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CASE

PRICES AND COSTS OF EU ENERGY

Annex 4: Data for industrial analysis

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1 Sector selection and data points

To select the sectors to analyse further, we considered three aspects:

i) energy costs per production value;
ii) importance for the economy (measured as share of GDP); and,
iii) trade intensity.

Table 1 gives an overview of these three aspects. Energy intensity is calculated by dividing expenses for energy by the total production value of each sector. The share of GDP is calculated by dividing the statistical information about value added for one sector by the sum of GDP for all EU-28 Member States. The trade intensity is assessed by dividing the sum of imports and exports of a product to and from the EU in total by the size of the market represented by the sum of production value and imports. Results are only presented for sectors on NACE3-level that have an energy cost intensity of more than 3%. Values for energy cost intensity and share of GDP are averages for the yearly values of 2008 to 2015. For trade intensities average values for the years 2010 to 2013 are taken into account.

NACE3 code	Description	NACE 4 case study
106	Manufacture of grain mill products, starches and starch products	
132	Weaving of textiles	
161	Sawmilling and planing of wood	
171	Manufacture of pulp, paper and paperboard	C1712 - Manufacture of paper and paperboard
192	Manufacture of refined petroleum products	
201	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	C2013 - Manufacture of other inorganic basic chemicals
206	Manufacture of man-made fibres	
231	Manufacture of glass and glass products	C2313 - Manufacture of hollow glass
232	Manufacture of refractory products	
233	Manufacture of clay building materials	
234	Manufacture of other porcelain and ceramic products	
235	Manufacture of cement, lime and plaster	
237	Cutting, shaping and finishing of stone	
241	Manufacture of basic iron and steel and of ferro-alloys	C2410 - Manufacture of basic iron and steel and of ferro-alloys
244	Manufacture of basic precious and other non-ferrous metals	C2442 - Aluminium production

Table 1: Energy intensity, share of value added compared to EU-28 GDP and trade intensity for sectors on NACE3 level (source: own calculations based on Eurostat data)

NACE3 category	Energy Intensity	Share of GDP	Trade intensity
B071 - Mining of iron ores	6.21%	0.01%	83%
B072 - Mining of non-ferrous metal ores	10.36%	0.01%	83%
B081 - Quarrying of stone, sand and clay	7.44%	0.07%	13%
B089 - Mining and quarrying n.e.c.	6.73%	0.02%	n.a.
B099 - Support activities for other mining and quarrying	3.24%	0.00%	n.a.
C106 - Manufacture of grain mill products, starches and starch products	**3.56%**	**0.05%**	**12%**
C131 - Preparation and spinning of textile fibres	4.87%	0.02%	43%
C132 - Weaving of textiles	**3.41%**	**0.03%**	**56%**
C133 - Finishing of textiles	6.42%	0.02%	n.a.
C161 - Sawmilling and planing of wood	**3.37%**	**0.05%**	**29%**
C171 - Manufacture of pulp, paper and paperboard	**10.41%**	**0.12%**	**32%**
C192 – Manufacture of refined petroleum products	**1.89%** [1]	**0.05%**	**n.a.**
C201 - Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	**6.47%**	**0.45%**	**42%**
C206 - Manufacture of man-made fibres	**7.36%**	**0.01%**	**44%**
C231 - Manufacture of glass and glass products	**8.29%**	**0.11%**	**25%**
C232 - Manufacture of refractory products	**5.88%**	**0.01%**	**47%**
C233 - Manufacture of clay building materials	**11.63%**	**0.05%**	**25%**
C234 - Manufacture of other porcelain and ceramic products	**5.19%**	**0.03%**	**56%**
C235 - Manufacture of cement, lime and plaster	**14.98%**	**0.06%**	**7%**
C236 - Manufacture of articles of concrete, cement and plaster	3.38%	0.15%	3%
C237 - Cutting, shaping and finishing of stone	**3.32%**	**0.04%**	**35%**
C241 - Manufacture of basic iron and steel and of ferro-alloys	**7.83%**	**0.16%**	**25%**
C244 - Manufacture of basic precious and other non-ferrous metals	**4.21%**	**0.12%**	**75%**
C245 - Casting of metals	5.45%	0.08%	2%

[1] The energy intensity of the refined petroleum products sector is as shown in this table if most probably below the real energy intensity, because crude oil consumption is not included in the energy purchases calculation. In addition, data for most Member States that have a large share in the annual turnover is absent.

Mining and quarrying is covered by five relevant sectors. However, these sectors are not subject to further analysis as their relative share of final industrial energy consumption and their total production value are relatively low. In the table above, the selected industry sectors are marked as bold. The sectors are chosen based on 15 sectors with the highest trade intensity that also fulfil the criteria that they are above 3% energy intensity and the added value is above 0.02% of EU GDP. The sector basic iron and steel is not broken down into further subcategories. Therefore, it will also be analysed on NACE4 level. The sectors “manufacture of refined petroleum products” and “Manufacture of cement, lime and plaster” are taken into account because of their political sensitivity.

On NACE4 level, statistical classes are closer related to single products. Energy intensities are higher, the share of GDP in general lower than on NACE3 level. Table 2 provides an overview on the most energy intensive sectors, starting at a threshold of at least 5% energy cost intensity. Again, numbers are the average of 2008 to 2015 at EU level, except for trade intensity which is the average non-EU trade intensity for 2010 to 2013.

Table 2: Energy intensity, share of GDP and trade intensity of NACE4 sectors (source: own calculations based on Eurostat data)

NACE4 category	Energy Intensity	Share of GDP	Trade intensity
B0811 - Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	8.58%	0.02%	30.80%
B0812 - Operation of gravel and sand pits; mining of clays and kaolin	7.20%	0.05%	8.94%
C1081 - Manufacture of sugar	6.42%	0.02%	21.24%
C1621 - Manufacture of veneer sheets and wood-based panels	5.59%	0.03%	20.19%
C1712 - Manufacture of paper and paperboard	11.19%	0.09%	23.10%
C2011 - Manufacture of industrial gases	17.30%	0.03%	4.70%
C2013 - Manufacture of other inorganic basic chemicals	9.70%	0.05%	40.62%
C2014 - Manufacture of other organic basic chemicals	6.02%	0.17%	41.38%
C2015 - Manufacture of fertilisers and nitrogen compounds	6.38%	0.03%	28.48%
C2016 - Manufacture of plastics in primary forms	5.16%	0.12%	29.68%
C2313 - Manufacture of hollow glass	13.34%	0.04%	20.46%
C2331 - Manufacture of ceramic tiles and flags	9.35%	0.03%	28.48%
C2332 – Manufacture of bricks, tiles and construction products in baked clay	16.15%	0.02%	3.26%
C2351 - Manufacture of cement	14.75%	0.05%	5.68%
C2399 - Manufacture of other non-metallic mineral products n.e.c.	5.05%	0.03%	15.94%

C2410 - Manufacture of basic iron and steel and of ferro-alloys	7.83%	0.16%	25%
C2442 - Aluminium production	7.19%	0.05%	34.64%
C2451 - Casting of iron	7.43%	0.03%	3.73%
D3511 - Production of electricity	7.79%	0.34%	n.a.

The 5 selected sectors are marked in bold and are based on energy intensity above 7%, trade intensity of more than 10% and a share of GDP greater than 0.02%

On NACE4 level, available information becomes scarcer because of statistical reasons: If there are only a few companies reporting for a specific sector, information might be traceable to one specific company and therefore it is often not reported. Therefore, it makes sense to concentrate on specific products. Table 3 lists the specific products that are used for a more detailed analysis.

Table 3: Products for detailed analysis

Division	Group (NACE 3)	Class (NACE 4)	Selected product	Selection comments
17	17.1	17.12	Paper	Paper, pulp, printing has a high electricity demand. The specific energy consumption of the chemical pulp industry is higher, but it is less affected by international competition. In addition, the paper industry can be a very interesting case study concerning the issue of self-consumption.
20	20.1	20.13	Chlor alkali	Very high electricity demand, basis for plastic production.
23	23.1	23.13	Container glass	High specific energy demand use in food, drink, chemical and pharmaceutical industry. Low transportation costs.
24	24.1	24.10	Crude steel	Energy intensive product facing a highly competitive shrinking international market with large overcapacities. Especially in secondary production (simple steel products) international competition plays an important role.
24	24.4	24.42	Aluminium	Highly traded product facing a highly competitive market with high specific energy demand. Increasing demand since 1970s and further market potential concerning material substitution strategies (e.g. substitute for steel in vehicle construction).

This focus allows us to dive deeper into the specific characteristics of a certain product and to explore the variations that exist, for instance, between production processes (e.g. primary versus secondary production).

Analysis of energy consumption in total and by energy carrier is limited by the available data. The following table summarises the data points available and used by the study to make the calculations in chapter 5 of the main report.

NACE3 code	Description	Countries with available consumption data per energy carrier	2008-2013 average % of secvtor GVA covered by these countries
106	Manufacture of grain mill products, starches and starch products	DE	6.7%
132	Weaving of textiles	DE	6.4%
161	Sawmilling and planing of wood	DE	7.0%
171	Manufacture of pulp, paper and paperboard	DE, SE, FI	24.7%
192	Manufacture of refined petroleum products		#N/A
201	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	DE	17.2%
206	Manufacture of man-made fibres	DE	22.2%
231	Manufacture of glass and glass products	DE, FR	19.6%
232	Manufacture of refractory products	DE	14.3%
233	Manufacture of clay building materials	DE	7.6%
234	Manufacture of other porcelain and ceramic products	DE	17.4%
235	Manufacture of cement, lime and plaster	DE, UK, FR	15.4%
237	Cutting, shaping and finishing of stone	DE, ES	16.3%
241	Manufacture of basic iron and steel and of ferro-alloys	DE, AT, IT, FR	13.9%
244	Manufacture of basic precious and other non-ferrous metals	DE, UK, FR	23.8%

2 National sectoral shares of value added in EU28 and consumption sources

The table below gives the Member States in which the largest share of the industrial value added is generated in the EU.

Table 4: Country ranking 2013: share of value added in EU28[2] value added on NACE 3 level

Branch	**Manufacture of grain mill products, starches and starch products**		**Weaving of textiles**		**Sawmilling and planing of wood**	
Country 1	United Kingdom	22%	Italy	42%	Germany	16%
Country 2	Germany	16%	Germany	14%	France	12%
Country 3	France	16%	France	9%	Sweden	11%
Country 4					Austria	9%
Country 5					United Kingdom	9%
Sum		**53%**		**64%**		**57%**
Branch	**Manufacture of pulp, paper and paperboard**		**Manufacture of refined petroleum products**		**Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms**	
Country 1	Germany	20%	Belgium	9%	Germany	37%
Country 2	Sweden	17%	Hungary	7%	France	11%
Country 3	Finland	16%	Poland	6%	Belgium	8%
Sum		**53%**		**22%**		**56%**
Branch	**Manufacture of man-made fibres**		**Manufacture of glass and glass products**		**Manufacture of refractory products**	
Country 1	Germany	33%	Germany	24%	Germany	30%
Country 2	Austria	17%	France	18%	Spain	11%
Country 3	Netherlands	16%	Italy	14%	Italy	10%
Sum		**65%**		**56%**		**51%**
Branch	**Manufacture of clay**		**Manufacture of**		**Manufacture of**	

[2] If EU28 not available then the sum of the available countries have been used as basis.

	building materials		other porcelain and ceramic products		cement, lime and plaster	
Country 1	Italy	28%	Germany	31%	Germany	30%
Country 2	Germany	22%	Italy	9%	United Kingdom	14%
Country 3	Spain	13%	Austria	8%	France	10%
Country 4			France	7%		
Sum		**63%**		**55%**		**53%**
Branch	**Cutting, shaping and finishing of stone**		**Manufacture of basic iron and steel and of ferro-alloys**		**Manufacture of basic precious and other non-ferrous metals**	
Country 1	Italy	28%	Germany	31%	Germany	30%
Country 2	Germany	22%	Italy	9%	United Kingdom	14%
Country 3	Spain	13%	Austria	8%	France	10%
Country 4			France	7%		
Sum		**63%**		**55%**		**53%**

A similar analysis has been made on NACE 4/product level.

Table 5: Country ranking 2013: share of value added in EU28[3] value added on NACE 4 level

	Manufacture of paper and paperboard		Manufacture of other inorganic basic chemicals		Manufacture of hollow glass		Manufacture of basic iron and steel and of ferro-alloys		Aluminium production	
Country 1	Germany	22%	France	26%	France	25%	Germany	31%	Germany	34%
Country 2	Finland	16%	Germany	19%	Germany	17%	Italy	9%	Greece	9%
Country 3	Sweden	15%	UK	12%	Italy	16%	Austria	8%	France	8%

[3] If EU28 not available then the sum of the available countries have been used as basis.

3 International electricity and gas prices

Table 6 Electricity and natural gas price data availability from IEA and CEIC databases for G20 countries (excluding EU Member States)

Country	IEA	CEIC data
Argentina	No data	No data
Australia	No data	No data
Brazil	No data	Average industrial electricity price. Source: Ministry of Mining and Energy.
Canada	Natural gas price and taxes only	No data
China	No data	Industrial electricity price (>35 kV) and natural gas price for 36 cities. Source: Price Monitoring Center, NDRC.
India	No data	No data
Indonesia	No data	Average industrial electricity price. Source: State Electricity Company.
Japan	Electricity prices and taxes only	No data
Korea	Incomplete dataset on taxes and prices.	Industrial electricity price not available, retail electricity price available. Source: Korea Energy Economics Institute.
Mexico	Complete dataset on electricity prices and taxes. Incomplete dataset on prices and taxes for natural gas.	Regional electricity prices for medium and large industry. Source: Federal Commission of Electricity.
Russia	No data	Regional electricity prices. Average natural gas price. Source: Federal State Statistics Service.
Saudi Arabia	No data	No data
South Africa	No data	No data
Turkey	Complete dataset on prices and taxes for electricity and natural gas.	No data
United States	Electricity and natural gas prices available, but tax values not available.	Average electricity and natural gas price. Source: Energy Information Administration.

The IEA database provides annual data on the prices and taxes on electricity and natural gas in the industrial sector. For 9 of the G20 countries (excluding EU Member States), price and tax data was

not available. CEIC obtain their data on energy prices from national statistics databases, for example, the Federal State Statistics Service in Russia and the Energy Information Administration in the United States. For 9 of the G20 countries (excluding EU Member States), industrial price data was not available. Average industrial price data was available for Brazil, China (gas price), Indonesia, Russia and the United States. CEIC also provides data on the Chinese industrial electricity price for consumers with a connection larger than 35kV, and Mexican electricity prices for medium and large industry.

Regional electricity pricing data was available for China, Mexico, Russia and the United States, and regional natural gas prices was available for China and the United States.

In China, the average spread in electricity prices for 35 cities over 2012–2015 was a €0.06/kWh. The maximum regional price in Wuhan was 19% higher than the average, while the minimum in Urumqi was 35% below the average price. The average electricity price across the 35 cities was unchanged from 2012–2015. The average spread in natural gas prices for 35 cities in 2015 was €0.04/kWh. In 2015, the maximum regional natural gas price in Nanning was 30% higher than the average, while the minimum price in Xining was 46% lower than the average price.

There was a large spread in regional electricity prices in Mexico of €0.59/kWh in 2012. In 2012, the minimum electricity price for large industry was in Sinaloa, where the price was 90% lower than the average. The highest price was located in Veracruz, where the price was 775% higher than average. The spread in regional prices grew over 2008–2012; in 2008 the range was only €0.13/kWh.

There is also a significant spread in electricity prices for medium industry in Mexico of €0.72/kWh in 2012. In 2012, the minimum electricity price was in Zacatecas, where the price was 50% lower than average. The maximum electricity price was in Nuevo Leon, where the price was 870% higher than average. Similar to the large industry electricity pricing trend, the spread in regional prices has grown significantly over the period 2008–2012.

In Russia, the average spread in electricity prices for the 9 federal districts was €0.03/kWh in 2015. The maximum price was in Southern Federal District, where prices were 50% higher than the average price in 2015. The minimum price was in the North Caucasian Federal district where the price was 33% lower than the average price in 2015.

In the United States, the average spread in electricity prices for the 55 states in 2014 was €0.2/kWh. The maximum price was in Hawaii, where the electricity price is 326% higher than the average in 2014. The minimum price was in Washington State, where the electricity price was 39% lower than the average in 2014. The average spread in natural gas prices for the 55 states in 2014 was €0.06/kWh. The maximum price was in Hawaii, where the electricity price is 385% higher than the average in 2014. The minimum price was in Louisiana, where the electricity price was 15% lower than the average in 2014.

4 Detailed results

In general for comparison of costs shares across countries it should be kept in mind that differing salary levels for personnel have an important influence on total costs, and therefore the energy cost share. As a result energy cost shares (as a % of total production cost) will tend to be higher in countries with relatively low average salaries, as the total production cost is lower. This partly explains why lower income Member States have higher energy cost shares. The efficiency of energy use can also be lower in these Member States and also contribute to proportionally higher energy costs.

4.1 Manufacture of grain mill products, starches and starch products

Summary of sector results:

- The EU average energy cost as a share of production costs was 3.7% over 2008–2013 and a decreasing energy cost share was observed in this period. However, across the Member States, a consistent temporal trend was not observed, with the energy cost as a share of production costs increasing in some Member States, e.g. CY, EL and ES, and decreasing in others, e.g. AT, IT. Relatively low energy costs compared to production costs are observed in BE, FI, IE, IT and UK, while relatively high costs are observed in BG, HU, LT and SK.
- The EU total[4] production cost fell in 2009; since then, the total costs increased above the 2008 level in 2011 and remained relatively stable over 2011–2013. Energy costs represented a small share of the total production cost and energy costs declined over the period 2008-2013. Personnel costs were larger than energy costs and rose over 2008–2013.
- The gross operating surplus as a percentage of total production costs in the EU declined over 2011–2013. While this trend is mirrored in some individual Member States, e.g. AT and CZ, a consistent temporal trend across each individual Member State was not observed. The largest gross operating surplus as a percentage of total production costs in the EU over 2008–2013 were recorded in CY, HU and UK, while the lowest was located in HR, where negative gross operating surpluses were recorded in 2010 and 2012.
- Over 2008–2010, energy costs as a percentage of total production costs in the US were higher than in the EU average. However, the energy costs as a percentage of total production costs in the United States declined more rapidly than in the EU over 2008–2013, and in 2013, the share of energy costs in the United States was lower than in the EU. This is, at least partially, a result of diverging trends in energy prices in the EU and the US over this period.

[4] Of Member States with all available data points for all years, see table 5 in the main report.

- The energy intensity in the EU[5] peaked in 2010 and declined over 2011–2013. The energy intensity in the US in 2010 was lower than the EU average. Discussion on the analysis of energy intensity in all sectors is in the Chapter 5 of the main report.

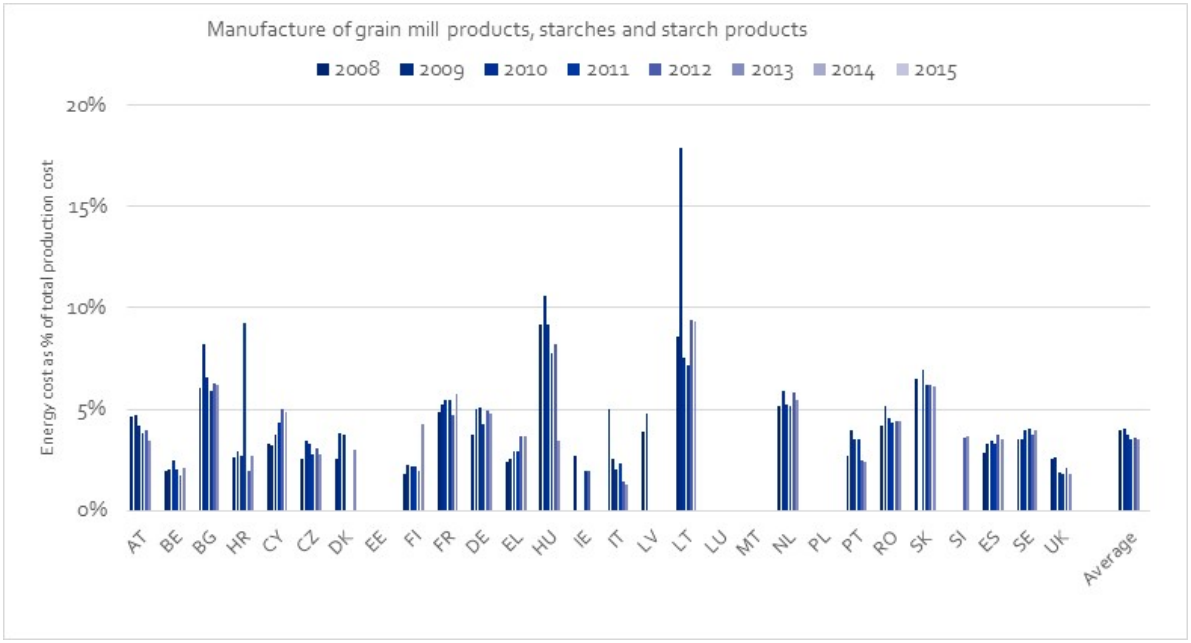

Figure 1 Energy cost as a share of total production cost 2008-2013 – Member State results

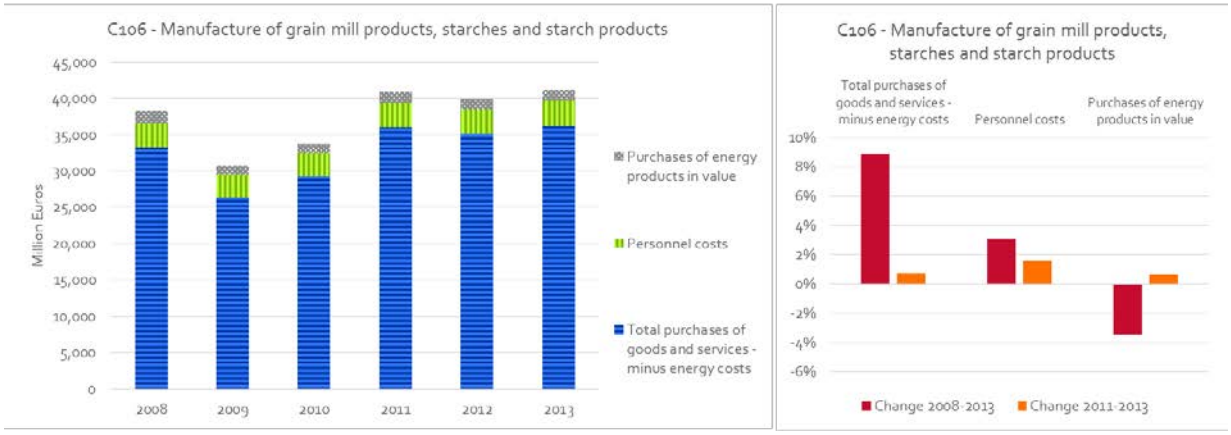

Figure 2 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

[5] Of Member States with available data, see table 6 in the main report.

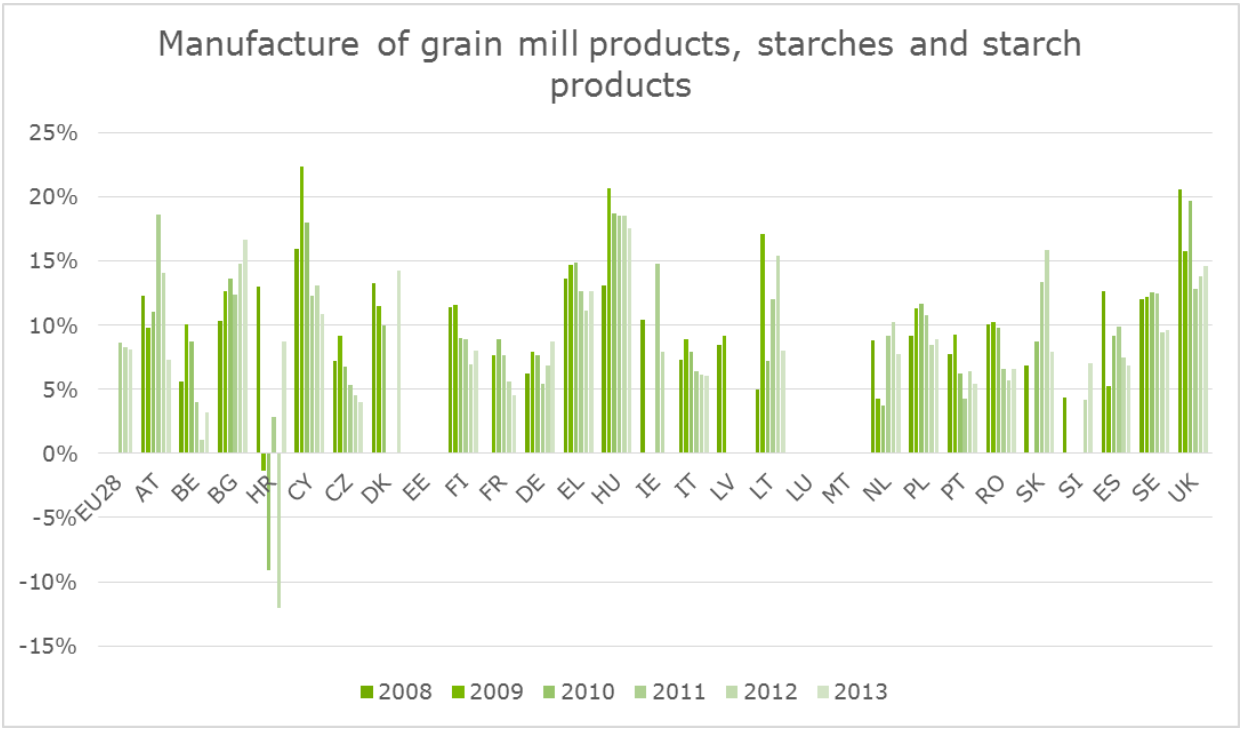

Figure 3 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

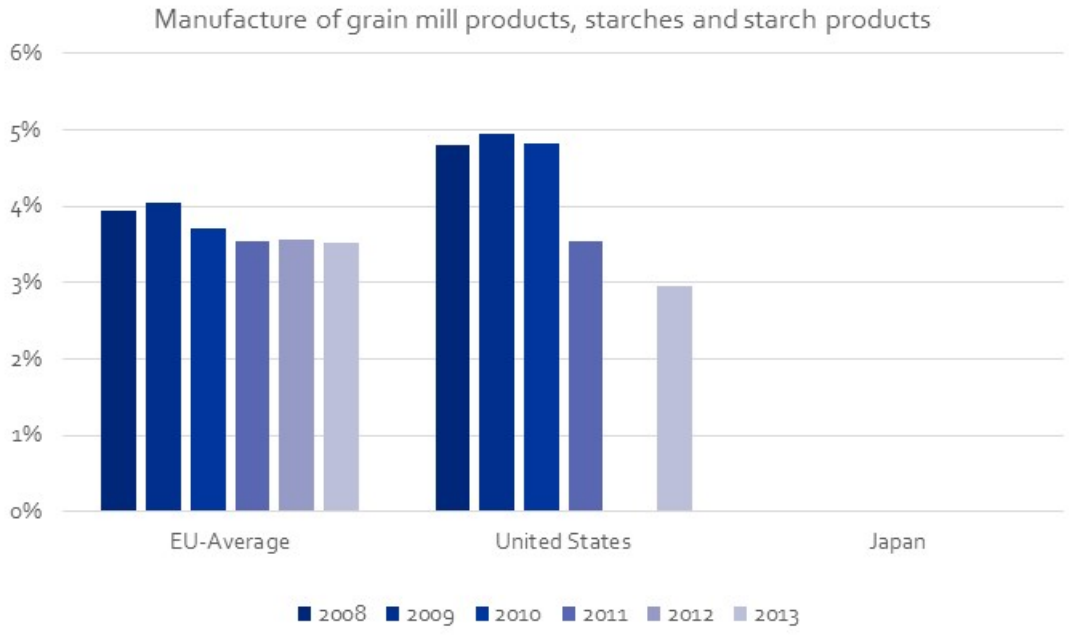

Figure 4 International comparison, energy cost as a percentage of total production costs

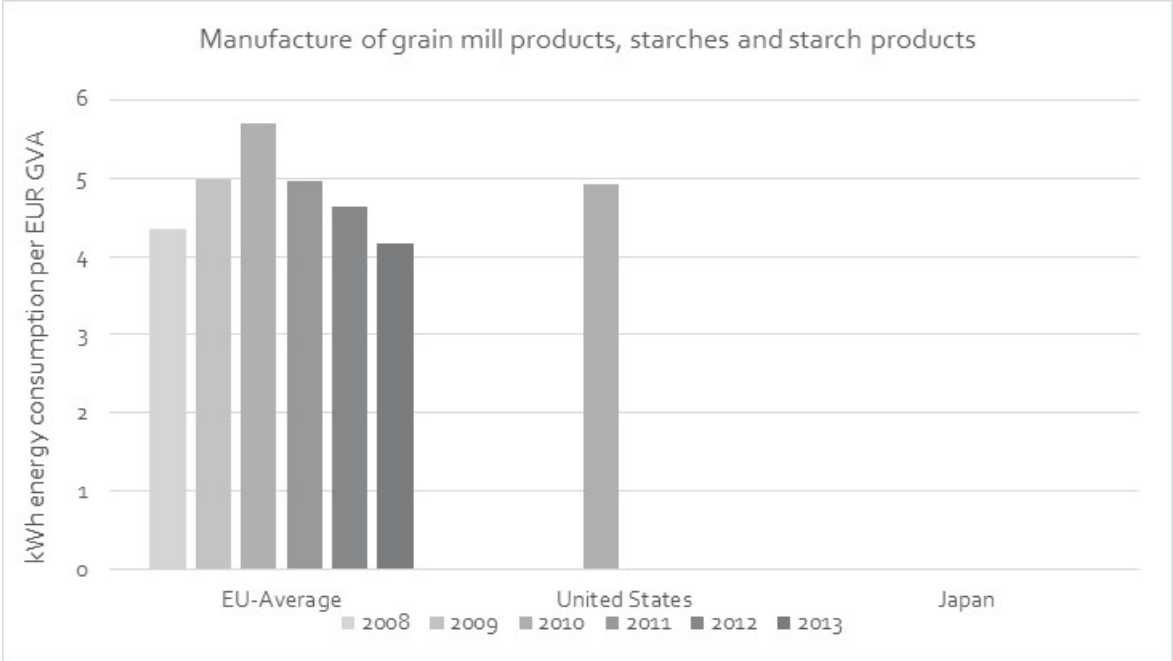

Figure 5 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.2 Weaving of textiles

Summary of sector results:

- The EU average energy cost as a share of the total production cost over 2008–2013 declined. However, a consistent temporal trend across individual Member States was not observed, with the energy cost share increasing in some Member States, e.g. EL and ES, decreasing in others, DE and IT. The highest energy cost shares were observed in SI, while relatively low energy cost shares were observed in IT.
- The EU total[6] production cost fell between 2008-2009, then increased over 2010–2011, and declined in 2012. The energy cost over 2008–2013 was lower than personnel costs and the energy costs declined more rapidly than personnel costs over this period.
- With the exception of 2009, the EU average energy cost as a percentage of total production costs was lower than in the United States. The energy cost share in the United States grew in 2009–2010, and subsequently fell in 2011 and 2013. Over 2008–2010, the average energy cost share in Japan declined and was substantially lower than the EU average.
- The EU average energy intensity[7] remained relatively stable over 2008–2013. In 2010, the energy intensity in the US was higher than in the average for the EU Member States with available data.

[6] Of Member States with all available data points for all years, see table 5 in the main report.

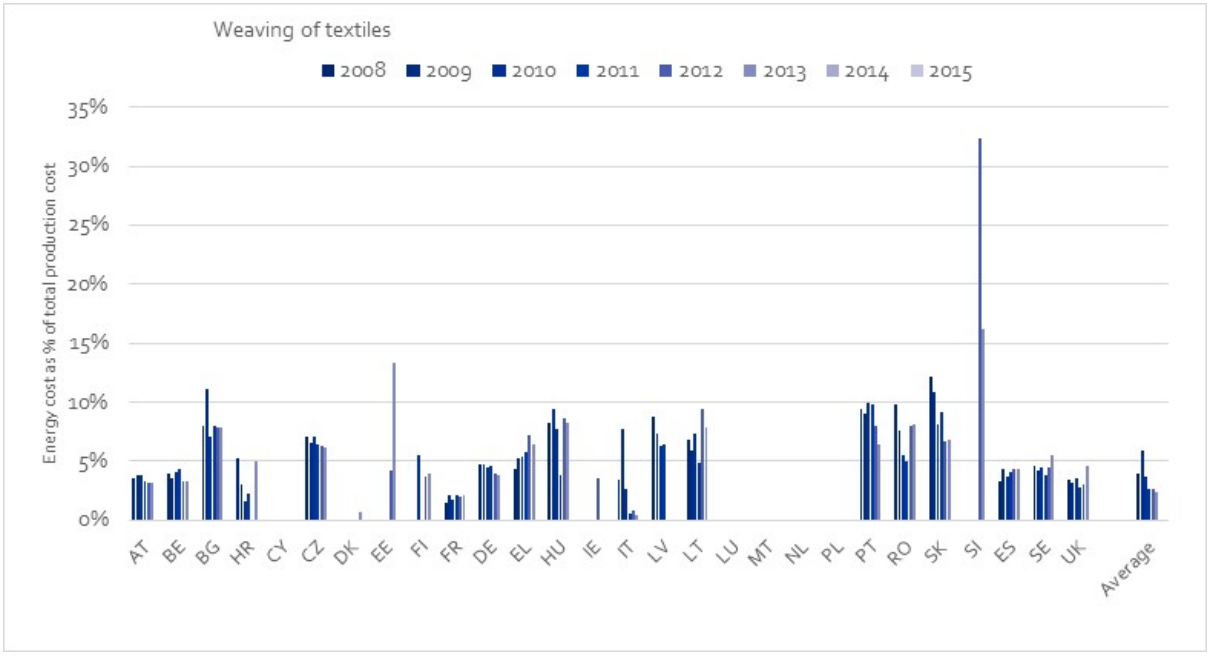

Figure 6 Energy cost as a share of total production cost 2008-2013 – Member State results

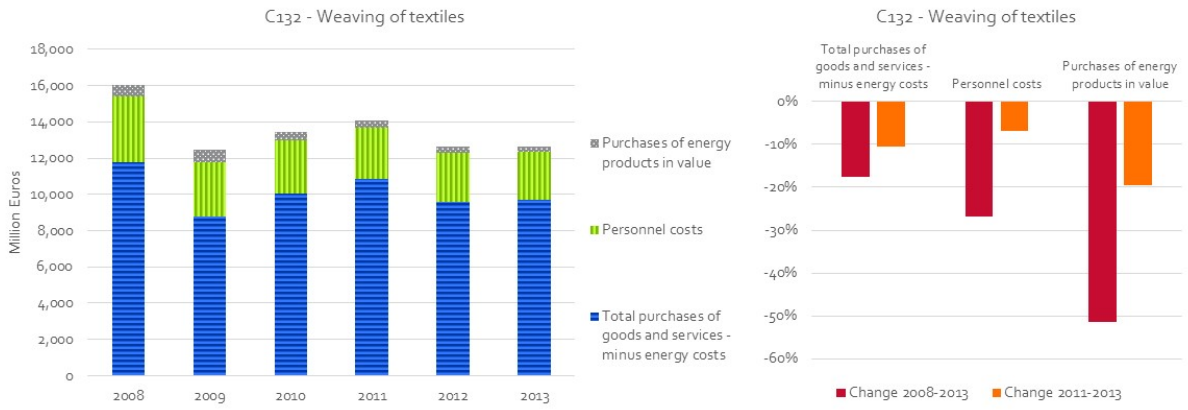

Figure 7 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

[7] Of Member States with available data, see table 6 in the main report.

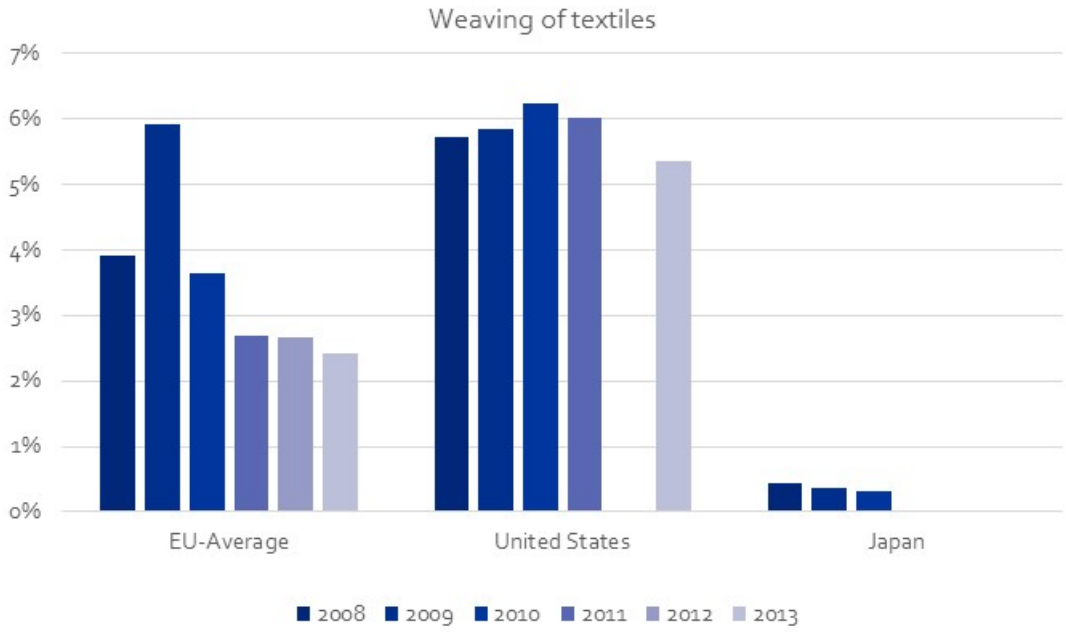

Figure 8 International comparison, energy cost as a percentage of total production costs

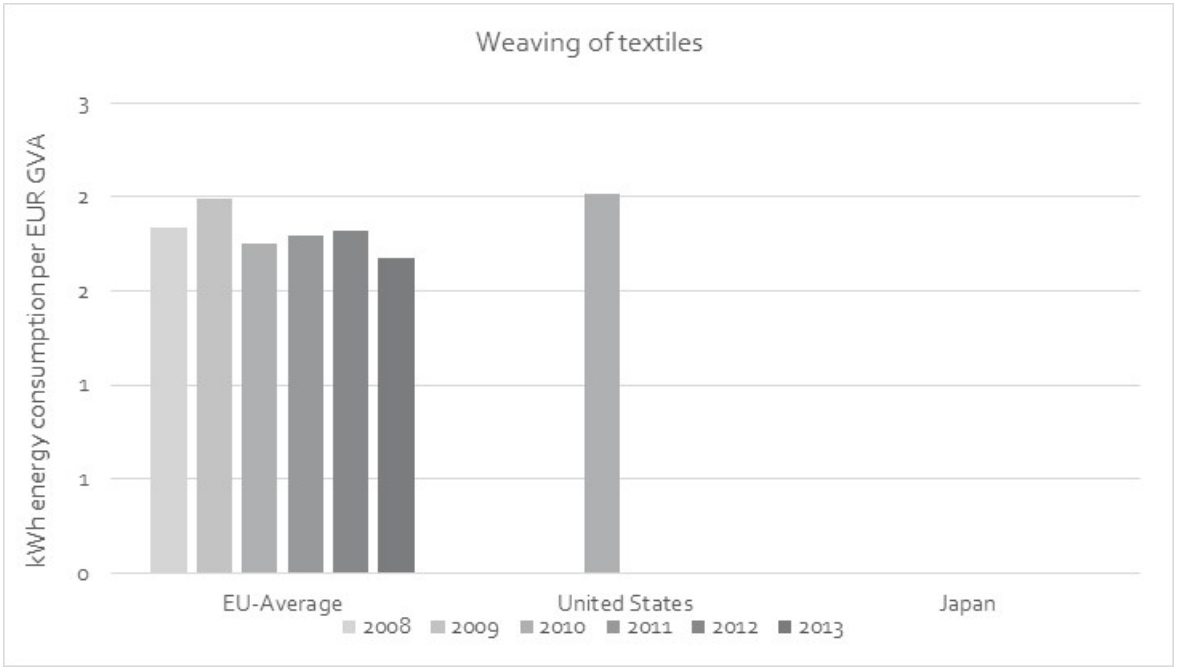

Figure 9 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.3 Sawmilling and planing of wood

Summary of sector results:

- The EU average energy cost as a share of the total production cost over 2008–2013 was 3.6%, and the energy cost share was relatively stable over this period. A consistent temporal trend across individual Member States was not observed: an increasing trend was observed in BG and EE, while a declining trend was observed in CZ. The highest energy cost share was observed in CY in 2012, while low energy cost shares were located in FR and NL.
- The EU total[8] production cost fell in 2009; since then, the total costs recovered to about the 2008 level in 2011 and remained relatively stable over 2011–2013. Energy costs represented a small share of the total production cost over the period 2008-2013. Energy costs fell more rapidly than personnel costs over 2008–2013.
- The gross operating surplus as a percentage of total production costs in the EU was relatively stable at about 7% over 2011–2013. A consistent temporal trend across each individual Member State was not observed. The largest gross operating surplus as a percentage of total production costs in the EU over 2008–2013 were located in CY, SK and UK, while the lowest were located in HR and IE, where negative gross operating surpluses were recorded in 2010 and 2009, respectively.
- Over 2008–2011 and 2013, energy costs as a percentage of total production costs in the US were higher than the EU average. However, the energy costs as a percentage of total production costs in Japan were substantially lower than in the EU over 2008–2011.
- The energy intensity in the EU[9] peaked in 2012 and declined in 2013.

[8] Of Member States with all available data points for all years, see table 5 in the main report.
[9] Of Member States with available data, see table 6 in the main report.

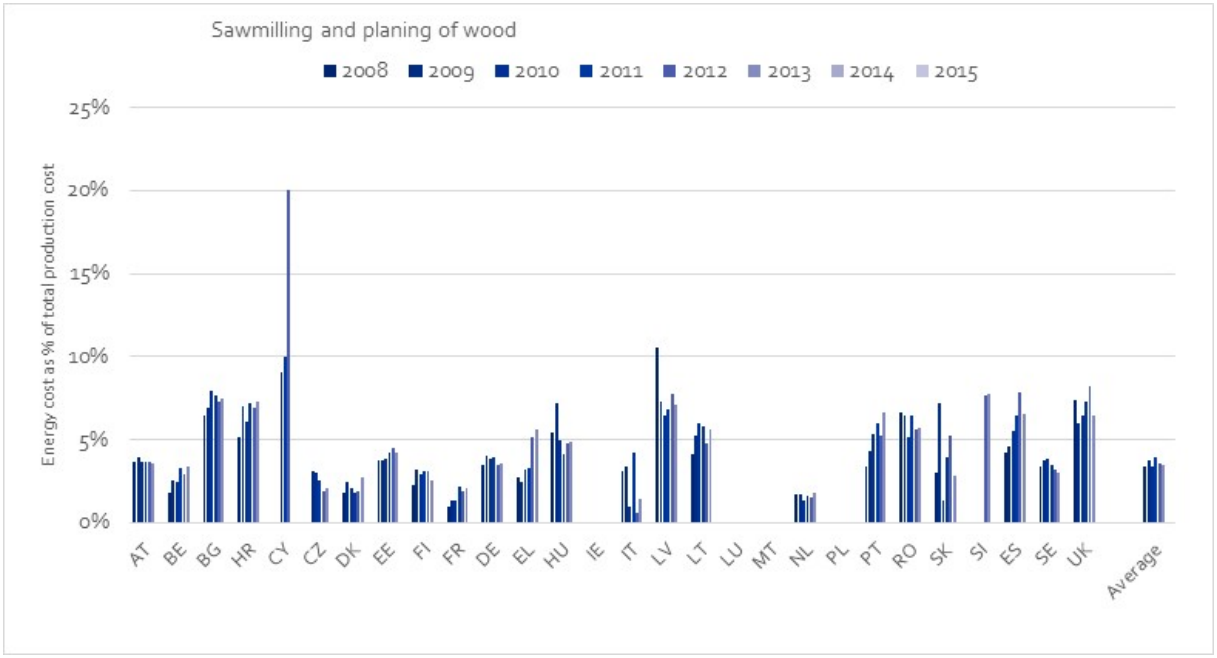

Figure 10 Energy cost as a share of total production cost 2008-2013 – Member State results

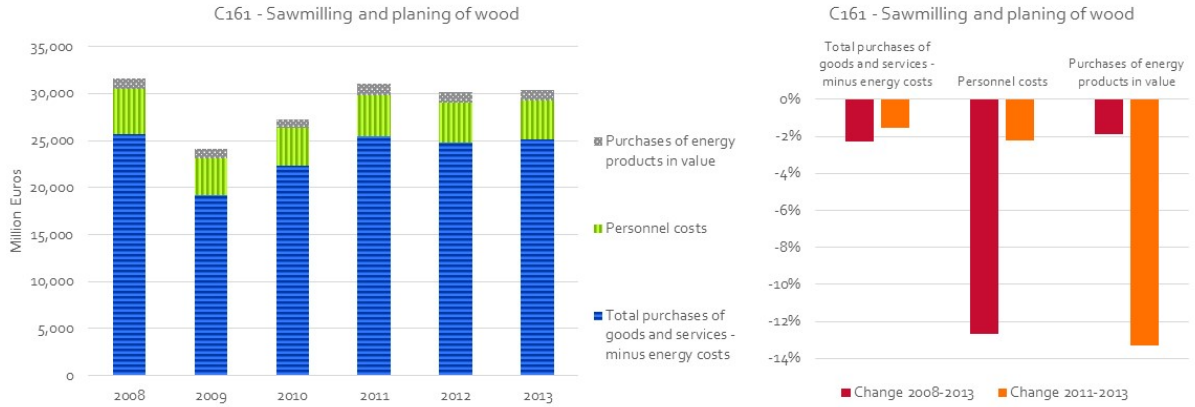

Figure 11 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

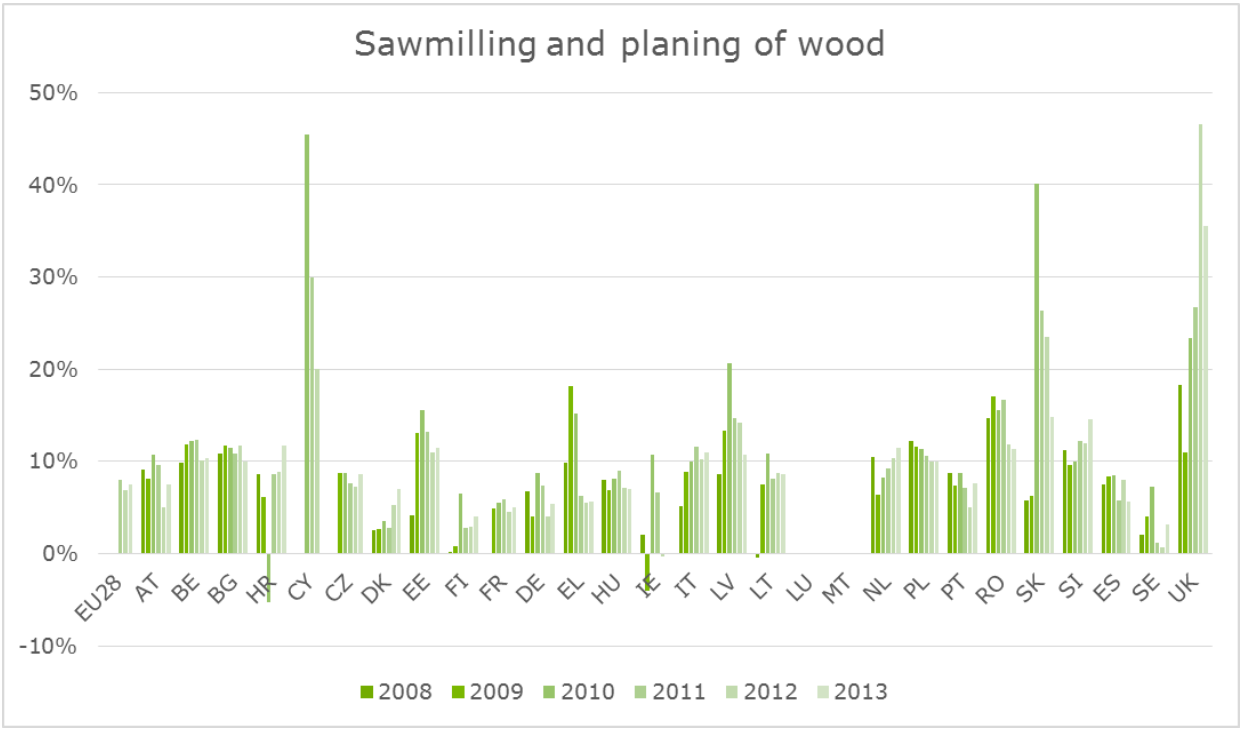

Figure 12 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

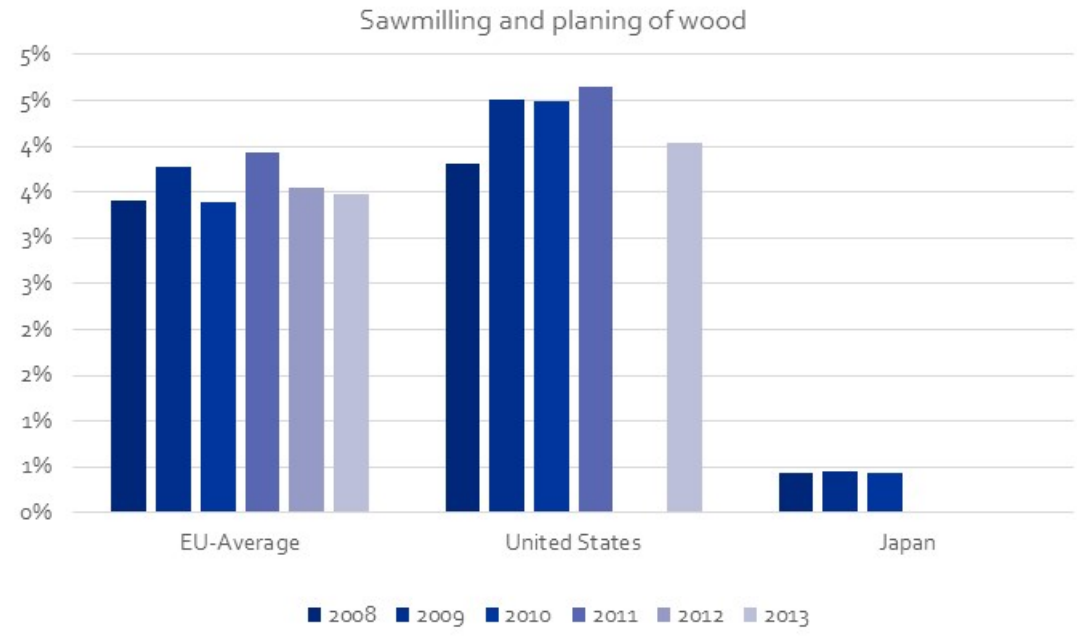

Figure 13 International comparison, energy cost as a percentage of total production costs

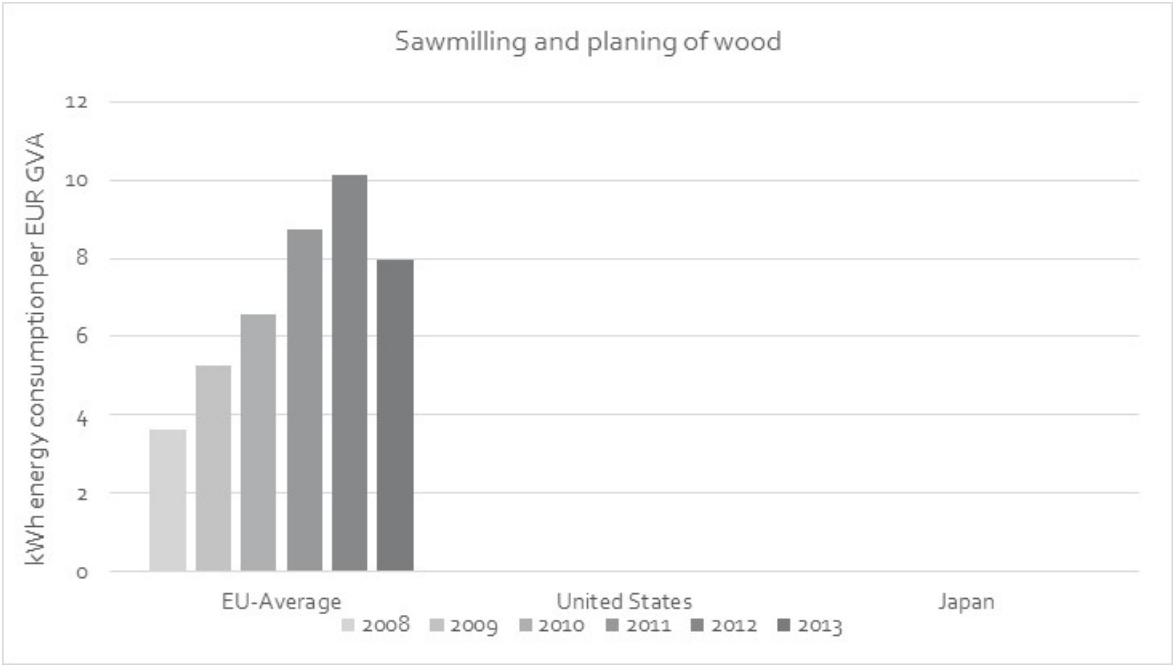

Figure 14 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.4 Manufacture of pulp, paper and paperboard

Summary of sector results:

- The EU average energy cost as a share of the total production costs decreased over 2008–2013. The energy cost as a share of total production costs across individual Member States fluctuated over this time period and a consistent temporal trend across individual Member States was not observed. The highest energy cost shares were observed in LT and EE, while very low energy cost shares were observed in IT over 2012–2013. Several different fuels, including black liquor from pulp manufacture, are used in this sector so analysis of the energy cost component is complex. More discussion on the paper sector is included in Annex 5, the industry case studies
- The EU total[10] production cost fell in 2009; since then, the total costs recovered to about the 2008 level in 2011 and remained relatively stable over 2011–2013. Energy costs were slightly lower than personnel costs over the period 2008-2013. The energy cost fell more rapidly than personnel costs over 2008–2013.
- The gross operating surplus as a percentage of total production costs in the EU declined over 2011–2013 from 10% to 8%. While this trend is mirrored in some individual Member States, e.g. AT and EE, a consistent temporal trend across each individual Member State was not

[10] Of Member States with all available data points for all years, see table 5 in the main report.

observed. The largest gross operating surpluses as a percentage of total production costs in the EU over 2008–2013 were located in EE, PL and PT, while the lowest were located in HR and FR. Negative gross operating surpluses were recorded in BG in 2008 and in HR in 2009 and 2012.

- Over 2008–2011 and 2013, energy costs as a percentage of total production costs in the US were higher than in the EU average. However, the energy costs as a percentage of total production costs in the US declined more rapidly than in the EU over this period. Energy costs as a percentage of total production costs in Japan were substantially lower than in the EU over 2008–2010.
- The average energy intensity in the EU[11] peaked in 2009, fell in 2010 and 2011, and rose over 2012–2013. The average energy intensity in the US in 2010 was lower than in the EU. The energy intensity in Japan over 2008–2013 was less than half the energy intensity in the US in 2010. It is likely that the differences in energy intensity relate to a large extent to structural differences in the sectors in different countries.

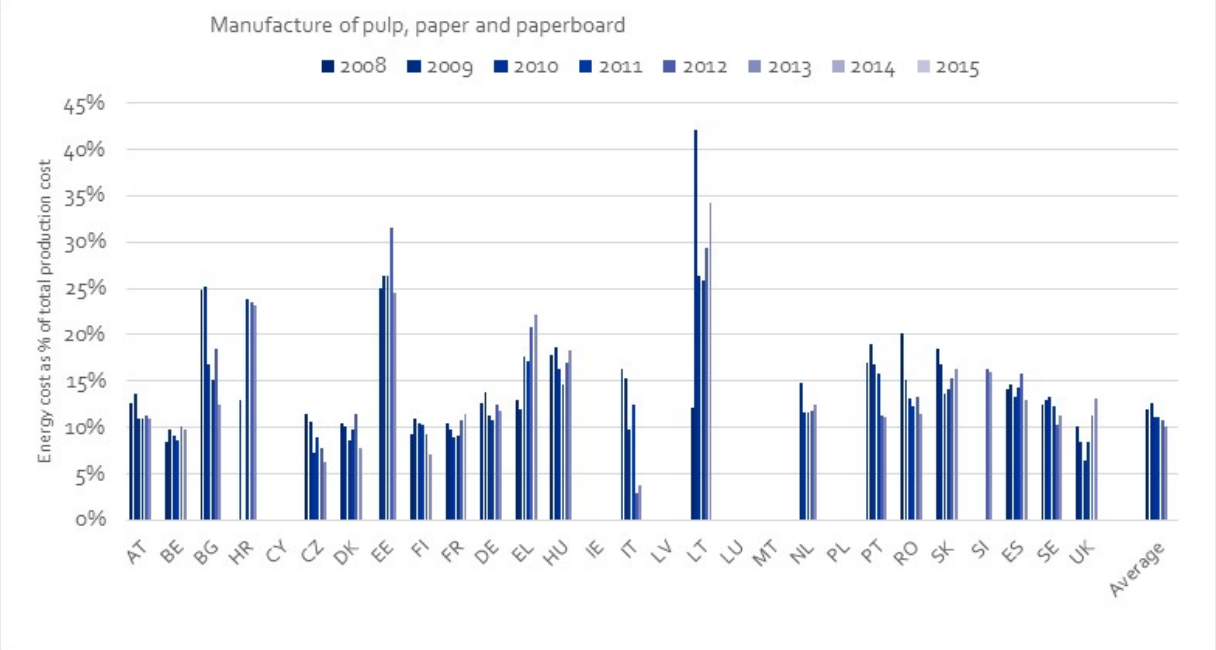

Figure 15 Energy cost as a share of total production cost 2008-2013 – Member State results

[11] Of Member States with available data, see table 6 in the main report.

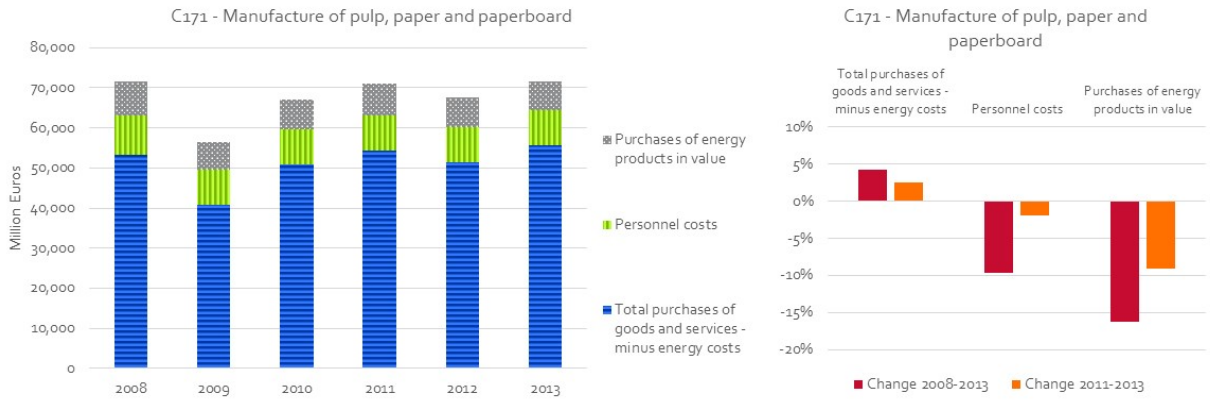

Figure 16 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

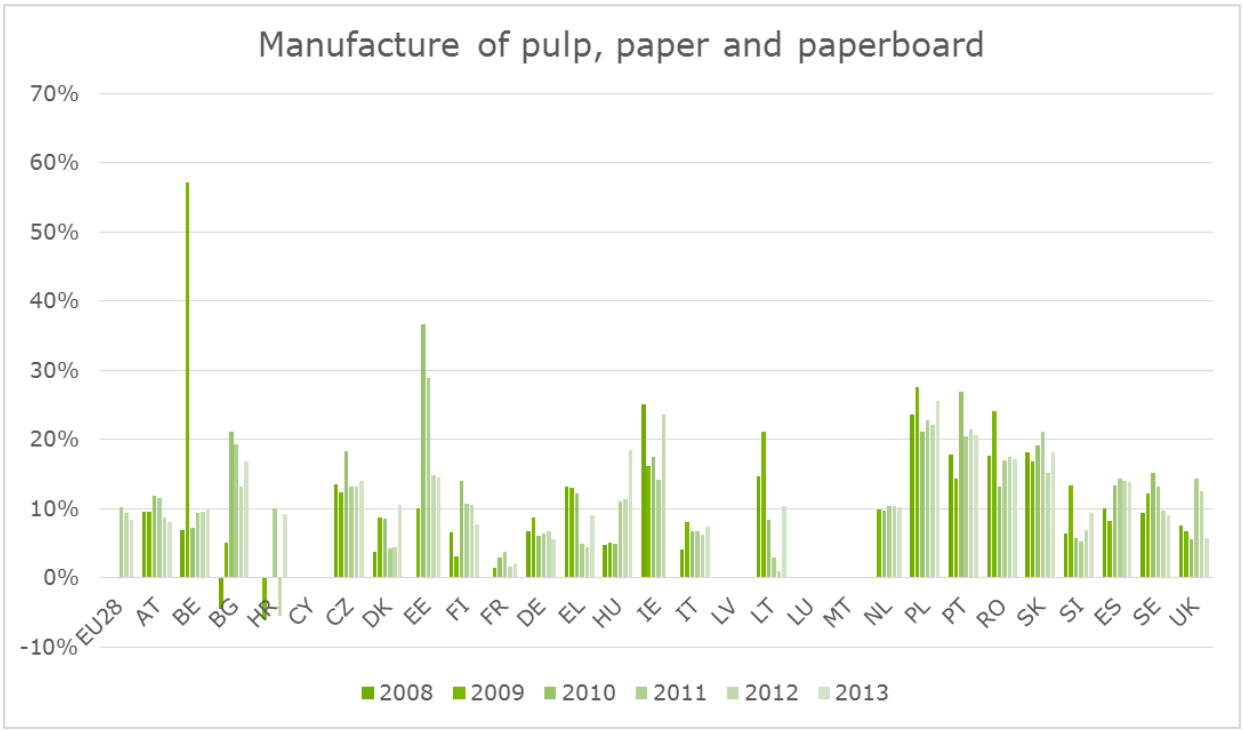

Figure 17 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

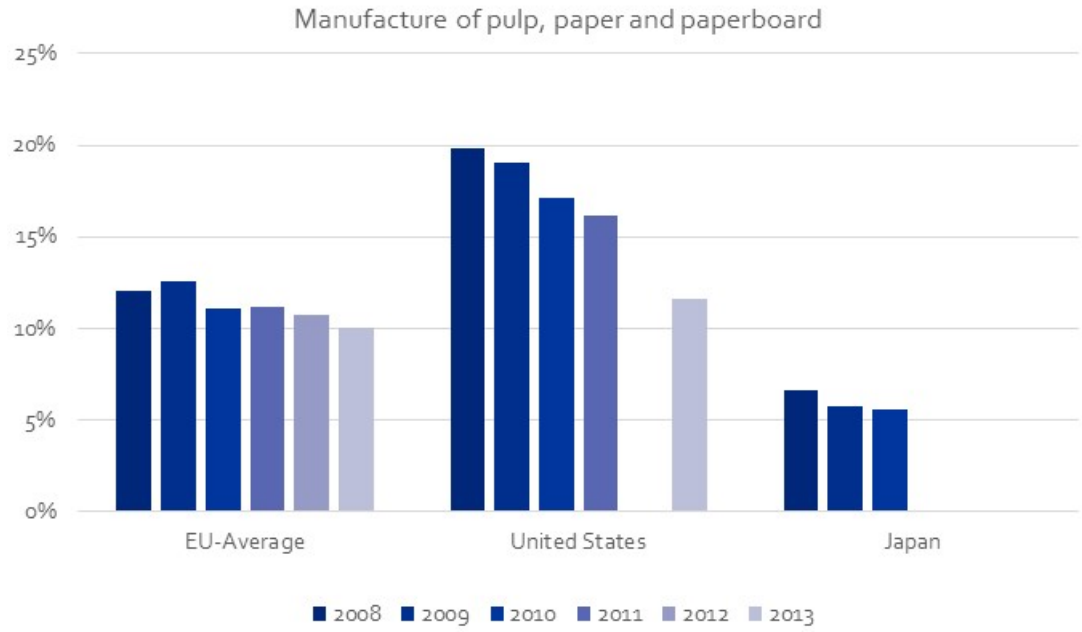

Figure 18 International comparison, energy cost as a percentage of total production costs

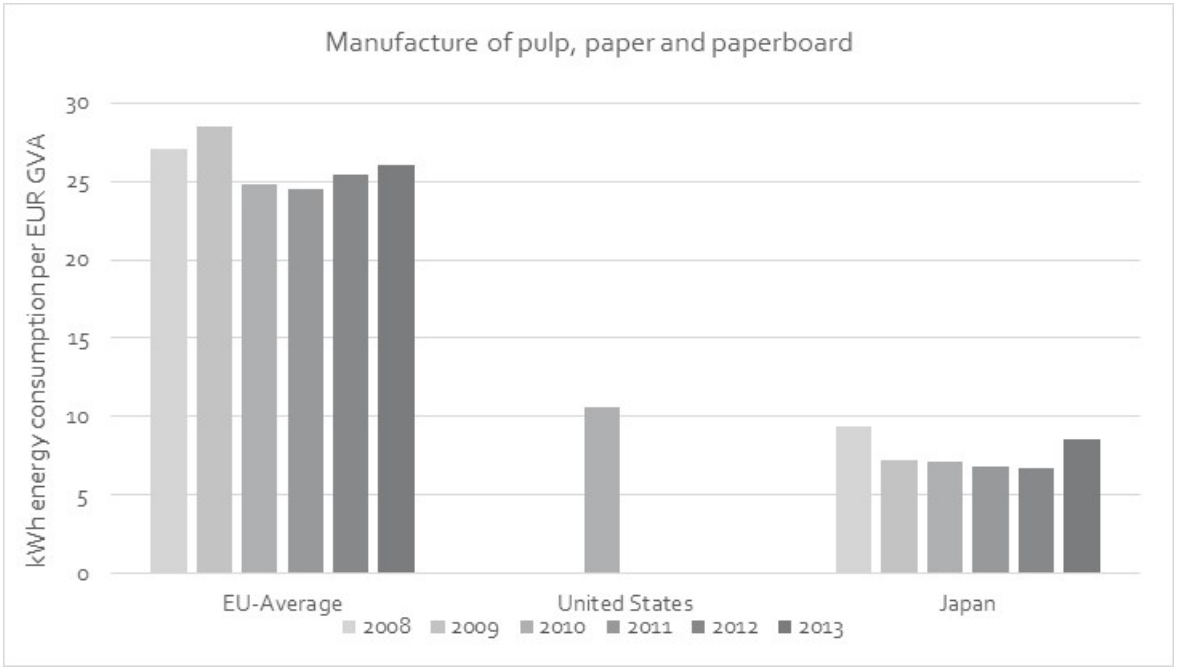

Figure 19 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.5 Manufacture of refined petroleum products

Summary of sector results:

- As noted in the main report, statistics for this sector can be misleading. Energy costs for the sector in reality include both energy used in processes and also fuels purchased for processing, both of which are subject to energy price fluctuations. The energy cost statistics used in this work, from the Eurostat SBS dataset, only include costs associated with energy used in processes, not as inputs, significantly underestimating the cost impact to the sector of changes in energy prices.
- There is limited data availability on the energy costs as a share of total production costs over 2008–2013. The EU average energy cost as a share of the total production cost increased over 2008–2013.
- The EU total[12] production cost fell in 2009; since then, the total production costs rose steadily, peaking in 2012, and falling slightly in 2013. Energy costs represented a small share of the total production cost over the period 2008-2013. However, energy costs increased over this period and energy costs were larger than personnel costs over 2010–2013.
- There is poor availability of gross operating surplus data for this sector. Of the Member States for which data is available, the highest gross operating surplus as a percentage of production costs was located in EE.
- Over 2008–2011 and 2013, the energy costs as a percentage of total production costs in the US fell, likely a result of the impact of shale gas on energy prices, while an increasing trend was observed in the EU. Energy costs as a percentage of total production costs in the EU over 2009–2011 and 2013 were higher than in the US. Energy costs as a percentage of total production costs in Japan over 2008–2010 were higher than in the EU.
- EU energy intensity data is not available. The energy intensity in Japan fell from 2008 levels, to a minimum in 2011; since 2011, the energy intensity grew. In 2010, the energy intensity in the US was higher than in Japan.

[12] Of Member States with all available data points for all years, see table 5 in the main report.

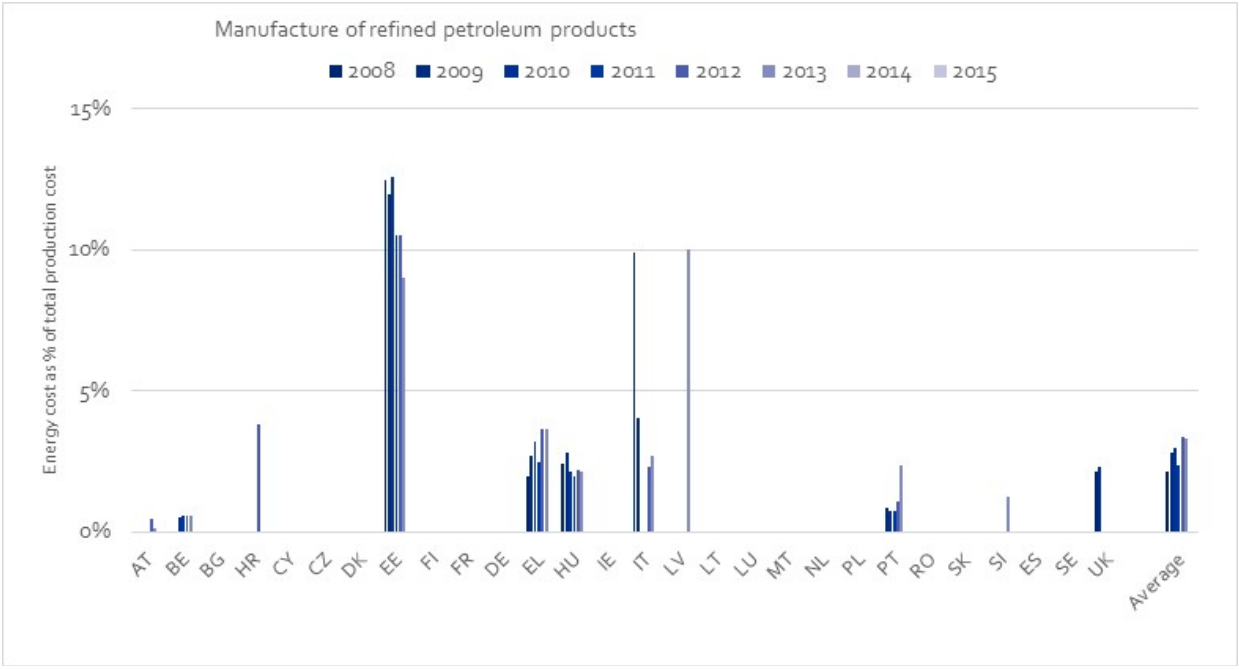

Figure 20 Energy cost as a share of total production cost 2008-2013 – Member State results

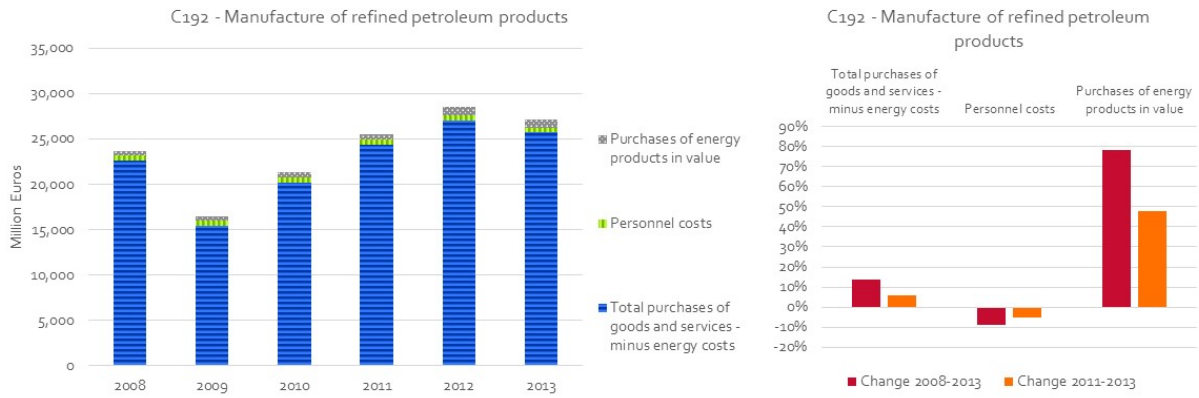

Figure 21 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

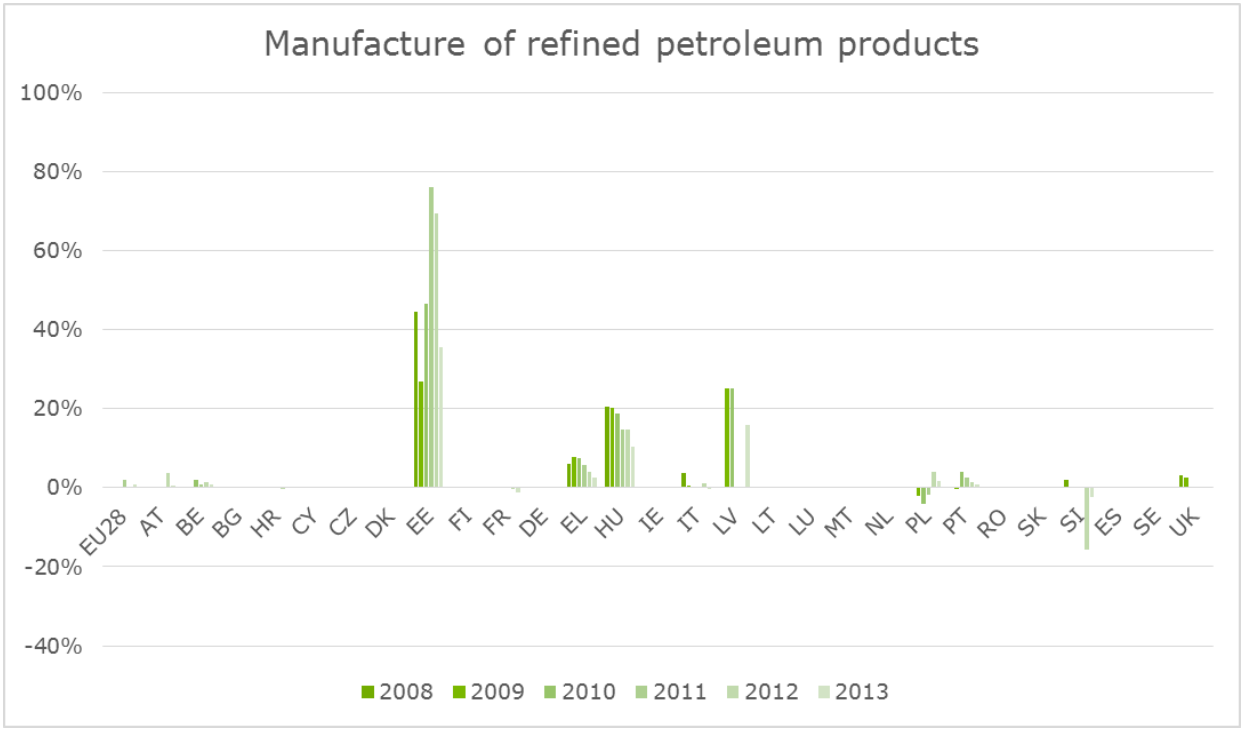

Figure 22 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

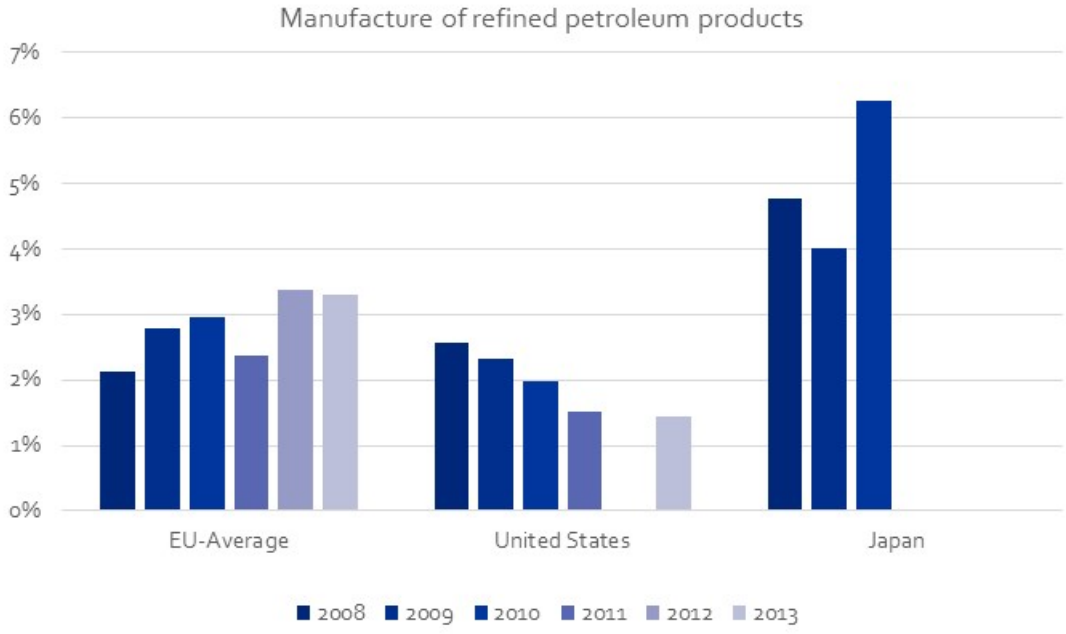

Figure 23 International comparison, energy cost as a percentage of total production costs

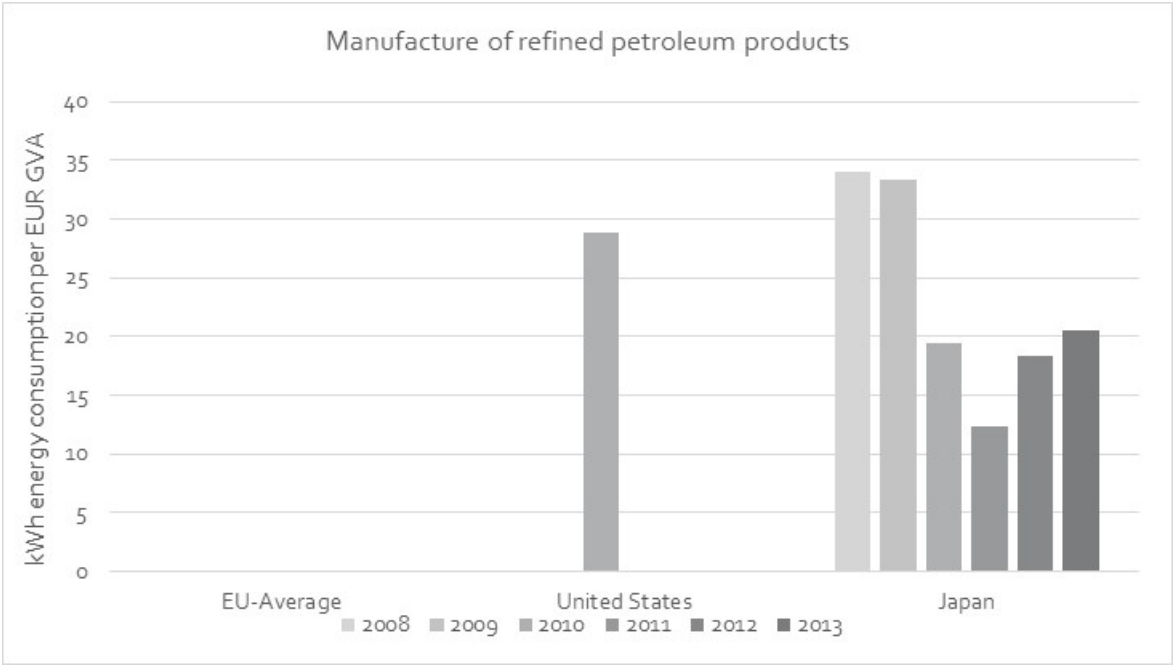

Figure 24 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.6 Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms

Summary of sector results:

- The EU average energy cost as a share of the total production costs was 6.7% over 2008–2013, and the energy cost share was relatively stable over this period. A consistent temporal trend across individual Member States was not observed as the energy cost as a share of the total production costs fluctuated over the 2008–2013 period. Larger energy cost shares was observed in BG, HR, LV and RO, while the lowest energy cost shares were observed in IE over 2012–2013.
- The EU total[13] production cost fell in 2009; since then, the total costs recovered to about the 2008 level in 2011 and remained relatively stable over 2012–2013. Energy costs decreased over the period 2008-2013. Personnel costs were larger than energy costs and rose over 2008–2013.
- The gross operating surplus as a percentage of total production costs in the EU declined from 10% to 9% over 2011–2012, and was stable in 2013. A consistent temporal trend across each individual Member State was not observed. The largest gross operating surplus as a percentage of total production costs in the EU over 2008–2013 were located in DK, IE and

[13] Of Member States with all available data points for all years, see table 5 in the main report.

UK, while the lowest was located in HR, where negative gross operating surpluses were recorded in 2009, 2012 and 2013.

- In 2013, the energy cost as a percentage of total production costs in the US was lower than the EU average. Over 2008–2010, energy costs as a percentage of total production costs in Japan were lower than in the EU.
- The average energy intensity in the EU[14] was higher than in Japan over 2009-2013. The energy intensity in Japan fell gradually over 2011 – 2012, however it increased in 2013. The energy intensity in the US in 2010 was lower than in both the EU and Japan.

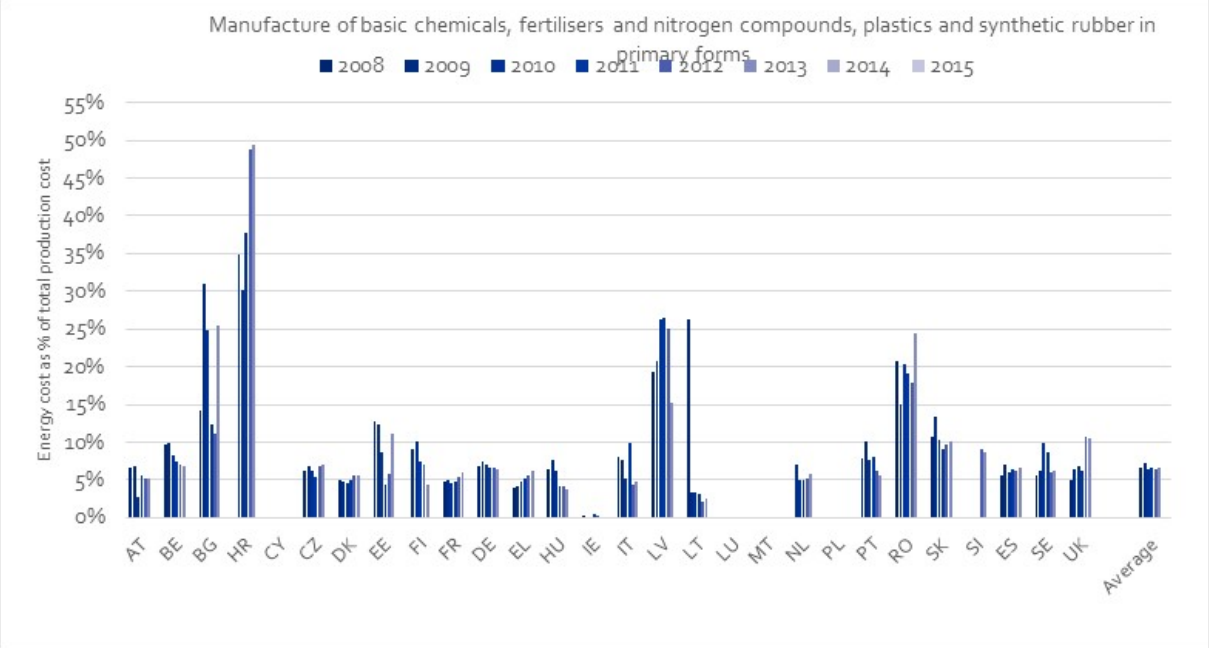

Figure 25 Energy cost as a share of total production cost 2008-2013 – Member State results

[14] Of Member States with available data, see table 6 in the main report.

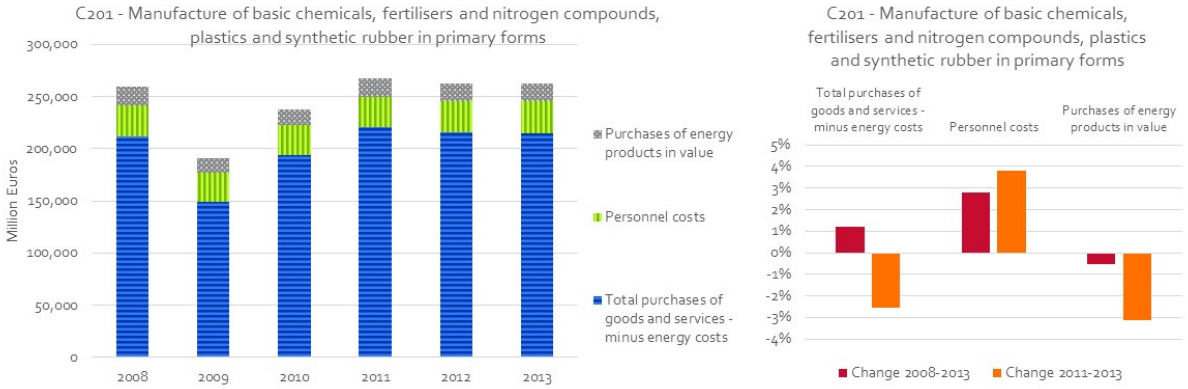

Figure 26 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

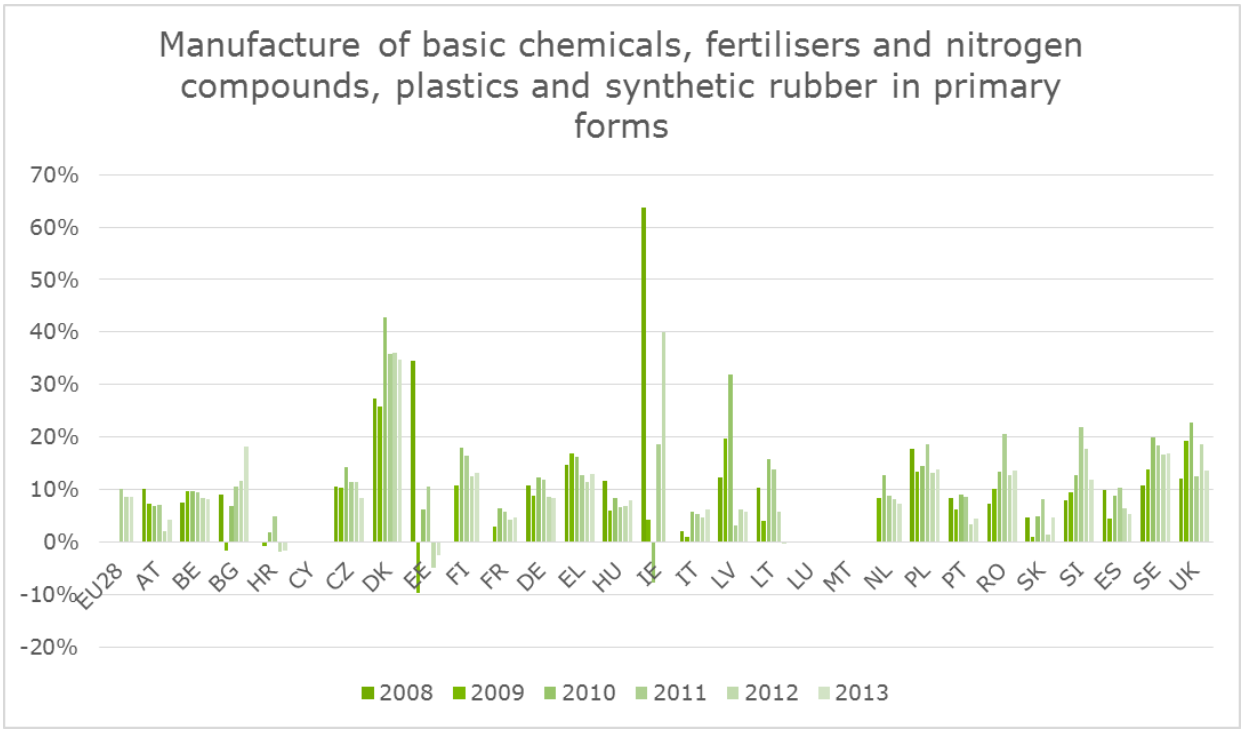

Figure 27 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

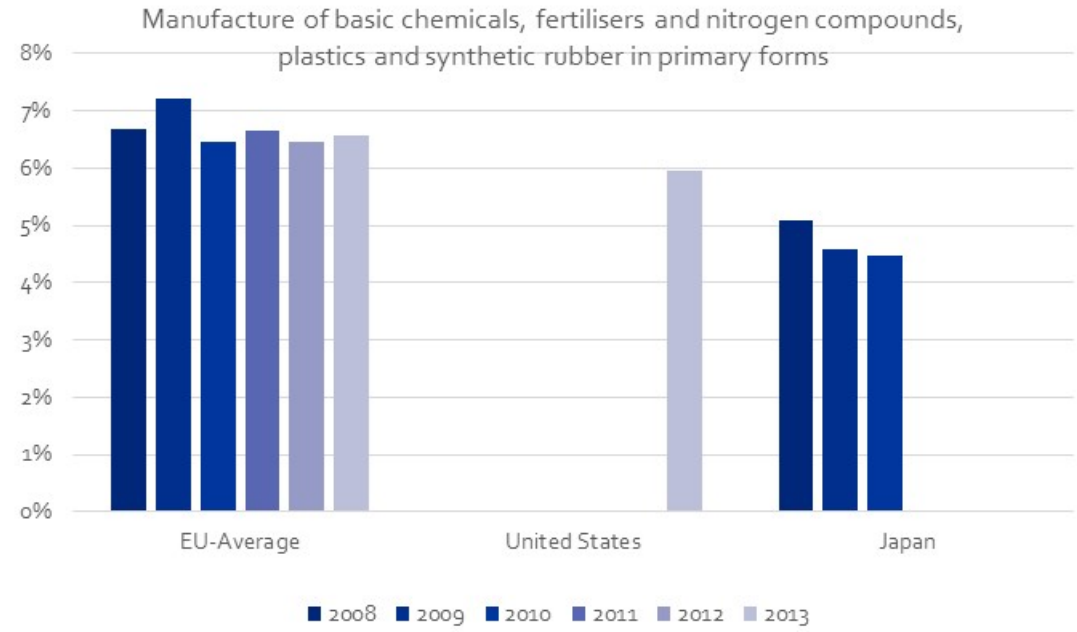

Figure 28 International comparison, energy cost as a percentage of total production costs

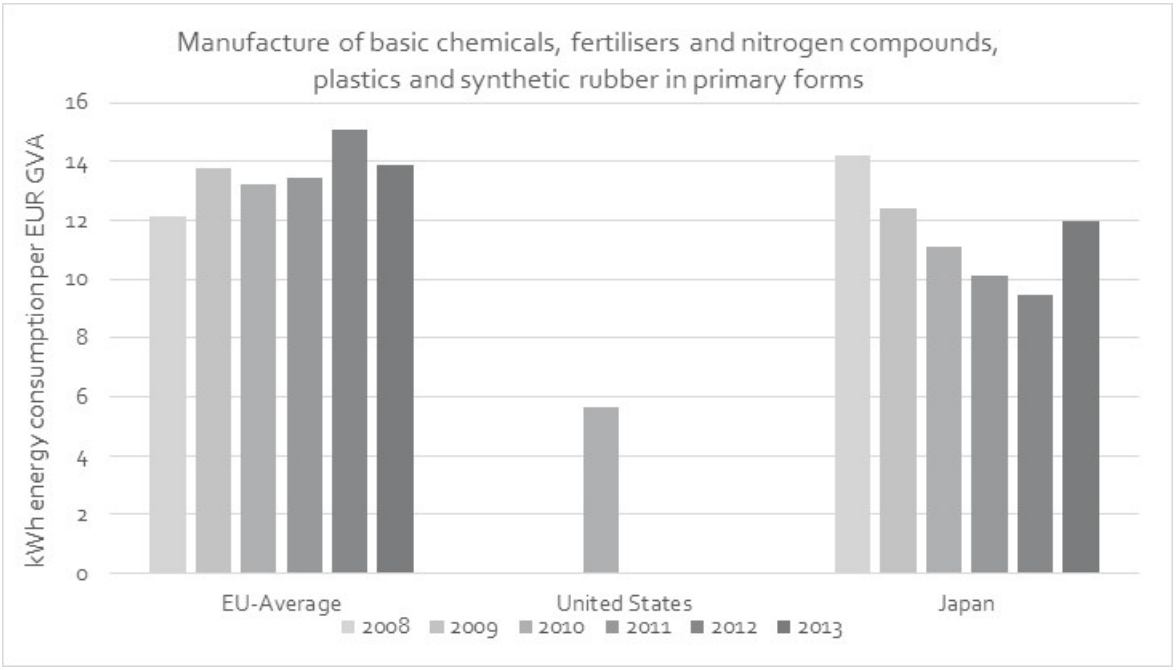

Figure 29 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.7 Manufacture of man-made fibres

Summary of sector results:

- The EU average energy cost as a share of the total production cost peaked at 12.1% in 2009, fell over 2010–2012, and increased slightly in 2013 to 8.4%. An overall declining trend in the energy cost share was observed in AT, BG and PT, while a fluctuating trend was observed for the other Member States. A large variation in the energy cost as a share of the total production cost was observed in IT—the EU wide maximum and minimum energy cost shares were observed in IT in 2009 and 2012, respectively. This appears not to be linked to any large swings in either average gas or electricity prices in Italy (see main report Section 2).
- The EU total[15] production cost fell in 2009; since then, the total costs rose in 2010–2011 and fell slightly over 2012–2013. Energy costs were lower than personnel costs over the period 2008-2013. Energy costs in 2013 were lower than in 2008, however, compared to 2011 levels, the energy cost in 2013 increased.
- There is limited EU-level data available on the gross operating surplus as a percentage of total production costs. A consistent temporal trend across each individual Member State was not observed. The largest gross operating surpluses as a percentage of total production costs in the EU over 2008–2013 were located in AT, EL, NL and PL, while the lowest were located in FI, IT, PT and SK, where negative gross operating surpluses were recorded across several years over 2008-2013.
- In 2010, 2011 and 2013, energy costs as a percentage of total production costs in the US were lower than in the EU. The energy cost share in the US fell more rapidly than in the EU over 2008–2013.
- The energy intensity in the EU[16] peaked in 2009 and declined over 2010–2011. The energy intensity in 2013 was higher than 2011 levels. Energy intensity data from the US and Japan was not available.

[15] Of Member States with all available data points for all years, see table 5 in the main report.
[16] Of Member States with available data, see table 6 in the main report.

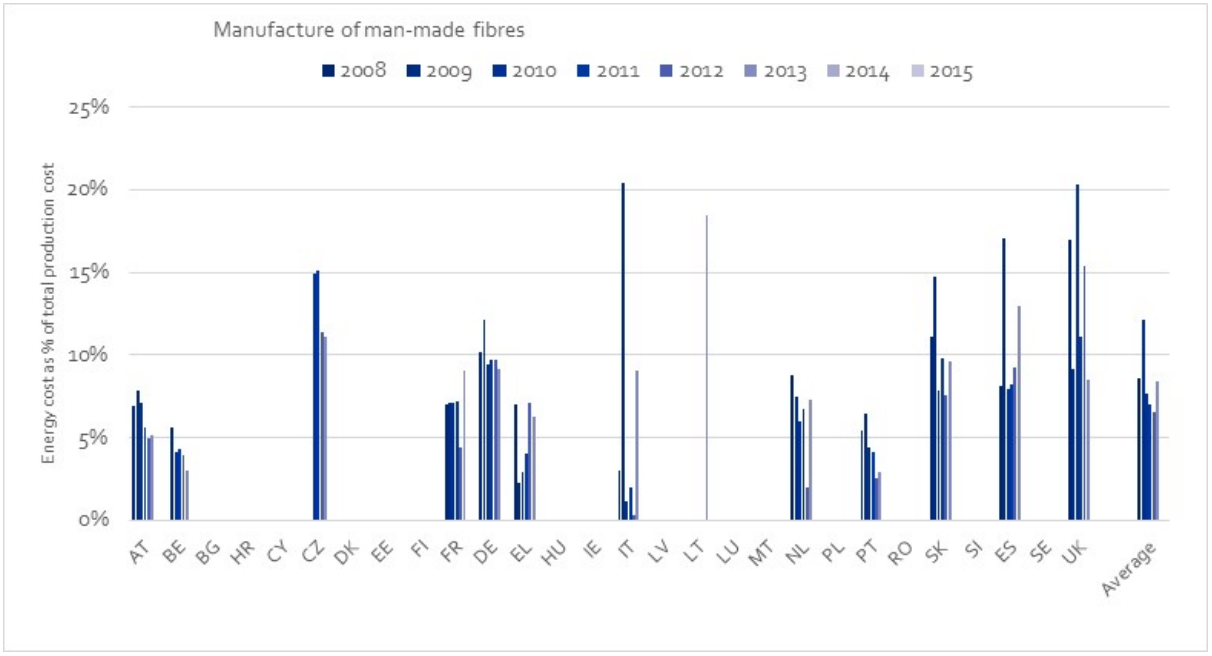

Figure 30 Energy cost as a share of total production cost 2008-2013 – Member State results

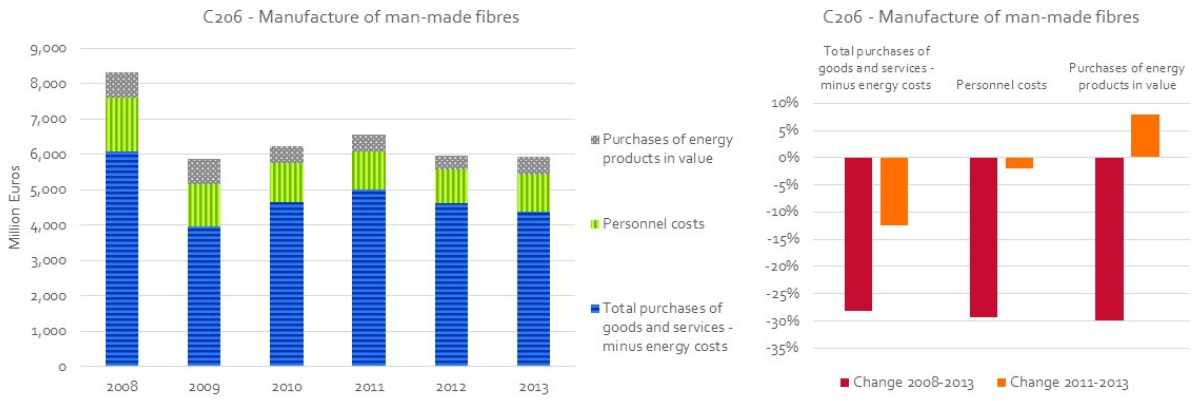

Figure 31 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

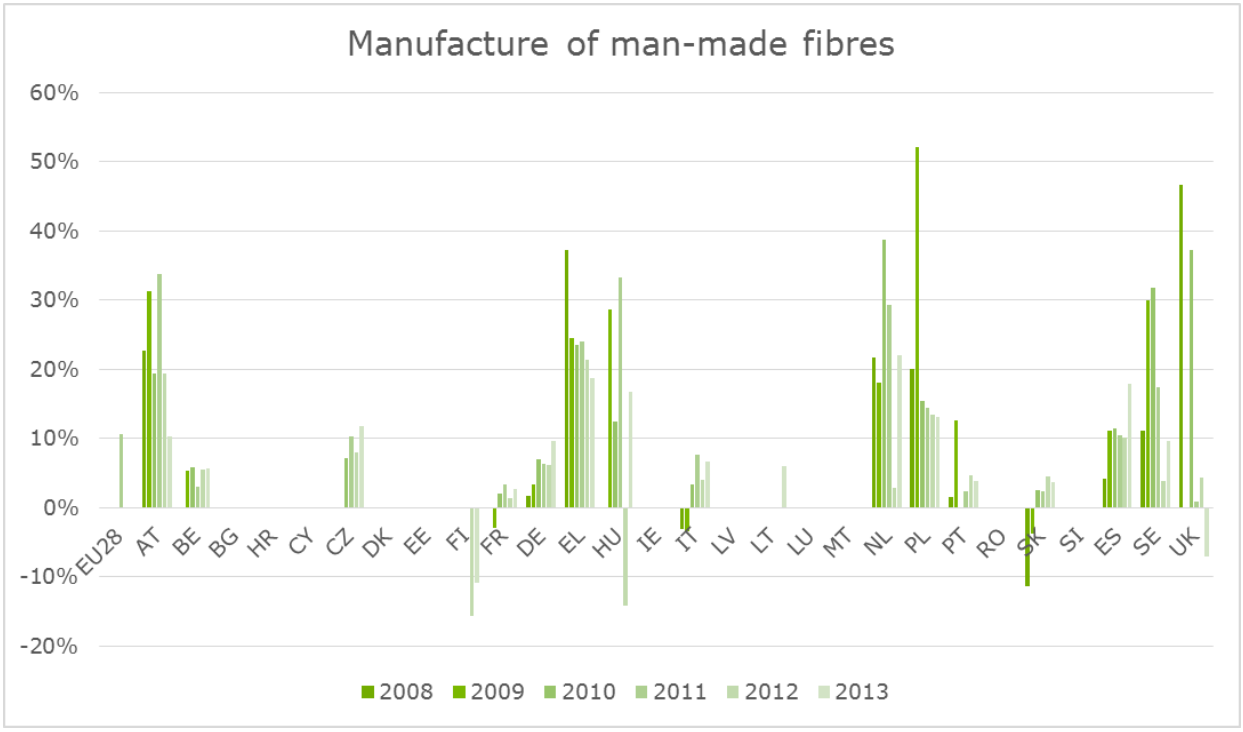

Figure 32 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

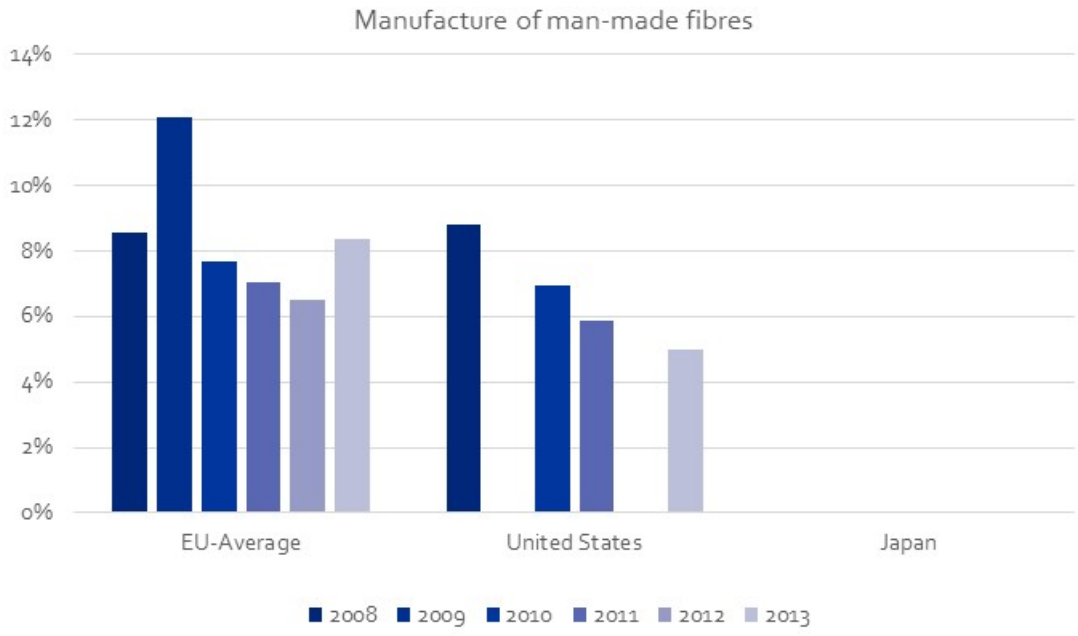

Figure 33 International comparison, energy cost as a percentage of total production costs

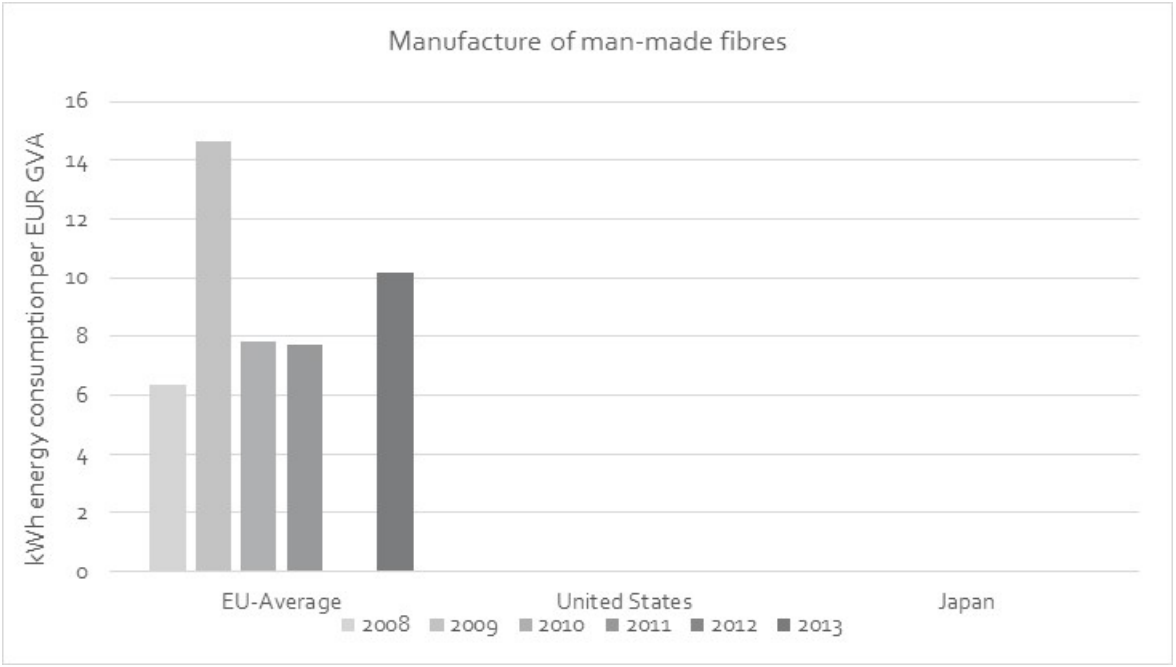

Figure 34 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.8 Manufacture of glass and glass products

Summary of sector results:

- The EU average energy cost as a share of the total production costs fell from the 2008-2009 level of 9.4% to 8.5% in 2010–2011. Over 2012–2013, the energy cost share recovered to about the 2008 level. A consistent temporal trend across individual Member States was not observed, with the energy cost share increasing in, for example, EE and ES, and decreasing in, for example, AT and FI. The highest energy cost shares were observed in BG, HR and PT, while very low energy cost shares were observed in CY.
- The EU total[17] production cost fell in 2009; since then, the total costs rose in 2010–2011 and fell slightly over 2012–2013. Energy costs were smaller than personnel costs over 2008–2013. Energy costs in 2013 were lower than in 2008, however, compared to 2011 levels, the energy cost in 2013 increased.
- The gross operating surplus as a percentage of total production costs in the EU declined slightly over 2011–2013 from 11% to 10%. A declining trend in the gross operating surplus as a percentage of total production costs was observed in the majority of individual Member States, e.g. BE and BG over 2008 – 2013, however, increasing trends were observed in others, e.g. LV and SK. The largest gross operating surpluses as a percentage of total

[17] Of Member States with all available data points for all years, see table 5 in the main report.

production costs in the EU over 2008–2013 were located in HR and PT, while the lowest were located in BE and IE.

- Over 2008–2011 and 2013, energy costs as a percentage of total production costs in the US were higher than in the EU average. A relatively stable trend was observed for the EU over this period, while a declining trend was observed in the United States.
- The average energy intensity in the EU[18] peaked in 2009 and declined in 2010; since then, the energy intensity rose slightly. The energy intensity in the US in 2010 was higher than in the EU.

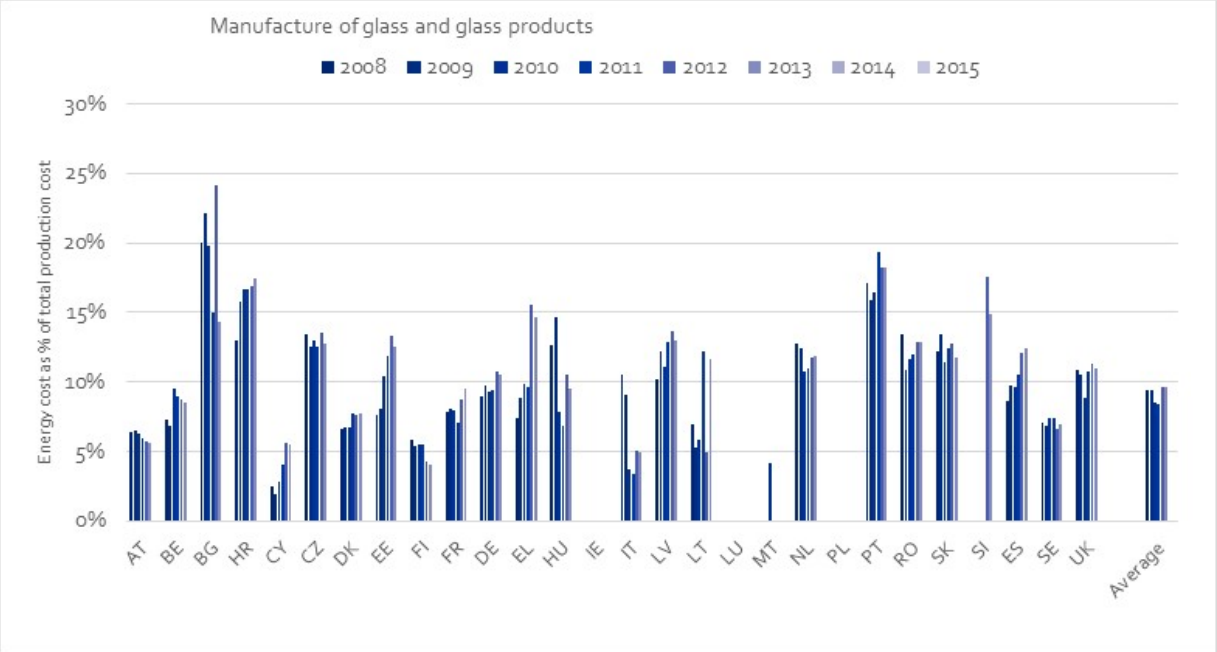

Figure 35 Energy cost as a share of total production cost 2008-2013 – Member State results

[18] Of Member States with available data, see table 6 in the main report.

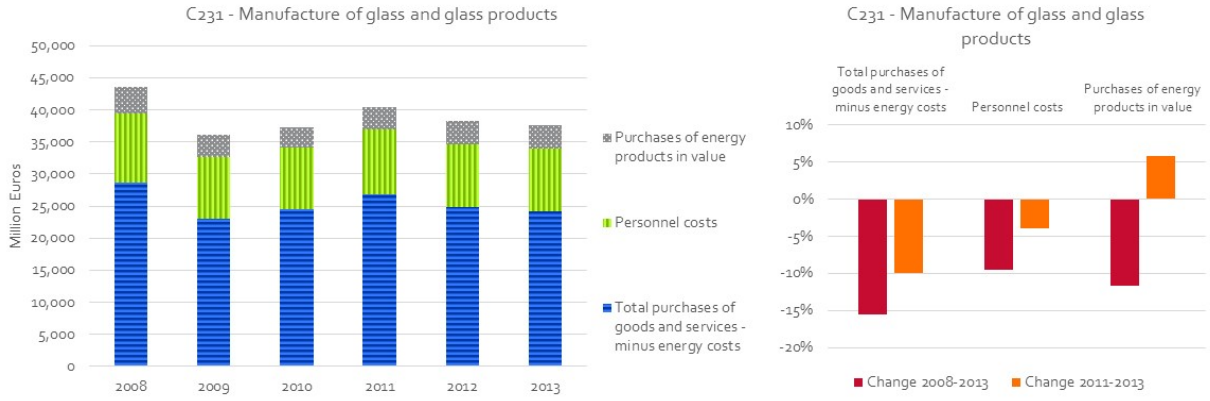

Figure 36 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

Figure 37 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

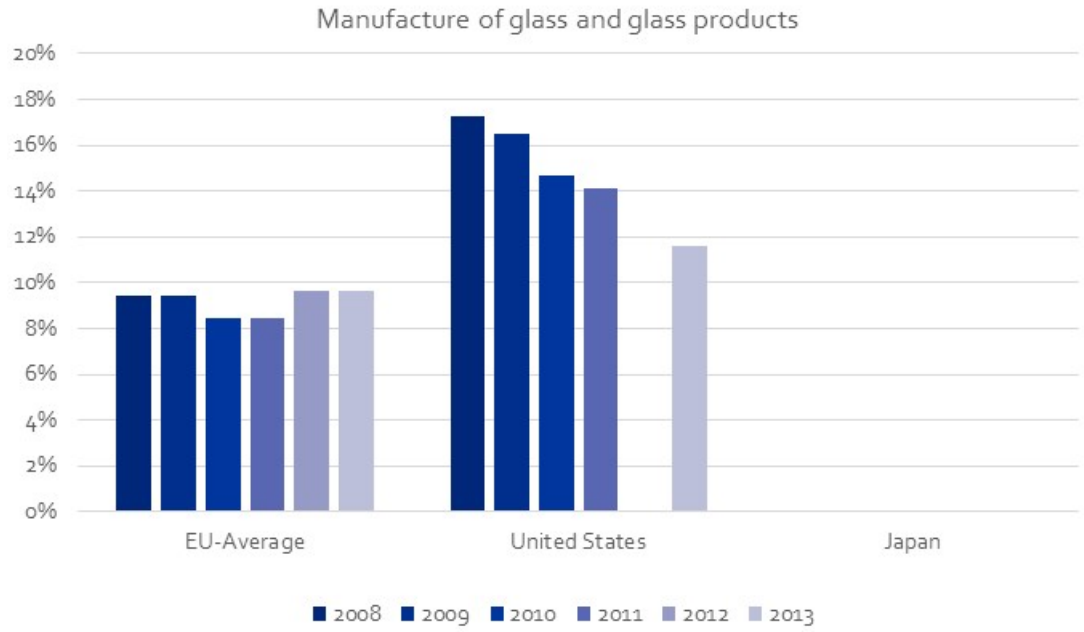

Figure 38 International comparison, energy cost as a percentage of total production costs

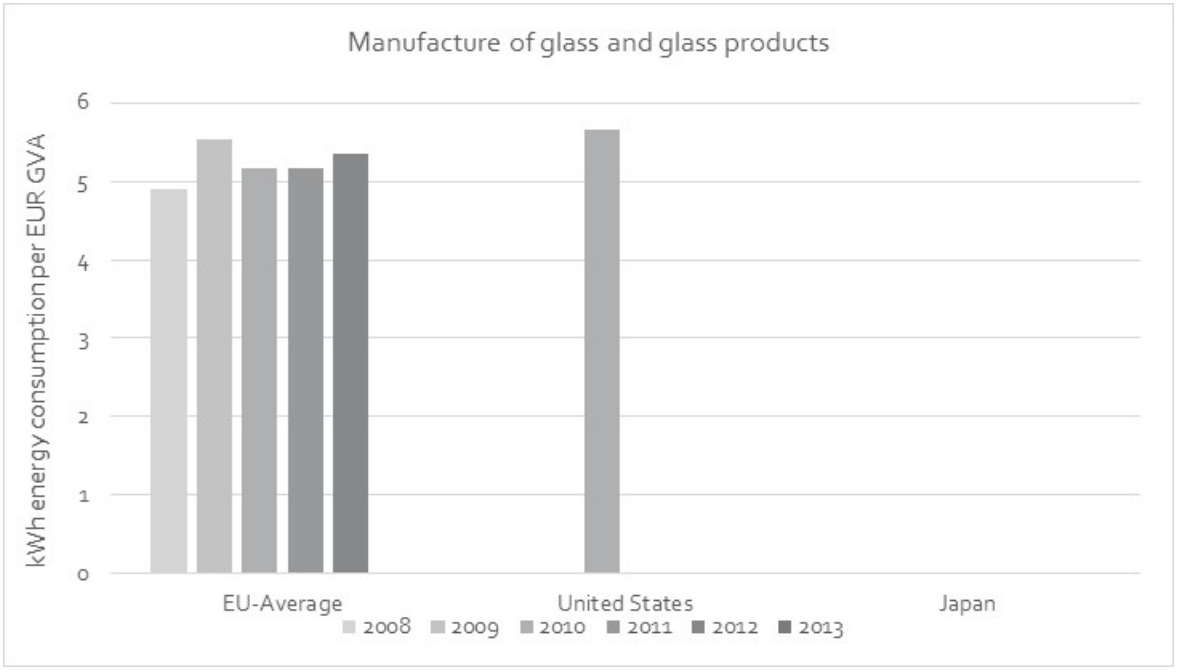

Figure 39 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.9 Manufacture of refractory products

Summary of sector results:

- The EU average energy cost as a share of the total production cost was 6.1% over 2008–2013 and the energy cost share was relatively stable over this period. A consistent temporal trend across individual Member States was not observed, with increasing energy cost shares observed in, for example, FR and ES, while a decline were observed in, for example, UK. The highest energy cost shares was observed in PT and SK, while very low energy cost shares were observed in SE.
- The EU total[19] production cost fell in 2009; since then, the total costs recovered to about the 2008 level in 2011, and then fell slightly in 2012-2013. Energy costs were lower than personnel costs over the period 2008-2013. Energy costs in 2013 were lower than in 2008, however, compared to 2011 levels, the energy cost in 2013 increased.
- The gross operating surplus as a percentage of total production costs in the EU was about 9% over 2011–2013. A consistent temporal trend across each individual Member State was not observed, with increasing trends observed in, for example, SK and SE, while decreasing trends observed in, for example, FR and DE. The largest gross operating surpluses as a percentage of total production costs in the EU over 2008–2013 were located in FI and LV, while the lowest were located in LT, where negative gross operating surpluses were recorded in 2008 and 2009.
- Energy costs as a percentage of total production cost data from the United States and Japan was not available for comparison with the EU.
- The energy intensity in the EU[20] peaked in 2009, and declined over 2010–2013. Data from the United States and Japan were not available for comparison with the EU.

[19] Of Member States with all available data points for all years, see table 5 in the main report.
[20] Of Member States with available data, see table 6 in the main report.

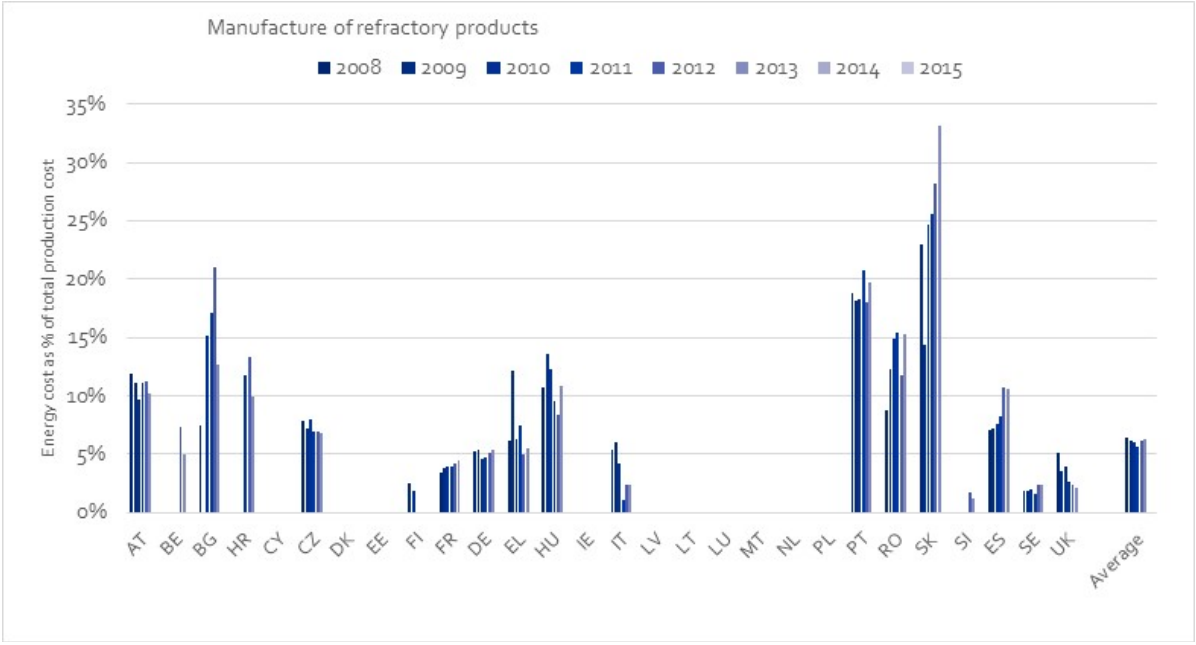

Figure 40 Energy cost as a share of total production cost 2008-2013 – Member State results

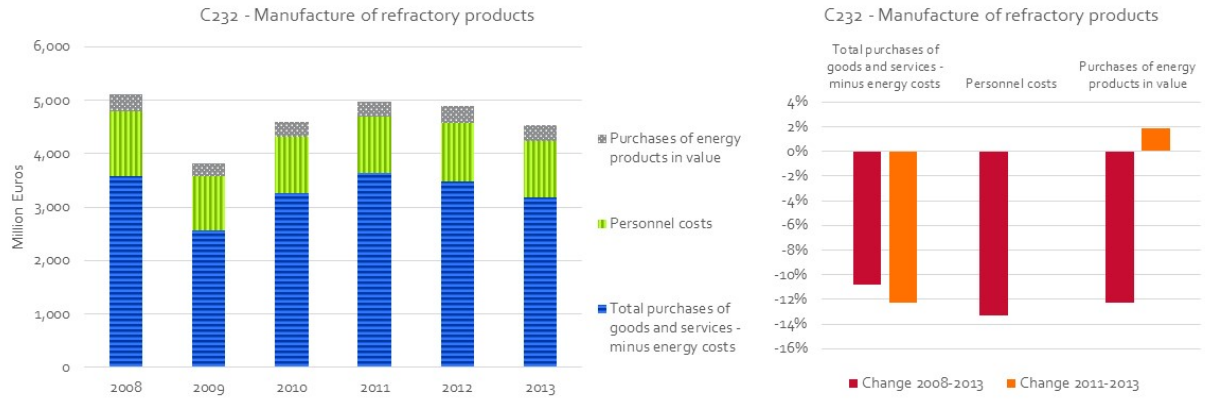

Figure 41 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

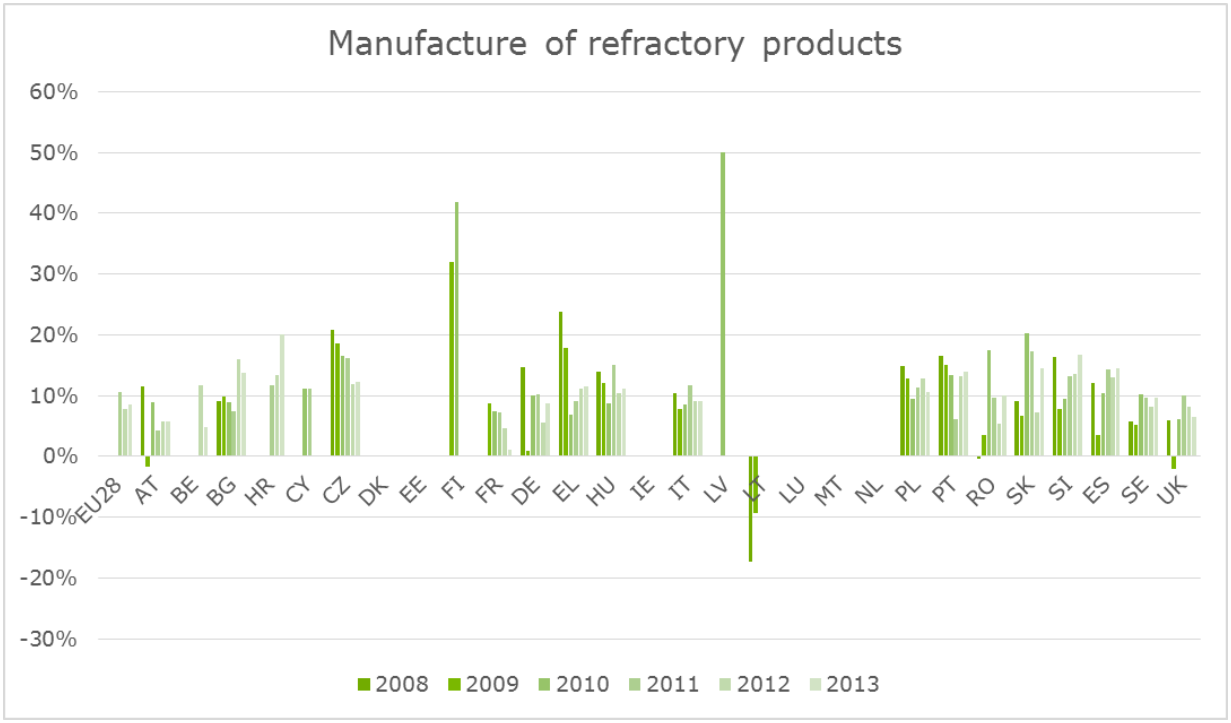

Figure 42 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

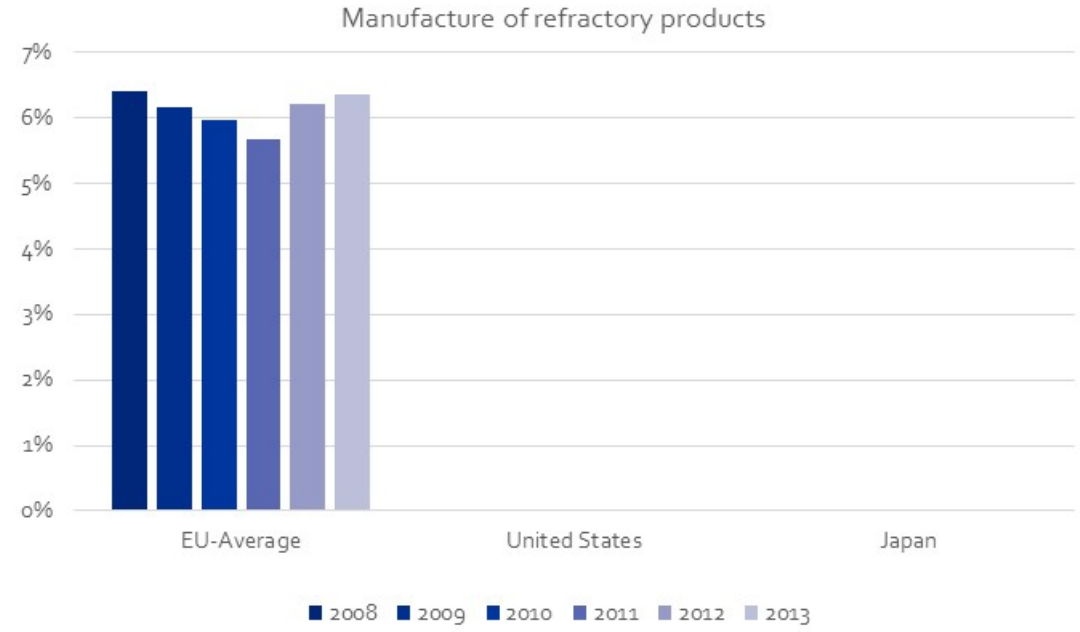

Figure 43 International comparison, energy cost as a percentage of total production costs

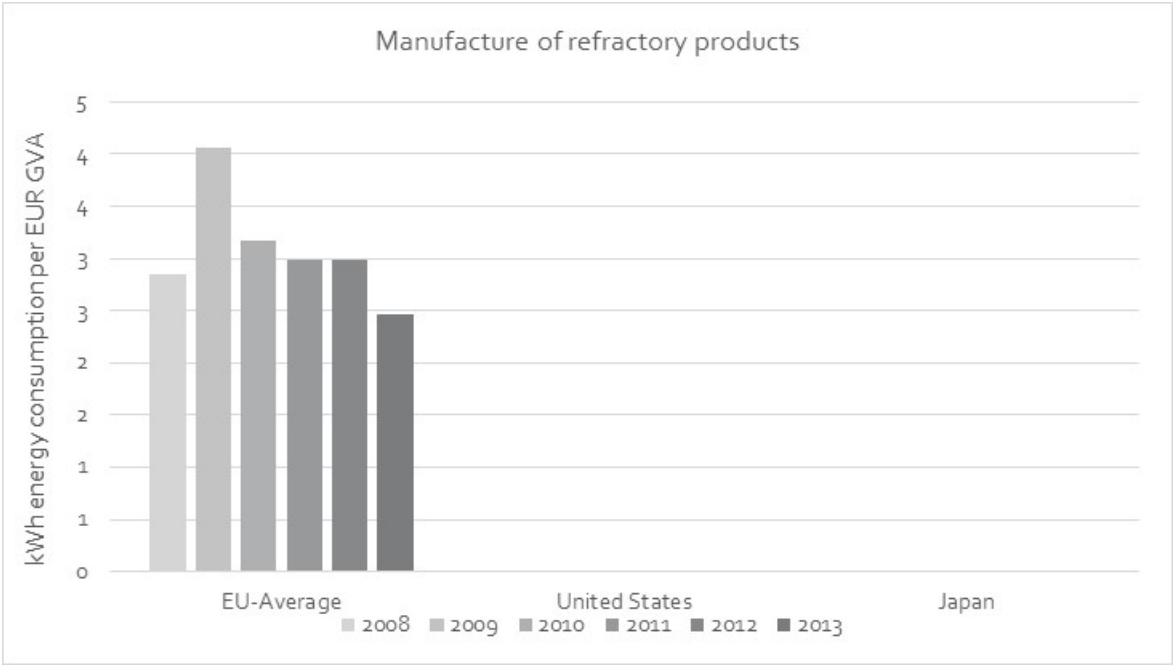

Figure 44 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.10 Manufacture of clay building materials

Summary of sector results:

- The EU average energy cost as a share of the total production cost fell from a peak of 15.4% in 2008 to 11.3% in 2011; over 2012–2013, the energy cost share rose slightly. Across individual Member States, the energy cost share of the total production cost generally fluctuated across 2008–2013, and a consistent temporal trend was not observed. The highest energy cost shares were observed in CY, while relatively low energy cost shares were observed in FI.
- The EU total[21] production cost fell in 2009; since then, the total costs rose in 2010–2011 and fell slightly over 2012–2013. Energy costs were lower than personnel costs over the period 2008-2013. The energy cost fell more rapidly than personnel costs over 2008–2013.
- The average gross operating surplus as a percentage of total production costs fell from 13% in 2011 to 11% in 2012–2013. In most Member States, there was an overall declining trend over 2008–2013, however, some increasing trends in gross operating surpluses as a percentage of total production costs were observed in this period, for example in ES and UK. The largest gross operating surpluses as a percentage of total production costs in the EU over 2008–2013 were located in BG and CY while the lowest were located in FI, SK and SE, where

[21] Of Member States with all available data points for all years, see table 5 in the main report.

negative gross operating surpluses was recorded in several years over this period. The negative gross operating surplus as a percentage of total production costs in BE recorded in 2008 was an outlier in the data collected over this period.

- Energy cost as a percentage of total production costs data from the United States and Japan were not available for comparison with the EU.
- The energy intensity in the EU[22] peaked in 2008 and declined over 2009–2010. Over 2010–2013, the energy intensity was relatively stable. Data from the United States and Japan were not available.

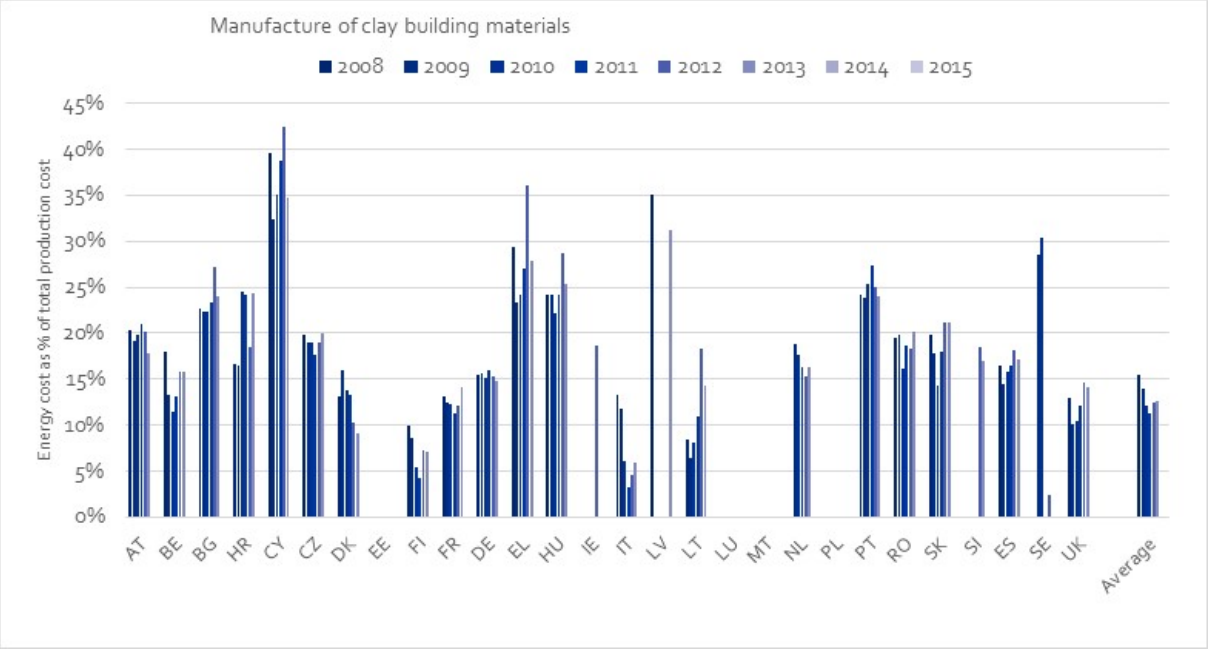

Figure 45 Energy cost as a share of total production cost 2008-2013 – Member State results

[22] Of Member States with available data, see table 6 in the main report.

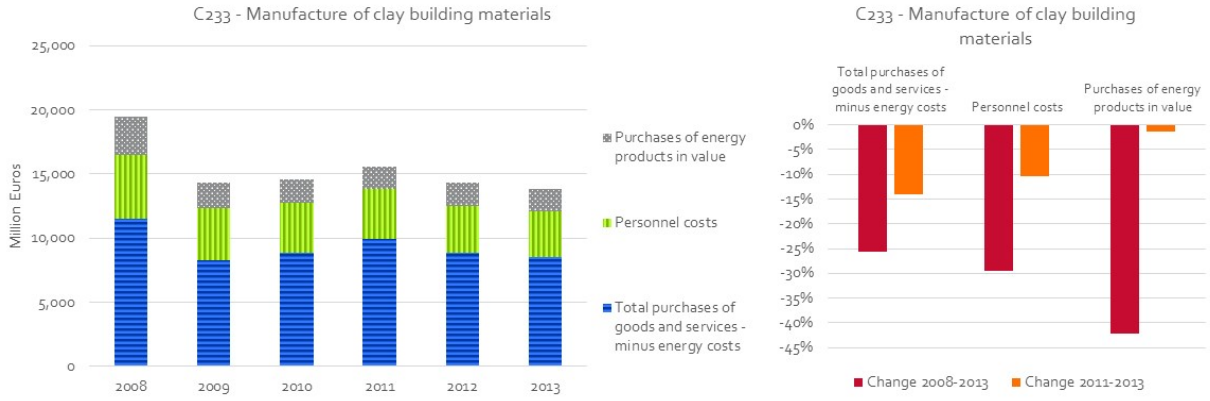

Figure 46 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

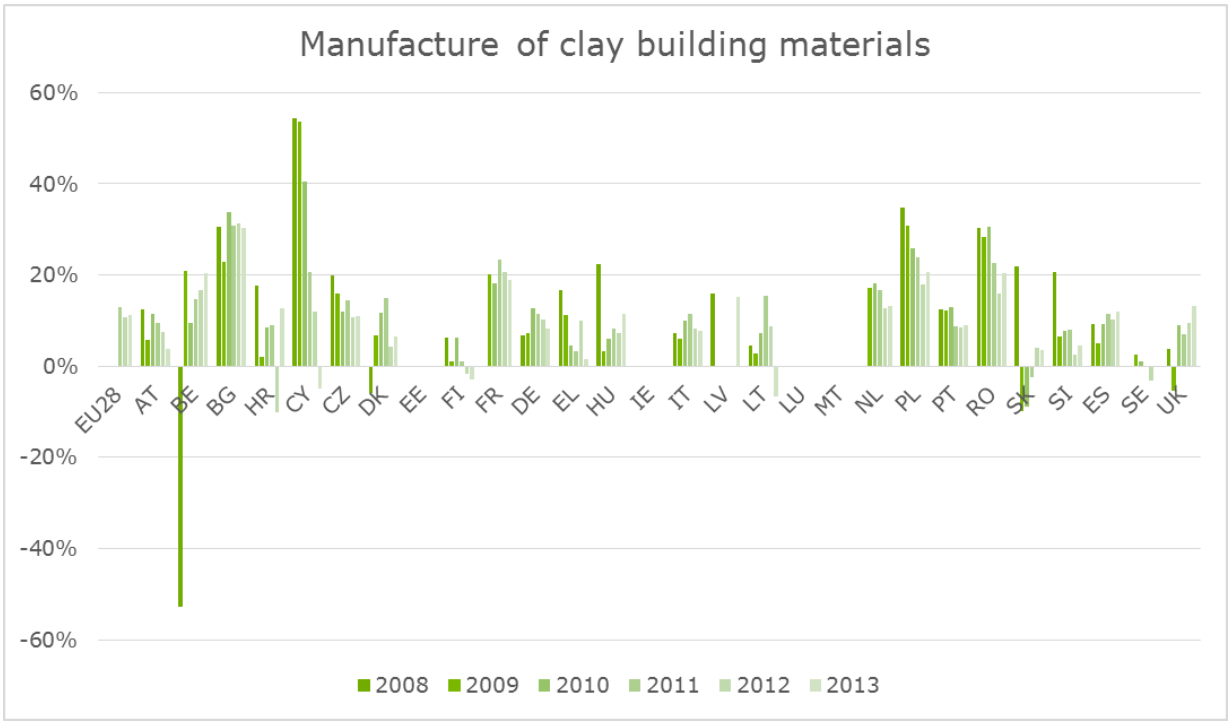

Figure 47 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

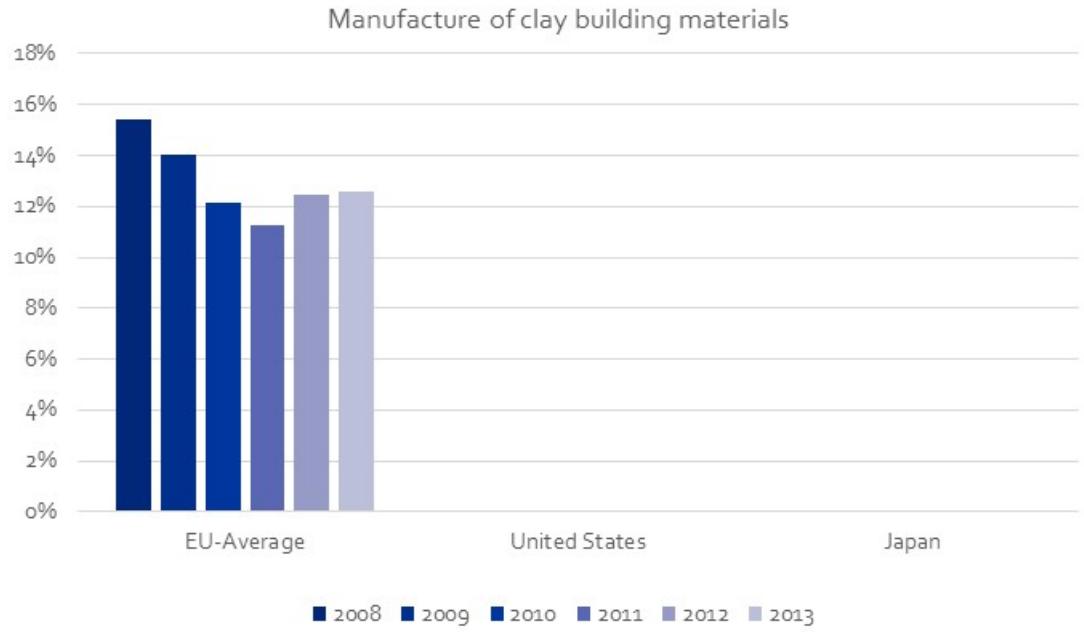

Figure 48 International comparison, energy cost as a percentage of total production costs

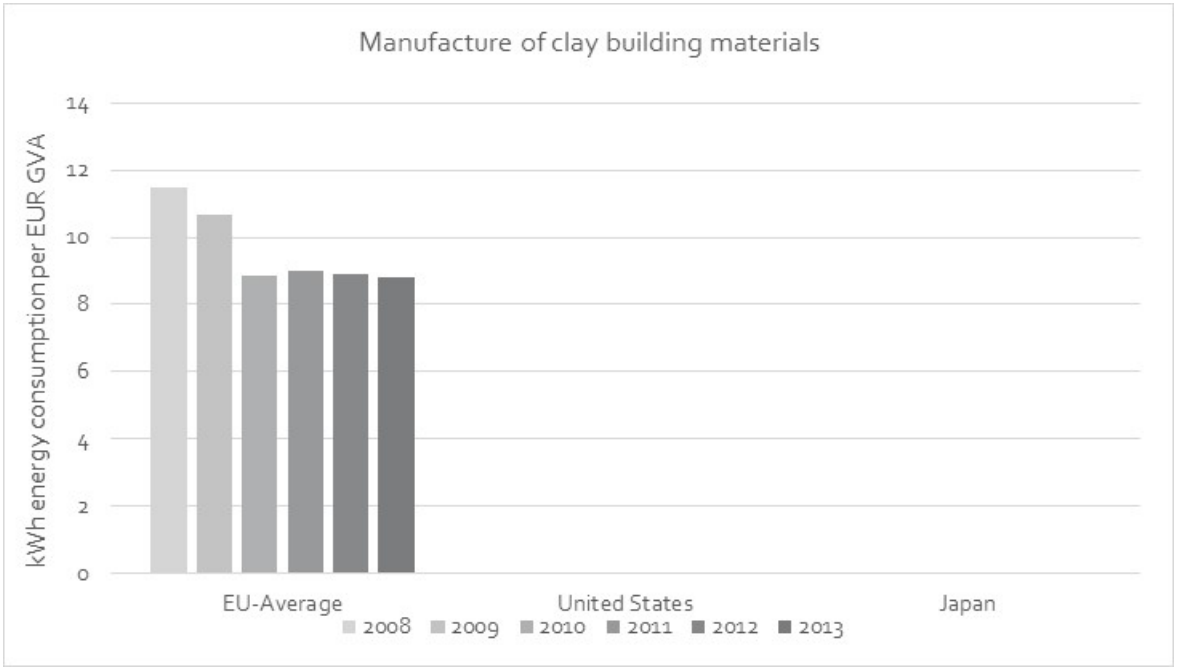

Figure 49 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.11 Manufacture of other porcelain and ceramic products

Summary of sector results:

- The EU average energy cost as a share of the total production cost over 2008–2013 was 5.3%. Apart from a slight decline in 2010, and the energy cost share was relatively stable over this period. Across individual Member States, the energy cost as a share of the total production cost fluctuated over 2008–2013, and a consistent temporal trend was not observed. The highest energy cost shares were observed in HR and PT, while relatively low energy cost shares were observed in DK and LT.
- The EU total[23] production cost fell in 2009; since then, the total costs rose in 2010–2011 and fell slightly over 2012–2013. Energy costs were lower than personnel costs over the period 2008-2013. The energy cost fell at a slightly lower rate than personnel costs over 2008–2013.
- The average gross operating surplus as a percentage of total production costs over 2011–2013 was 10%. A consistent temporal trend across each individual Member State was not observed, with an increasing trend observed in some Member States, for example, BG and RO, while a declining trend was observed in others, for example, AT and EL. The largest gross operating surplus as a percentage of total production costs in the EU over 2008–2013 were located in BE, HU and PL, while the lowest were located in DK, FR and SSI, where negative gross operating surpluses were recorded in several years over the 2008–2013 period.
- Over 2008–2011 and 2013, energy costs as a percentage of total production costs in the US were higher than in the EU. Over this period, the energy costs as a percentage of total production costs in the United States fell, while a relatively stable trend was observed in the EU. Energy costs as a percentage of total production costs in Japan over 2008–2010 were substantially lower than in the EU.
- The energy intensity in the EU[24] peaked in 2009 and declined over 2011–2013. The energy intensity Japan over 2008–2013 was substantially higher than in the EU.

[23] Of Member States with all available data points for all years, see table 5 in the main report.
[24] Of Member States with available data, see table 6 in the main report.

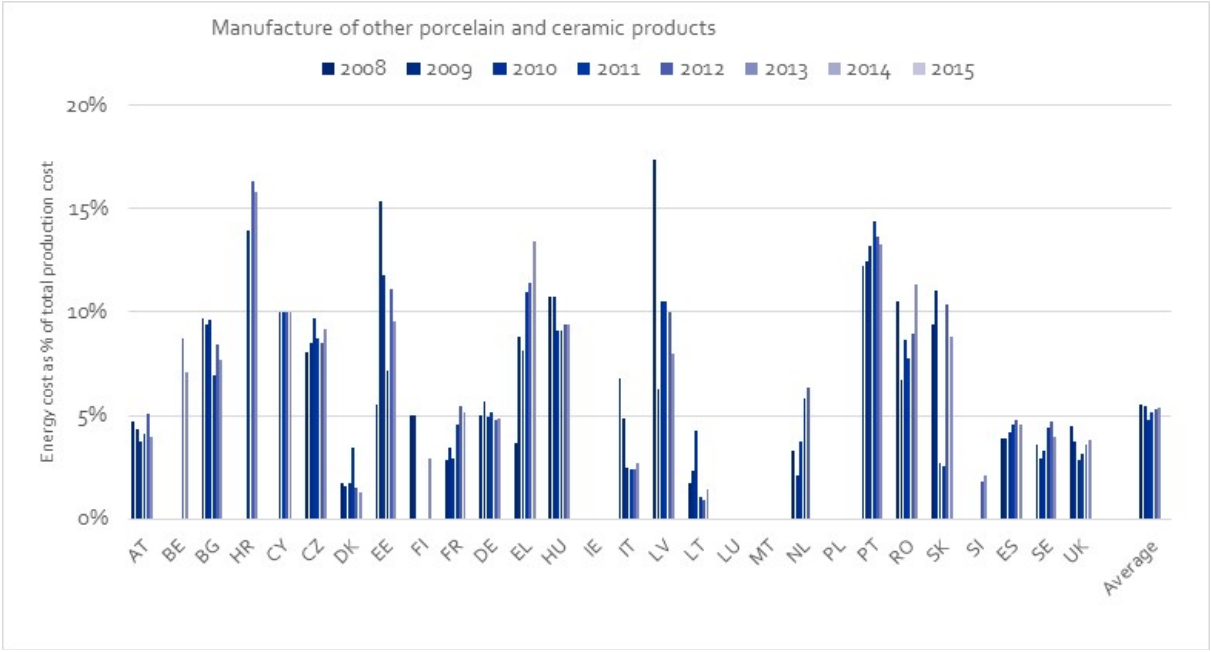

Figure 50 Energy cost as a share of total production cost 2008-2013 – Member State results

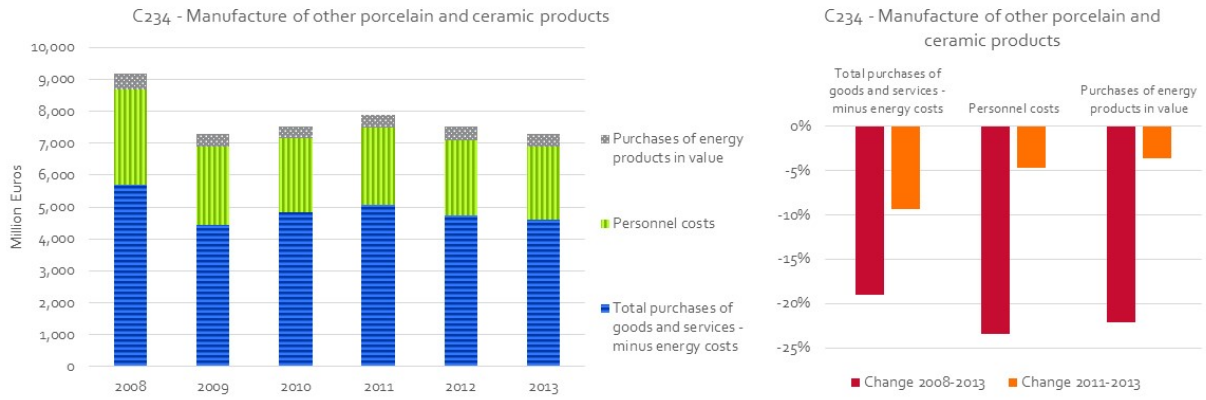

Figure 51 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

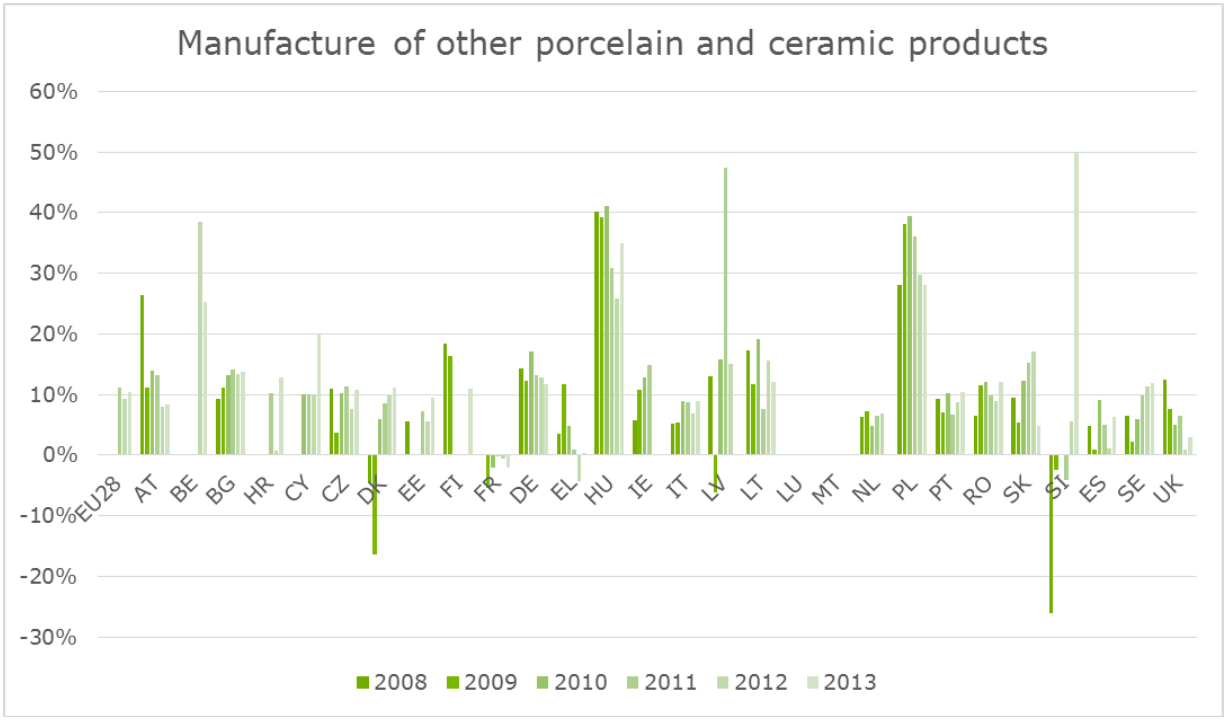

Figure 52 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

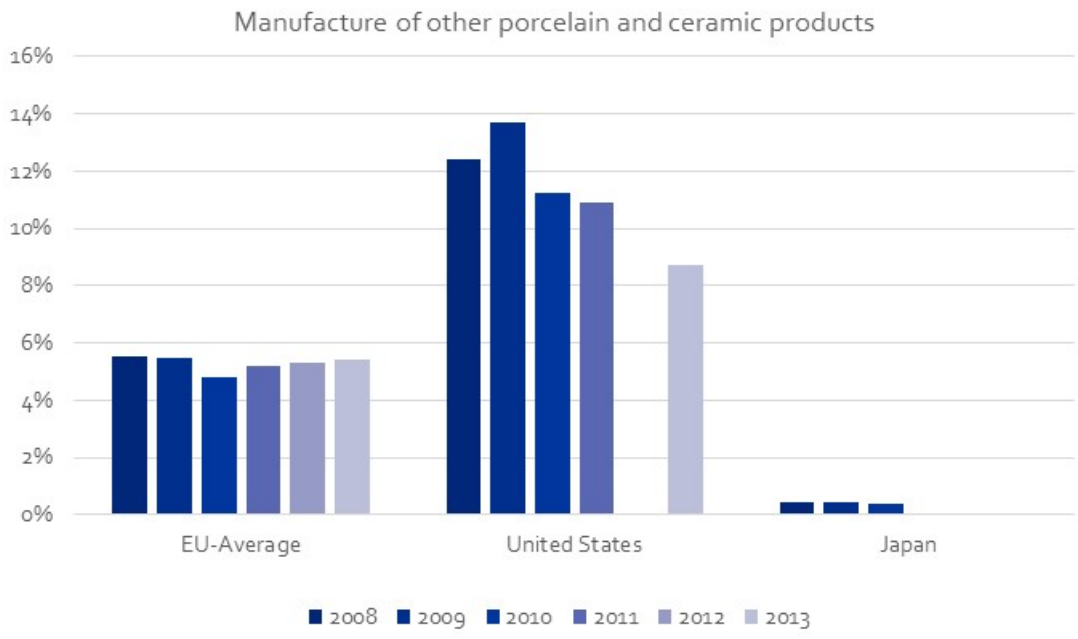

Figure 53 International comparison, energy cost as a percentage of total production costs

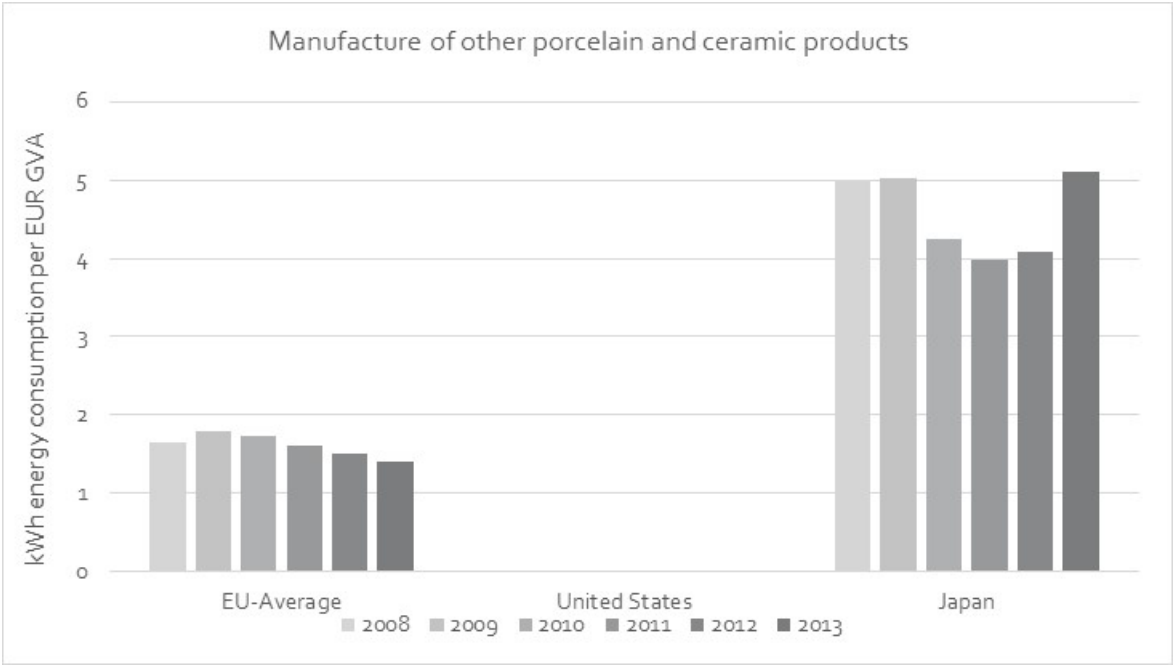

Figure 54 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.12 Manufacture of cement, lime and plaster

Summary of sector results:

- The EU average energy cost as a share of the total production cost decreased from 20.5% in 2008 to 18.7% in 2013. A decreasing trend in the energy cost share over this period was also observed across some individual Member States, for example, HU and IT, however, increasing trends were observed for others, for example, CY and CZ. The highest energy cost share was observed in CY, while relatively low energy cost shares were observed in BE, CZ and FR.
- The EU total[25] production cost declined over the period 2008 – 2013. Over 2008–2011, energy costs were higher than personnel costs; however, the inverse trend was observed in 2012–2013. Energy costs fell more rapidly than personnel costs over 2008–2013.
- The gross operating surplus as a percentage of total production costs fell from 23% to 16% over 2011–2013. Across most individual Member States, there was an overall declining trend in the gross operating surplus as a percentage of total production costs over 2008–2013. The largest gross operating surplus as a percentage of total production costs in the EU over 2008–2013 were located in BG, CZ, PL and RO, while the lowest were located in IT.

[25] Of Member States with all available data points for all years, see table 5 in the main report.

- Over 2008–2011 and 2013, energy costs as a percentage of total production costs in the US were higher than in the EU.
- The energy intensity in the EU[26] rose gradually over 2008–2012. The energy intensity in the US in 2010 was higher than in the EU.

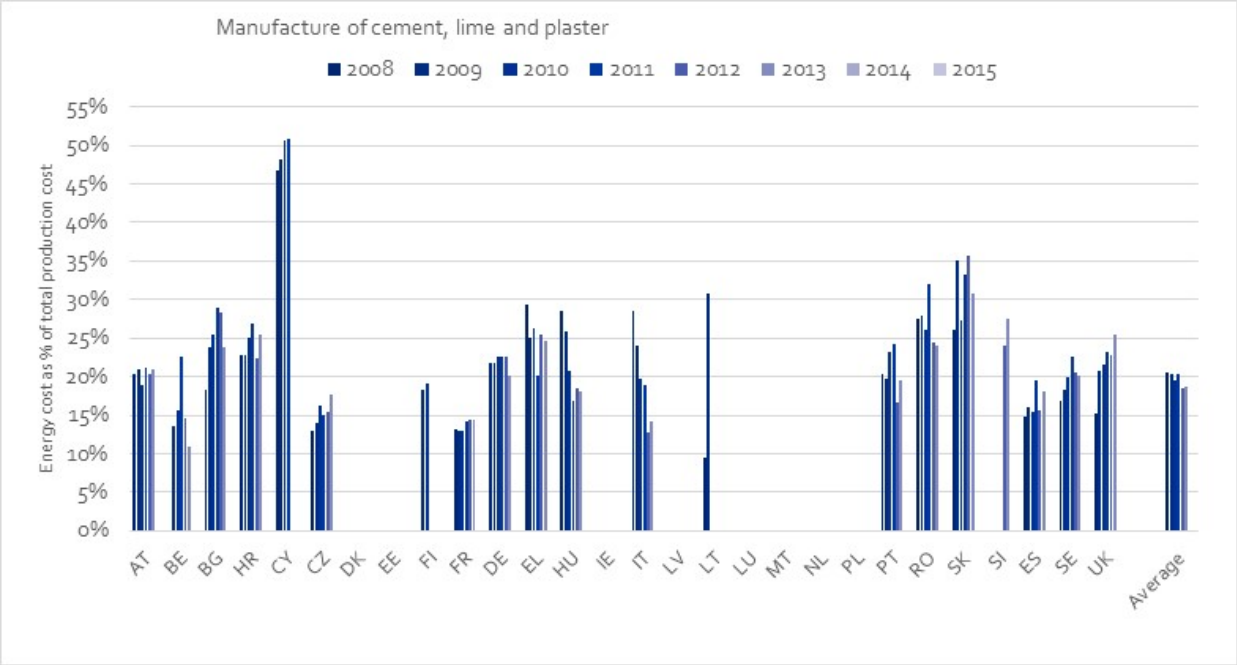

Figure 55 Energy cost as a share of total production cost 2008-2013 – Member State results

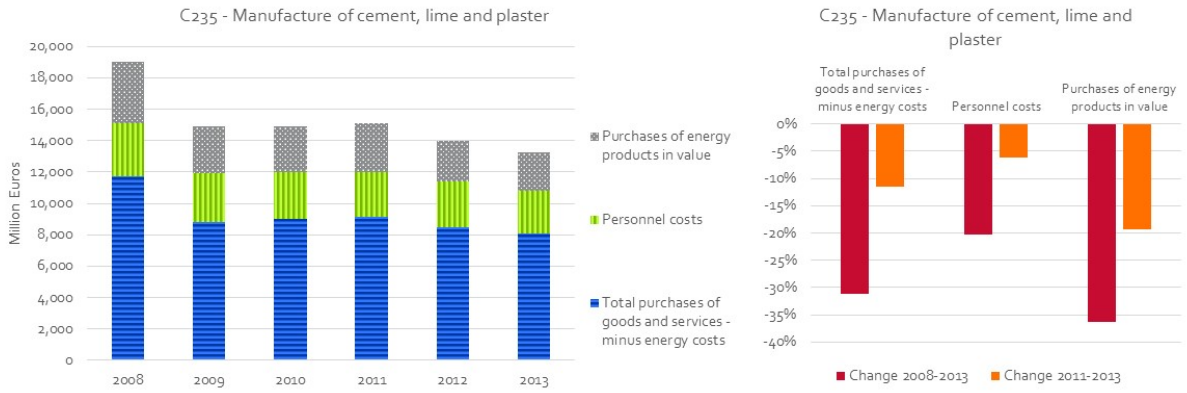

Figure 56 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

[26] Of Member States with available data, see table 6 in the main report.

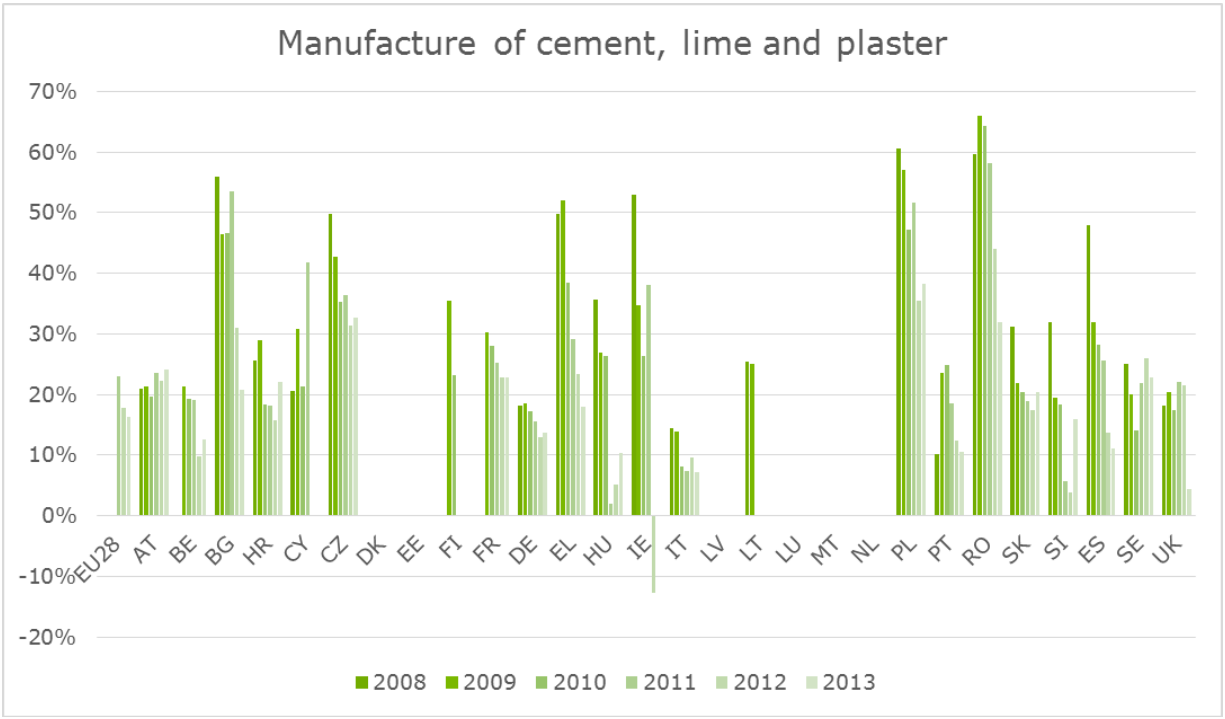

Figure 57 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

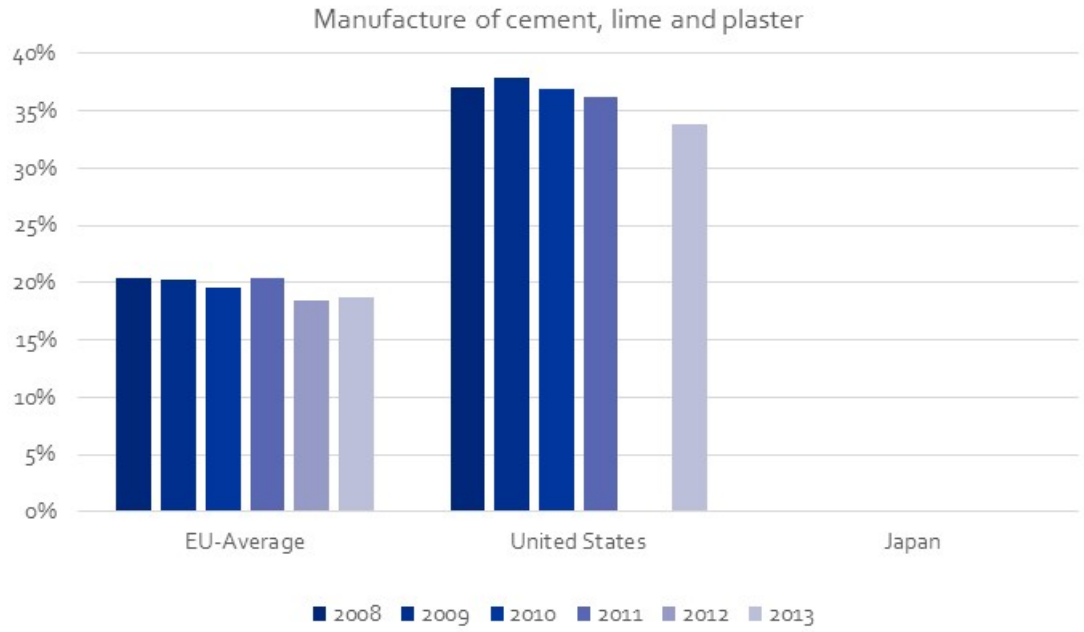

Figure 58 International comparison, energy cost as a percentage of total production costs

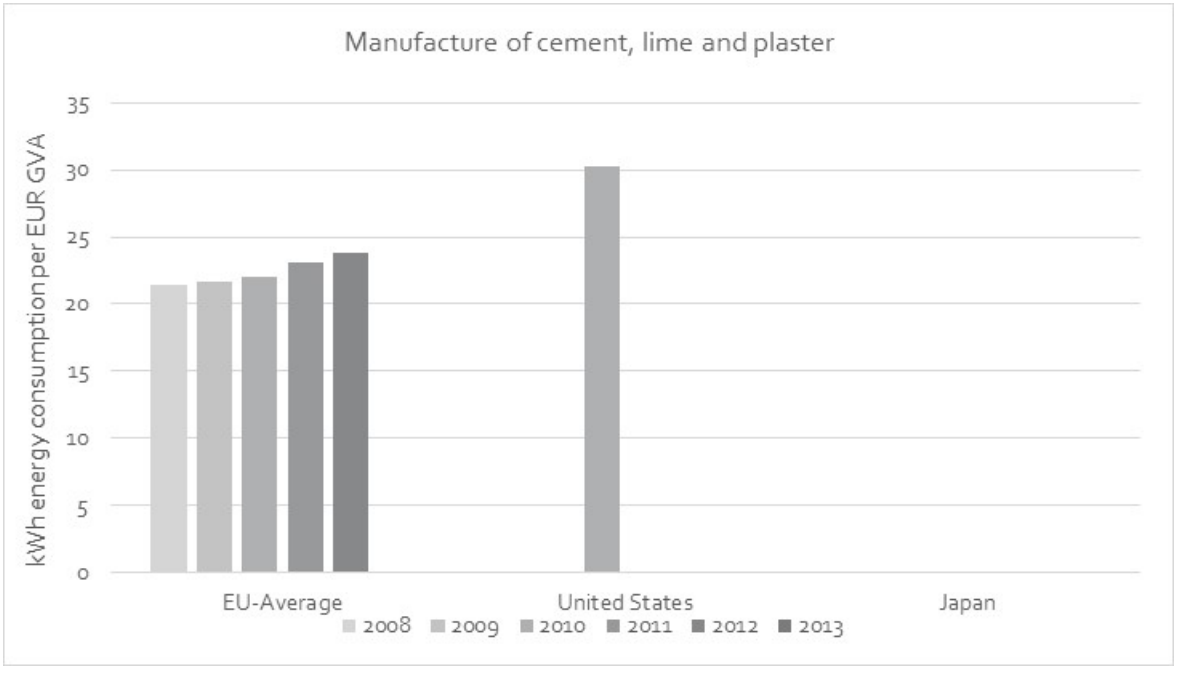

Figure 59 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.13 Cutting, shaping and finishing of stone

Summary of sector results:

- The EU average energy cost as a share of the total production cost fluctuated over 2008–2013, ranging from 3.4–4.8%. A consistent temporal trend across individual Member States was not observed. The energy cost share in HU in 2012 is a noticeable outlier as the highest observed in the EU across 2008–2012, while the lowest energy cost share was observed in IE.
- An overall decreasing trend was observed for the EU total[27] production cost over 2008–2013. Energy costs were lower than personnel costs over the period 2008-2013. Energy costs fell over 2008–2013. However, compared to 2011 levels, the energy cost in 2013 increased.
- The average gross operating surplus as a percentage of total production costs over 2012-2013 was 13%. A consistent temporal trend across each individual Member State was not observed, with increasing trends observed in some Member States, for example, AT and CZ, while decreasing trends observed in others, for example, HR and CY. The largest gross operating surpluses as a percentage of total production costs in the EU over 2008–2013 were located in SK and UK while the lowest were located in FR and IE. A negative gross operating surplus was recorded in RO in 2011.
- In 2008, the EU average energy cost as a percentage of total production cost was higher than in the United States; an inverse trend was observed 2009–2011. However, in 2013, the energy cost share was higher in the EU than in the United States, which may be partially attributed to the diverging trends in energy prices in the EU and the US over this period.

[27] Of Member States with all available data points for all years, see table 5 in the main report.

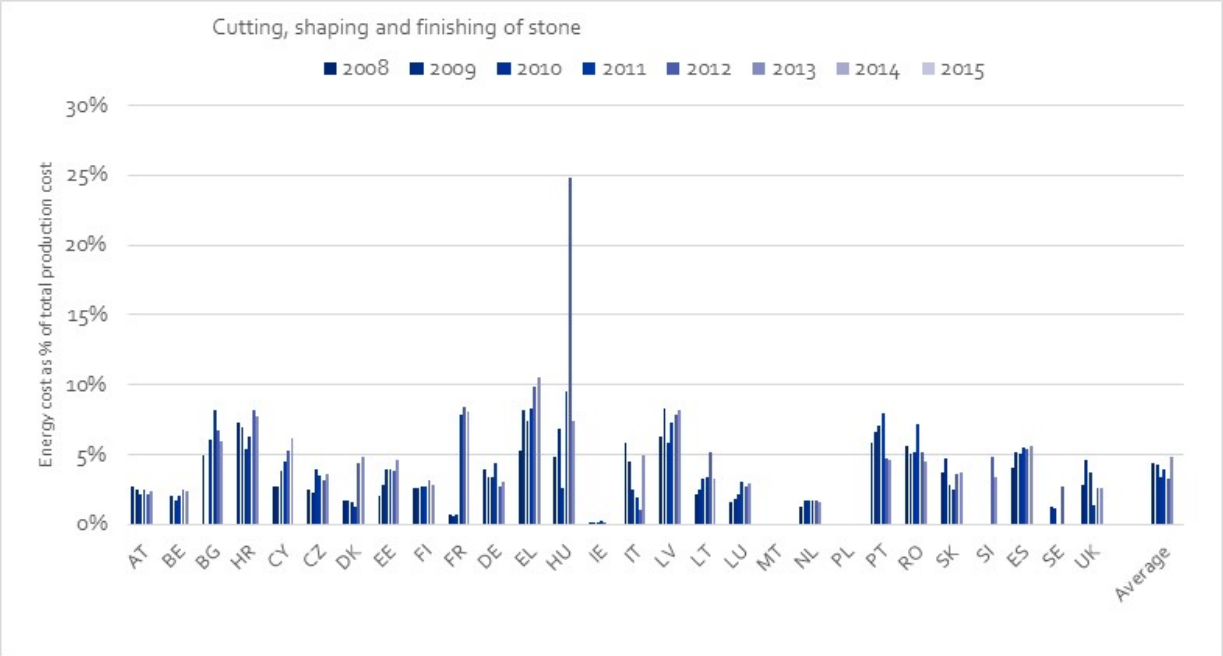

Figure 60 Energy cost as a share of total production cost 2008-2013 – Member State results

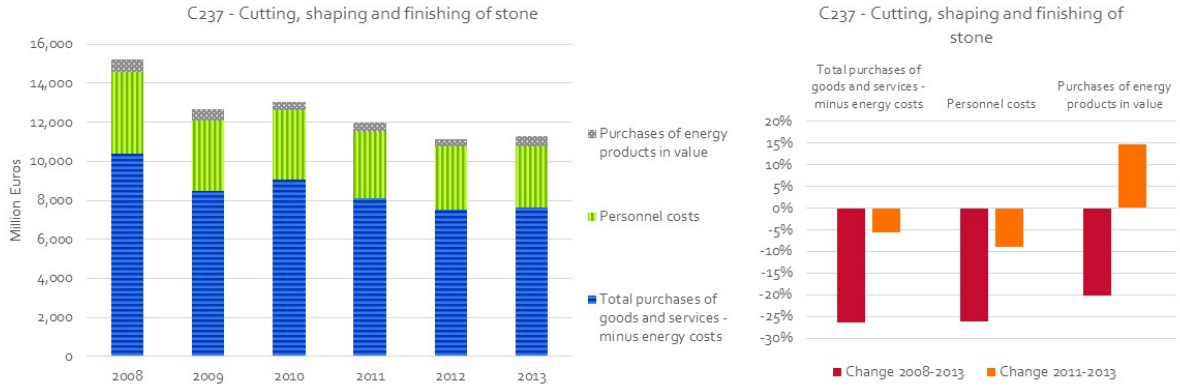

Figure 61 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

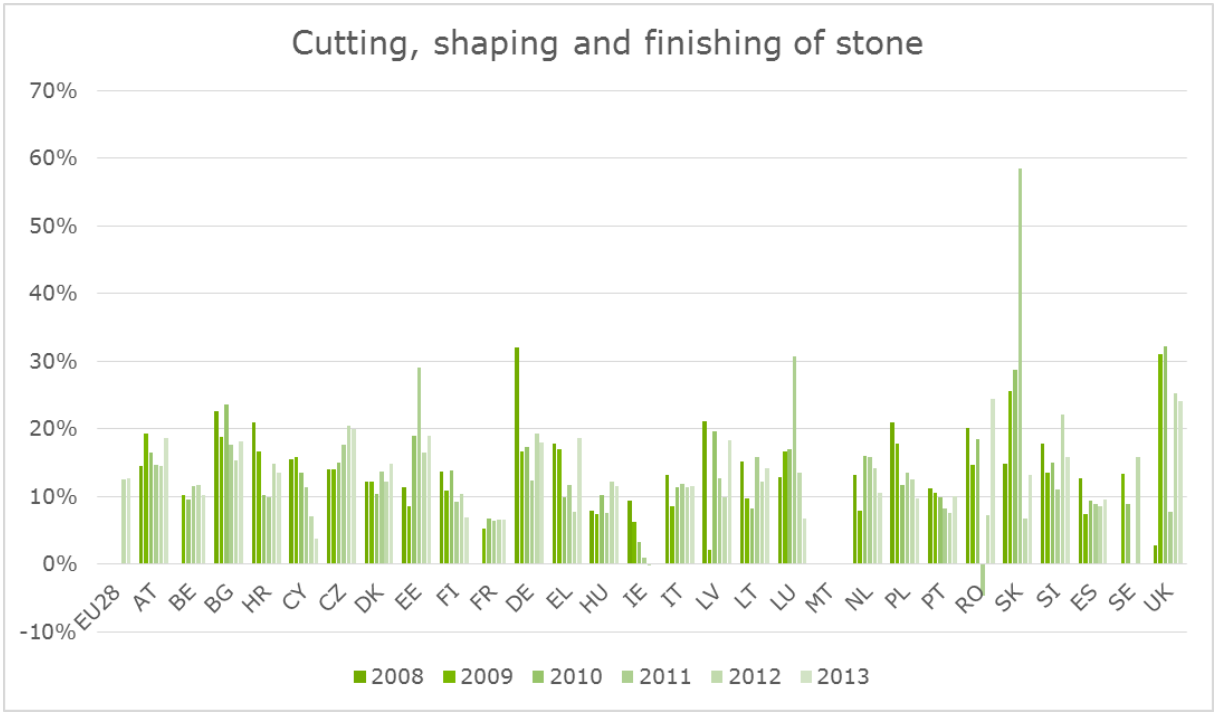

Figure 62 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

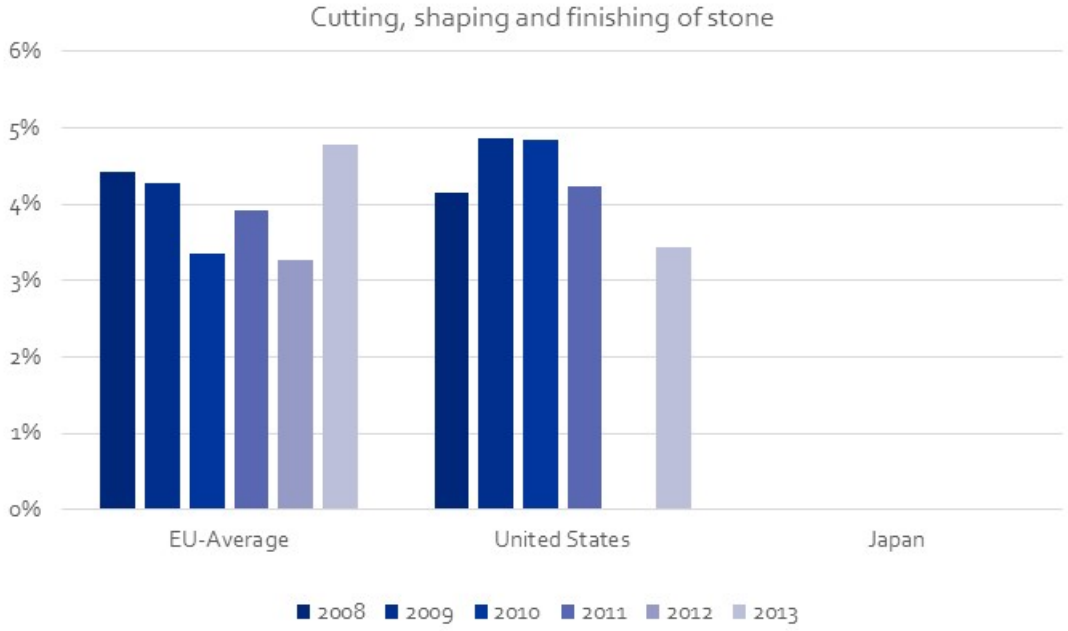

Figure 63 International comparison, energy cost as a percentage of total production costs

4.14 Manufacture of basic iron and steel and of ferro-alloys

Summary of sector results:

- The EU average energy cost as a share of the total production cost fluctuated over 2008–2013, ranging from 7.3–10.9%. A consistent temporal trend across individual Member States was not observed as the energy cost as a share of the total production costs fluctuated over the 2008–2013 period. The highest energy cost shares were observed in IE and RO, while relatively low energy cost shares were observed in HR in 2011.
- The EU total[28] production cost fell in 2009; since then, the total costs rose in 2010–2011 and fell again over 2012–2013. Energy costs were lower than personnel costs over 2008–2013. Energy costs fell more rapidly than personnel costs over 2008–2013.
- The gross operating surplus as a percentage of total production costs fell from 4% to 2% over 2011–2012 and remained constant in 2013. Over 2008–2013, across all Member States where data is available, there has been a general decline in the gross operating surplus as a share of total production costs. Substantial negative gross operating surpluses were recorded HR in 2011 and 2012.
- Over 2008–2009 and 2013, energy costs as a percentage of total production costs in the United States were lower than in the EU. Energy costs as a percentage of total production costs in Japan over 2008–2010 were lower than in the EU.
- The energy intensity in the EU[29] rose in 2009 and 2010, dipped slightly in 2011, and increased in 2012 to the peak value over 2008-2012. The energy intensity in Japan over 2009–2012 was higher than in the EU.

[28] Of Member States with all available data points for all years, see table 5 in the main report.
[29] Of Member States with available data, see table 6 in the main report.

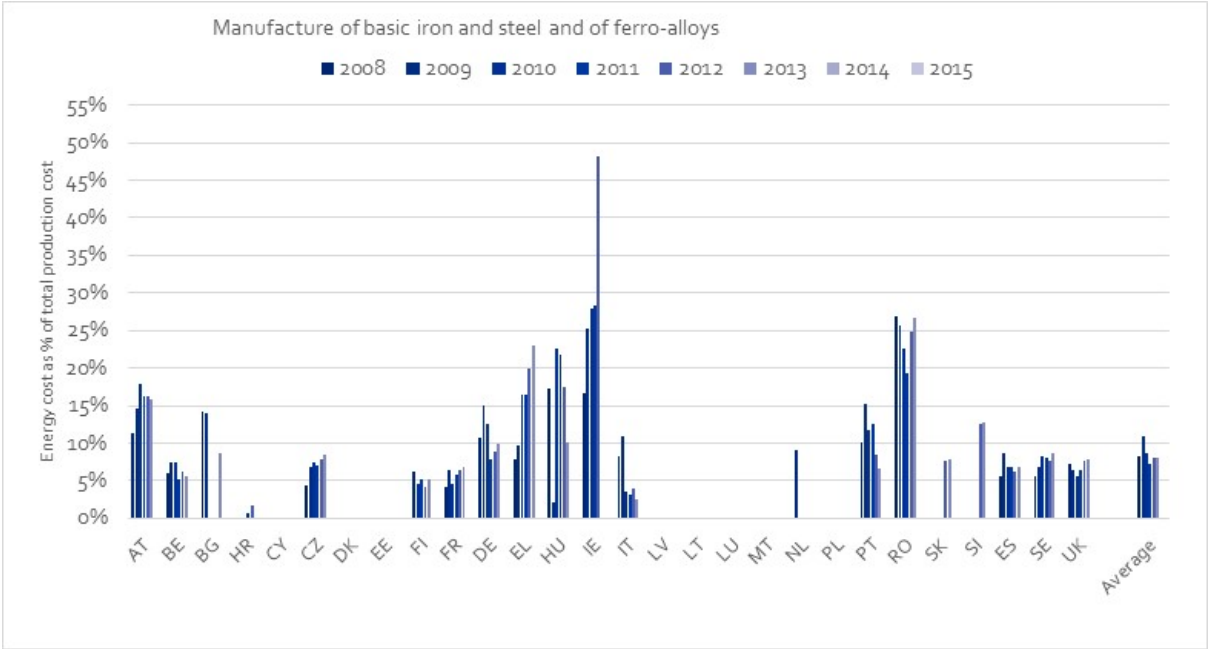

Figure 64 Energy cost as a share of total production cost 2008-2013 – Member State results

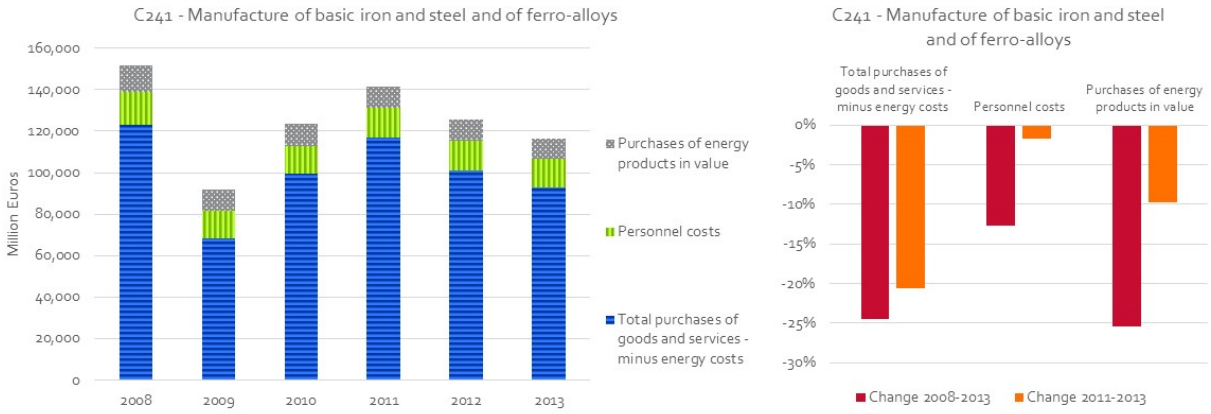

Figure 65 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

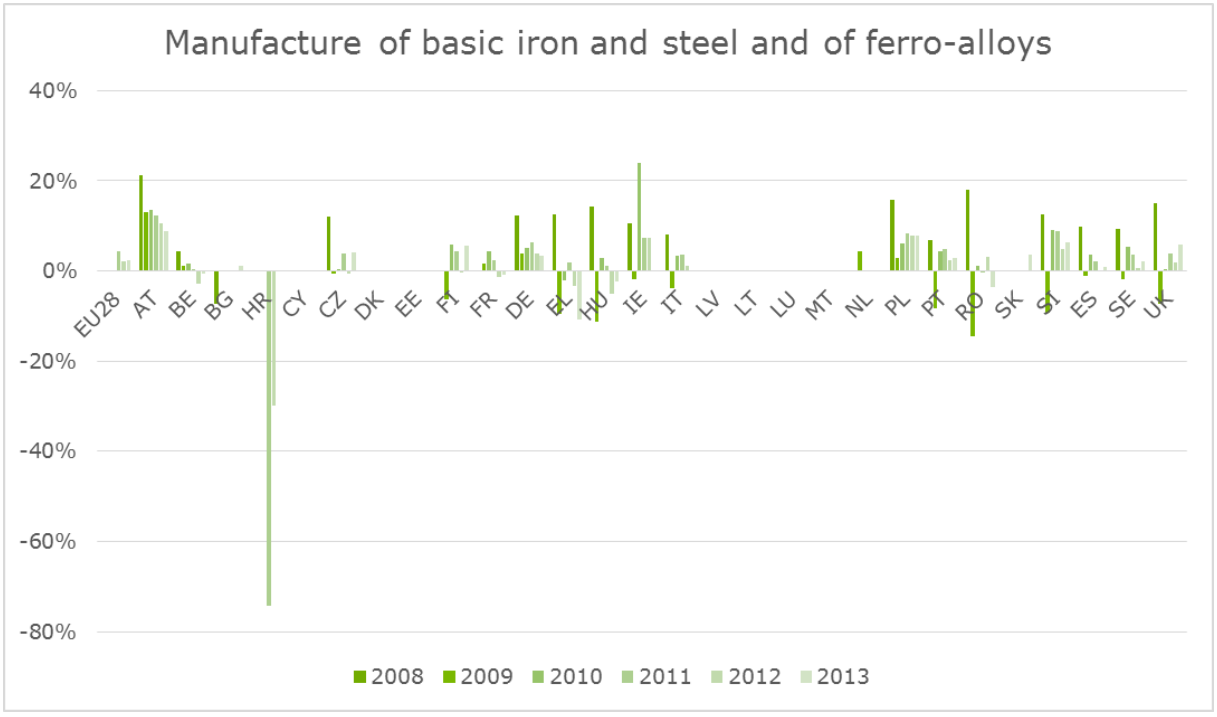

Figure 66 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

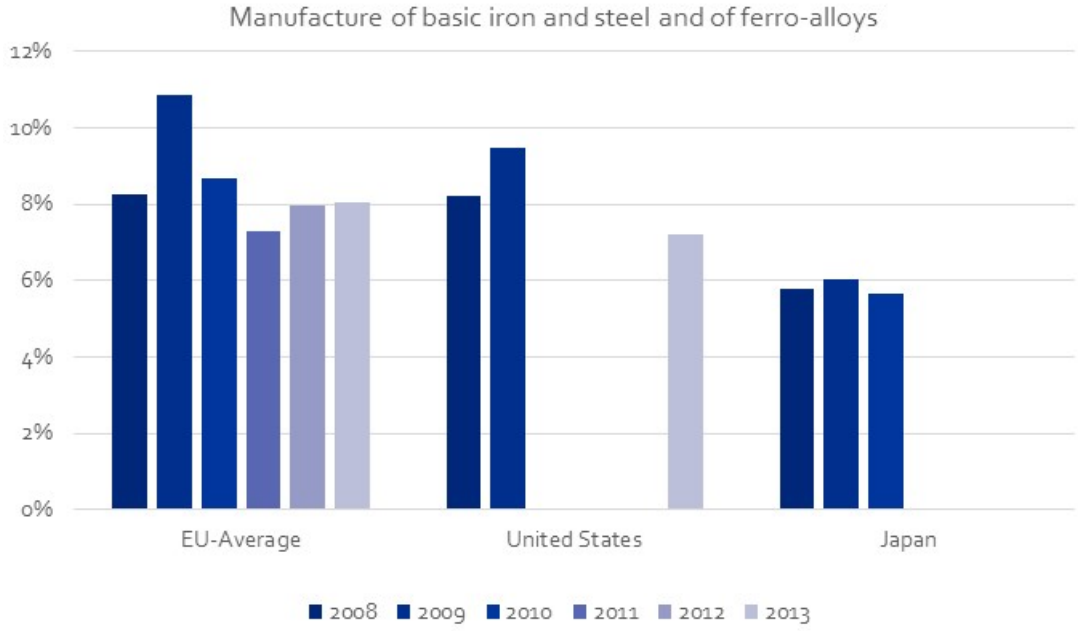

Figure 67 International comparison, energy cost as a percentage of total production costs

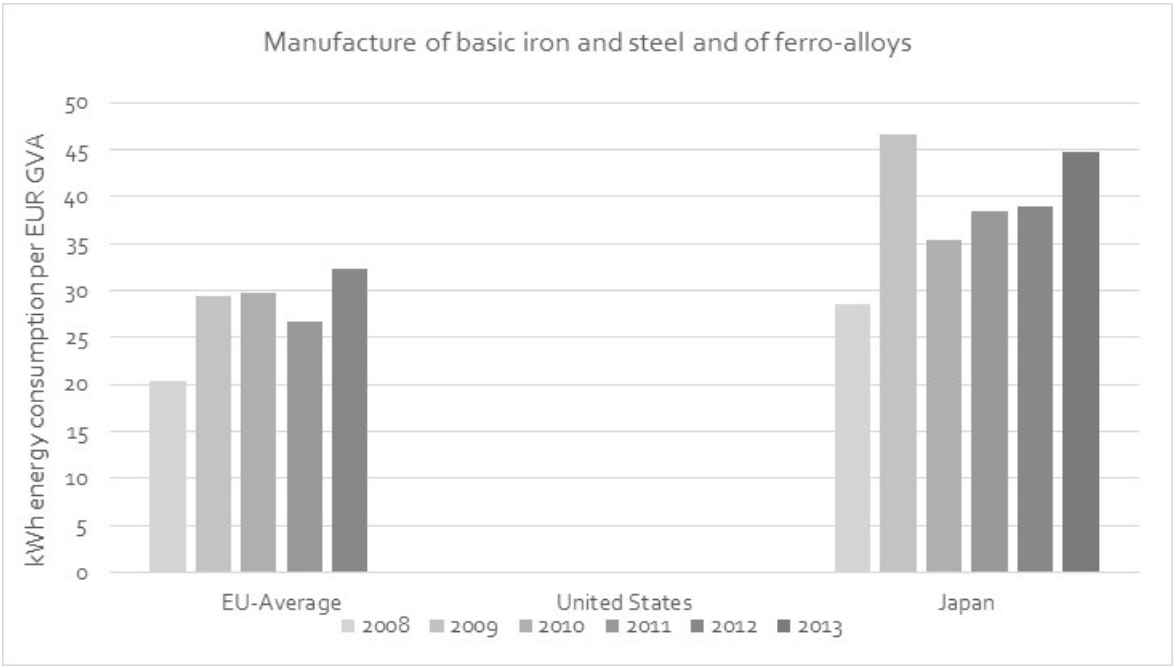

Figure 68 International comparison, energy intensity (energy consumption per EUR GVA generated)

4.15 Manufacture of basic precious and other non-ferrous metals

Summary of sector results:

- The EU average energy cost as a share of total production costs peaked in 2009 at 5.6% and then gradually fell to 2013 level of 3.9%. A consistent temporal trend across individual Member States was not observed. The highest energy cost shares were observed in IE and RO, while relatively low energy cost shares were observed in DK and IE.
- The EU total[30] production cost fell in 2009; since then, the total costs recovered to about the 2008 levels in 2011 and then fell slightly over 2012–2013. Energy costs were lower than personnel costs over the period 2008-2013. The energy cost fell more rapidly than personnel costs over 2008–2013.
- The gross operating surplus as a percentage of total production costs at an EU level was 6% in 2011 and 5% in 2013. Over most individual Member States, there was an overall decline in the gross operating surplus as a share of total production costs when comparing 2008 levels

[30] Of Member States with all available data points for all years, see table 5 in the main report.

to 2013 levels, however, HL was a notable exception. Substantial negative gross operating surpluses as a share of total production costs were observed in EE and IE in 2009.

- In 2013, the energy cost as a percentage of total production costs was lower in the United States than in the EU. Over 2008–2010, energy costs as a percentage of total production costs were lower in Japan than in the EU.
- The energy intensity in the EU[31] declined over 2008–2012. The energy intensity in Japan over this period was substantially lower than in the EU. In 2010, the energy intensity in the US was higher than in Japan, but lower than the EU average. These differences could relate to structural differences between sectors in different countries e.g. the different contributions from different metals.

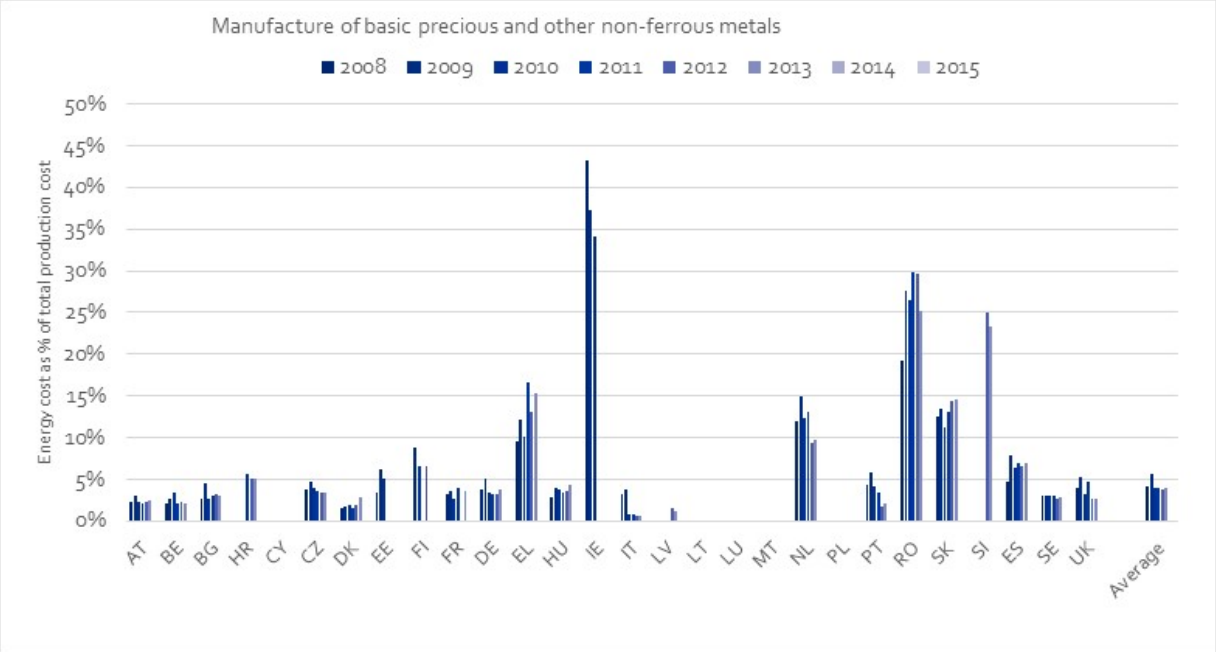

Figure 69 Energy cost as a share of total production cost 2008-2013 – Member State results

[31] Of Member States with available data, see table 6 in the main report.

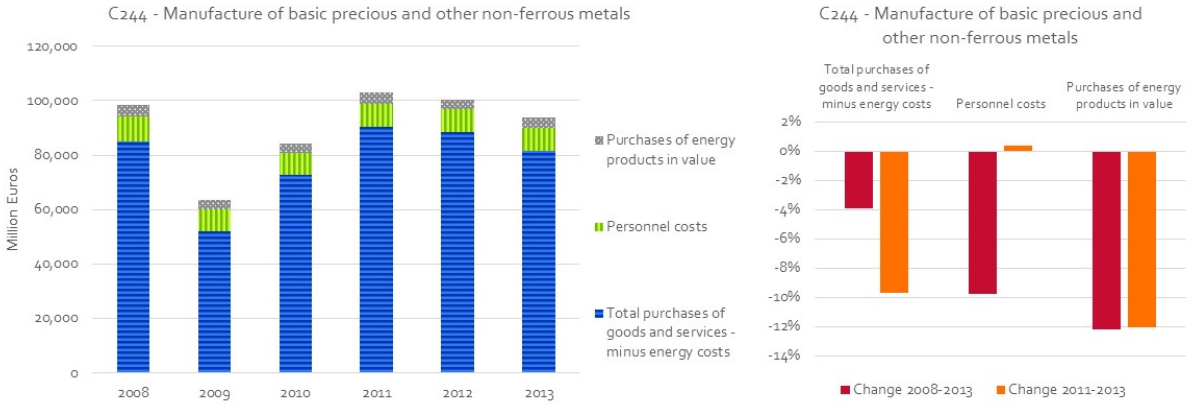

Figure 70 Production costs breakdown and trends– EU total. For consistency only for countries for which data points are available for every year in the series are included in the totals.

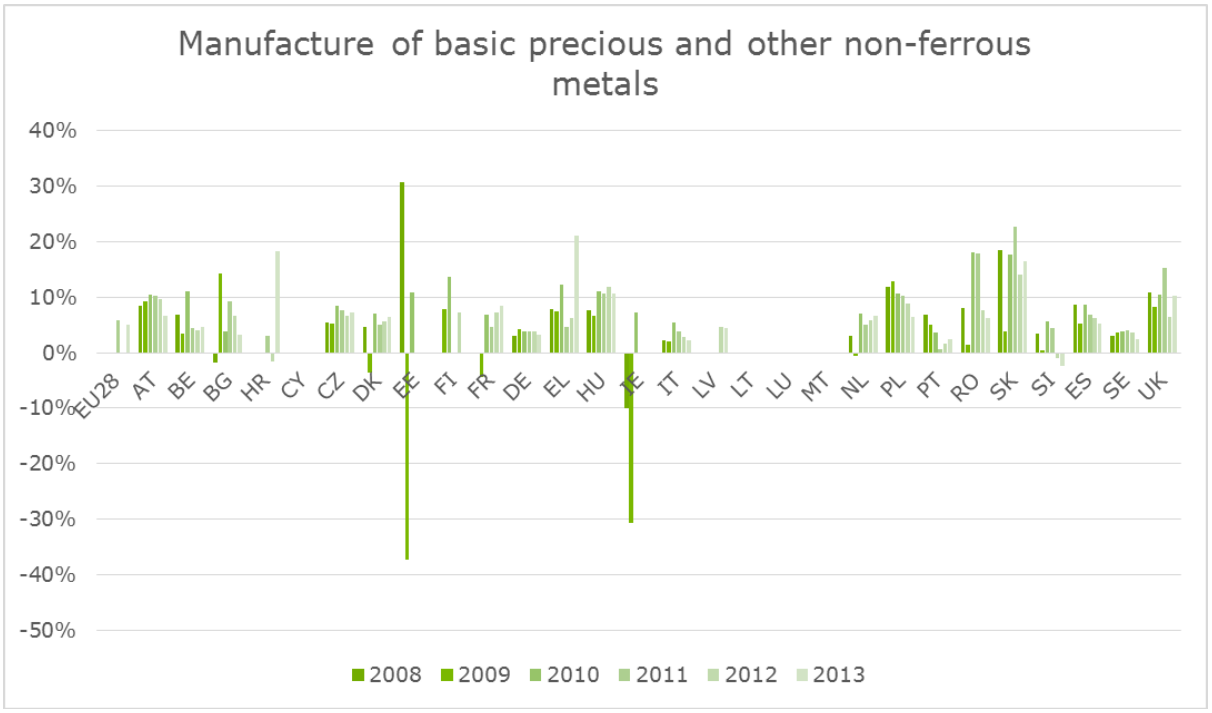

Figure 71 Gross operating surplus as a percentage of total production costs over 2008-2013, EU

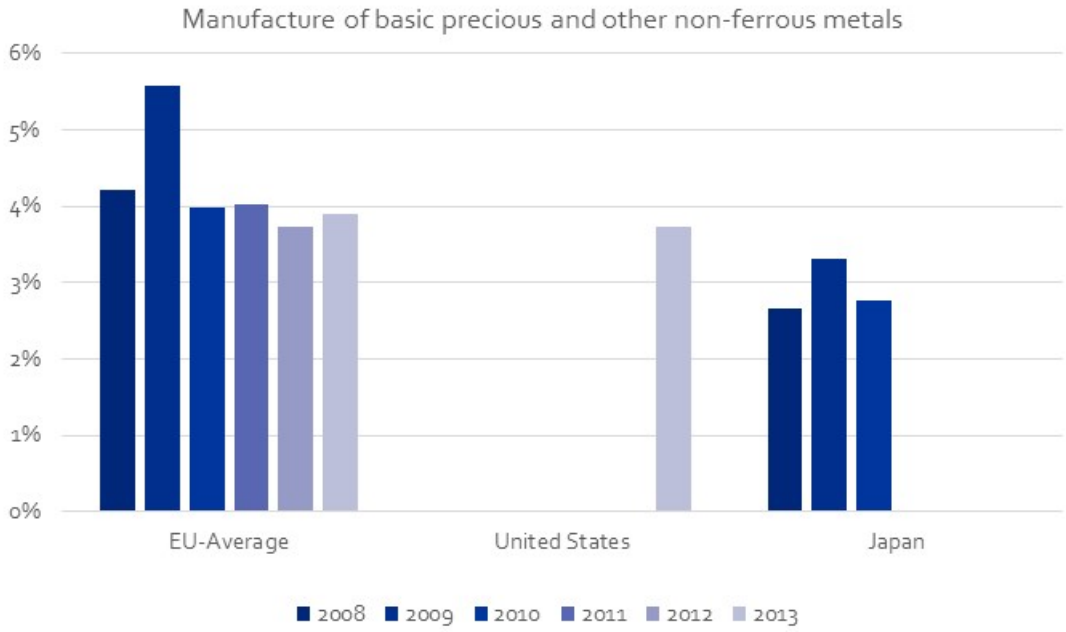

Figure 72 International comparison, energy cost as a percentage of total production costs

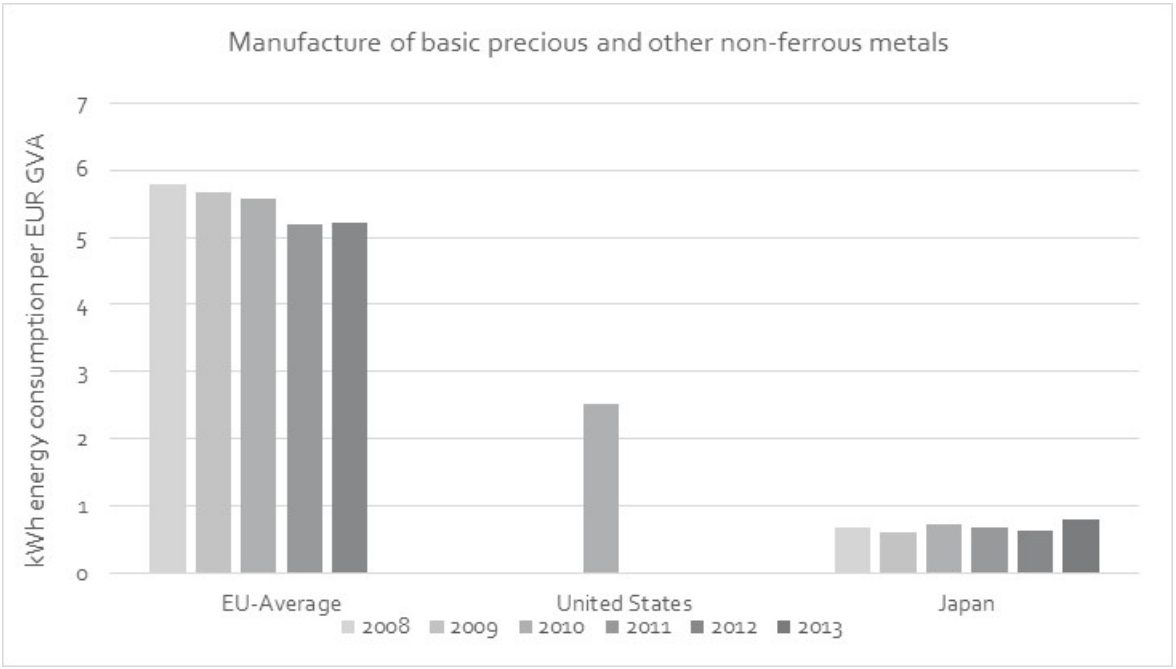

Figure 73 International comparison, energy intensity (energy consumption per EUR GVA generated)

ECOFYS Germany GmbH | Albrechtstraße 10 c | 10117 Berlin | **T** +49 (0)30 29773579-0 | **F** +49 (0)30 29773579-99 | **E** info@ecofys.com | **I** www.ecofys.com

ECOFYS Germany GmbH

Albrechtstraße 10 c
10117 Berlin

Tel: +49 (0) 30 29773579-0
Fax: +49 (0) 30 29773579-99

info@ecofys.com
www.ecofys.com