EUROPEAN
COMMISSION

Brussels, 30.11.2016
SWD(2016) 420 final

PART 9/13

COMMISSION STAFF WORKING DOCUMENT

Accompanying the document

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

Energy prices and costs in Europe

{COM(2016) 769 final}

Contents

2.2 Paper

Source: Ecofys study

Europe produces roughly a quarter of worldwide paper and paperboard. The competitiveness position is different for different types of paper (paper grades). So far, the European paper industry has succeeded to be among the technological leaders which helped to maintain competitiveness with other regions of the world, despite comparably high production costs (JRC 2015)[1]. Beyond that consumption trends are different across paper grades by various reasons (e.g. graphic papers' consumption is declining replaced by electronic publications; while papers for packaging and hygienic grades are growing due to internet-based trade and demographics). Major actors in global competition come from Russia, China and other regions. These have invested substantially in new capacities and are playing an increasing role in reshaping raw material supply and demand for both wood and pulp. This is particularly true for China, where around 50 % of the total new capacities over the last five years has been built and were mills reportedly benefitted from subsidised energy prices.

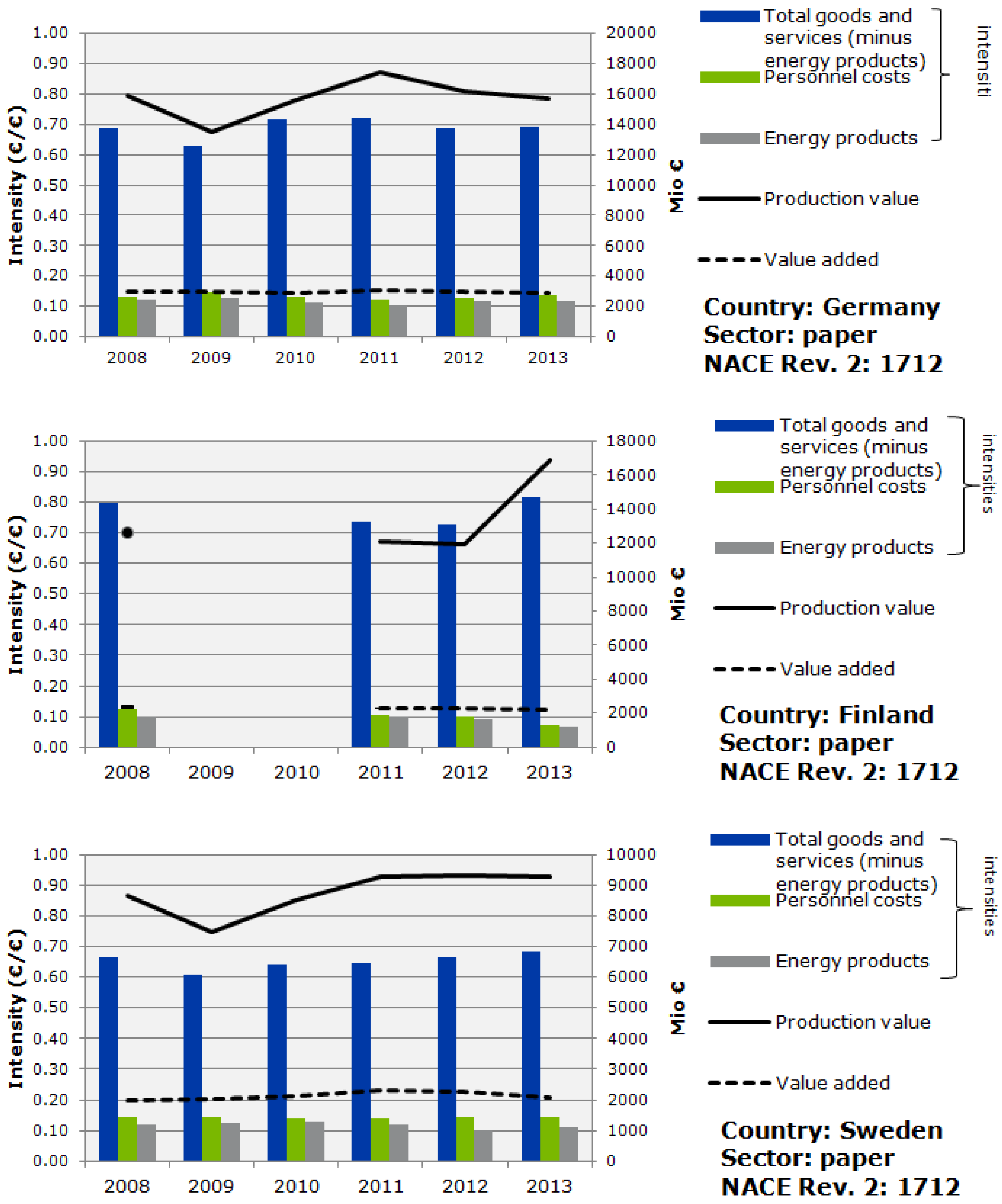
The Ecofys study looks at the ***Paper making (NACE Rev 2 C1712)*** in three Member States which represent 53% of the EU added value in this sector (Germany (22%), Finland (16%), Sweden (15%)).The high level of aggregation studied does not allow taking into account the wide variation in cost structures (raw materials, energy and other costs) across different types of paper (grades) and countries[2]..

As regards the relevance of **energy costs** in the production value, it can be observed that in Sweden and in Germany, energy purchases are roughly 0.12€/€ of production value. In Sweden this value has been decreasing slightly to ca. 0.10€/€ over the past years. In Finland, energy purchases make up only around 0.08€/€ of production value. The different cost structure of the three focus countries is likely rooted in differences in energy inputs used (**Figure 202**), product portfolio and industry structure. In the Nordic countries, fine paper mills have often been built adjacent to pulp mills (JRC 2015) which allows synergies e.g. through the use of pulping residues (black liquors) as a fuel for processing energy, for example, for drying paper. For Sweden 60% of the energy used in papermaking is mainly from biomass (for Finland no data was available).

[1] Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board – linked to the Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) - JRC Science and Policy reports

[2] E.g. Important paper producers like France, Spain, Portugal are not covered by the Ecofys study.

Figure 253 - **Paper and paperboard (NACE Rev. 2 1712)[3] - Production cost structure, production value and value added for Germany, Finland and Sweden**



Source: Ecofys study, Eurostat

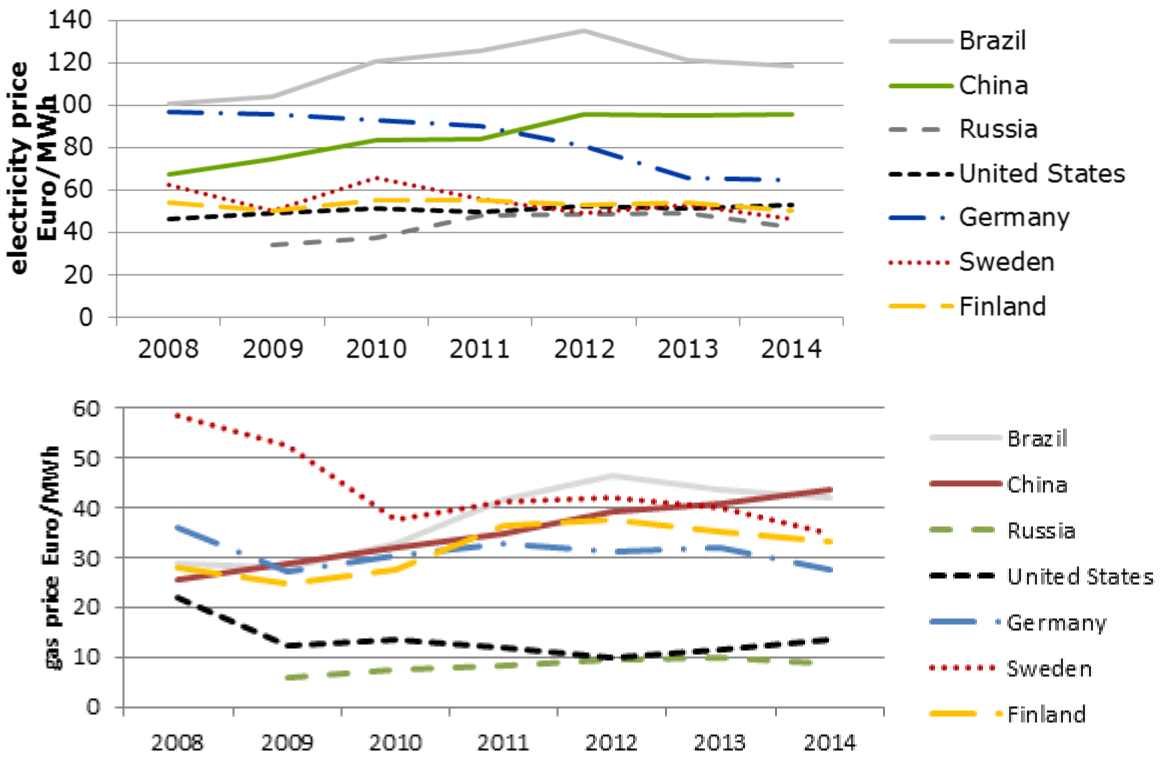
[3] Ecofys study provides averages for all paper grades

The Ecofys study also provides international price comparisons on the basis of IEA data and prices estimated for the industry in the concerned EU Member States.

For gas prices, the data indicate that Russia and the USA have an advantage. However, that price gap might not be as important as the graph indicates. The annual report from Smurfit Kappa for the year 2015 indicates that realised prices of the European Paper industry may be lower than the one estimated by Ecofys: the reports states 22.8 €/MWh as peak price and give 17.5 €/MWh as the price for natural gas at the end of 2015 (Smurfit Kappa 2016)[4].

As to electricity prices, China and Brazil industry prices seem to be rather high prices compared to the prices paid by industry in the EU. However, it is not clear whether paper making firms actually pay these prices. Similar to European countries, tax/price reductions may apply that lead to lower prices for paper mills. For example in China, subsidized prices are discussed as one reason for the existing overcapacities (EUCCC 2016)

Figure 254 -– Paper and Board - Electricity and gas prices in selected European countries and industrial electricity and gas prices for selected G20 countries[5]



Source: Ecofys study

2.3 Non-ferrous metals and Aluminium

Non-ferrous metals and Aluminium includes sectors with relatively healthy competitive situations like copper or zinc and other sectors, like primary aluminium, suffering from international competitive pressure.

Copper (source JRC study)

---

[4] These prices might not be representative for the whole paper industry as the Smurfit Kappa Group mostly deals with (high-bulk, low-value) packaging papers, often made from recycled fibres which generally require a lower energy input than more refined paper grades made from fresh wood, especially those made in non-integrated mills.

[5] In many cases, e.g. integrated pulp & paper mills, much of the electricity is generated on site by burning wood waste and/or pulping residues (e.g. black liquors). This makes price comparisons difficult.

The JRC indicates that productivity of the EU **copper** industry is one of the highest in the world. In the case of copper smelters, the EU has similar production costs to South American countries which are the leaders in producing copper, because of their proximity to raw materials. China has low labour costs which reduces overall costs. In the case of copper refineries, the EU has among the lowest production costs. The higher recycling rate is an advantage for the EU as copper anodes can be produced by either the primary or the secondary route and be processed in the same copper refineries. The EU copper industry has the lowest treatment and refining charges compared to the rest of the countries studied. Based on a rough estimation of the copper concentrates price, the sum of EU copper concentrates costs and treatment and refining charges was about 10 % lower than the average copper price in the London Exchange Market in 2013

Zinc (source JRC study)

The JRC study EU ***zinc*** smelters have some of the lowest total average production costs among the countries studied. EU zinc smelters also have one of the highest productivities. European (EU and Norway) treatment charges are the second lowest of the analysed countries. The sum of zinc concentrates (roughly estimated) and treatment costs in the EU was about 16 % lower than the average zinc price in the London Exchange Market in 2013:

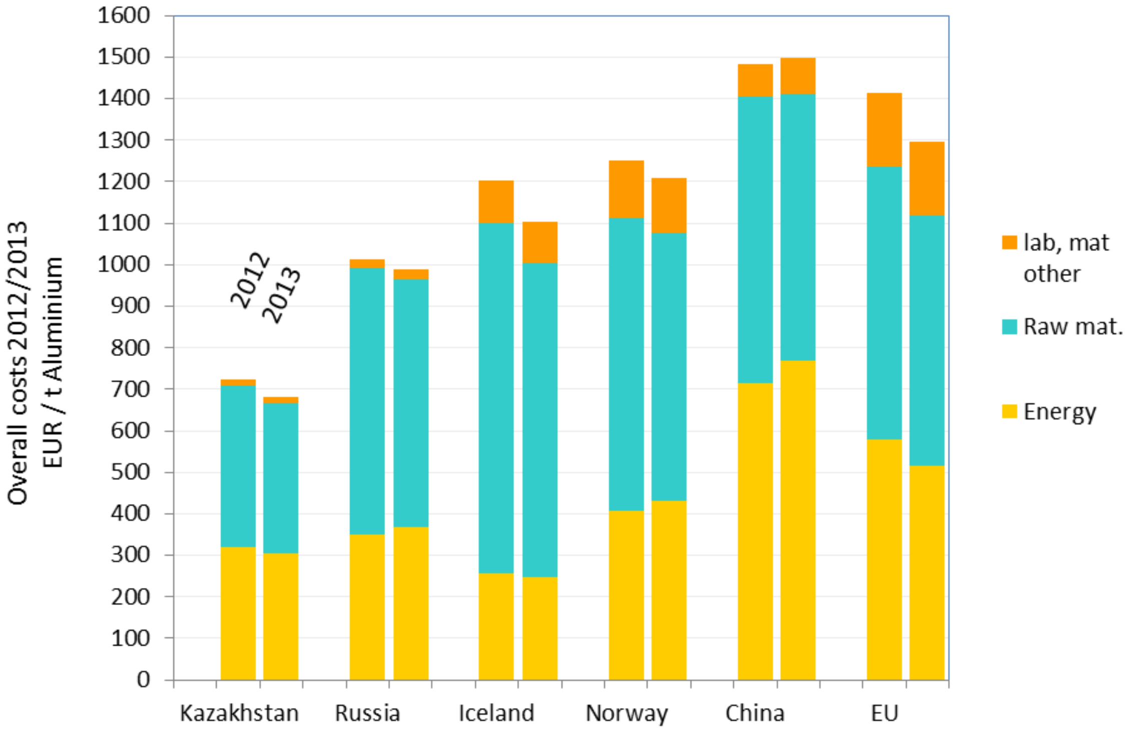
Aluminium *(mainly Primary Aluminium* *(sources: Ecofys, JRC and CEPS et altri studies)*

Primary aluminium is globally traded (London Metal Exchange) and consequently subject to high international competition. A large share of primary aluminium is imported to Europe. For the aggregate of primary aluminium production and aluminium products Europe's major trading partners are Russia, the United States, Turkey and China[6].

The JRC estimated that the average ***production costs*** for the EU for ***primary aluminium*** in 2012 and 2013 are lower than the aluminium prices those years (10% and 7% lower, respectively). However, it should be noted that capital costs are excluded from the analysis. In the EU, the presence of some long term energy contracts makes that some producers have similar production costs to Norwegian, Icelandic and some Russian competitors. Low electricity prices in Iceland, Norway and Russia, due to hydroelectric power, explain much of their cost advantage compared to the production costs in the EU, where energy costs account for around 40% of total production costs. These low power prices also reduce the estimated average production costs. Chinese producers' production costs are the highest (to a great extent due to higher energy costs) but they operate in markets dominated by state intervention.

[6] Europe is a net importer especially of Russian and Turkish aluminium products while the United States, Saudi Arabia, Mexico and South Korea are the net importers of European aluminium products.

Figure 255 – **Primary Aluminium - Summary of total production costs per tonne of cast aluminium in 2012 and 2013**



Source: JRC study

Energy includes electricity, natural gas, coke and coal

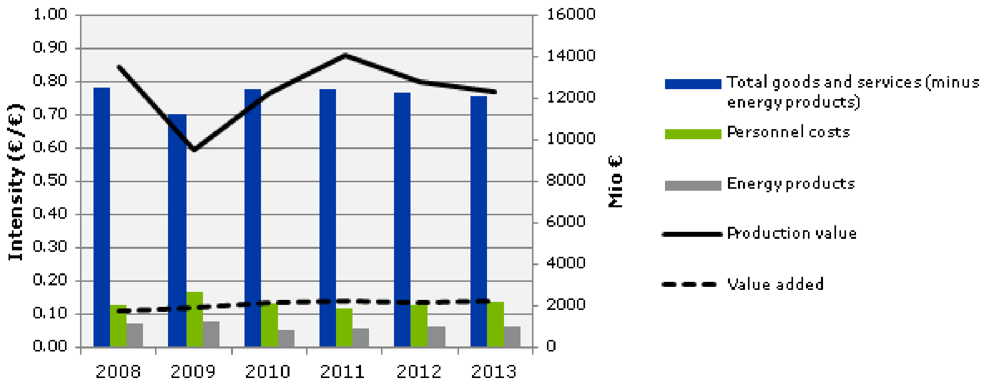
Capital costs (depreciation) not included

The Ecofys study looked at the **production cost structure** of the industry in three Member States which represent 51% of the European added value in the sector: Germany (34%) Greece (9%) and France (8%) Comparing the German, Greek and French (major value added contributors of the EU28) production cost structure shows that, between 2008 and 2015, Greece has an average of approximately 0.16 €/€ by product costs to production value which is significantly higher than in Germany (0.06 €/€) and France (0.05 €/€). Similar to the steel industry these intensities do reflect a country's specialisation.[7]

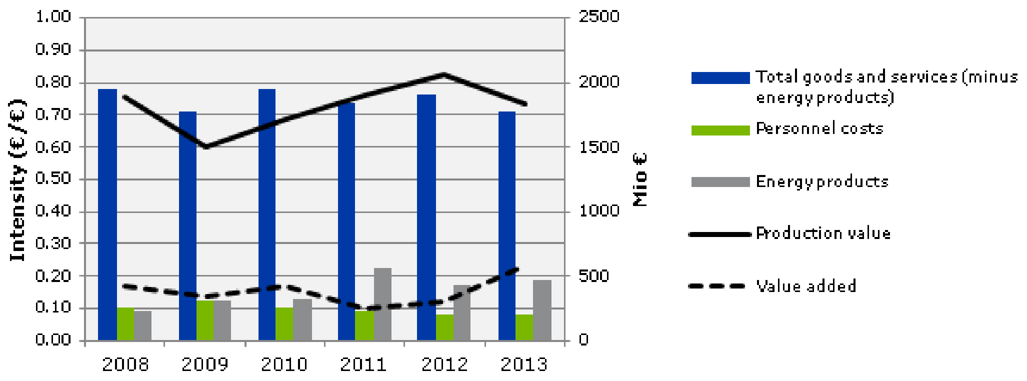
[7] The underlying NACE class 2442 for the analysis includes several products among them semi-finished products as well as both primary and secondary alloyed aluminium (usually delivered as bulk as well). Alloyed aluminium up to customer requests usually creates a higher value added which may contribute to lower intensities e.g. in Germany and higher cost intensity in Greece with little downstream activity.

Figure 256 – **Aluminium (NACE 2442)- Production cost structure (total goods & services[8], personnel costs, energy products), production value and value added in Germany, Greece and France**

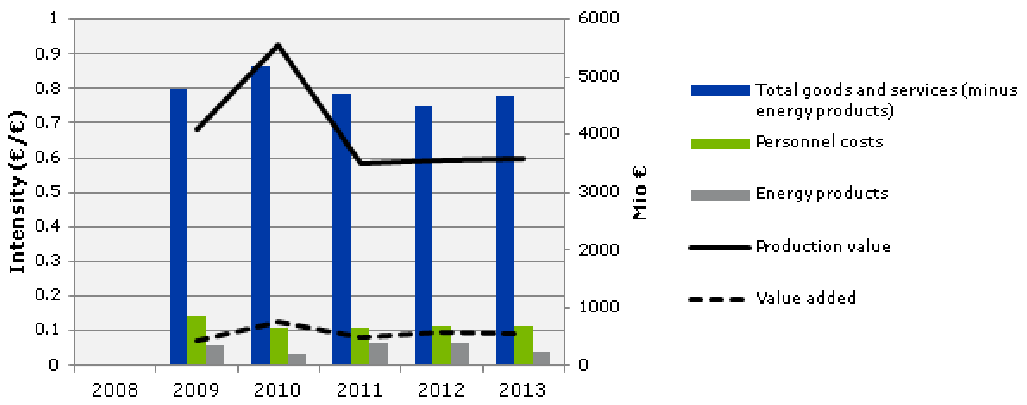
Germany



Greece



France



Source: Ecofys study, Eurostat SBS

[8] Total goods and services have been calculated from Eurostat data. Eurostat total purchases of goods and services and contain by definition also energy purchases. To avoid double counting purchases of energy products in value were subtracted from total purchases of goods and services.

Energy prices paid by the Aluminium industry

The CEPS case study looked at the prices paid by **primary aluminium** as well as **aluminium recyclers and downstream products** [9].

That study indicates that average *electricity prices* for **primary aluminium** in 2015 (40 €/MWh) were higher than in 2008 (35 €/MWh) but 9% lower than the peak level reached in 2012. Yet the spread between minimum and maximum price paid increased over the entire period, with the latter being almost 2.5times higher (66 versus 26€/MWh).

The share of non-energy components in the electricity price (network costs, taxes and levies, RES support) remained stable between 10-13% from 2012 to 2015.

The assessment of energy price components – limited to the period 2012-2015 – indicates a clear reduction in absolute value of the energy supply component (from 44.8 €/MWh to around 31 €/MWh).

Other non-energy components (network costs, taxes and levies, RES support) altogether accounted for about 13% of the price in 2015, compared to 10% in 2012. The increase is mainly linked to increasing network costs while RES support, resulted in 2015 one third lower than in 2012, although they had a sudden peak in 2013.

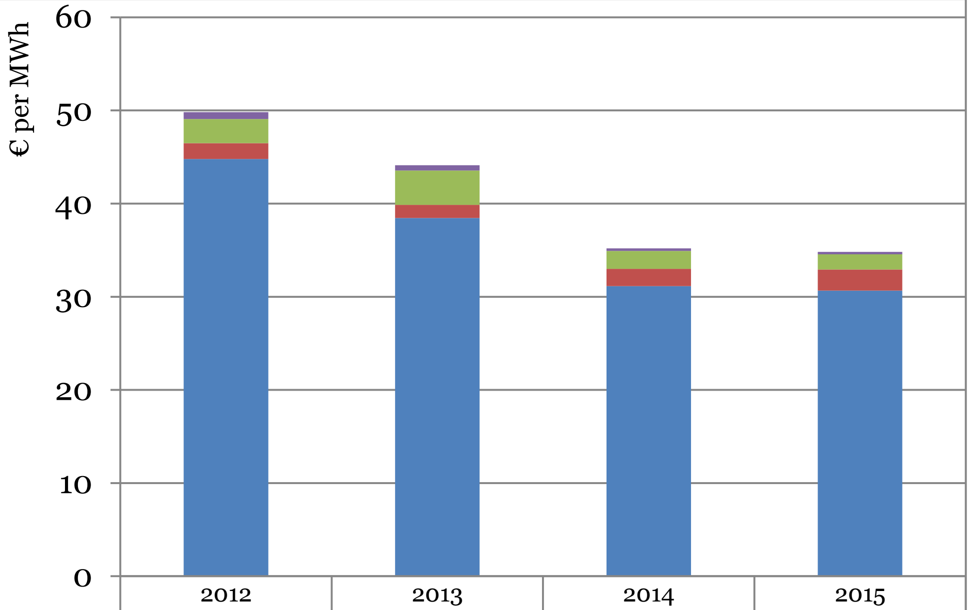
[9] The primary aluminium subsectors and the recyclers and downstream subsector have different products with very different production processes. The grouping in the CEPS study of **recyclers and downstream** products does not represent an ideal solution from an industrial perspective because of the very high variability still associated with activities covered (in terms of size, product, technology and geographic location) but it was found necessary in order to ensure a sufficient sample size and the possibility to present results in the respect of confidentiality concerns.

Table 28. Primary Aluminium - Descriptive statistics for electricity prices paid by sampled producers (€/MWh)

	2008	2010	2012	2013	2014	2015
Number of respondents	8	8	9	9	10	10
EU - Weighted Average (consumption)	34.97	35.93	43.38	40.24	38.35	39.62
EU - Weighted Average (production)	35.77	35.87	44.52	42.35	39.93	40.08
EU - Median	32.2	38.8	40.2	36.3	34.0	40.4
EU - Inter-Quartile Range	6.8	8.7	16.4	19.1	11.8	17.5
EU - Minimum	26.27	25.6	26.24	26.35	25.78	25.64
EU - Maximum	52.2	47.4	61.1	62.9	59.8	61.5
EU - Relative Standard Deviation (weighted average, consumption)	24.39%	19.61%	26.89%	34.93%	28.97%	30.78%
EU - Relative Standard Deviation (weighted average, production)	23.84%	19.65%	26.20%	33.19%	27.82%	30.43%

Source: CEPS et al.

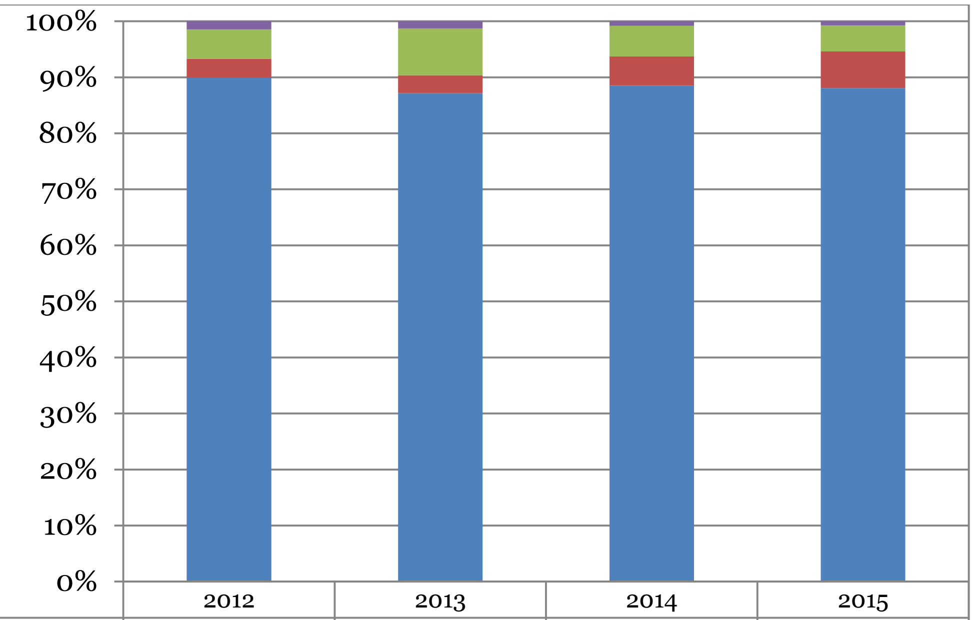
Figure 257 – **Primary Aluminium - Components of the electricity bills paid by sampled producers in the EU (€), 2012 - 2015, annual averages, weighted by consumption**



	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	0,73	0,56	0,29	0,25
Renewable support	2,60	3,69	1,92	1,63
Network costs	1,70	1,41	1,84	2,27
Energy supply costs	44,78	38,45	31,15	30,66

Source: CEPS et al.

Figure 258 – **Primary Aluminium - Components of the electricity bills paid by sampled producers in the EU (%), 2012 - 2015, annual averages, weighted by consumption**



	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	1,5%	1,3%	0,8%	0,7%
Renewable support	5,2%	8,4%	5,5%	4,7%
Network costs	3,4%	3,2%	5,2%	6,5%
Energy supply costs	89,9%	87,2%	88,5%	88,1%

Source: *CEPS et al.*

The CEPS study also assessed recent trends in natural gas price paid by primary aluminium producers, although with a lower coverage in terms of respondents to the questionnaire, due to the fact that natural gas represents a less important energy carriers compared to electricity. Yet, available results indicate a stable to decreasing average price in 2015 compared to 2008, after a peak in 2012.

For **recyclers and downstream producers**, average electricity prices remain relatively stable over the period 2008-2015 (at around 62 €/MWh). However, the average calculated hides very high spreads (median price in 2015 was 104 €/MWh) due to the large variety of different activities included together in the sample (e.g. products, technologies, consumption levels)

Table 29. Recycling and downstream aluminium - Statistics for electricity prices paid by sampled producers (€/MWh)

	2008	2010	2012	2013	2014	2015
Number of respondents	12	15	15	14	15	15
EU - Weighted Average (consumption)	62.36	62.76	66.45	65.77	65.23	62.77
EU - Median	79.98	84.93	93.82	102.09	101.00	104.06
EU - Inter-Quartile Range	27.50	37.35	46.56	51.87	53.82	64.49
EU - Minimum	41.21	42.12	50.84	50.58	52.15	50.52
EU - Maximum	127.73	125.93	161.64	149.75	152.39	145.47
EU - Relative Standard Deviation (weighted average, consumption)	41.02%	41.61%	49.55%	49.79%	51.26%	55.37%

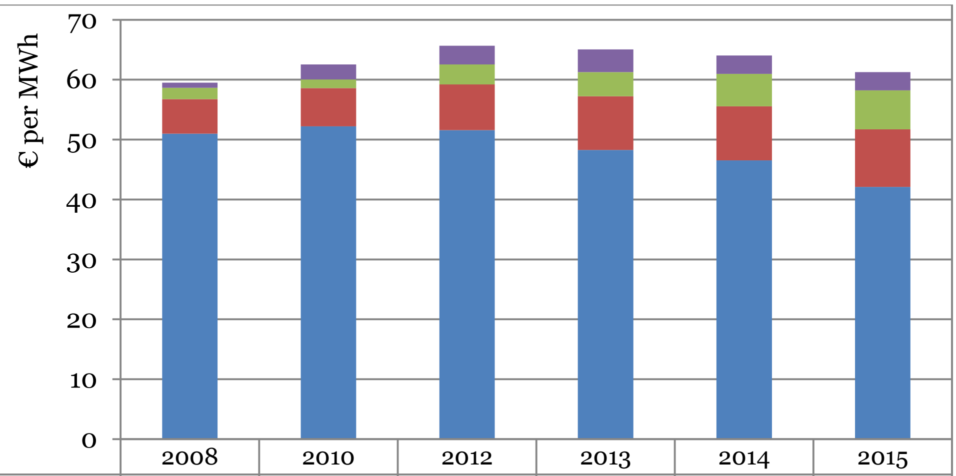
Source: *CEPS et al*.

Compared to primary aluminium, the non-energy components of the price paid by **aluminium recyclers and downstream producers** show a more pronounced increase both in absolute terms and as a share of total price (more than 30% in 2015 versus 15% in 2008). The energy supply component decreased on average from 51 €/MWh in 2008 to 42€/MWh in 2015.

This supports the consideration that primary smelters were to a larger degree exempted from network costs and renewable support measures compared to recyclers and downstream producers.

At the same time, the interpretation of results for recyclers and downstream producers must consider the high heterogeneity of products and process covered, which is also reflected by the considerable spread between the minimum and maximum price observed (146 €/MWh and 51 €/MWh, respectively in 2015).

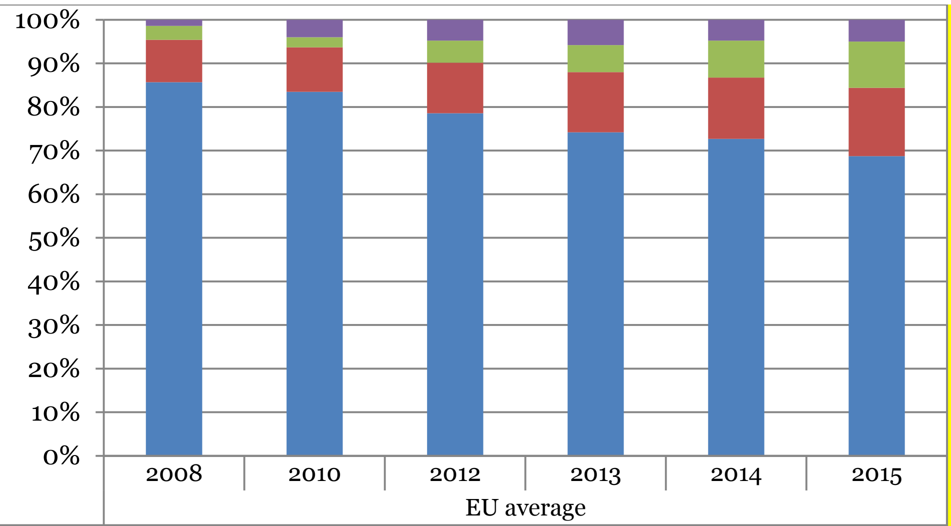
Figure 259 – **Recycling and downstream aluminium - Components of the electricity bills paid by sampled producers in the EU (€), 2008-2015, annual averages, weighted by consumption**



	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	0,84	2,52	3,13	3,79	3,06	3,06
Renewable support	1,91	1,44	3,32	4,02	5,42	6,50
Network costs	5,77	6,37	7,64	8,97	9,01	9,60
Energy supply costs	50,99	52,21	51,58	48,27	46,54	42,10

Source: CEPS et al, authors' own elaboration.

Figure 260 - **Recycling and downstream aluminium - Components of the electricity bills paid by sampled producers in the EU (%), 2008-2015, annual averages, weighted by consumption**



	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	1,4%	4,0%	4,8%	5,8%	4,8%	5,0%
Renewable support	3,2%	2,3%	5,1%	6,2%	8,5%	10,6%
Network costs	9,7%	10,2%	11,6%	13,8%	14,1%	15,7%
Energy supply costs	85,7%	83,5%	78,5%	74,2%	72,7%	68,7%

Source: CEPS et altri, authors' own elaboration

Natural gas prices for recyclers and downstream producers also increased from 27.8€/MWh in 2008 up to 31.9 €/MWh in 2013 and then decreased to 26.4 €/MWh in 2015.

Over the period the energy supply component maintained its relevance and in 2015 it accounted for 88% of total natural gas price paid by surveyed recyclers and down-stream producers.

Table 30. Recycling and downstream aluminium - Statistics for natural gas prices paid by sampled producers (€/MWh)

	2008	**2010**	**2012**	**2013**	**2014**	**2015**
Number of respondents	12	13	13	13	13	13
EU - Weighted Average (consumption)	27.75	22.38	28.52	31.89	28.20	26.38
EU - Median	28.55	23.74	30.99	31.50	28.99	28.73
EU - Inter-Quartile Range	10.27	7.65	9.33	7.45	7.91	6.55
EU - Minimum	20.59	15.10	20.51	20.05	22.61	22.23
EU - Maximum	35.31	35.73	38.62	40.81	44.95	44.00
EU - Standard Deviation (weighted average, consumption)	35.41%	29.75%	19.09%	16.52%	21.00%	22.91%

Source: CEPS et al.

As for steel, CEPS et altri compared recent trends in international energy prices for primary aluminium producers, integrating direct evidence collected via questionnaires with data gathered from the CRU database[10].

Differences in electricity prices paid by primary aluminium producers across the world are stark. EU producers in 2015 paid significantly more (42 €/MWh – simple average) than producers in some other regions such as Canada (13€/MWh), CIS (23€/MWh), Nordic region

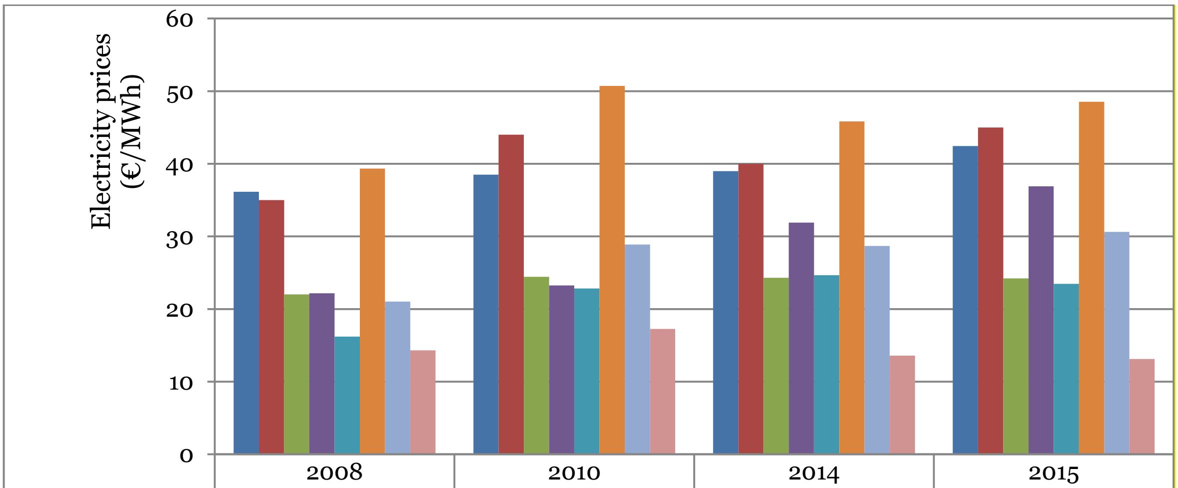
[10] The CRU database takes into account the impact of exchange rates when compiling international data.

(Norway and Iceland - 24€/MWh), the US (31€/MWh) and the Middle East (37€/MWh). While Nordic countries (Iceland and Norway) and Canada are characterised by significant hydro-electric power plants that are frequently owned or operated by the producers of primary aluminium - which enables acquiring electricity at production cost - CIS, the US and the Middle East are characterized by low electricity prices fuelled partially by an abundance of fossil fuels.

However, electricity price spreads between the EU and main competing regions have fallen between 2008 and 2015 (except when comparing to Canada). The sharpest convergence can be observed with the US, CIS and especially the Middle-East. In 2008 EU primary aluminium producers paid over 60% more for their electricity than plants in the Middle East, this difference fell to 15% in 2015.

China is characterized by consistently higher prices for electricity, though the picture is unclear as generally primary aluminium producers and electricity providers are (at least partially) both controlled by the state. Also, computing average prices by using production weights gives a significantly lower result for China (by about half) while levels for other competitors remain comparable to what described above.

Figure 261 – **Primary Aluminium * International comparison of electricity prices paid by producers[11] (2008-2015), in €/MWh[12]**



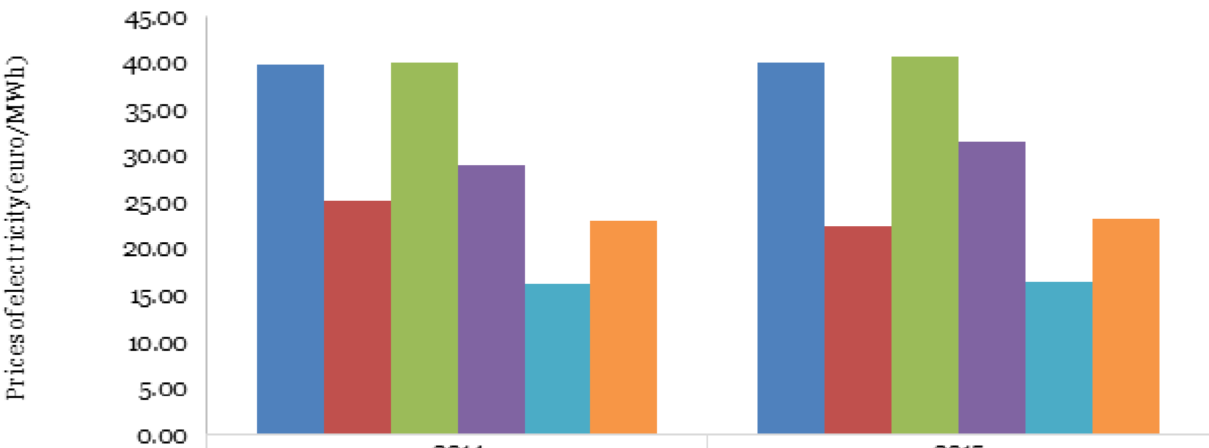
	2008	2010	2014	2015
EU	36,15	38,51	38,98	42,44
Australasia	35,00	44,00	40,00	45,00
Nordic region	22,02	24,44	24,31	24,23
Middle East	22,17	23,26	31,90	36,90
CIS	16,21	22,82	24,65	23,48
China	39,33	50,72	45,82	48,53
USA	21,04	28,88	28,68	30,62
Canada	14,31	17,27	13,58	13,13

Source: CEPS and EA (2013) *Cumulative Cost Assessment for the Aluminium Industry*, and CEPS elaboration on CRU (2013 and 2016).

[11] EU respondents: 8 (2008 -10), 10 (2014 -15), CIS: 8, China 47 (2008), 58 (2010), 93 (2014), 93 (2015), USA: 8, Canada: 9 (2008 -10), 10 (2014 -15), Australasia: 3 (2008-2010), 6 (2014-2015) Middle East: 2 (2008), 3 (2010 -15)

[12] Countries included in each of the regions: Australasia – Australia, Nordic region - Iceland, Norway, Middle East - Turkey, UAE, CIS - Azerbaijan, Kazakhstan, Russia, Tajikistan, Ukraine

Figure 262 – **Primary Aluminium - Prices of electricity - EU vs. international (€/MWh, weighted av. by production) - EU, CIS, US, China, Canada, Nordic region - 2014 -15**[13]



	2014	2015
EU	39.93	40.08
CIS	25.32	22.47
China	40.10	40.82
USA	29.12	31.63
Canada	16.33	16.58
Nordic region	23.07	23.35

Source: CRU (2016) and CEPS elaboration.

CEPS et altri also give indication of recent trends in main performance indicators for primary aluminium producers.

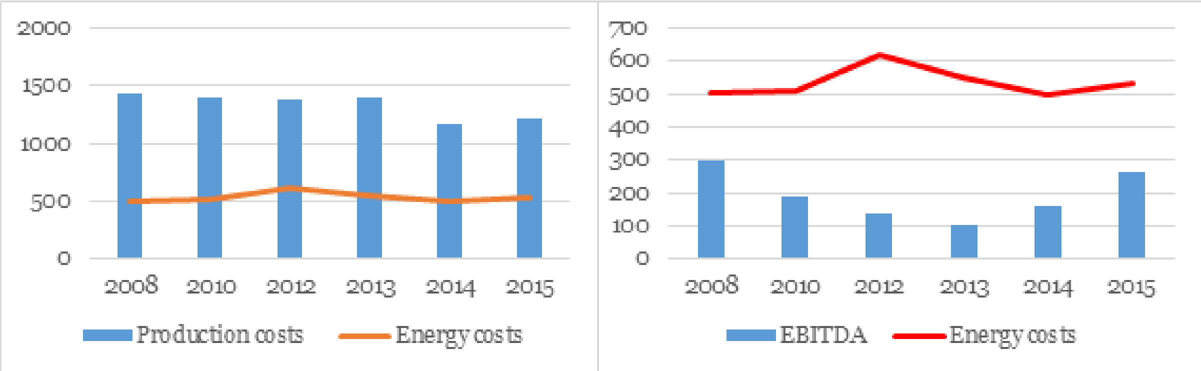
While for individual responding plants in the period assessed energy costs varied between 12% and 46% of production costs weighted averages varied instead between 22% and 32%, almost entirely associated with electricity rather than natural gas.

In absolute terms, energy costs per tonne of production followed energy price trends, i.e. peaking in the 2012-2013 period, slowly declining until 2015, but remaining higher in than in 2008.

Energy costs also resulted to be significantly larger than the sampled plants' EBITDA but mainly due to the energy supply component. Non energy components (network costs, RES support, other taxes, fees, levies and charges) indeed only represented on average between 3%-4% of EBITDA over the whole period.

[13] Number of observations: EU respondents: 8 (2008 -10), 10 (2014 -15), CIS: 8, China 47 (2008), 58 (2010), 93 (2014), 93 (2015), USA: 8, Canada: 9 (2008 -10), 10 (2014 -15)

Figure 257 – **Primary Aluminium - Impact of energy costs over production costs and EBITDA (2008-2015) of sampled plants, in €.**



Source: *CEPS et al.*

2.4 Hollow Glass

Source: Ecofys study

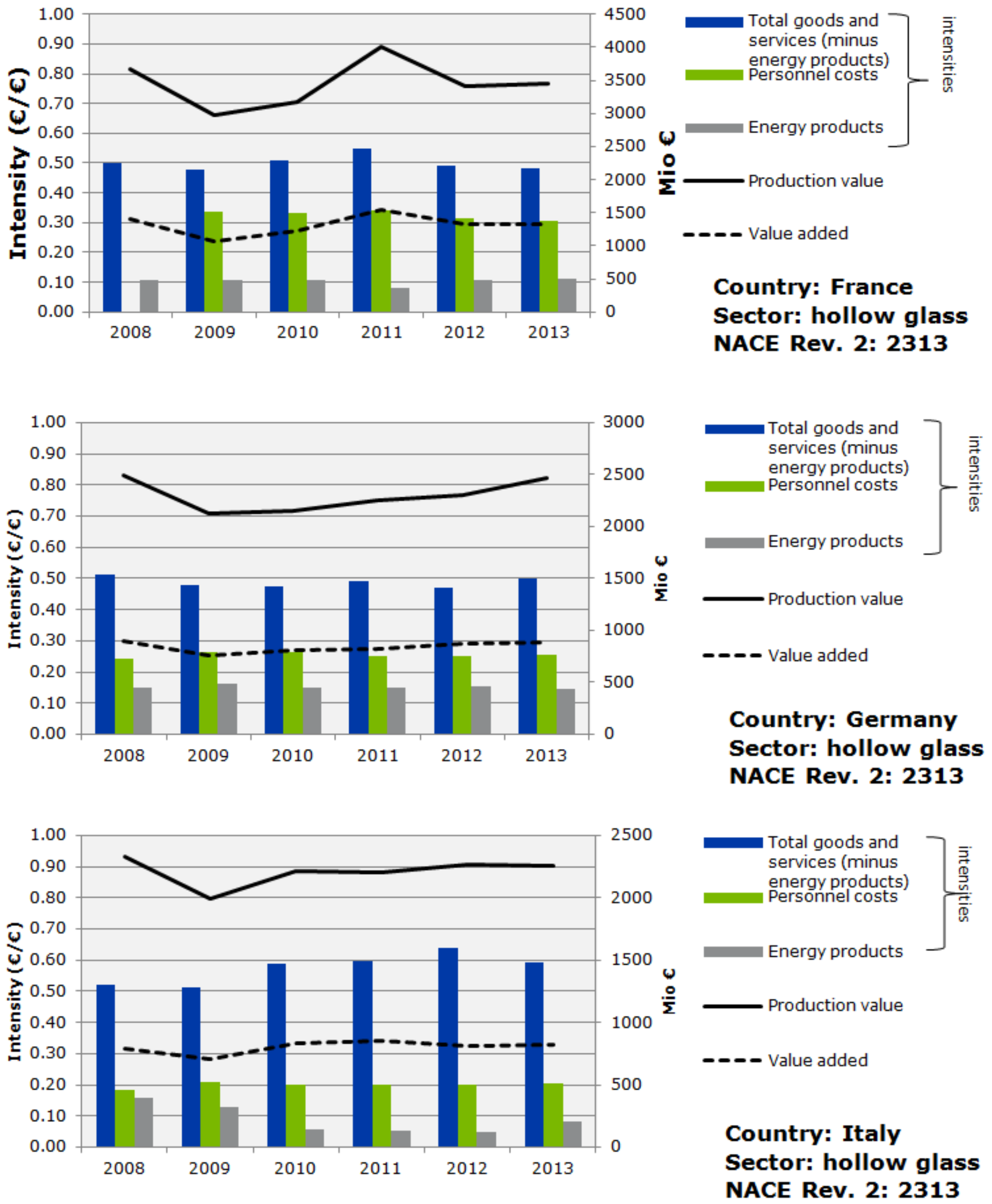
Worldwide, Europe is the largest glass producer with roughly one-third of the total global market. Exports of European glass producers towards G20 countries represent roughly 8% of the production value. This indicates that a major share of production is traded within Europe which can be explained by transport costs generally being high in relation to the sales price[14]. The largest export destinations among the non-EU G20 for hollow glass (tableware) are the United States followed by Russia.

The Ecofys study looks at the glass industry (***Manufacture of hollow glass (NACE Rev 2. C2313)***. in three Member States which represent close to 60% of the added value of the EU sector (France 25%, Germany 17% and Italy17 %)

The analysis of **cost production structures** reveals that purchases of energy products are around 0.10€/€ in France, and slightly higher with around 0.12€/€ in Germany. In Italy, energy purchases were only roughly 0.05€/€ from 2010 to 2012 and are still below 0.10€/€ after an increase in 2013. The lack of energy consumption data (available only for Germany) makes difficult to identify the main reasons for the difference.

[14] For this reason, in the case of container glass - the most relevant sub-sector in NACE 2313 - plants are placed near clients

Figure 263 – **Hollow glass (NACE 2313) - Production cost structure of the sector, production value; value added for France, Germany and Italy**



Source: Ecofys study, Eurostat

2.5 Basic chemicals

Manufacture of other inorganic basic chemicals (NACE Rev 2 C2013).- Comparing the French, German and UK (the major value added contributors of the EU28) production cost structure shows, that while Germany and UK have a higher magnitude of intensity of energy product costs to production value between 2008 and 2015 (0.11 €/€ German average and 0.11 €/€ United Kingdom average), the average French energy product costs intensities are significantly lower at 0.04 €/€. As shown in **Figure 187** and **Figure 188**, electricity prices in France are significantly lower than the UK and Germany which will contribute to the lower intensity. Several other factors will also play a part e.g. production process, integration with other chemical plants.

Europe's major trading partners are Russia, the United States, and China. Europe is a net importer especially of Russian **chlor-alkali** products while the United States are the major net importers of European chlor-alkali products.

International competitiveness assessment of other product markets(ammonia & methanol, ethylene & propylene)

The JRC study looks at the energy costs and production costs in the ammonia/methanol as well as in the ethylene/propylene sectors. It concludes that the decisive factor in ***ammonia and methanol*** production costs is feedstock availability. In the Middle East and in Russia where feedstock (mainly natural gas) is produced locally, production costs are much lower. The EU has higher costs for both products. Estimated average production costs for the EU ammonia industry in 2013 are about 14 % lower than the ammonia price in the western European market. Methanol production in the EU seems to have been facing strong competition. [Figure energy costs ammonia and methanol]

In ***ethylene*** *and* ***propylene*** production, feedstock is an important component of the costs, but as steam cracking is a multi-product process, the credits obtained thanks to co-products produced compensate for part of the costs. The higher the price of fuels in a country, the higher the feedstock costs and the credits obtained.

A major feature of steam cracking is the variety of feedstock that can be used. Different parts of the world have adopted the feedstock most easily available. North America and Saudi Arabian production is based on domestic natural gas liquids, primarily ethane and propane, while ethylene producers in Europe and Russia favour petroleum liquid feeds. Ethane-based industries in general have lower production costs than naphtha-based industries, but the total costs are comparable in all the countries analysed. The price of ethylene in 2013 in the EU was about 1 125 EUR/t, and the average total costs amounted to 748.4 EUR/t when considering ethylene as the main product or to 816.2 EUR/t when both olefins are considered as a product. In the case of propylene, almost all countries have comparable production costs, except Ukraine where propylene is produced only by steam cracking. Production costs are higher in Ukraine as steam cracking is not a process producing mainly propylene.

2.6 Cement

Source: JRC study

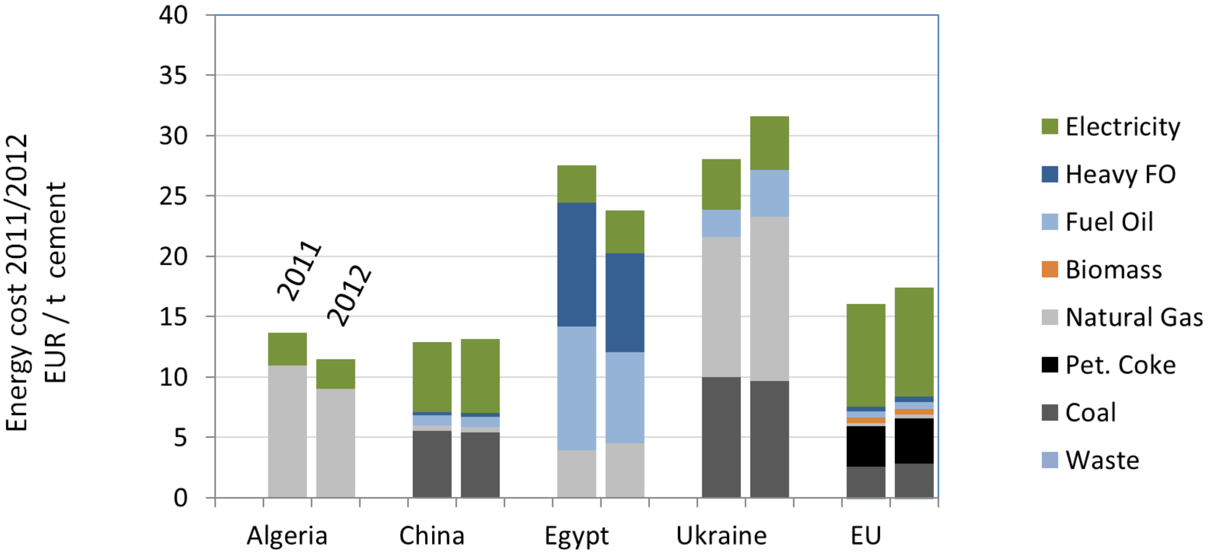
The JRC study concludes that the specific cost of thermal energy consumed by the EU cement industry is quite similar to that of the country with the lowest cost of thermal energy of those studied (China)[15]. When including estimated electricity costs, the EU energy costs per tonne of cement are well below those in Ukraine and Egypt and in the middle of the five countries looked at in the JRC study. The difference between average production costs in China and Algeria (36 EUR/t) and the EU average costs (48 EUR/t) is slightly lower than the transportation cost of crossing the Mediterranean Sea (15 EUR/t).

The JRC study provides insight on the different energy carriers used by the industry internationally and its implications for the energy cost structures. The Figure below summarises the energy costs of the fuel mix used in the countries looked at by the JRC

[15] JRC study only considers Africa, the EU as well as Algeria, Egypt, CIS, Ukraine and China.

study[16]. The figure combines the effect of the fuels price and the performance of the industry in each country. For example, although the thermal performance in Algeria and Egypt is quite similar, their energy costs are however quite different due to the different fuels used: natural gas in Algeria and fuel oil in Egypt.

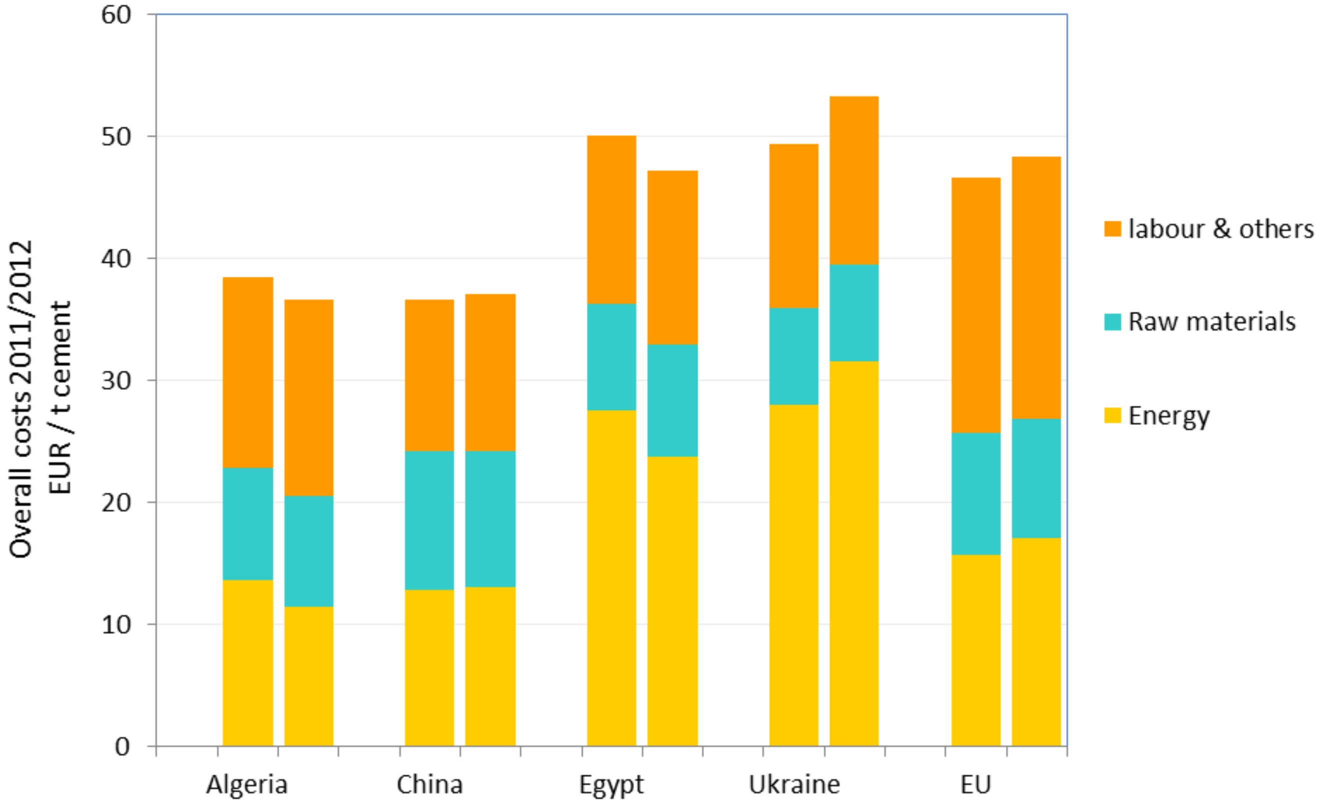
Figure 264 – **Cement - Energy costs in 2011/2012 by energy carrier**



The JRC also puts the energy costs in perspective with other costs and observes that when adding the rest of the costs — raw materials, labour and other costs — the position of the EU industry worsens.

[16] The JRC study uses 2011 and 2012 data. According to EU industrial associations the fuel mix of the EU cement could be changing. In particularly the electricity share could be decreasing due to efforts increase the use of alternative fuels, mainly biomass.

Figure 265 - Cement - Summary of the cement industry costs in 2011 and 2012



2.7 Wall and floor Tiles

Source: CEPS et altri study

The CEPS et altri study allows to get insight on the **energy prices** actually paid by the Wall and floor tiles industry

According to the study, average natural **gas prices** (weighted by respondents' consumption) fluctuated over the period 2008-2015 and in 2015 went down to 29.9 €/MWh, slightly below 2008 levels (30.6 €/MWh).

The comparison between simple and weighted averages indicates that plants with higher consumption levels normally reported lower prices.

The spread between minimum and maximum price paid remained fairly stable over the assessed period.

Table 31. Wall and floor tiles - Statistics for natural gas prices paid by sampled producers (2008-15, €/MWh)

	2008	2010	2012	2013	2014	2015
EU (average)[17]	29.8	25.8	33.9	33.8	34.2	30.6
EU (weighted average)[18]	30.6	24.1	32.8	32.5	32.6	29.9
EU (median)	29.7	25.9	33.1	32.4	31.1	29.0
EU (IQR)	0.6	4.0	6.5	5.9	8.7	3.7
EU - Relative standard deviation	4.7%	11.6%	11.9%	12.5%	16.9%	12.8%
EU (minimum)	27.6	20.9	27.4	25.1	26.4	25.0
EU (maximum)	33.6	31.1	40.4	40.8	41.8	39.1
Central Eastern Europe (simple average)	26.0	25.9	29.4	28.9	27.2	25.7
Southern Europe (simple average)	30.3	26.2	34.9	34.9	35.6	31.4
Central Eastern Europe (consumption weighted average)	29.8	25.0	29.1	28.4	27.5	26.1
Southern Europe (consumption weighted average)	30.9	24.3	33.6	33.4	33.6	30.6

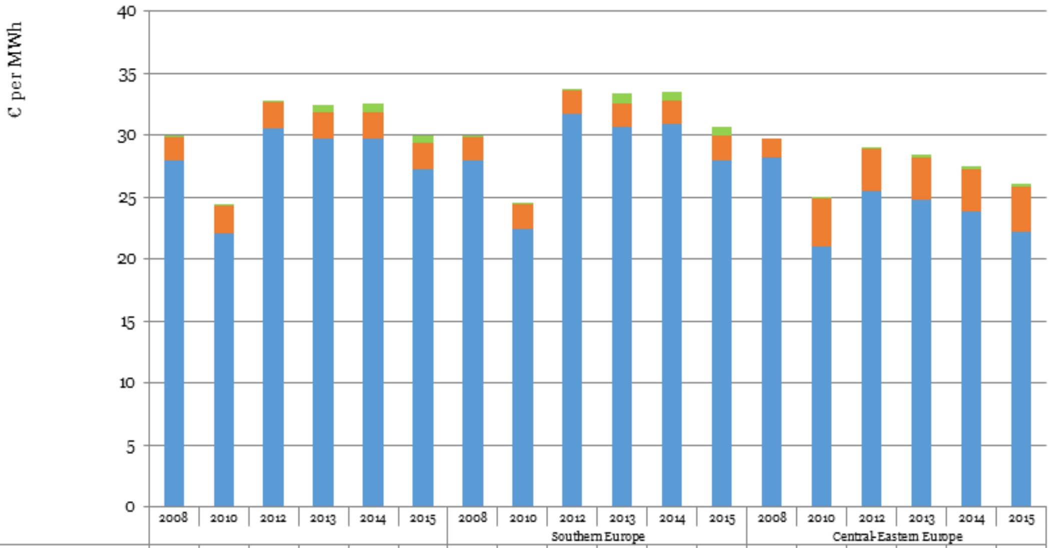
Note: Observations from 22 plants in all years but in 2008 (20 plants)
Source: *CEPS et al*.

In terms of price components, network costs and taxes generally constitute a very limited share of gas prices, on average less than 10%.

[17] This average is computed by aggregating the simple average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional average to reflect the uneven distribution of production across the EU.

[18] Weighting factor: gas consumption. This average is computed by aggregating the weighted average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional weighted average to reflect the uneven distribution of production across the EU.

Figure 266 - **Wall and floor tiles - Components of the natural gas bills paid by sampled producers (€/MWh), weighted averages[19], 2008 - 2015**

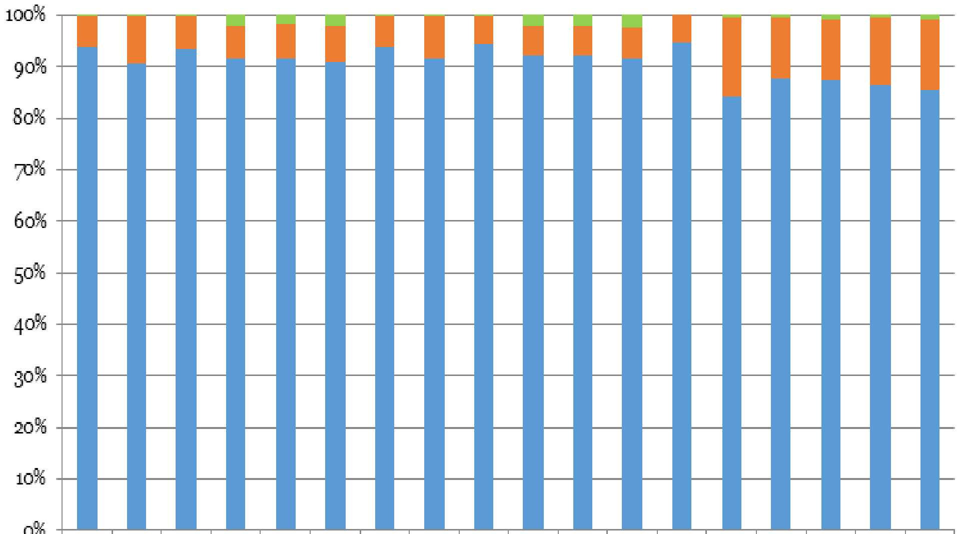


	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
							Southern Europe						Central-Eastern Europe					
Other taxes, fees, levies and charges (excl. VAT)	0,0	0,1	0,1	0,7	0,6	0,6	0,0	0,0	0,0	0,7	0,7	0,7	0,0	0,2	0,2	0,2	0,2	0,2
Network costs	1,8	2,2	2,1	2,1	2,1	2,1	1,9	2,1	1,9	1,9	1,9	1,9	1,6	3,8	3,4	3,4	3,5	3,6
Energy supply costs	27,9	22,0	30,6	29,7	29,7	27,2	28,0	22,4	31,7	30,7	30,9	28,0	28,2	21,1	25,5	24,8	23,8	22,2

Note: Observations from 22 plants in all years but in 2008 (16 plants) and 2010 (18 plants).
Source: *CEPS et al*.

[19] Weighting factor: gas consumption. The EU average is computed by aggregating the weighted average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional weighted average to reflect the uneven distribution of production across the EU.

Figure 267 - **Wall and floor tiles - Components of the natural gas bills paid by sampled producers (%), weighted averages[20], 2008 - 2015**



	EU average						Southern Europe						Central-Eastern Europe					
	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	0,1%	0,2%	0,3%	2,0%	1,9%	2,1%	0,0%	0,1%	0,1%	2,2%	2,1%	2,4%	0,0%	0,6%	0,6%	0,7%	0,6%	0,8%
Network costs	6,2%	9,1%	6,4%	6,5%	6,6%	7,2%	6,3%	8,4%	5,7%	5,8%	5,8%	6,2%	5,3%	15,1%	11,7%	12,1%	12,8%	13,9%
Energy supply costs	93,7%	90,6%	93,3%	91,5%	91,5%	90,8%	93,7%	91,5%	94,3%	92,0%	92,1%	91,4%	94,7%	84,2%	87,7%	87,3%	86,5%	85,3%

Note: Observations from 22 plants in all years but in 2008 (16 plants) and 2010 (18 plants).
Source: *CEPS et al*.

Differently from gas, electricity prices showed a general upward trend over the period both in their median (+14.7%) and weighted average value (+8.3%). The fact that EU simple averages are higher than consumption weighted averages confirms the indication that larger consumers purchased electricity at lower prices. The analysis also showed an increasing spread between minimum and maximum price paid, with the latter being more than double in almost all years.

[20] Weighting factor: gas consumption. The EU average is computed by aggregating the weighted average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional weighted average to reflect the uneven distribution of production across the EU.

Table 32. Wall and floor tiles - Statistics for electricity prices paid by sampled producers (2008-2015, €/MWh)

	2008	2010	2012	2013	2014	2015
EU (average)[21]	95.3	87.3	104.6	105.2	101.7	107.1
EU (weighted average)[22]	96.6	86.3	103.8	104.5	100.0	104.7
EU (median)	86.6	81.9	93.9	101.0	93.9	99.4
EU (IQR)	24.3	18.0	24.6	21.7	30.0	40.3
EU - Relative standard deviation	22.6%	15.9%	19.8%	19.8%	22.9%	27.4%
EU (minimum)	68.2	69.0	76.2	74.3	69.3	66.3
EU (maximum)	141.4	120.7	155.2	153.7	145.2	151.6
Central Eastern Europe (simple average)	75.6	72.4	83.9	83.2	72.3	69.0
Southern Europe (simple average)	96.3	90.3	108.1	108.8	105.9	111.6
Central Eastern Europe (consumption weighted average)	75.3	71.7	83.0	83.4	71.8	68.8
Southern Europe (consumption weighted average)	97.9	89.2	107.3	107.9	103.9	108.7

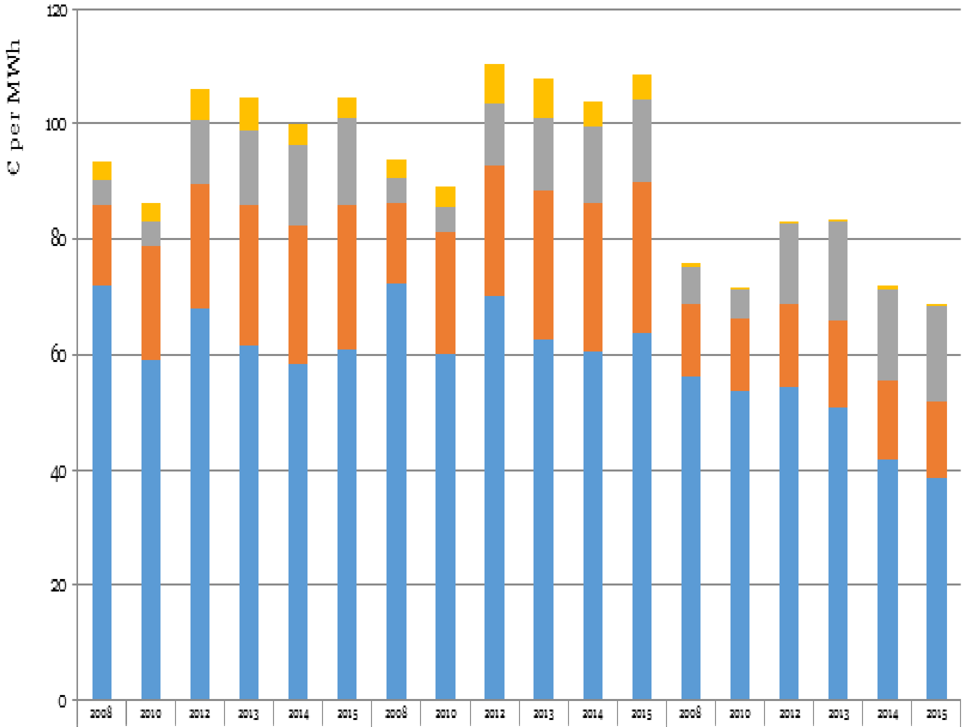
Note: Observations from 22 plants in all years but in 2008 (21 plants)
Source: *CEPS et al*.

CEPS et altri indicates that, as expected non-energy components (network costs, RES support, other taxes and fees) played a relevant role in the composition of total electricity prices paid by wall and floor tiles producers. Their share increased over the years and accounted for about 42% in 2015, almost double the share observed for 2008. While the increased importance was associated with a marked reduction of the energy component - down on average from 72€/MWh in 2008 to €61€/MWh in 2015 – it also results from a significant increase in absolute terms of both RES support and network costs which in 2015 resulted triple and double, respectively compared to 2008.

[21] This average is computed by aggregating the simple average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional average to reflect the uneven distribution of production across the EU.

[22] Weighting factor: electricity consumption. This average is computed by aggregating the weighted average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional weighted average to reflect the uneven distribution of production across the EU

Figure 268 - **Wall and floor tiles - Components of the electricity bills paid by sampled producers (€/MWh), weighted averages[23], 2008 - 2015**

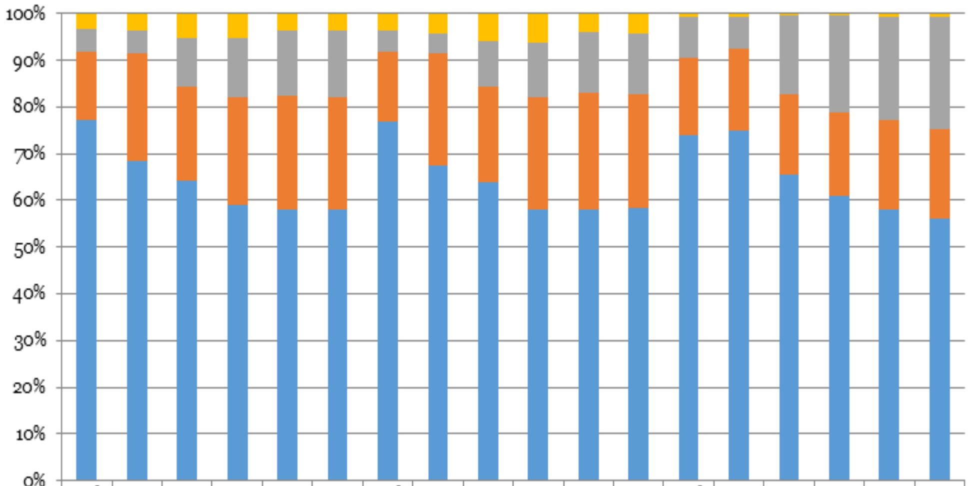


	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
							Southern Europe						Central-Eastern Europe					
Other taxes, fees, levies and charges (excl. VAT)	3,2	3,2	5,5	5,6	3,6	3,8	3,4	3,7	6,5	6,7	4,3	4,6	0,5	0,4	0,4	0,4	0,5	0,5
Renewable support	4,3	4,1	11,0	13,2	14,0	15,0	4,1	4,0	10,8	12,7	13,5	14,3	6,7	5,1	13,8	17,3	15,9	16,5
Network costs	13,9	20,0	21,4	24,2	24,3	25,0	14,1	21,4	22,6	25,9	25,8	26,3	12,6	12,5	14,4	14,8	13,8	13,4
Energy supply costs	72,1	58,9	68,2	61,6	58,1	60,9	72,3	60,1	70,3	62,6	60,3	63,6	56,1	53,8	54,3	50,9	41,7	38,5

Note: Observations from 22 plants but in 2008 (18 plants), 2010 (20 plants) and 2012 (21 plants).
Source: *CEPS et al*.

[23] Weighting factor: electricity consumption. The EU average is computed by aggregating the weighted average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional weighted average to reflect the uneven distribution of production across the EU.

Figure 269 - **Wall and floor tiles - Components of the electricity bills paid by sampled producers (%), weighted averages[24], 2008 - 2015**



	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
	EU average						Southern Europe						Central-Eastern Europe					
Other taxes, fees, levies and charges (excl. VAT)	3,4%	3,7%	5,2%	5,3%	3,6%	3,6%	3,6%	4,2%	5,9%	6,2%	4,1%	4,2%	0,7%	0,6%	0,5%	0,5%	0,7%	0,7%
Renewable support	4,6%	4,8%	10,4%	12,6%	14,0%	14,3%	4,4%	4,4%	9,8%	11,7%	13,0%	13,2%	8,8%	7,1%	16,6%	20,7%	22,1%	23,9%
Network costs	14,8%	23,2%	20,2%	23,2%	24,3%	23,8%	15,0%	24,0%	20,5%	24,0%	24,8%	24,2%	16,6%	17,4%	17,4%	17,8%	19,2%	19,4%
Energy supply costs	77,2%	68,3%	64,2%	58,9%	58,2%	58,2%	76,9%	67,4%	63,8%	58,0%	58,0%	58,5%	73,9%	75,0%	65,5%	61,0%	58,0%	55,9%

Note: Observations from 22 plants but in 2008 (18 plants), 2010 (20 plants) and 2012 (21 plants).
Source: *CEPS et al*.

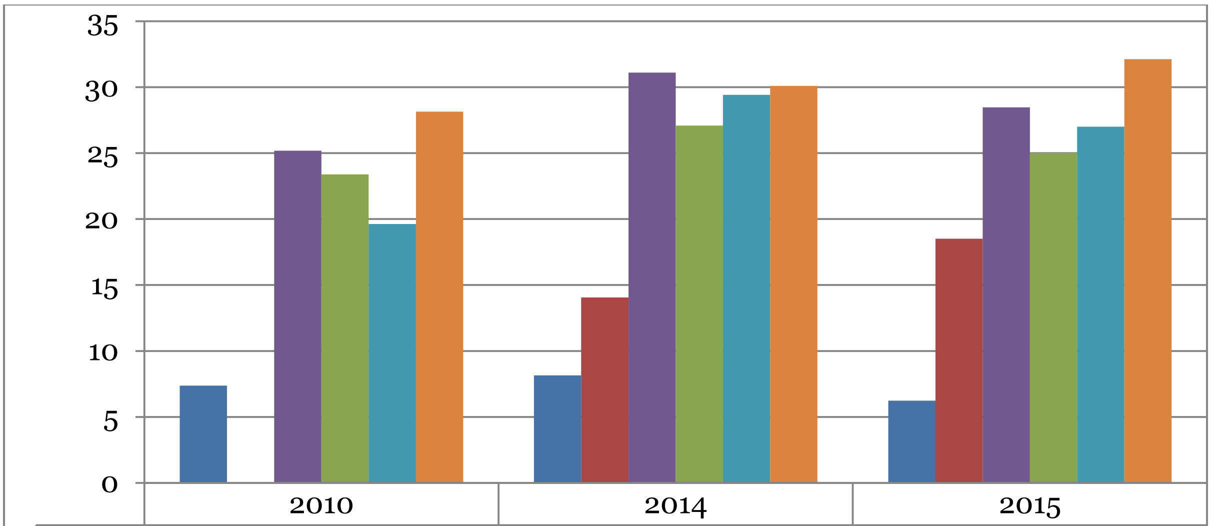
International price comparison in clay building materials (NACE 23.3, including wall and floor tiles and bricks and roof tiles)

CEPS et altri tried also to assess recent trends in energy prices paid by ceramics producers in comparison to non-EU competitors. However, due to data limitations and the lack of any international database for the sector, information could be collected only from four extra-European plants - two bricks and tiles plants in Russia, one wall and floor tiles plant in Russia, and one bricks and tiles plant in the US - run by multinational European companies participating in the study. This limits of course the representativeness of findings which are only to be considered as indicative. Also, due to limited confidentiality reasons results are presented jointly for the bricks and tiles and the wall and floor tiles sub-sectors.

In 2015, Russian plants paid approximately 6 €/MWh, about 78% less than the calculated EU average, and 75% less than the Central-Eastern Europe average, their closest neighbours. In 2014 and 2015, reported US prices for natural gas were in between 14 and 19 €/MWh, that is 35% lower than those paid by their European peers. Given the high importance of natural gas costs in total production costs (about 20% for bricks and tiles and wall and floor tiles together), competiveness implications are clear. Compared to natural gas, the electricity price differential is also evident although less stark, in particular compared to the US.

[24] Weighting factor: electricity consumption. The EU average is computed by aggregating the weighted average in each region. Yet, as mentioned in the sampling strategy and sample statistics section above, a different weight is applied to each regional weighted average to reflect the uneven distribution of production across the EU.

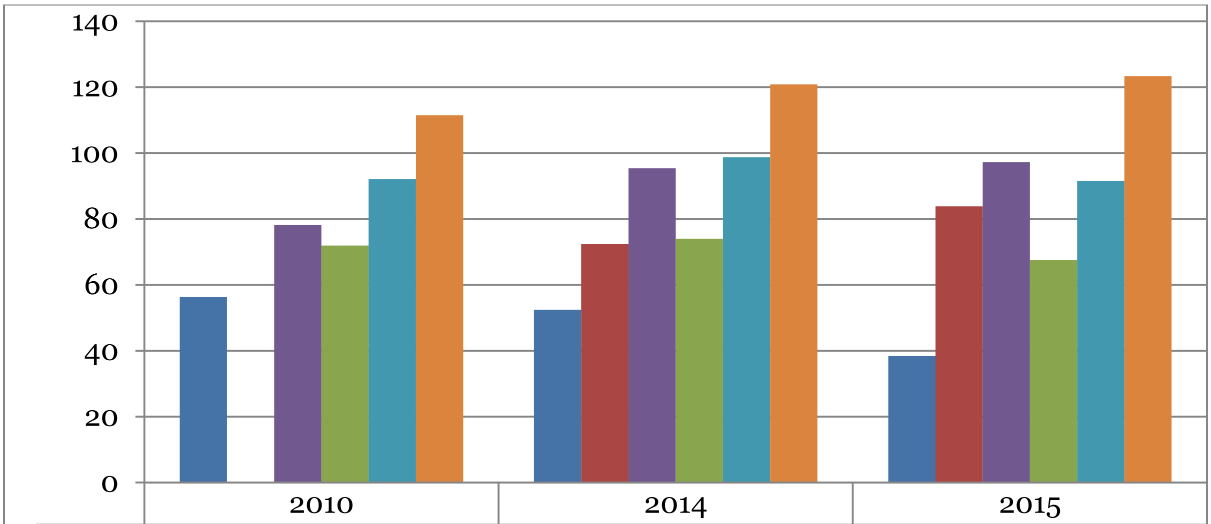
Figure 270 – **Clay building materials - Prices of natural gas - EU vs. individual plants in third countries (€/MWh) (2008 - 2015)**



	2010	2014	2015
RU	7,4	8,1	6,2
US		14,1	18,5
EU	25,2	31,1	28,5
CEE	23,4	27,1	25,0
NWE	19,6	29,4	27,0
SE	28,2	30,1	32,1

Source: *CEPS et al.*

Figure 266 – **Clay building materials - Prices of electricity - EU vs. individual plants in third countries (€/MWh) (2008 – 2015)**



	2010	2014	2015
RU	56,3	52,4	38,4
US		72,5	83,8
EU	78,2	95,4	97,3
CEE	71,9	74,0	67,6
NWE	92,1	98,7	91,6
SE	111,5	120,8	123,4

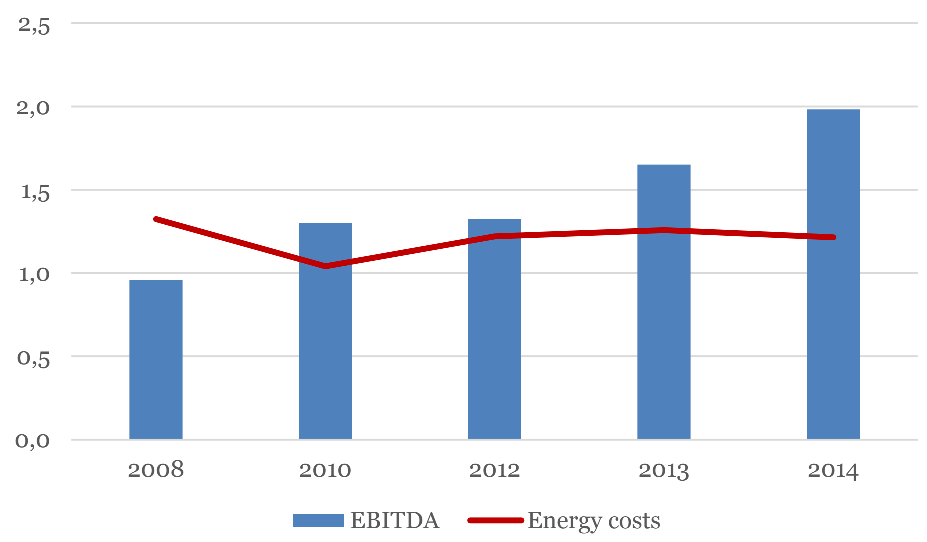
Source: *CEPS et al.*

Performance indicators and impacts of energy costs in the wall and floor tiles sector

CEPS et altri also give indication of recent trends in main performance indicators for wall and floor tiles producers.

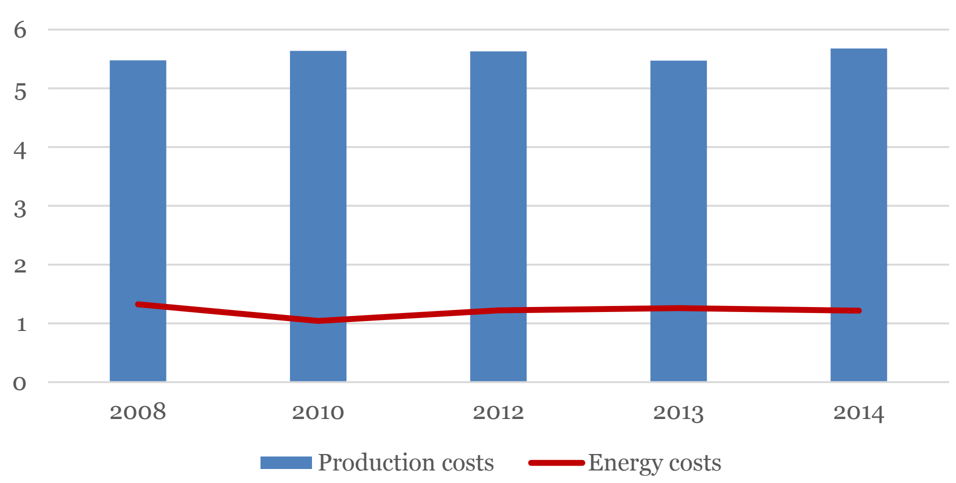
Energy prices and costs showed to be important for the competitiveness of the sector, in particular having a potential major impact on the financial performance of respondents. Total energy costs were higher than or significant compared to EBITDA and represented some 20% or more of the total production costs over the whole period investigated.

Figure 271 - **Wall and floor tiles - Energy costs vs. EBITDA (euro/m^2) for sampled producers (consumption weighted averages)**



Note: Observations from 22 plants in all years but in 2008 (21 plants for EBITDA and 20 plants for energy costs). 2015 data are not shown due to a lower number of respondents and confidentiality reasons.
Source: *CEPS et al.*

Figure 272 - **Wall and floor tiles - Energy costs vs. Production costs (euro/m2) for sampled producers (consumption weighted averages)**



Note: Observations from 22 plants in all years but in 2008 (21 plants for production costs and 20 plants for energy costs). 2015 data are not shown due to a lower number of respondents and confidentiality reasons.
Source: *CEPS et al.*

2.8 Bricks and Roof Tiles

Source: CEPS et altri

The *CEPS et altri* study allows to get insight on the **energy prices paid** by the Bricks and Roof Tiles industry.

EU average *natural **gas price*** paid increased in the period 2008-2013 (from 27.2 €/MWh to 30.1 €/MWh) and then declined until 2015 back to levels slightly lower than in 2008 (27 €/MWh). High and increasing variation can be observed across Europe between minimum and maximum price paid, with the latter being almost four times the former in 2015.

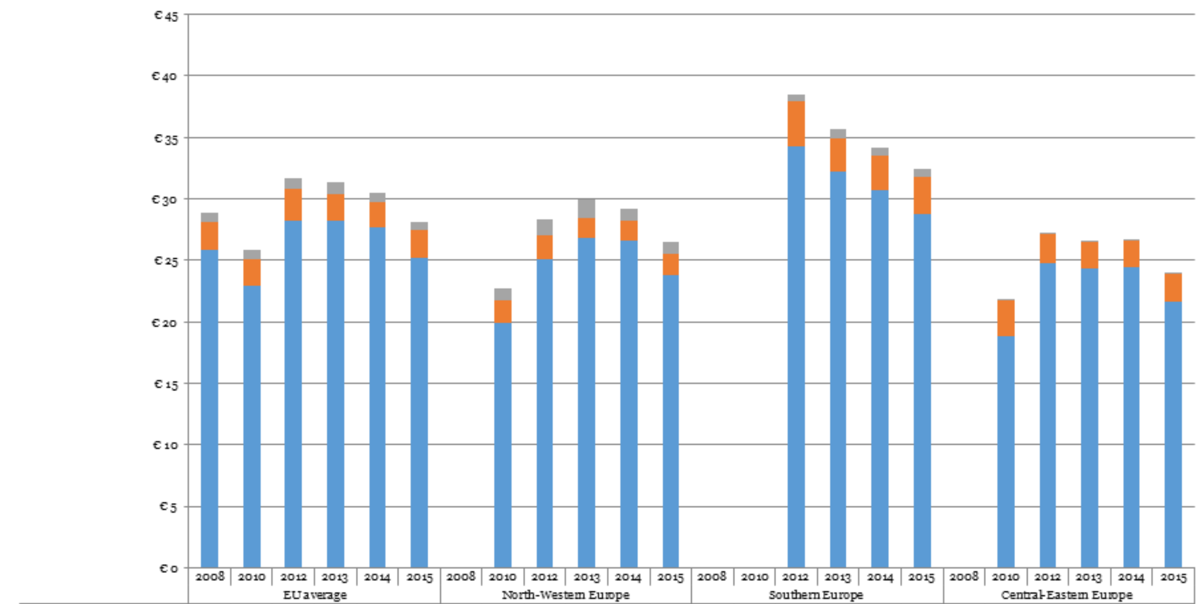
As for other sectors, the split of the *natural gas price* into components shows a very limited role of the non-energy components.

Table 33. Bricks and roof tiles - Descriptive statistics for natural gas prices paid by sampled producers (2008-2015, €/MWh)

	2008	**2010**	**2012**	**2013**	**2014**	**2015**
EU - Weighted Average	27.19	26.26	29.10	30.09	29.61	27.04
EU - Simple Average	28.79	28.59	32.51	33.26	30.01	30.93
EU - Median	28.56	29.93	31.30	33.54	31.97	30.61
EU - Inter-Quartile Range	3.38	5.88	6.99	5.68	5.93	5.61
EU - Minimum	18.66	13.16	18.96	17.60	16.45	14.37
EU - Maximum	40.31	38.00	49.17	52.86	49.12	52.72
NWE - Weighted Average	26.96	19.63	22.50	29.95	29.42	27.00
SE - Weighted Average	29.02	32.00	35.83	36.59	36.59	33.66
CEE - Weighted Average	26.54	21.79	26.59	26.59	26.67	23.95
NWE - Simple Average	29.85	28.84	30.97	31.91	31.42	29.85
SE - Simple Average	28.71	31.67	37.58	39.37	39.13	36.62
CEE - Simple Average	26.04	21.84	26.73	26.26	26.52	23.99

Note: Based on 60 respondents; 10.5% of the sector's production value.
Source: *CEPS et al*.

Figure 273 - **Bricks and roof tiles - Components of the natural gas bills paid by sampled producers, (€/MWh, 2008 – 2015)**

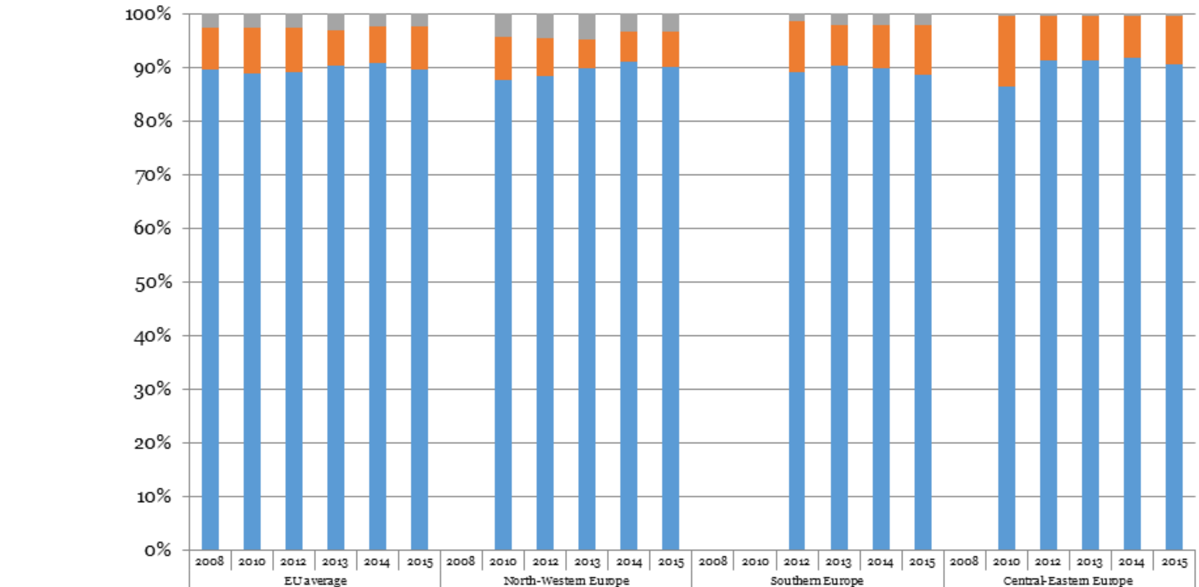


	EU average 2008	EU average 2010	EU average 2012	EU average 2013	EU average 2014	EU average 2015	North-Western Europe 2008	North-Western Europe 2010	North-Western Europe 2012	North-Western Europe 2013	North-Western Europe 2014	North-Western Europe 2015
Other taxes, fees, levies and charges (excl VAT)	0,75	0,69	0,81	0,96	0,72	0,68		0,99	1,27	1,44	0,96	0,90
Network costs	2,24	2,15	2,64	2,10	2,10	2,26		1,80	2,04	1,61	1,64	1,75
Energy supply costs	25,86	22,96	28,19	28,25	27,65	25,16		19,90	25,05	26,86	26,58	23,82

	Southern Europe 2008	Southern Europe 2010	Southern Europe 2012	Southern Europe 2013	Southern Europe 2014	Southern Europe 2015	Central-Eastern Europe 2008	Central-Eastern Europe 2010	Central-Eastern Europe 2012	Central-Eastern Europe 2013	Central-Eastern Europe 2014	Central-Eastern Europe 2015
Other taxes, fees, levies and charges (excl VAT)			0,51	0,72	0,72	0,67		0,08	0,12	0,12	0,09	0,09
Network costs			3,67	2,73	2,72	3,00		2,85	2,27	2,18	2,11	2,17
Energy supply costs			34,28	32,20	30,75	28,79		18,85	24,82	24,28	24,46	21,69

Note: Based on 43 respondents; 8.9% of the sector's production value
Source: CEPS et al.

Figure 274 - **Bricks and roof tiles - Components of the natural gas bills paid by sampled producers, (%, 2008 – 2015)**



	EU average 2008	EU average 2010	EU average 2012	EU average 2013	EU average 2014	EU average 2015	North-Western Europe 2008	North-Western Europe 2010	North-Western Europe 2012	North-Western Europe 2013	North-Western Europe 2014	North-Western Europe 2015
Other taxes, fees, levies and charges (excl VAT)	2,6%	2,7%	2,5%	3,1%	2,4%	2,4%		4,3%	4,5%	4,8%	3,3%	3,4%
Network costs	7,8%	8,3%	8,4%	6,7%	6,9%	8,0%		7,9%	7,2%	5,4%	5,6%	6,6%
Energy supply costs	89,6%	89,0%	89,1%	90,2%	90,7%	89,6%		87,7%	88,3%	89,8%	91,1%	90,0%

	Southern Europe 2008	Southern Europe 2010	Southern Europe 2012	Southern Europe 2013	Southern Europe 2014	Southern Europe 2015	Central-Eastern Europe 2008	Central-Eastern Europe 2010	Central-Eastern Europe 2012	Central-Eastern Europe 2013	Central-Eastern Europe 2014	Central-Eastern Europe 2015
Other taxes, fees, levies and charges (excl VAT)			1,3%	2,0%	2,1%	2,1%		0,4%	0,4%	0,5%	0,3%	0,4%
Network costs			9,5%	7,7%	8,0%	9,2%		13,1%	8,3%	8,2%	7,9%	9,1%
Energy supply costs			89,1%	90,3%	89,9%	88,7%		86,5%	91,2%	91,3%	91,7%	90,5%

Note: Based on 43 respondents; 8.9% of the sector's production value
Source: CEPS et al.

The average ***electricity price*** shows an increasing trend, from 80.4€/MWh in 2008 to 86 €/MWh in 2013, up to 89.8 €/MWh in 2015.

Price variation across regions is even larger than for gas, possibly due to higher weight of regulated components and higher fragmentation of national policies. The spread between minimum and maximum price paid by respondents was the highest in 2012 (158 €/MWh) but still above 100 €/MWh in 2015.

Table 34. Bricks and roof tiles - Statistics for electricity prices paid by sampled producers (€/MWh, 2008-2015)

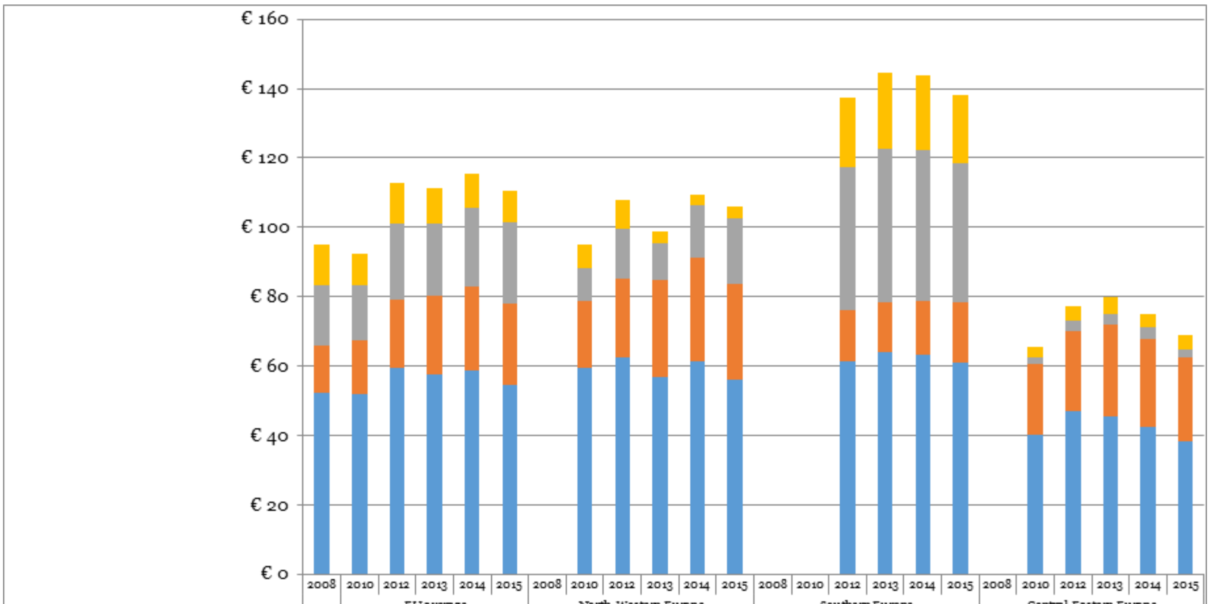
	2008	**2010**	**2012**	**2013**	**2014**	**2015**
EU - Weighted Average	80.42	72.09	83.94	85.97	90.72	89.82
EU - Simple Average	88.70	89.17	108.65	109.29	107.43	103.42
EU - Median	86.52	83.05	97.82	97.95	92.09	88.32
EU - Inter-Quartile Range	23.83	29.41	33.69	23.83	33.46	41.39
EU - Minimum	43.88	26.95	30.00	40.30	42.95	32.27
EU - Maximum	115.01	133.05	188.30	179.10	155.68	150.83
NWE - Weighted Average	78.17	74.02	87.30	89.95	97.62	97.26
SE - Weighted Average	102.94	98.40	133.49	134.49	129.56	127.68
CEE - Weighted Average	72.73	67.91	77.43	77.82	72.57	66.43
NWE - Simple Average	88.18	92.12	102.16	97.34	98.69	91.57
SE - Simple Average	96.70	95.82	133.74	141.73	137.78	138.04
CEE - Simple Average	74.35	67.99	77.00	77.72	71.62	67.59

Note: Based on 43 respondents; 10.5% of the sector's production value
Source: CEPS et al.

Contrary to gas, the impact of non-energy components on the electricity price is significant and increased over time. In 2015, network costs, RES support, and other taxes and fees (excluding VAT) accounted for 51% of the weighted EU average price.

The result is mainly driven by increasing RES support and network costs in absolute terms, with both reaching about 23 €/MWh in 2015, compared to 17 €/MWh and 14 €/MWh respectively in 2008.

Figure 275 - **Bricks and roof tiles - Components of electricity bills paid by sampled producers (€/MWh, 2008 - 2015)**



EU average	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	11,72	9,23	11,69	10,18	9,77	9,13
Renewable support	17,44	15,83	21,70	20,74	22,72	23,35
Network costs	13,61	15,45	19,96	22,97	24,09	23,39
Energy supply costs	52,30	52,06	59,38	57,47	58,77	54,65

North-Western Europe	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)		6,86	8,46	3,74	3,28	3,33
Renewable support		9,65	14,37	10,29	14,91	18,97
Network costs		19,13	22,53	27,95	30,01	27,59
Energy supply costs		59,50	62,62	56,99	61,33	55,98

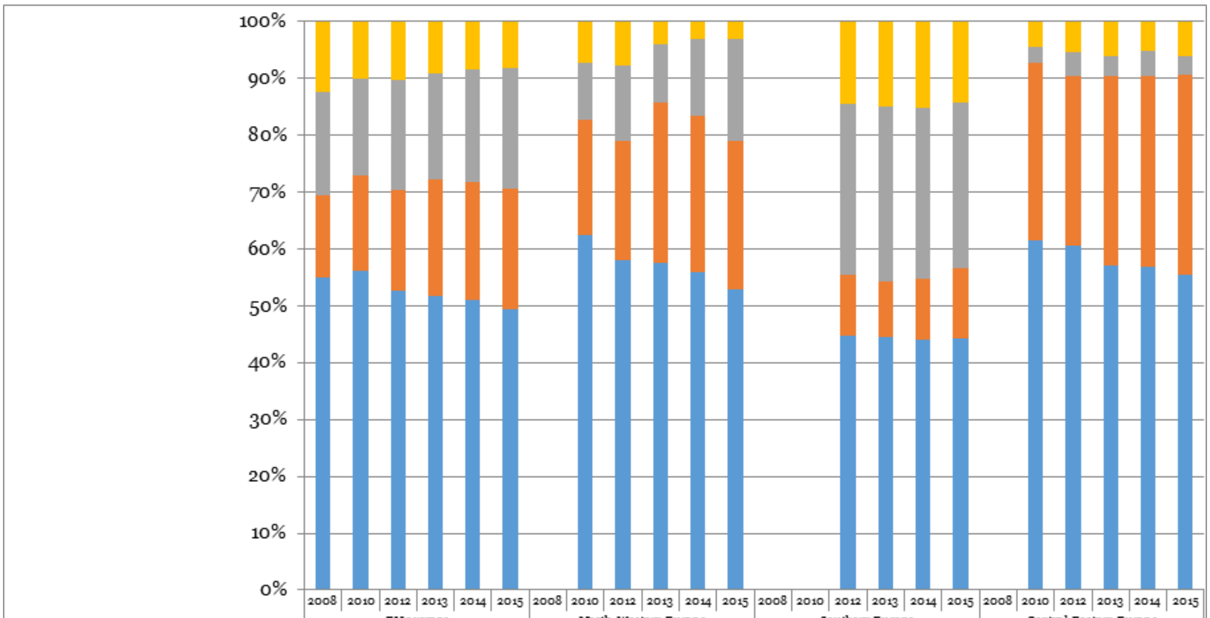
Southern Europe	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)			19,92	21,82	21,77	19,72
Renewable support			41,33	44,39	43,39	40,13
Network costs			14,75	14,22	15,36	17,11
Energy supply costs			61,21	64,19	63,42	61,18

Central-Eastern Europe	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)		2,88	4,29	4,90	3,90	4,15
Renewable support		1,87	3,12	2,78	3,40	2,27
Network costs		20,42	23,16	26,56	25,10	24,24
Energy supply costs		40,37	46,86	45,55	42,62	38,16

Note: Based on 43 respondents; 8.5% of the sector's production value

Source: CEPS et al.

Figure 276 - **Bricks and roof tiles - Components of electricity bills paid by sampled producers (%, 2008 - 2015)**



EU average	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)	12,3%	10,0%	10,4%	9,1%	8,5%	8,3%
Renewable support	18,3%	17,1%	19,3%	18,6%	19,7%	21,1%
Network costs	14,3%	16,7%	17,7%	20,6%	20,9%	21,2%
Energy supply costs	55,0%	56,2%	52,7%	51,6%	50,9%	49,5%

North-Western Europe	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)		6,4%	7,8%	3,9%	3,0%	3,1%
Renewable support		8,9%	13,3%	10,4%	13,6%	17,9%
Network costs		17,7%	20,9%	28,2%	27,4%	26,1%
Energy supply costs		55,1%	58,0%	57,6%	56,0%	52,9%

Southern Europe	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)			14,5%	15,1%	15,1%	14,3%
Renewable support			30,1%	30,7%	30,1%	29,1%
Network costs			10,8%	9,8%	10,7%	12,4%
Energy supply costs			44,6%	44,4%	44,1%	44,3%

Central-Eastern Europe	2008	2010	2012	2013	2014	2015
Other taxes, fees, levies and charges (excl. VAT)		4,4%	5,5%	6,1%	5,2%	6,0%
Renewable support		2,9%	4,0%	3,5%	4,5%	3,3%
Network costs		31,2%	29,9%	33,3%	33,5%	35,2%
Energy supply costs		61,6%	60,5%	57,1%	56,8%	55,5%

Note: Based on 43 respondents; 8.5% of the sector's production value

Source: CEPS et al.

International price comparison in clay building materials (NACE 23.3, including wall and floor tiles and bricks and roof tiles)

The assessment at international level is common between wall and floor tiles and bricks and roof tiles. (See considerations and graphs above).

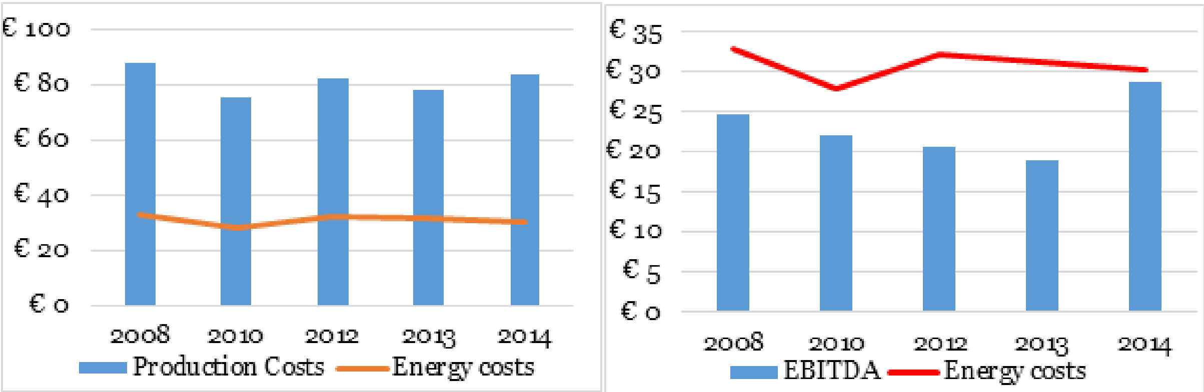
Performance indicators and impacts of energy costs in the wall and floor tiles sector

CEPS et altri also give indication of recent trends in main performance indicators for bricks and roof tiles producers.

As for the wall and floor tiles sector, the assessment gives indication of the importance of the potential impact of energy prices and costs for the competitiveness of the sector. The weighted average energy costs over total production costs ranged between 28% and 35%, varying in line with energy price trends (i.e. peaking in the 2012-2013 period). Natural gas is confirmed to be the main energy carrier and represents about two thirds of energy costs (gas and electricity), with a weight of 19.5% on total production costs in 2015.

When compared to EBITDA, the importance of energy costs is even more prominent, as they are larger than plants' margins across the whole period.

Figure 277 - **Bricks and roof tiles - Energy costs over production costs and EBITDA for sampled producers (2008-14)**



Note: Based on 41 respondents; 8% of the sector's production value
Source: CEPS et al.

2.9 Refineries

Sources: Solomon Associates and study by CEPS et altri

The sector energy costs could not be appropriately covered in the analysis of the Ecofys study based on Eurostat SBS statistics due to the fact that these statistics do not include crude oil as part of the purchases of energy (see explanation following Table 18). Data of the refinery sector is anyhow scarce due to confidentiality issues. Therefore this in part relies not only on the results of the plant data from the *CEPS et altri study* but also on other publicly available studies/sources.

The EU oil refining sector is a strategically important EU industry sector in terms of employment and energy security of supply. Despite the fact that EU refineries are among the most energy efficient in the world they are facing serious challenges. These include high energy prices, reduction in oil products demand, aggressive competition from non-EU refiners, cumulative impact of regulation, diesel-gasoline imbalance[25].

Trade analysis by CEPS et altri shows net trade flows for refined products. Due to the significant excess gasoline production capacity, 60% of the EU refineries' net exports are gasoline. More than 50% of these exports traditionally go to North America which is however reducing its imports due to shale gas/oil production. Conversely European refineries do not cover the EU's demand for diesel and jet fuel which are mainly imported from Russia, the Middle East and the US (FuelsEurope, 2015)

Energy prices paid by the Refinery sector

The study by *CEPs et altri* also maps the prices paid by the sector which have evolved similarly to other energy intensive sectors assessed. Overall, average EU *natural gas prices* have decreased between 2008 and 2015 by 11% although a peak was registered in 2013. The spread between minimum and maximum price paid increased significantly over the observation period (from 11 €/MWh in 2008 to 28 €/MWh in 2015, mainly linked to the inclusion of some plants with very low price at the end of the period). The share of the energy component was above 90% in all years, with very low impact associated of other non-energy (regulated) components.

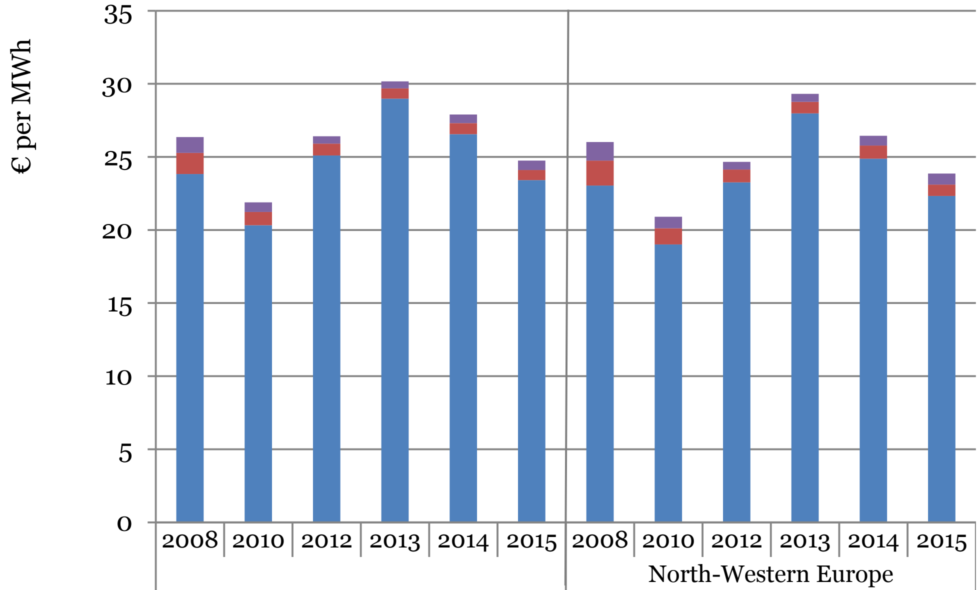
Table 35. Oil Refining - Statistics for natural gas prices paid by sampled producers (€/MWh, 2008-2015)

	2008	**2010**	**2012**	**2013**	**2014**	**2015**
Plant sites/total sample	5/15	7/15	10/15	11/15	14/15	14/15
EU (weighted average)	26.36	21.89	26.41	30.17	26.00	23.44
EU (median)	28.31	24.64	28.22	30.59	26.17	23.50
EU (relative standard deviation)	13.7%	15.8%	23.6%	7.7%	29.4%	25.4%
EU (IQR)	1.81	6.55	12.36	4.98	13.62	8.37
EU (minimum)	23.92	17.57	17.31	25.87	8.8	7.87
EU (maximum)	35.03	26.46	37.73	34.31	41.59	35.94
CEE EU (weighted average)	--	--	--	--	--	--
SE EU (weighted average)	--	26.26	34.80	33.99	26.68	22.39
NWE EU (weighted average)	26.02	20.90	24.66	29.36	25.80	23.76

Source: *CEPS et al.*

[25] *Refining Fitness Check*

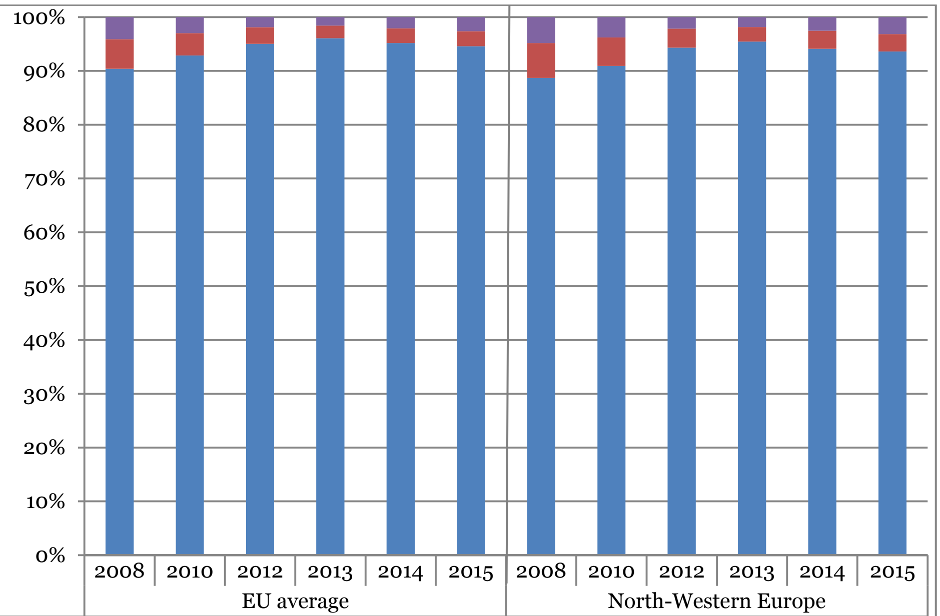
Figure 278 – **Oil Refining - Components of natural gas bills paid by sampled producers, (€/MWh, 2008-2015)**



	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
							North-Western Europe					
Other taxes, fees, levies and charges (excl. VAT)	1,08	0,65	0,50	0,48	0,58	0,65	1,27	0,79	0,53	0,55	0,67	0,75
Network costs	1,45	0,91	0,81	0,70	0,76	0,69	1,70	1,10	0,87	0,79	0,89	0,77
Energy supply costs	23,82	20,33	25,10	28,99	26,55	23,41	23,04	19,01	23,26	27,98	24,88	22,33

Source: *CEPS et al.*

Figure 279 – **Oil Refining -Components of natural gas bills paid by sampled producers (%, 2008-2015)**



	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
	EU average						North-Western Europe					
Other taxes, fees, levies and charges (excl. VAT)	4,1%	3,0%	1,9%	1,6%	2,1%	2,6%	4,8%	3,8%	2,1%	1,9%	2,5%	3,1%
Network costs	5,5%	4,1%	3,1%	2,3%	2,7%	2,8%	6,5%	5,3%	3,5%	2,7%	3,4%	3,2%
Energy supply costs	90,4%	92,9%	95,0%	96,1%	95,2%	94,6%	88,6%	90,9%	94,3%	95,4%	94,1%	93,6%

Source: *CEPS et al.*

Looking at all observation available CEPS et altri indicate that average electricity prices showed a clear downward trend, decreasing by about 7% between 2008 and 2015. A decreasing trend is confirmed also when looking only at plants which provided data for all the years but it is much less pronounced and is associated with a peak of average prices in 2014.

A very high spread between minimum and maximum price paid - in the order of 100 €/MWh – across the whole period.

The decrease in total price was driven by a reduction in energy supply component. At the same time, network costs component continuously increased in both absolute and relative terms, accounting in 2015 for 13% of the total price versus 3.9% in 2008. Renewable energy support costs were fluctuating due to changes in the German renewable energy support scheme, which impacted some of the respondents in the sample with high consumption, therefore significantly affecting the weighted average.

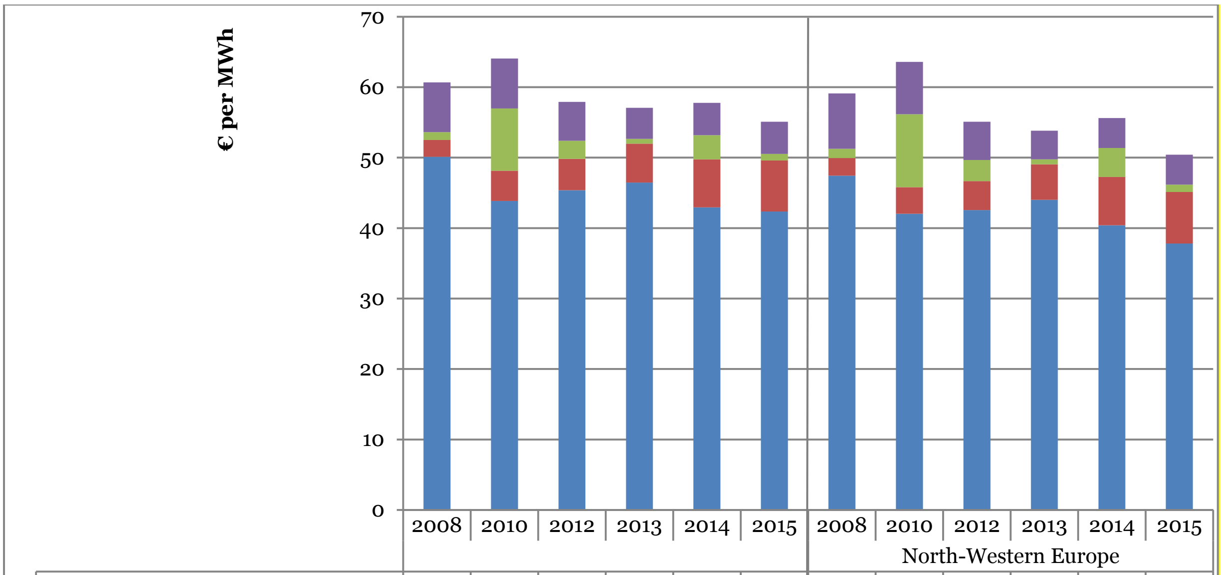
Table 36.- Oil Refining - Descriptive statistics for electricity prices paid by sampled producers (€/MWh, 2008-2015)

	2008	**2010**	**2012**	**2013**	**2014**	**2015**
Plant sites/total sample	7/15	8/15	13/15	14/15	14/15	14/15
EU (weighted average)	62,37	64,59	59,41	58,89	58,75	57,82
EU (median)	70,71	66,29	66,09	66,34	59,97	56,98
EU (relative standard deviation)	18.8%	30.1%	40.5%	41.0%	60.0%	44.4%
EU (IQR)	17,36	20,61	31,09	32,68	29,52	47,05
EU (minimum)	51,28	38,88	33,88	24,43	23,73	23,35
EU (maximum)	91,06	103,9	131,71	134,89	171,82	134,82
CEE EU (weighted average)	--	--	--	--	--	--
SE EU (weighted average)	70.03	67.06	71.46	73.45	68.48	78.40
NWE EU (weighted average)	59.12	63.59	55.09	53.65	55.32	50.65
*EU (weighted average)**	62,37	68,21	66,46	66,74	70,34	65,24

** Average calculated only for 7 plants which provided data for all years*

Source: CEPS et al.

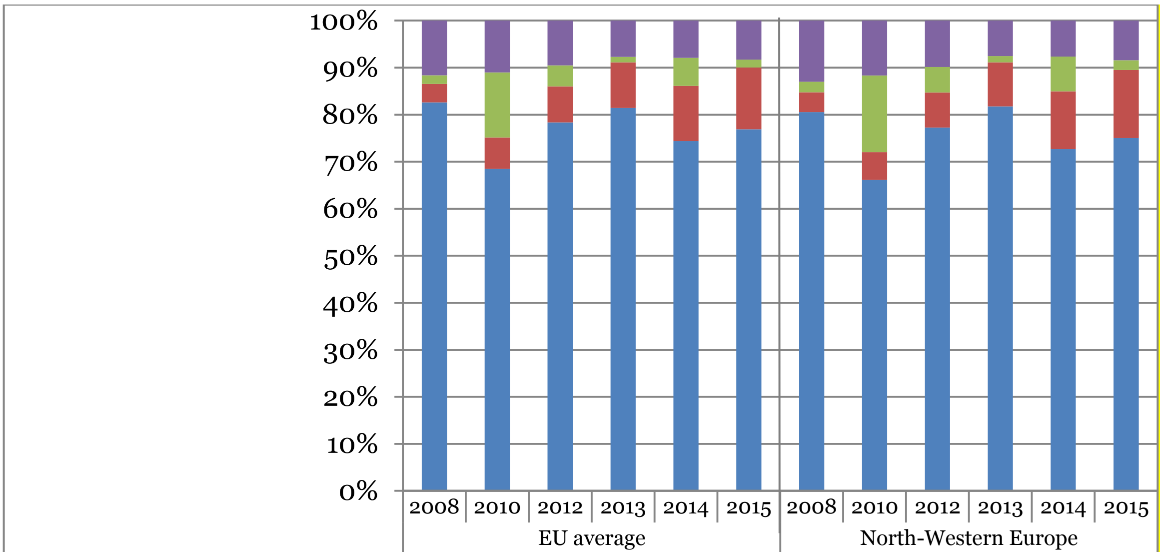
Figure 280 – **Oil refining - Components of electricity bills paid by sampled producers, (€/MWh, 2008-2015)**



	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
							North-Western Europe					
Other taxes, fees, levies and charges (excl. VAT)	7,06	7,07	5,52	4,40	4,57	4,57	7,87	7,42	5,43	4,07	4,25	4,26
Renewable support	1,13	8,84	2,58	0,67	3,45	0,92	1,31	10,37	2,99	0,70	4,12	1,04
Network costs	2,37	4,29	4,44	5,53	6,80	7,25	2,49	3,76	4,10	5,05	6,84	7,31
Energy supply costs	50,13	43,85	45,38	46,47	42,95	42,35	47,45	42,04	42,57	44,00	40,41	37,81

Source: *CEPS et al.*

Figure 281 – **Oil refining - Components of electricity bills paid by sampled producers, (%, 2008-2015)**

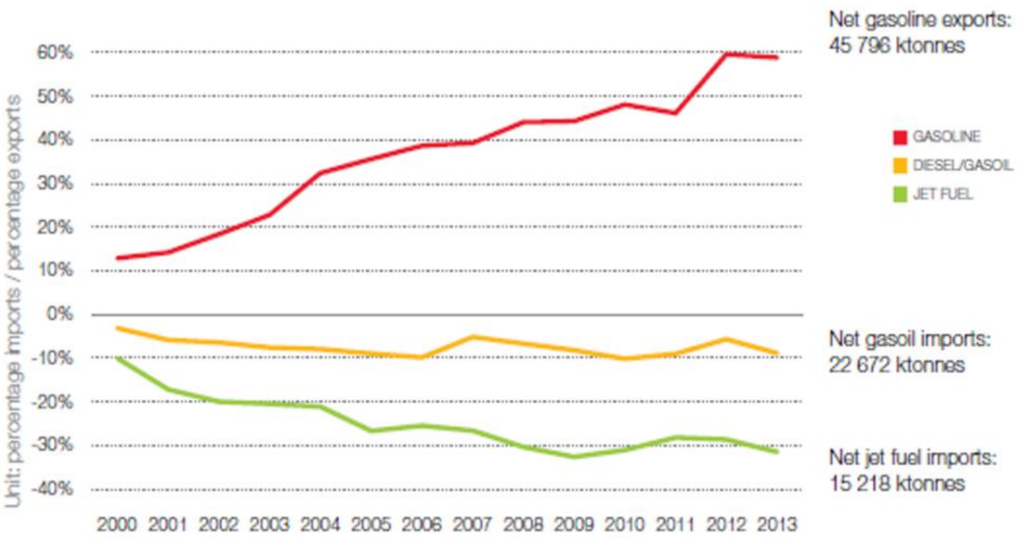


	2008	2010	2012	2013	2014	2015	2008	2010	2012	2013	2014	2015
	EU average						North-Western Europe					
Other taxes, fees, levies and charges (excl. VAT)	11,6%	11,0%	9,5%	7,7%	7,9%	8,3%	13,0%	11,7%	9,9%	7,6%	7,6%	8,4%
Renewable support	1,9%	13,8%	4,4%	1,2%	6,0%	1,7%	2,2%	16,3%	5,4%	1,3%	7,4%	2,1%
Network costs	3,9%	6,7%	7,7%	9,7%	11,8%	13,2%	4,2%	5,9%	7,4%	9,4%	12,3%	14,5%
Energy supply costs	82,6%	68,5%	78,4%	81,4%	74,4%	76,9%	80,3%	66,1%	77,3%	81,8%	72,7%	75,0%

Source: *CEPS et al.*

Energy costs in the refinery sector

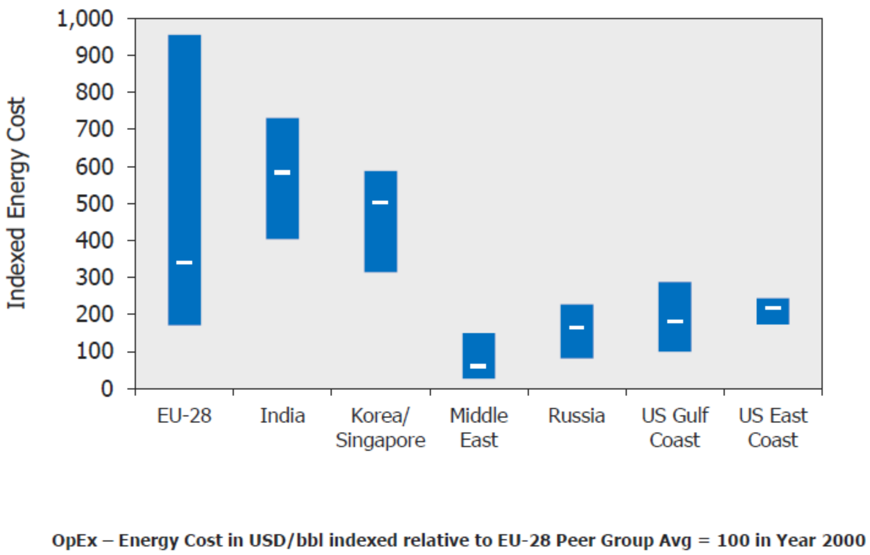
Figure 282 – Oil refining - Net trade flows for refined products



Source: FuelsEurope (2015).

Based on a recent *analysis by Solomon Associates*[26], which collects confidential refinery plant site questionnaires, European refineries' operational energy expenditures have tripled between 2000 and 2014 (As seen in the chart, in 2014 they reached an indexed level of 340 compared to 100 in 2000). Refiners in the two regional peer groups - India and Korea/Singapore - show stronger increases in energy costs, while those of US Gulf Coast show a declining trend since 2008. Energy expenditures of refineries in the Middle East region, while the lowest among the 7 studied regions, remained fairly stable at a level of 61 (the EU28 peer group average is indexed to 100 in operating year 2000).

Figure 283 **– Oil refining - Energy costs for refineries in 2014 (Max, min and average values)**



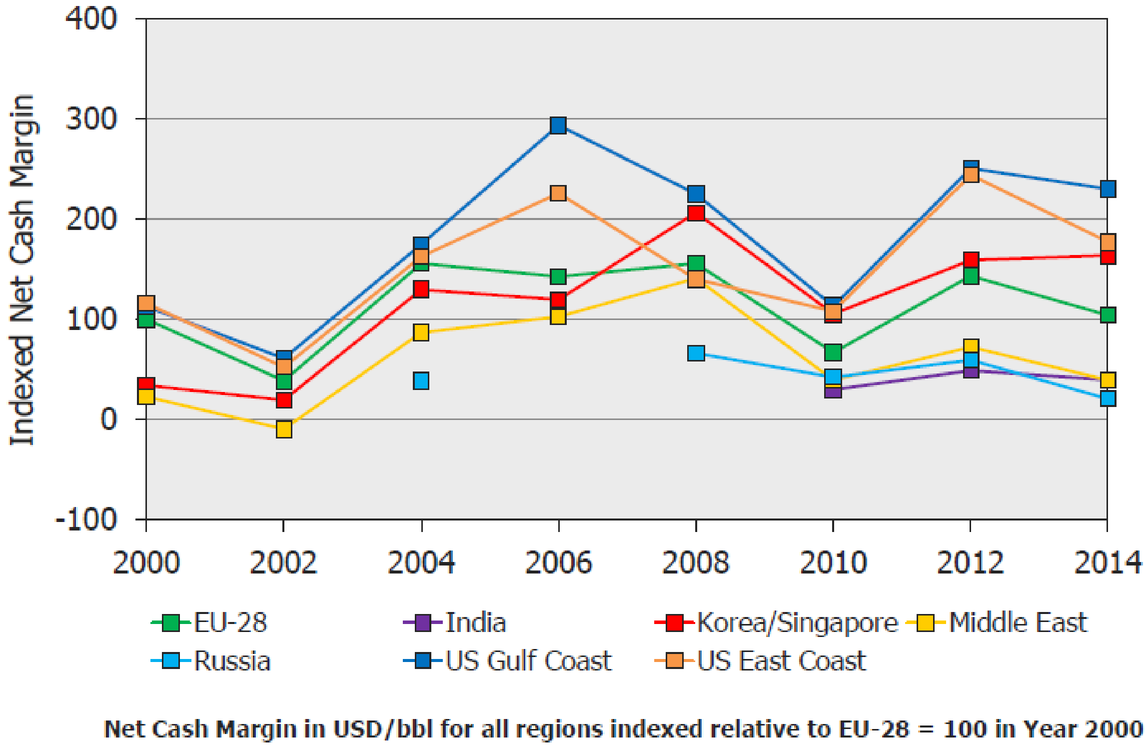
Source: Solomon Associates (2015)

[26] One of the most prominent sources in the refining sector is Solomon Associates. Every two years, Solomon provides a summary of the refining costs and margins in EU28 compared to other competing world regions. The latest update of the Solomon study includes data up to 2014

European *refining margins* have been shrinking since 2008, mainly as a result of reduced demand, overcapacity and shifting product demand to diesel. This is deterring the necessary investments in medium-to long-term in Europe, which are divested from Europe to non-OECD countries.

The *Refining Fitness Check* (equally to CEPS study) reveals that the main factor of loss of competitiveness of the sector in that period was the cost of energy. Furthermore, the contribution from the cost of legislation was responsible for up to 25% of the loss of competitiveness of the oil refining sector as a whole over the studied period 2000-2012. High energy and regulatory costs could be leading to lower profit margins making EU refineries more vulnerable.

Figure 284 – Oil refining - Net cash margin for refineries by region (2000 -2014, indexed relative to EU-28=100 in 2000)



Source: Solomon Associates (2015)