) in Electricity - 2010

2010	Number of DSOs in the country	Number of DSOs that are ownership unbundled	Number of DSOs that are legally unbundled	Application of the 100.000 customer exemption in the country	Number of DSOs with less than 100.000 customers
AUSTRIA	128	0	11	YES	117
BELGIUM	27	11	27	NO	12
BULGARIA	4	4	4	NO	1
CYPRUS					
CZECH REPUBLIC	3	0	3	YES	297
DENMARK	77	0	77	NO	71
ESTONIA	37	NA	1	YES	36
FINLAND	85	0	51	NO	82
FRANCE	148	0	5	YES	143
GERMANY	869	0	146	YES	794
GREECE					
HUNGARY	6	0	6	NO	0
IRELAND					
ITALY	144	119	10	YES	134
LATVIA					
LITHUANIA	2	0	2	YES	4
LUXEMBOURG	6	0	1	YES	5
MALTA	1	0	0	NO	0
POLAND	22	0	7	YES	15
PORTUGAL	13	10	11	YES	10
ROMANIA	37	5	8	YES	29
SLOVAK REPUBLIC	3	0	3	YES	162
SLOVENIA	1	0	1	NO	0
SPAIN	351	0	351	YES	345
SWEDEN	173	0	173	YES	167
THE NETHERLANDS	7	5	7	NO	3
UK	19	13	6	NO	5

Source: CEER database