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Results of the assessments of sectors and sub-sectors based on the qualitative criteria set out Article 10a(17) of Directive 2003/87/EC

1. Finishing of textiles (NACE code 1730)

Finishing of textiles is an intermediate process in the textiles value chain. It comprises the activities of pre-treatment, dyeing, printing, coating and top coating of yarns, fabrics and garments[1].

There are around 8000 finishing firms in the EU27, but only few (43) have combustion installations and are directly affected by ETS and present in CITL. This circumstance could not be reflected in the standard quantitative assessment (based on data from the CITL).

Between 2000 and 2006 the finishing of textiles sector has undergone profound restructuring and strong reductions in turnover (-20%), in gross operating surplus (-40%), in employment (-53%) and in profit margins took place[2].

The results of the quantitative analysis indicate that all sectors of the textile and clothing chain, with the exception of the finishing sector, are deemed to be at risk of carbon leakage since their trade exposure is well above 30%. For finishing of textiles, there is no trade data available and, therefore, it is not possible to prove trough trade exposure, that that the subsector is at risk of carbon leakage.

Based on the results of the standard quantitative assessment, CO_2 cost in relation to GVA is 1.4%. If the increased CO_2 cost is calculated only for the companies which are in CITL and for which electricity data is available (16), the CO_2 cost indicator roughly triples. This information was verified by an independent reviewer.

CO_2 emissions from textile finishers in CITL amount to only 0.03%[3] of total CO_2 CITL reported emissions in 2006.

a. <u>The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption</u>

Although data on technological assessment is difficult to gather at Community level, there is some information on voluntary government/industry agreements at national level. The latest report[4] of the voluntary agreement between the German textile industry and the government indicates that the energy use in the textile industry went down by 53% from 1990 to 2007 which corresponds to a reduction of CO_2 emissions of 54.4%. The report

[1] 1730 Finishing of textiles includes: bleaching, dyeing and printing (including thermoprinting) of not self-produced textiles and textile articles, including wearing apparel, dressing, drying, steaming, shrinking, mending, sanforizing, mercerizing of not self-produced textiles and textile articles, including wearing apparel.

This class excludes: finishing of textile articles made from self-produced materials, see 1710, 1720, 1750.

[2] Eurostat, SBS

[3] CO_2 emissions from 43 textile finishing companies = 602.980 tons in 2006. Total 2006 CITL emissions = 2.035.649.356 tons CO2

[4] Die Klimavorsorge-verpflichtung der deutschen Wirtschaft –Monitoringbericht 2005-2007, RWI Essen

concludes that "there is little space to substitute with less carbon intensive sources of energy and that the optimum mix is already achieved in the textile industry". A report on a voluntary agreement in the United Kingdom, which the textile industry is part of, indicates also that the textile sector has reduced energy consumption and CO_2 emissions as compared with the year 1999.

b. Current and projected market characteristics

There is increased international pressure on textile products, mostly from China. Trade exposure of finishing activities can be indirectly estimated by looking at trade flows of finished products and raw materials. Community imports of fabrics already finished (e.g. cotton fabrics dyed) have increased over time combined with a reduction of import prices of these products. At the same time imports of raw materials for further processing (e.g. cotton fabrics unbleached) have decreased.

Furthermore, trade exposure of some semi-finished and finished products can be calculated. Trade exposure of finished fabrics (excluding fabrics made of wool, terry towelling and knitted & crocheted fabrics) was above 60% in 2006. Trade exposure of cotton fabrics (85% cotton) dyed was above 80% in 2006.

These figures suggest a very high risk of delocalisation of the finishing activity together with other (related) parts of the production chain (e.g. clothing manufacture).

c. Profit margins

Profit margins for the textile finishing[5] sector were negative in 2005 (-0.5%), only 0.4% in 2006 and a maximum of 1% in 2007 (which was generally a good year for the textile sector). On basis of this data, it can be concluded that most of the finishing companies will not be able to bear any additional economic shock.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, it can be concluded that the sector should be deemed as exposed to a significant risk of carbon leakage.

2. Manufacture of veneer sheets, manufacture of plywood, laminated board, particle board, fibre board and other panels and boards (NACE code 2020)

The result of the quantitative assessment for the CO_2 cost in relation to GVA is 3.7%. Small installations not included under CITL are responsible for a relevant part of the capacity share, but this circumstance could not be reflected in the results of the standard quantitative assessment (based on data from the CITL). According to Member States data that includes information about the complete sector, considering also small companies, CO_2 cost in relation to GVA is 4.2%. The trade intensity is 23.83%.

[5] Source: PwC, Amadeus

Total CO_2 emissions from the sector amount to 0.13%[6] of total CO_2 CITL reported emissions. Among the products included in this sector, medium density fibreboard (MDF) and plywood are the most energy intensive.

The sources of information used for the qualitative assessment are Eurostat, Community Independent Transaction Log (CITL), Amadeus Database, the Intergovernmental Panel on Climate Change (IPCC) guidelines, climate change agreements in the UK, McKinsey & Ecofys study for DG Environment on the Review of ETS Scheme, UNECE-FAO study on wood availability and demands, Europe Economics study on the impact of renewable energy policy on supply of raw materials for wood panels, Xerfi 700 study on wood-based panels and data from the European Panel Federation (EPF) and from individual companies.

a. The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption

The sector has already considerably reduced their emissions levels, shifting from fossil fuel combustion installations to biomass combustion installations. At this stage, it is difficult and very expensive to further reduce them. The marginal abatement cost is very high and there is a risk that additional CO_2 reductions will be made by decreasing the production. This consequence will be negative both from the competitiveness and from the climate change policy point of view, given the fact that the products of this sector are "climate friendly".

b. Current and projected market characteristics

Market concentration of the sector at Community level is in two segments: a cluster of big firms and a myriad of small ones.

Large company groups have a total capacity share of 69% and small companies have a total capacity share of 31%. There are 47 large companies and 607 small companies in the EU. The sector is highly integrated with furniture and construction applications. Increases in price of European wood-based panels can have an impact on the sectors downstream that can be further delocalised if the base material costs increase.

The elasticity shows that demand for wood-based panels is very price sensitive. An analysis of the integration along the value chain together with the price elasticity shows that the substitution threat by other more CO_2-intense materials is significant. A major determinant of demand is the price of a specific wood-based product relative to other products from competing materials.

Looking at the trade intensity, while this sector has always been a net exporter, following the current trend, it is very likely that it will become a net importer in the future. For some products of this sector like plywood, imports from low cost manufacturing countries with no CO_2 commitments have increased by 73% in the last years, leading to an important increase of the non-EU trade intensity.

[6] CO_2 emissions from 20.20 in 2006= 2,765,100 t. Total 2006 CITL CO_2 emissions = 2,035,649,356 t

c. Profit margins

Profit margins have been compared to CO_2 cost and the result shows that CO_2 cost would represent 31.5% of profit margins considering the results of the standard quantitative assessment. In case Member States data is considered and small companies are also included, it would represent 35.8% of profit margins. The capacity for the sector to invest in technology to reduce emissions would, therefore, be very limited.

According to available information, both demand and turnover had a negative growth in 2008. A further decrease is expected in 2009.

Due to the further increase of biomass use promoted by the renewable energy target, it is expected that wood prices will increase. Taking into account that wood represents between 25 and 50% of the costs for this sector, this might have an important impact on the competitiveness and profit margins of the sector.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, it can be concluded that the sector should be deemed as exposed to a significant risk of carbon leakage.

3. Manufacture of plastics in primary forms (NACE code 2416)

Article 10a(17) of Directive 2003/87/EC stipulates that current and projected market characteristics have to be examined, including when trade exposure or cost increase are close to one of the thresholds mentioned in paragraph 16. In the case of manufacture of plastics in primary forms the quantitative analysis using the standard "top-down" approach (emissions from CITL and Member States attributed to NACE-4 sectors) results in non-EU trade intensity of 27.1 % and carbon cost in relation to GVA of 3 %.

Using a "bottom-up" approach based on empirical data from a number of manufacturers of polymers (summing up calculated emissions for most plastics sub-categories corresponding to 94.1% of the plastics industry volume in 2007), a quantitative assessment carried out by industry experts came to a significantly higher carbon cost. The methodology used by industry seems to be technically correct and the data used in their calculation have been reviewed by the consultancy Arthur D. Little as independent expert. These are indeed strong indications that carbon cost per GVA is at a borderline closely below or above 5%.

From a statistical perspective the borders of this subsector are not clear-cut which puts chemicals subsectors to an exceptional position in comparison with other, more homogeneous sectors. Most enterprises are fully integrated and have also activities in other parts of the chemicals value chain. This creates additional uncertainties on the validity of some Eurostat, Member State and even BREF figures and should largely explain the differences in carbon cost estimates. Due to these uncertainties the results of the quantitative assessment remain to be regarded as not completely sufficient to take a definitive decision. In order to remove remaining doubts arising from the quantitative

assessment in this borderline case, the quantitative assessment has been supplemented by the qualitative assessment, in line with the requirements of the Directive.

a. The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption

By converting monomers into polymers the primary plastics industry has mainly indirect emissions. Over the last 20 years the petrochemical industry, including the production of polymers, substantially decreased its energy intensity. Integrated crackers have significantly contributed to such an improvement. As an example, figures show that within the 1990-2004 timeframe, the energy intensity of the EU chemicals industry has declined by 38.8 per cent, yielding an annual decrease of 3.5 per cent. However, the remaining potential to increase energy efficiency is generally considered much more limited.

There is a considerable difference in emissions for certain plastics in case of polymer production in China vs. Europe. As an example, the ethylene based production technology for PVC used in Europe, if compared with acetylene technology predominantly used in China, has been proven as several times less emissive.

b. Current and projected market characteristics

The Middle East has a strong feedstock advantage but virtually no domestic market. Very large production capacities are being installed and their excess production is pressing on the European market. A continuous increase in imports has led to an increased competition in EU-27. It is expected that by 2015 Middle East imports will account for almost 90% of EU-27 imports. In 2008, 79% of EU-27 imports were sourced from Saudi Arabia. This is challenging for the European producers since the dominance of that region for the EU-27 market has led to downward pressure on prices and this pressure has much increased by the economic crisis. Saudi Arabia and the entire Middle-East region are unlikely to face any carbon constraint in future. The trade intensity indicator has been 27,1 % for 2006 and 2007 and is expected to exceed 30% in the near future. More important, however, is that exports are going down while imports increase. While there is a strong growth of the global primary plastics market, there are no or very low investments in Europe and further decline in Community exports of plastics to third markets are expected in the coming years.

Moreover, high integration along the value chain is one of the crucial competitive advantages of the EU chemicals industry, e.g. vis-à-vis Middle East producers, and it is a condition for an efficient use of feedstock and energy and the avoidance of waste. When taking into account the whole value chain, closures of polymer capacities (some polymer producers in Europe have already closed down some lines to adjust their production accordingly and to cope with tight margins, or have shifted their focus to the Middle East and East Asia) could have important knock-on effects to the plastics processing industry which is the main client of the polymer (i.e. primary plastics) producers.

Furthermore, the primary plastics market is characterized by distortions due to unfair commercial practices (local subventions, double pricing). One of the key feedstocks for ethylene are natural petroleum gases, which are sourced in Saudi Arabia and sold to their domestic market at discount prices while at higher price to other regions.

Transport costs are low in comparison with product price; therefore they do not hinder trade.

The mass polymers are typical commodities for which price is the determinant factor for competition and it is largely set on the world market, which impedes unilateral price increases. Competitiveness in polymer sector is determined primarily by feedstock costs, then by processing costs and proximity to customer markets. In recent years, the emerging countries of Asia have had an advantage on all these factors compared to EU-27. If the EU does not maintain a competitive domestic supply of plastics in primary forms with sound investment, it will face a decline in EU-27 plastics processing as well. Any loss of competitiveness upstream would have a domino effect downstream.

c. Profit margins

The EU producers have been under competitive pressure in recent years, which is reflected in declining margins. For the future, due to generally difficult competitive position of Europe for the bulk polymers, there is very little possibility for new investments and large modernizations. A comparison of profit margins in international context shows that the new investments in Asia and the Middle East have widened the gap between Asian and European cash cost margins. Additional carbon related costs would exacerbate this situation. Hence, even further closing down of capacities would be the consequence.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, it can be concluded that the sector should be deemed as exposed to a significant risk of carbon leakage.

4. Manufacture of bricks, roof tiles and construction products in baked clay (NACE code 2640)

The Commission's quantitative analysis of the sector showed that although it was above the carbon intensity threshold set out in the Directive, it was well below the trade intensity threshold required. CO_2 cost in relation to GVA is 9.8%. The trade intensity is 2.7%.

Two issues have been considered for the assessment. Firstly, using the CITL (Community Independent Transaction Log) could present a false picture of CO_2 emissions from the ceramics industry in that it is incomplete covering only 20 installations according to preliminary Commission results, when there are about 200 installations covered by ETS. This circumstance could not be reflected in the standard quantitative assessment (based on data from the CITL) with a result of 4.3%. Therefore Member States data that includes information about the complete sector, considering also small companies, has been used, with a result of 9.8%.

Secondly, the evaluation of carbon leakage for all industrial sectors has been carried out based on Rev 1.1 of the NACE classification at 4-digit level, since this was the version that was applicable during the reference years, 2005, 2006, and 2007. There is a significant difference between NACE Rev 1.1 and the new NACE Rev 2, since the ceramics industry is one of those where the nomenclature was considerably revised. The

new NACE definition has the effect of bringing bricks & roof tiles, which are normally traded only on local or regional markets, into the same category as wall & floor tiles, which are traded world-wide (some European companies traditionally exporting half their total production).

According to a sensitivity analysis by the Commission services, if bricks and roof tiles had been assessed under NACE Rev 2, the result might have been different, but even then only at the NACE-3 level. However, since NACE Rev 2 only became applicable in 2008, that is, after the three reference years, and for the sake of consistency with the treatment of all other industrial sectors in this whole exercise, Commission staff have carried out their assessment at NACE Rev 1.1 4-digit level.

a. The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption

The brick and roof tile production process is highly energy intensive, with the cost of energy normally accounting for up to 30% of total production costs, and the sector accounts for about half of all energy consumed in the ceramics industry.

CO_2 emissions come not only from the firing process but also from the raw materials, which differ according to the location. Specific energy consumption in the industry as a whole went down by up to 33% depending on the country.

b. Current and projected market characteristics

Production, imports and exports all grew over the 3-year period (2005-2007), but production fell sharply in 2008 as the financial crisis hit the construction industry.

Because of the weight of the product, and the high transport costs, bricks and roof tiles are not traded over long distances by road, and markets therefore tend to be regional.

There is a clear difference in the structure of the market between the north of the EU and southern countries. The north is characterised by some multi-national producers whereas producers tend to be SMEs in the south.

Brick products are used as materials in numerous branches of building and construction, indicating a low concentration on the side of the client sectors. They are usually designated according to their application, e.g. facing bricks, engineering bricks, lightweight bricks, roof tiles, paving bricks, etc. Clay products are in competition with other construction materials. However, production of these (e.g. concrete, steel framed and timbered structures) is also covered by the ETS.

c. Profit margins

The Commission does not have available an overall picture of profits. In a study carried out for the Enterprise DG in 2008, some information is given on two large, multi-national building materials producers showing a profit-to-turnover ratio of 9.1% and 12.5% in 2006. If more data becomes available, the sector may every year be reassessed and added to the carbon leakage list if it can be demonstrated that it satisfies the criteria laid down in the Directive.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, there is no evidence that the sector can be deemed as exposed to a significant risk of carbon leakage.

5. Casting of iron (NACE code 2751)

The Commission included the sector into the qualitative assessment primarily due to the fact that official trade statistics at Community level are not available which does not allow for an evaluation of trade intensity. Casting of iron is the most energy intensive part of the casting industry. The emission intensity is in the range between 1.1 and 1.6 tonne of CO_2 per tonne of production. CO_2 cost in relation to GVA is above 5%[7].

The sources used for the assessment include statistics of Eurostat, where available, submission of the the European Foundry Association (CAEF), analytical documents of the European Commission and external studies. An analysis of sector's market concentration and profit margins has been done by external consultant (PWC) for the purpose of the assessment. Data on trade were obtained from alternative sources, such as statistics of selected Member States and industry associations.

a. The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption

The Commission assessment focused the technical assessment of sector's potential to reduce greenhouse gas (GHG) emissions on cupola furnaces which is the technology used by the installations that are assumed to fall under the scope of EU ETS.

It needs to be underlined that coke is necessary for the metallurgical reaction in the cupola furnace. Part of the coke is used for the carburisation and is not available for burning and heat production. The CO_2 emissions are therefore to a large extent unavoidable process emissions resulting from the necessary use of coke in the metallurgical process.

Moreover, the available technical measures to reduce energy consumption are already broadly implemented in the EU and in the case of the big cupola furnaces the potential for further reduction appears to have almost been exhausted.

b. Current and projected market characteristics

The sector is represented by over 2000 companies, in general small and medium seized enterprises. The sector concentration (measured by HHI[8] index in the period 2005-2007) is very low at Community level, ranging between 157 and 229.

On the other hand, a high level of concentration exists on the side of client sectors. The predominant production share of the large foundries that are assumed to fall under scope of ETS Directive is destined for the automotive industry and the rest is destined for the

[7] The calculation is based on data obtained from the Member States. Due to confidentiality constraints the exact value cannot be specified.
[8] Herfindahl-Hirschman Index

cast iron tubes production. The automotive sector is very concentrated and ten biggest producers hold about 90% market share in the EU.[9] The above implies significant bargaining power of the main customer sector and very limited potential of the companies to pass through the additional costs.

Available trade statistics of selected Member States indicate that the casting production is traded internationally, the extra-EU exports and imports were growing over the period 2005-2007 and the trade intensity (based on the available data) is close to the 10 % threshold.

c. Profit margins

The profit margins ranged between 2.5% and 3.5% at Community level (2005–2007). Nevertheless, detailed overview shows that the profit margins varied largely across the Member States (-6.8% to 11.2%) and the profitability was lower than 2% in half of the evaluated countries. It needs to be taken into account that the evaluated period covers years of record production and exceptionally favourable situation on the market.

The presumed emission costs were compared against sector's average profit margins in order to give an estimate of the potential impacts related to the ETS. This comparison indicates relatively considerable effects on the sector of iron casting. At Community level the additional costs would account for at least 50 % of profit margins. Due to very limited pass through potential, the increase in production costs resulting from the revised ETS would significantly reduce profit margins of the producers and put at risk the future investment and economic activity in the sector.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, it can be concluded that the sector should be deemed as exposed to a significant risk of carbon leakage.

6. Casting of steel (NACE code 2752)

The Commission included the sector into the qualitative assessment primarily due to the fact that official trade statistics at Community level are not available which does not allow for an evaluation of trade intensity. CO_2 cost in relation to GVA is 2.2%.

The sources used for the assessment include statistics of Eurostat, where available, submission of the the European Foundry Association (CAEF), analytical documents of the European Commission and external studies. An analysis of sector's market concentration and profit margins has been done by external consultant (PWC) for the purpose of the assessment. Data on trade were obtained from alternative sources (statistics of selected Member States and industry associations).

[9] ACEA, Economic report 2007

a. The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption

Only large installations operating the rated thermal input above 20MW will be directly affected by ETS Directive. However, the technical assessment of limited potential to reduce GHG emissions related to cupola furnaces (see the part on casting of iron) is only partially valid for casting of steel, as the foundries in the category of steel casting use mostly electrical melting furnaces and thus not combustion installations.

b. Current and projected market characteristics

The assessment shows moderate concentration at Community level with HHI values around 1000[10]. Nevertheless, the results at country level show that numerous countries, among which three out of the five major producing countries (Germany – HHI of 4662; the UK – HHI of 2512; and Spain – HHI of 3306), have HHI higher than 1800 indicating high concentration. The production of steel castings is specifically concentrated in a limited number of EU countries, while very small or insignificant in others.

Steel castings find their market in the construction, machinery, and valve making industries. One of the main customers of the steel castings foundries is the power plant sector.

Available trade statistics of selected Member States indicates that the casting production is traded internationally, the extra-EU exports and imports were growing over the period 2005-2007 and the trade intensity (based on the available data) is close to the 10 % threshold.

World steel castings production has increased significantly in recent years. From 2004 to 2007, total steel casting output increased by 54%.

c. Profit margins

At Community level, the profit margins of the steel casting sector were between 2.7% and 3.3% in the period of 2005-2007.

The presumed ETS related costs would account for at approximately one quarter of average profit margins at Community level.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, there is no evidence that the sector can be deemed as exposed to a significant risk of carbon leakage.

[10] Markets in which the HHI is between 1000 and 1800 points are considered to be moderately concentrated, and those in which the HHI is in excess of 1800 points are considered to be highly concentrated.

7. Casting of light metals (NACE code 2753)

The Commission included the sector into the qualitative assessment primarily due to the fact that official trade statistics at Community level are not available which does not allow for an evaluation of trade intensity. CO_2 cost in relation to GVA is below 5%[11].

The sources used for the assessment include statistics of Eurostat, where available, submission of the the European Foundry Association (CAEF), analytical documents of the European Commission and external studies. An analysis of sector's market concentration and profit margins has been done by external consultant (PWC) for the purpose of the assessment. Data on trade were obtained from alternative sources (statistics of selected Member States and industry associations).

a. <u>The extent to which it is possible for individual installations in the sector or sub-sector to reduce emission levels or electricity consumption</u>

Only large installations operating the rated thermal input above 20MW will be directly affected by ETS Directive. The technical assessment of potential to reduce GHG emissions related to cupola furnaces (see the part on casting of iron) is thus valid for casting of light metals. As coke is necessary for the metallurgical reaction in the cupola furnace, the CO_2 process emissions are to a large extent unavoidable, while the available technical measures to reduce energy consumption are already broadly implemented.

b. <u>Current and projected market characteristics</u>

The sector is represented by over 2000 companies, in general small and medium seized enterprises. At Community level, the sector's market concentration is very low, with HHI levels between 211 and 249 in the period 2005-2007.

The main markets served by the castings of light metals industry are the automotive (at least 60%) indicating a high dependence on demand from this sector, which is very concentrated and where the ten biggest producers hold about 90% market share in the EU.[12] The above implies significant bargaining power of the main customer sector and very limited potential of the companies to pass through the additional costs.

Available trade statistics of selected Member States indicate that the casting production is traded internationally, the extra-EU exports and imports were growing over the period 2005-2007 and the trade intensity (based on the available data) is close to the 10 % threshold.

c. <u>Profit margins</u>

Assessment of profit margins at Community level shows that the sector suffered losses during two out of the three evaluated years (2005-2007). The profit margins ranged between -0.8 % and +0.6%. Detailed assessment shows that, with only few exceptions, the profitability was very low or negative also at country level. At Community level the additional costs would account for over 100 % of profit margins. Due to the absence of

[11] The calculation is based on data obtained from the Member States. Due to confidentiality constraints the exact value cannot be specified.
[12] ACEA, Economic report 2007

any pass through potential, the increase in production costs resulting from the revised ETS would eliminate or even exceed profits of the producers and make any future investment and economic activity in the sector unviable.

d. Conclusion

Based on this assessment and the combined impact of the qualitative criteria referred to in Article 10a(17) of the Directive, it can be concluded that the sector should be deemed as exposed to a significant risk of carbon leakage.