

The analysis of cost trends (time frame 2005-2014) demonstrate that share of regulatory costs on added value relating to the environment legislative package have dropped in 2007 and 2011 and have remained stable since 2012. As with the previous sub-sectors, we can observe a slight general decrease of costs ratios in 2007 (reaching a peak in 2009) and again decreasing thereafter. This is, as with the other subsectors, presumed to relate to the financial crises having an impact on producers of wooden pallets and other wooden packaging in 2008/2009, prior to which the high levels of business – “the calm before the storm”, as reflected in turnover and added value were reflected in relatively reduced costs.

The overall most significant cost for producers of wooden pallets and other wooden packaging, by far, is the environmental legislative package. In this instance, the increase of costs ratios between 2007 and 2009 may be explained by the revision of the Waste Framework Directive. The directive introduced new targets for reuse and recycling, and requirements for Member States to prepare waste prevention programmes, which may be underlying the increase in costs ratios for this sub-sector. The increase in costs ratios between 2007 and 2009 are also for a considerable part generated by the implementation of phytosanitary regulations, in particular those incorporating ISPM 15 - which was itself reviewed in this period, with investments in heat treat capacity and costs for reorganising the premises and controlling and licensing schemes. This required companies to investment in heat treatment capacity and to make adjustments to the control and marking scheme.

The remaining legislative packages have negligible costs for the sub-sector in comparison. Interestingly, we do however see an increase in employment costs ratios around 2007, which would be linked to the introduction of the second (in 2007) and third (in 2010) list of indicative occupational exposure limit values.

5.6 Cumulative cost assessment for the overall pulp, paper and paperboard sector

5.6.1 Scope

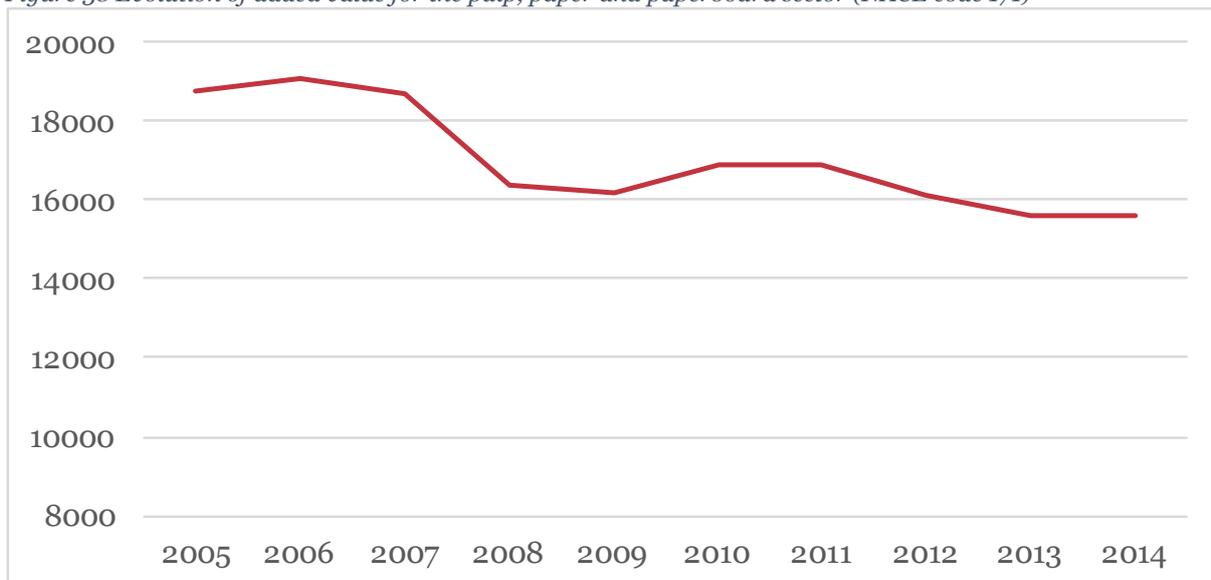
The section on cumulative cost assessment for the overall pulp, paper and paperboard sector provides an aggregated picture of EU regulatory costs (by a weighted sum of the values from each sub-sector, using turnover share as a weight) over the period 2004-2015 for the following sub-sectors:

- 17.11 Manufacture of pulp;
- 17.12 Manufacture of paper and paperboard

The subsequent sections will further cover each of these sub-sectors independently.

For the pulp, paper and paperboard sector and its sub-sectors (as mentioned above), the following sections provide an evolution of the share of regulatory cost as a percentage of added value over the time period (2005-2014). It is important to note that, while it certainly illustrates the evolution of regulatory costs over ten years, the trend is also impacted by the evolution of the ratio's denominator, i.e. the added value of the sector. As a matter of fact, recurrent peaks of regulatory costs as percentage of added value in 2009 may hence reflect the drop in added value due to the financial crisis and its subsequently difficult business environment. Nevertheless, although conclusions cannot be drawn on whether there has been a peak in regulatory costs per se for such a year, it is correct to mention that the share of regulatory costs (reflecting the regulatory burden) on added value has increased. The evolution of added value (denominator of all cost ratio), from 2005 to 2014, is as follows:

Figure 38 Evolution of added value for the pulp, paper and paperboard sector (NACE code 171)



Source: Eurostat, Structural Business Statistics, last available data

5.6.2 Direct regulatory costs for the overall pulp, paper and paperboard sector

The following seven legislative packages were prioritised for the pulp, paper and paperboard sub-sectors: competition, climate and energy, environment, forest-related, employment, products, transport and trade legislative packages. The results indicate that it is especially the climate and energy (monetary obligations, CAPEX) as well as the environment (CAPEX, OPEX) legislative packages that generated significant direct costs for manufactures of pulp, paper and paper products. Legislative packages concerned with employment, product and transport remained on a similar level as regards to generating costs. Nearly no direct costs have been reported for this subsector for the legislation forest-related and trade packages, for which the quantification exercise appeared to be difficult.

It can be noted that the manufacture of pulp, paper and paperboard sub-sectors demonstrate similar direct costs as the pulp sub-sector. It is therefore assumed that the prioritised legislation has a similar impact on the industry, with some exceptions.

Direct regulatory costs for the sub-sector reach 0.9% of turnover, 4.29% of added value and 10.76% of gross operating surplus of companies as an average for the period 2005-2014, which can be broken down between cost categories as follows in the table below. Other comparators are presented as well, i.e. regulatory costs as share of EBITDA, of EBIT and regulatory costs per tonne.

Table 30 Direct Costs for the overall pulp, paper and paperboard sector by package and comparison with main financial indicators – annual average for 2005-2014

	% turnover	% AV	% GOS	% EBITDA	% EBIT	Share of total costs
Climate & Energy	0.37%	1.78%	4.46%	3.2%	9.1%	41.5%
Environment	0.29%	1.37%	3.45%	2.4%	7.0%	32.0%
Forest	0.02%	0.11%	0.27%	0.2%	0.6%	2.5%
Employment	0.08%	0.37%	0.94%	0.6%	1.9%	8.7%
Product	0.08%	0.38%	0.94%	0.7%	1.9%	8.8%
Transport	0.05%	0.21%	0.53%	0.4%	1.1%	4.9%
Trade	0.01%	0.07%	0.17%	0.1%	0.3%	1.6%
Total	0.90%	4.29%	10.76%	7.6%	21.9%	100.0%

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

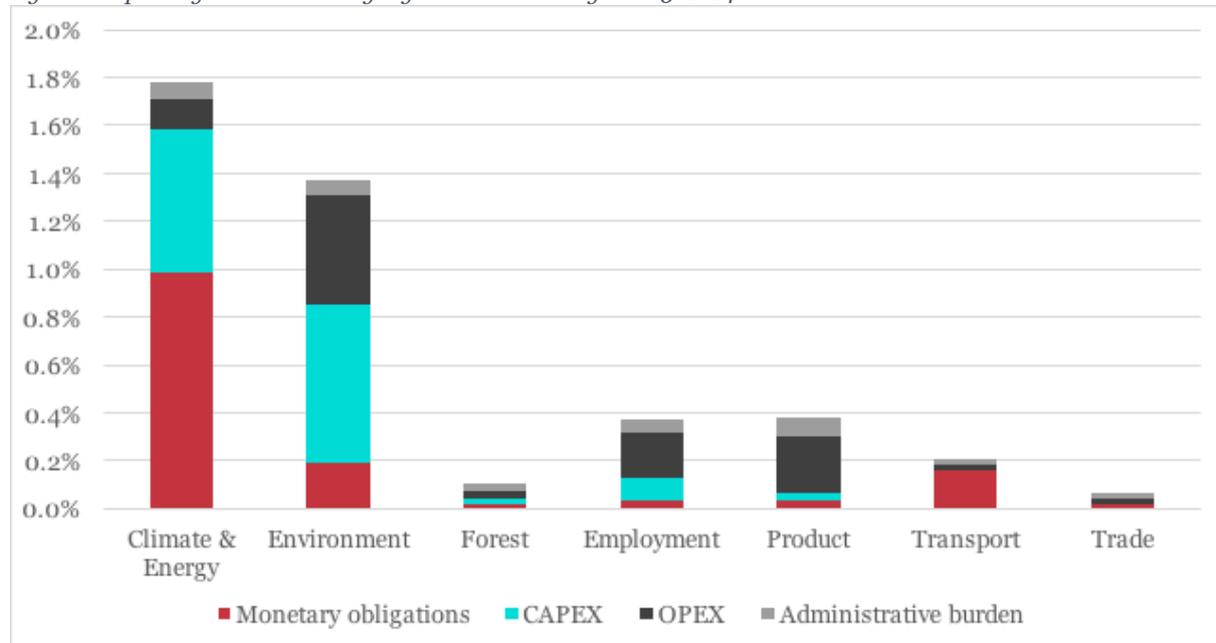
Table 31 Direct Costs for the overall pulp, paper and paperboard sector by cost category and comparison with main financial indicators – annual average for 2005-2014

	% turnover	% AV	% GOS	% EBITDA	% EBIT
Monetary obligations	0.3%	1.5%	3.7%	2.6%	7.4%
CAPEX	0.3%	1.4%	3.5%	2.5%	7.2%
OPEX	0.2%	1.1%	2.7%	1.9%	5.5%
Administrative burden	0.1%	0.3%	0.9%	0.6%	1.8%
Total	0.9%	4.3%	10.8%	7.6%	21.9%

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

Costs from EU regulation can be split by package and by cost categories. The following paragraphs elaborate on the pieces of legislation and related cost categories driving the regulatory costs.

Figure 39 Direct Regulatory costs for the overall pulp, paper and paperboard sector as % of added value, by legislative package and cost category – annual average 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

The key legislative package impacting the manufacture of pulp, paper and paperboard is **the climate and energy package**, accounting for 41.5% of total regulatory costs (1.78% of added value). The purchase of CO₂ allowances under the ETS system is an important cost for this legislative package. Substantive obligations are also a significant cost item for the climate and energy package, in particular as regards to the ETS, including investments in emission abatement equipment, energy and process efficiency that is beyond business-as-usual expenditures. Investments to increase energy independence and to reduce emissions amongst pulp, paper and paperboard producers have been made, in some cases this means that mills are, in part, operated with an autonomous power supply that generates energy for its own use (e.g. integrated pulp, paper and paperboard mills), which in turn improve energy efficiency.

In addition to investments costs (e.g. investments in equipment or new systems of procedures needed to comply with the provision for a 20% reduction in greenhouse gas emission), the Energy Efficiency Directive foresees independent energy audits for large companies. Energy audits do also imply fees and regulatory charges, which brings additional administrative burden for pulp companies.

The **environmental legislative package** accounts for 32% of total direct regulatory costs for the sector (1.37% of added value). Key cost items for these pieces of legislation are investment in new installations as well as maintenance costs for equipment and supplies for IED permit are obliged to invest in Best Available Technologies (BATs). For instance, costs for permits for waste (as well as waste water) treatment are significant costs that arise for pulp producers. Several large companies will have their own landfills where operating costs for the maintenance of its equipment and supplies are also generated.

The **forest-related legislative package** accounts for 2.5% of total regulatory costs (0.11% of added value). Direct costs started to become more significant when the EUTR regulation was concluded in

2010 and when it came into force in 2013. However, compared to costs arising from the implementation of other legislation it appears to be of lower magnitude.

The **employment legislative package** accounts for 8.7% of total regulatory costs (0,37% of added value). Main cost items are operating costs and capital expenditures. With respect to these substantive obligations (CAPEX and OPEX) pulp, paper and paperboard companies invest in health and safety standards, buy personal safety equipment as well as equipment to limit exposure substances including hazardous ones in accordance with the EU regulation (as well as invest in training). Investment and operating costs also arise from the monitoring procedures and protective equipment for work at night that have to be established because of the Working Time Directive. Additional costs may furthermore arise due to on-call and standby time in the Working Time Directive.

The **product legislative package** is the third most important package, accounting for 8.8% of total regulatory costs (0.38% of added value), among which a large part refers to operating costs. Such substantive costs are mainly associated with the eco-label and include costs from lifecycle assessment, training of personnel to fulfil eco-design requirements, obligations connected to distribution and labelling, or providing information about product supply chains.

The **transport legislative package** represents 4.9% of total regulatory costs (0.2% of added value). This sub-sector uses all modes of transport to get its raw materials and its products delivered. Road is however predominant. Monetary obligations are principally associated with the additional cost of switching to low-sulphur fuel (marine gas oils - MGO). It has been suggested that this represents a cost increase of 13 to 25% of the overall costs in the SECA area⁴¹. As stated earlier, the EU Directive on road transport⁴², by regulating vehicle dimensions and maximum weights for national and international journeys, affects the pulp, paper and paperboard and paper board producing companies in the same way it does affect woodworking companies. This may require investments related to the dimension and weight of vehicles or proof of fulfilment by providing a manufacturer's number plate with an additional plate showing dimensions or registration documents.

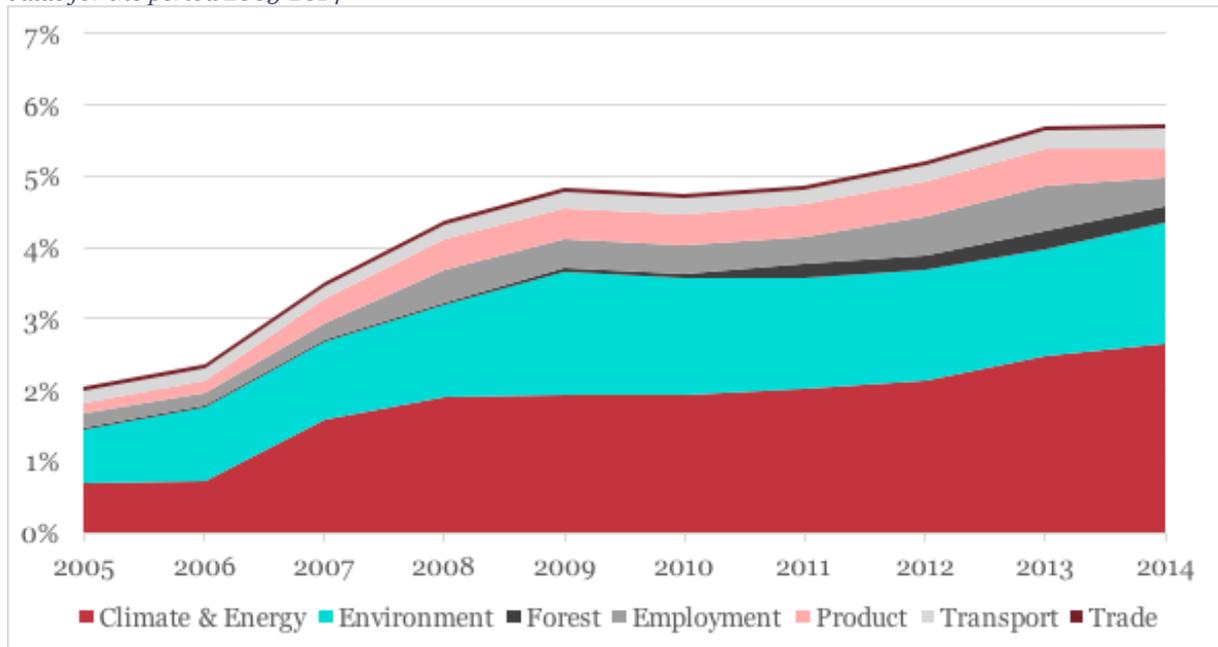
The **trade legislative package** accounts for 1.6% of total regulatory costs (0.07% of added value). Due to some specificities, such as the 'lesser duty rule' and the 'community interest', it has been suggested that the anti-dumping measures adopted by the EU are often of lower magnitude than in other countries. These trade defence measures thus do not restore a true level playing field for the European pulp, paper and paperboard industry when harmed by dumped or subsidised imports. This puts the European industry at a disadvantage and creates trade diversion, to the advantage of non-EU countries.

⁴¹ CE DELFT Study
(http://www.cedelft.eu/publicatie/seca_assessment%3A_impacts_of_2015_seca_marine_fuel_sulphur_limits/1780),

And EU Parliament study on Shippers
(http://www.europarl.europa.eu/RegData/etudes/STUD/2015/540338/IPOL_STU%282015%29540338_EN.pdf)

⁴² Directive 2002/7/EC of the European Parliament and of the Council of 18 February 2002 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic.

Figure 40 Evolution of direct regulatory costs for the overall pulp, paper and paperboard sector as % of added value for the period 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

The analysis of cost trends (time frame 2005-2014) demonstrate that direct costs ratios nearly tripled over the time period. Direct costs ratios relating to the climate and energy legislative package have increased significantly between 2006 and 2007, and have then remained stable until 2012 when we start seeing another increase in costs.

In contrast to other industries, the pulp, paper and paperboard industry cannot easily reduce its production since operating costs are high. It is as such presumed that the significant increase in costs for the pulp, paper and paperboard producing sub-sector in 2006-2007 is interlinked with investments to meet forthcoming legal obligations. This would be connected to the revision of the Renewable Energy Directive and the launch of the third phase of the ETS. For instance, pulp, paper and paperboard was covered by the ETS since its start in 2005. The second increase in 2012/2013 may also be linked to the ETS, e.g. from 2013 the ETS requires a reduction of -21% compared to 2005. The Energy Efficiency Directive also came into force during this period and it would also have been preceded by investments to meet new legal requirements.

The following table provides results for the first (2005) and last (2014) years over the period, along with ranges of direct regulatory costs over the period (2005-2014):

Table 32 Direct regulatory costs for the pulp, paper and paperboard sector - First year, last year, ranges min-max

	First year (2005)	Last year (2014)	Min	Year	Max	Year
Climate & Energy	0.706%	2.646%	0.706%	2005	2.646%	2014
Environment	0.739%	1.709%	0.739%	2005	1.730%	2009
Forest	0.024%	0.220%	0.024%	2005	0.244%	2013
Employment	0.189%	0.392%	0.183%	2006	0.634%	2013
Product	0.169%	0.416%	0.169%	2005	0.517%	2013
Transport	0.166%	0.280%	0.165%	2006	0.280%	2014
Trade	0.058%	0.072%	0.058%	2005	0.072%	2014

Source: Authors' elaboration

Results presented above apply to firms of the pulp, paper and paperboard industries where pulp mills sell their market pulp to third parties. As most mills included in our sample of companies are integrated companies, results are presented below for an average **integrated company** of pulp, paper and paperboard.

Table 33 Direct regulatory costs for the overall pulp, paper and paperboard sector by package and comparison with main financial indicators for an average integrated company – annual average for 2005-2014

	% turnover	EUR/tonne
Climate & Energy	0.42%	3.18 €
Environment	0.32%	2.46 €
Forest	0.02%	0.19 €
Employment	0.09%	0.67 €
Product	0.09%	0.68 €
Transport	0.05%	0.38 €
Trade	0.01%	0.12 €
Total	1.00%	7.68 €

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

5.6.3 Indirect regulatory costs for the overall pulp, paper and paperboard sector

Companies undergoing the interview process as well as stakeholders taking the online survey have systematically reported the significant impact of ETS indirect costs of regulation, that occur when utility companies pass-on some of their ETS-related costs on the industry. Such indirect costs from electricity providers become particularly substantial as pulp, paper and paperboard are energy-intensive sectors.

The methodology followed to produce results on ETS indirect costs can be consulted as part of chapter 3. In order to provide a fair overview of its impact, we propose the following scenarios:

- Pass-on rates: i) 0.5 and ii) 1; based on an extensive analysis of all available literature.

- For the evolution of indirect costs per year, two alternative carbon prices for 2007 have been used: i) 0.74 €/tonne CO₂ (spot price of 2007) and ii) 19.56 €/tonne CO₂ (average of daily future prices of the next year)

Table 34 Indirect costs of ETS (million EUR) for the overall pulp, paper and paperboard sector

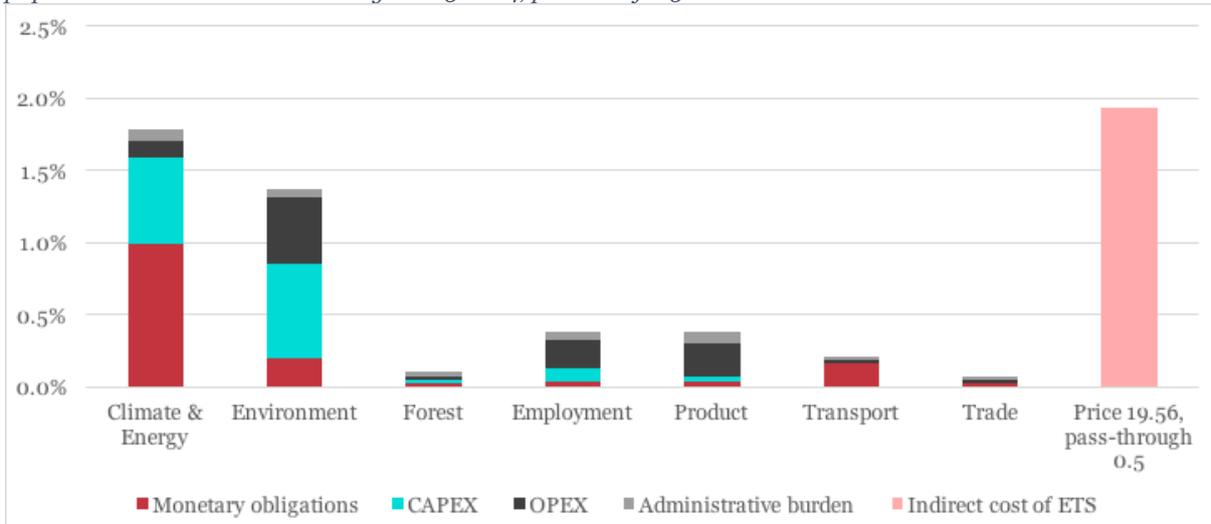
Indirect costs from ETS (in million EUR)				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Hypothesis 1 Pass-on	0.5	0.5	1	1
Hypothesis 2 Carbon price 2007	0.74	19.56	0.74	19.56
2005	524.27	524.27	1,048.54	1,048.54
2006	481.03	481.03	962.07	962.07
2007	18.57	490.91	37.14	981.82
2008	535.11	535.11	1,070.21	1,070.21
2009	275.12	275.12	550.24	550.24
2010	321.90	321.90	643.80	643.80
2011	289.24	289.24	578.48	578.48
2012	154.92	154.92	309.84	309.84
2013	89.49	89.49	178.98	178.98
2014	118.04	118.04	236.09	236.09

Source: Authors' elaboration

5.6.4 Direct and indirect regulatory costs for the overall Pulp, Paper and Paperboard sector

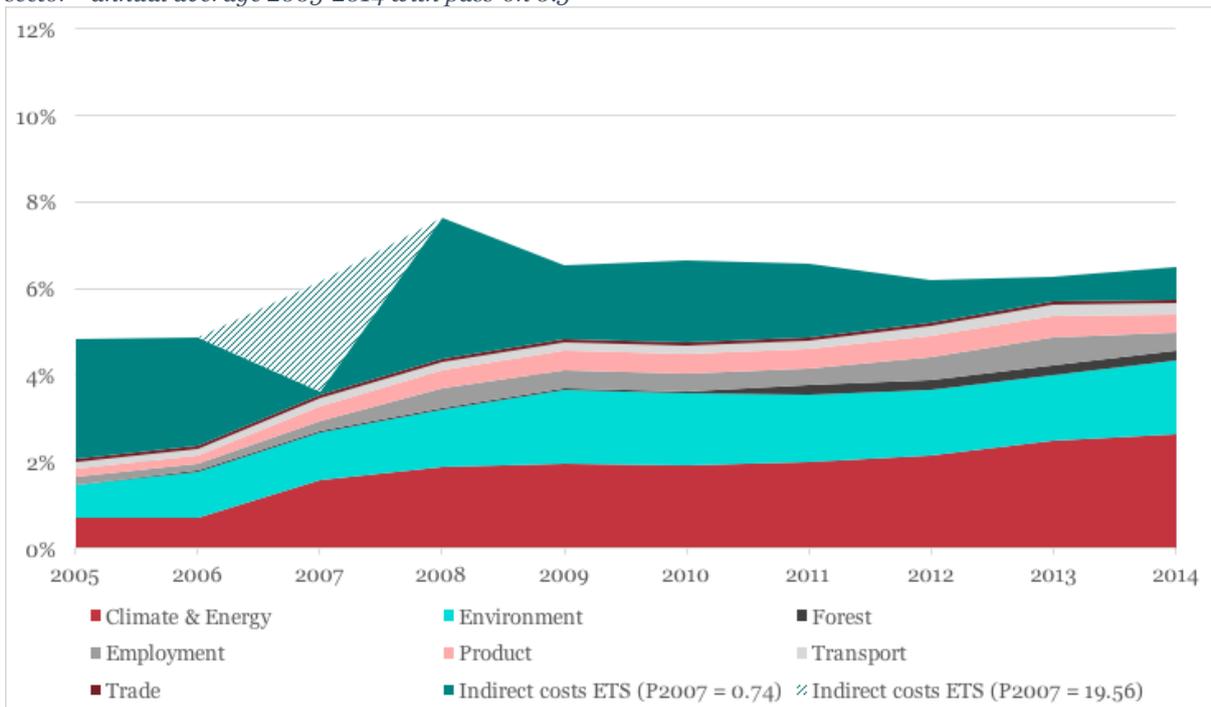
The following charts gathers the overall direct regulatory costs and indirect costs from ETS, as a share of added value and as an annual average for 2005-2014, with a pass-on rate of 0.5. Indirect costs from ETS are close to twice as much as direct costs from the climate and energy package, which contains, inter alia, direct costs from ETS.

Figure 41 Overall direct regulatory costs and ETS indirect regulatory costs for the overall pulp, paper and paperboard sector - annual average 2005-2014, pass-on of 0.5



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

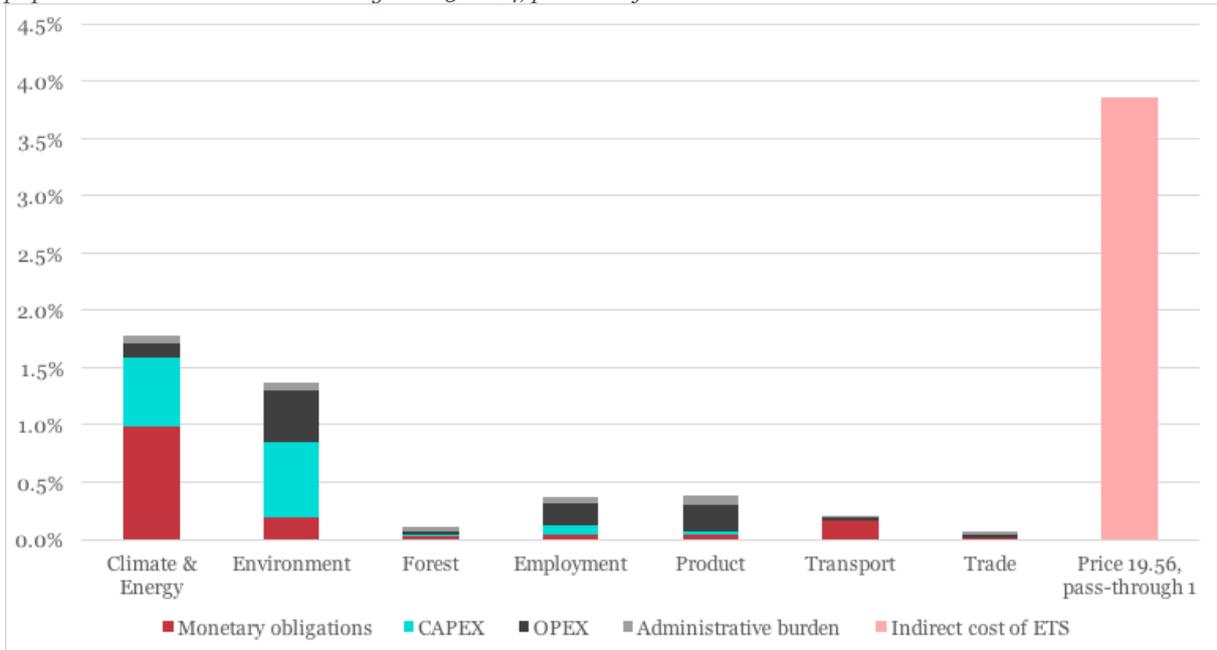
Figure 42 Evolution of direct regulatory costs and ETS indirect costs for the overall pulp, paper and paperboard sector - annual average 2005-2014 with pass-on 0.5



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

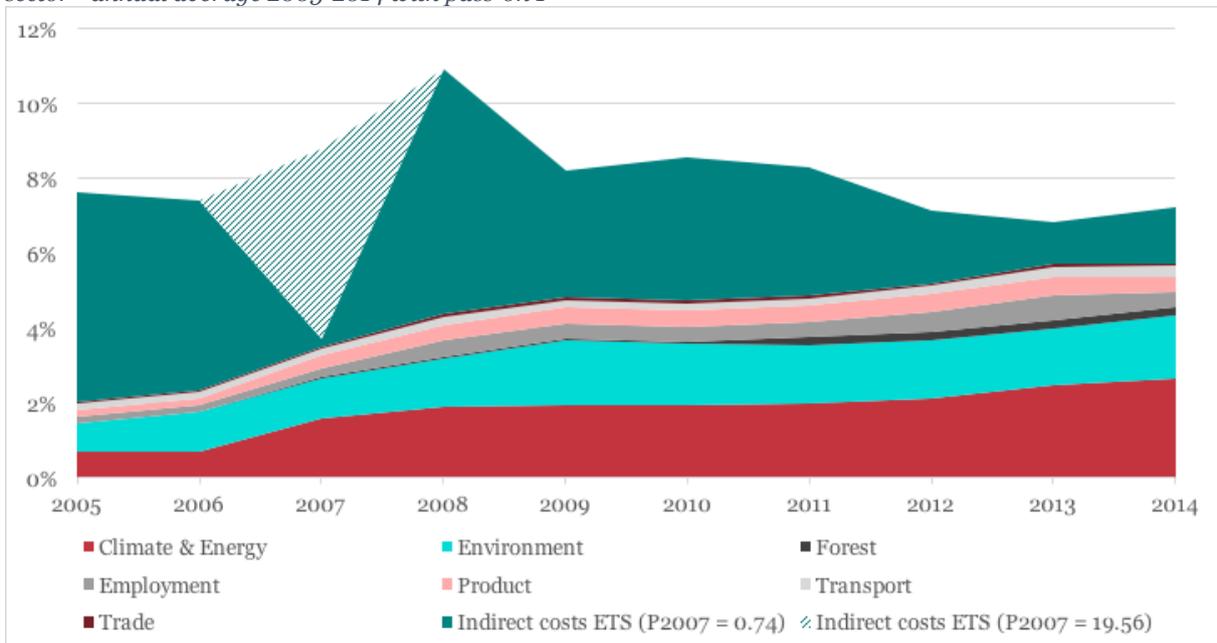
The following chart gathers the overall direct regulatory costs and indirect costs from ETS, as a share of added value and as an annual average for 2005-2014, with a pass-on rate of 1. Indirect costs from ETS are close to four times as much as direct costs from the climate and energy package, which contains, inter alia, direct costs from the ETS.

Figure 43 Overall direct regulatory costs and ETS indirect regulatory costs for the overall pulp, paper and paperboard sector - annual average 2005-2014, pass-on of 1



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

Figure 44 Evolution of direct regulatory costs and ETS indirect costs for the overall pulp, paper and paperboard sector - annual average 2005-2014 with pass-on 1



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

Finally, as mentioned in section 5.1.3, companies in the panel sector systematically reported to be impacted by indirect costs due to climate and energy policies, particularly by the Renewable Energy Directive (Directive 2009/28/EC). Companies reported that the directive has contributed to increasing the raw material costs (mainly wood), and led to the substitution of wood-based panels by less expensive materials when possible. By extension, this is likely to also be an issue for the pulp, paper and paperboard sub-sector, since they use the same types of fresh wood as part of their raw material intake.

5.7 Cumulative cost assessment of manufacture of pulp (17.11)

Eurostat definition of manufacture of pulp

NACE Rev.2: C1711

NACE Rev. 1.1: C2111

This sub-sector includes the manufacture of bleached, semi-bleached or unbleached paper pulp by mechanical, chemical (dissolving or non-dissolving) or semi-chemical processes, the manufacture of cotton-linters pulp and the removal of ink and manufacture of pulp from waste paper. Eurostat, 2016

All eight legislative packages were prioritised for the pulp-producing sub-sector: competition, climate and energy, environment, forest-related, employment, products, transport and trade legislative packages. The company survey did however only assess the direct regulatory costs for seven packages as the competition package was addressed qualitatively. The results indicate that it is especially the climate and energy (CAPEX, fees) as well as the environment (OPEX, CAPEX, fees) legislative packages that generated significant costs for pulp producers. Legislative packages concerned with employment, product (OPEX) and transport (fees) remained on a similar level as regards to generating costs. Nearly no costs have been reported by companies of this sub-sector for forest-related and trade legislative packages, for which the quantification exercise appeared to be difficult.

Direct regulatory costs for the sub-sector reach 1.2% of turnover, 4.9% of added value and 9% of gross operating surplus of companies as an average for the whole time period (2005-2014), which can be broken down between cost categories as follows in Table 35. Other comparators are presented as well, e.g. regulatory costs as share of EBITDA, of EBIT and regulatory costs per tonne.

Table 35: Direct regulatory costs for manufacture of pulp by package and comparison with main financial indicators – annual average for 2005-2014

	% turnover	% AV	% GOS	% EBITDA	% EBIT	EUR/tonne	Share of total regulatory costs
Climate & Energy	0.40%	1.7%	3.1%	3.4%	9.7%	0.87 €	34.6%
Environment	0.37%	1.6%	2.9%	3.1%	8.9%	0.79 €	31.7%
Forest	0.02%	0.1%	0.2%	0.2%	0.5%	0.04 €	1.8%
Employment	0.15%	0.7%	1.2%	1.3%	3.8%	0.34 €	13.4%
Product	0.14%	0.6%	1.1%	1.1%	3.3%	0.29 €	11.8%
Transport	0.07%	0.3%	0.5%	0.6%	1.6%	0.15 €	5.9%
Trade	0.01%	0.04%	0.1%	0.1%	0.2%	0.02 €	0.8%
Total	1.2%	5.0%	9.1%	9.8%	28%	2.50 €	100.0%

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

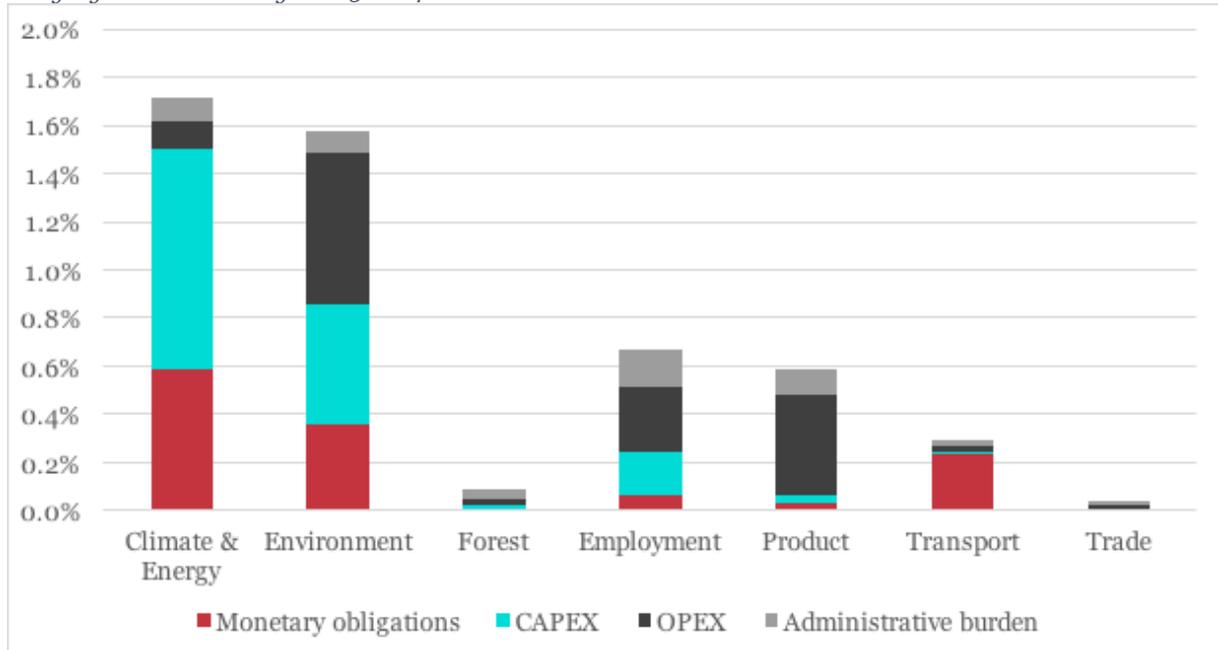
Table 36 Direct regulatory costs for manufacture of pulp by package and comparison with main financial indicators – annual average for 2005-2014

	% turnover	% AV	% GOS	% EBITDA	% EBIT	EUR/Tonne
Monetary obligations	0.3%	1.3%	2.4%	2.6%	7.3%	0.66 €
CAPEX	0.4%	1.6%	3.0%	3.2%	9.2%	0.82 €
OPEX	0.4%	1.5%	2.8%	2.9%	8.6%	0.76 €
Administrative burden	0.1%	0.6%	0.9%	1.0%	3%	0.26 €
Total	1.2%	5.0%	9.1%	9.8%	28%	2.5 €

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

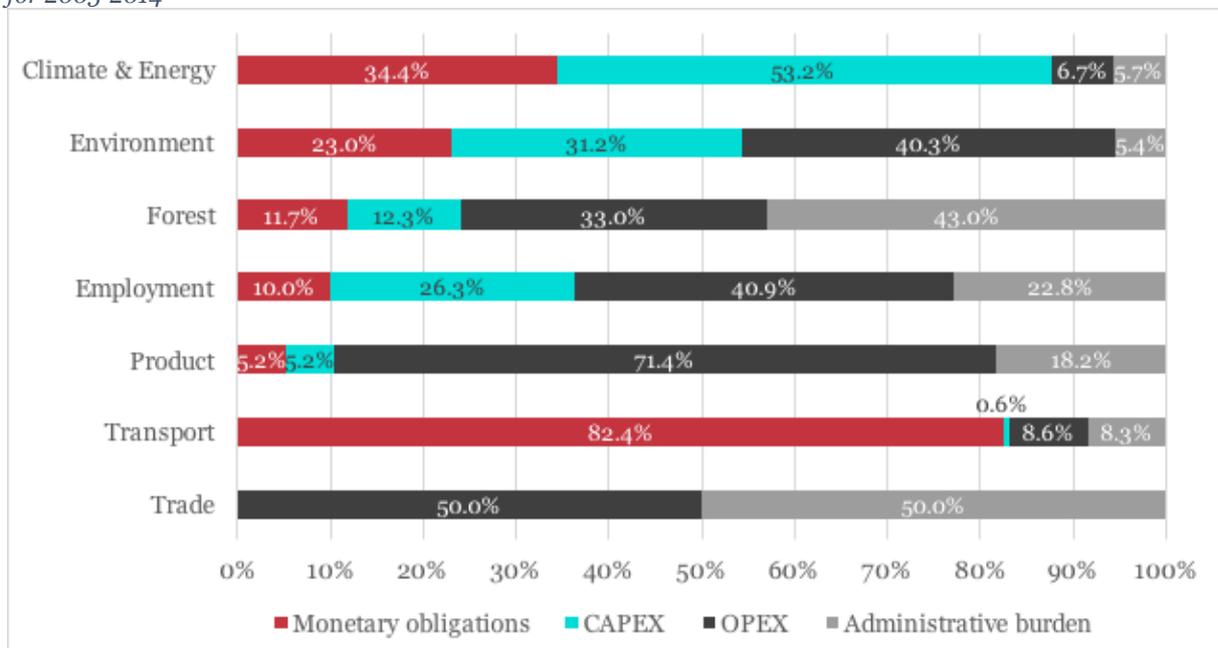
Direct costs from EU regulation can be split by package and by cost categories. The following paragraphs elaborate on the pieces of legislation and related cost categories driving the direct regulatory costs.

Figure 45 Direct regulatory costs for manufacture of pulp as % of added value, by legislative package and cost category – annual average 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

Figure 46 Share of categories of direct regulatory costs for manufacture of pulp by package – annual average for 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

The key legislative package impacting the manufacture of pulp is the **climate and energy package**, accounting for 34.6% of total direct regulatory costs (1.7% of added value). The purchase of CO₂ allowances under the ETS system is an important cost for the climate and energy package. Substantive obligations is the most significant cost item for this package (overall 53.2% of the package), in particular as regards to the ETS that include investments in emission abatement equipment, energy and process efficiency that is beyond business-as-usual expenditures. Investments to increase energy independence and to reduce emissions amongst pulp producers have been made, in some cases this means that mills are, in part, operated with an autonomous power supply that generates energy for its own use (e.g. pulp, paper and paperboard mills), which in turn improve energy efficiency.

The compliance of the industry with the ETS is however managed at the plant level, which also means that the administrative burden (e.g. related to greenhouse gas emission permits or accounting) is carried by the companies. Overall, administrative burden represents 5.7% of this package.

In addition to investments costs (e.g. investments in equipment or new systems of procedures needed to comply with the provision for a 20% reduction in greenhouse gas emission), the Energy Efficiency Directive foresees independent energy audits for large companies. Energy audits do however also imply fees and regulatory charges, which brings additional administrative burden for pulp companies. It should also be noted that benefits from increasing energy efficiency, such as heat recovery from the refiner steam, as part of reducing overall production costs are not accounted for in this assessment.

Accounting for 31.7% of total regulatory costs, the **environment legislative package** is the second most important one for this sub-sector (1.6% of added value). Within this package, monetary obligations reach 34.4% of the package, which are inter alia related to reducing industrial emissions (as linked to the Industrial Emissions Directive and IPPC Directive) –repealed by IED with effect on 7th January 2014. Capital expenditures and operating costs amount to respectively 53.2% and 6.7% of the package. Key cost items for these are investment in new installations as well as maintenance costs for equipment and supplies for IED permit are obliged to invest in Best Available Technologies (BATs). For instance, costs for permits for waste (as well as waste water) treatment are significant costs that arise for pulp producers. Several large companies will have their own landfills where operating costs for the maintenance of its equipment and supplies are also generated.

The administrative burden amounts to 5.7% of the package and relate to registration, notification or permitting of certain activities or costs sustained for the supply of data or information for monitoring according to the Industrial Emissions Directive (IED). The IPPC Directive, which was still in force during the study period, had an impact on costs in relation to permits that take into account the whole environmental performance of the plant based on BATs. For waste management documentation and depending on the product type (including hazardous waste) and waste management method will be required generating administrative burden for the pulp industry.

National Emission Ceilings for certain pollutants (Directive 2001/81/EC) sets upper limits for each Member State for the total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution (sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia). Since member states had to limit their annual national emissions of those pollutants by 2010 to an amount not exceeding the emission ceilings, this directive generates investment and administrative for the pulp sector.

The **employment legislative package** accounts for 13.4% of total direct regulatory costs (0,7% of added value). Main cost items are operating costs and capital expenditures, respectively representing 40.9% and 26.3% of the package. With respect to these substantive obligations (CAPEX and OPEX) pulp companies do need to invest in health and safety standards, buy personal safety equipment as well as equipment to limit exposure substances including hazardous ones according to the EU regulation (as well as invest in training). Investment and operating costs also arise from the monitoring procedures and equipment protection for work at night that have to be established because of the Working Time Directive.

The administrative burden that are associated with this package (22.8% of the package) arise because of the preparation of audits, carrying out health and safety checks or developing new measures for the use and handling of hazardous substances. The Working Time Directive (2003/88/EC) generates additional administrative burden because of the personnel in charge of monitoring working hours of personnel as well as monitoring obligations in relation to night work.

The **product legislative package** represents 11.8% of total direct regulatory costs (0.6% of added value). Its main cost relates to the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation - as related to the costs for testing, investing in laboratory equipment, employment, labelling equipment and databases for chemicals to be used in pulp – and to the EU Ecolabel.

Operating costs are the main cost item for this package, representing 71.4% of the package. Such substantive costs are associated with the eco-label and include costs from lifecycle assessment, training of personnel to fulfil ecodesign requirements, obligations connected to distribution and labelling, or providing information about product supply chains. Information obligations and administrative burden, the second most important cost item accounting for 18.2% of total package, also arise in relation to REACH regulation, including costs for administrative personnel.

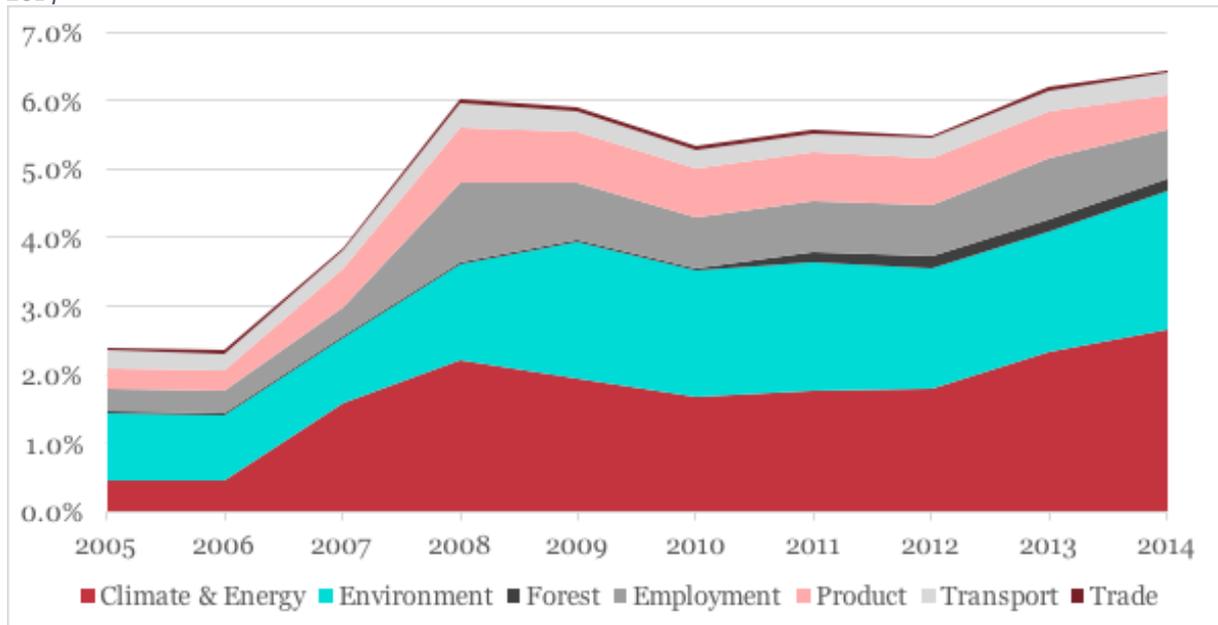
Monetary obligations represent 5.2% of the package, as all substances registered to the European Chemicals Agency (ECHA) are also subject to a fee, but registration fees vary depending on the volume of substances and size of companies (smaller ones pay less). Furthermore, fees associated with the applications for authorisation of a new substance to come into contact with food or an annual license fee associated with labelling products under the EU Ecolabel Regulation produce additional monetary obligations on the pulp industry. However, since the EU Ecolabel Regulation is entirely voluntary, it does not impose any specific obligation on the pulp industry by itself unless companies choose to use this label and meet the requirements and annual fees.

The **transport legislative package** represents 5.9% of total direct regulatory costs (0.3% of added value). This sub-sector uses shipping as well as road and rail to transport raw material to the pulp producers and its pulp customers. Monetary obligations amounting to 82.4% of the package, are the main cost item of this package and are principally associated with any sulphur tax or other related fees, such as charges for determining notifications under the waste shipment regulation. The Waste Shipment Regulation requires a financial guarantee or insurance and may include investments in infrastructure as all companies have a duty to manage the process in a way that protects the environment and human health. Pulp companies may have to pay higher fees for shipping waste as costs are passed on.

The EU Directive for road transport⁴³ also affects pulp producers by applying rules for limits on the dimensions and maximum weights for national and international journeys that are common to all EU member states. Thereby, pulp producing companies are limited in the weight and the dimension of material they are allowed to transport, hence leading to potential investments (capital expenditures and operating expenditures) in order to provide manufacturers' plate with an additional plate, displaying the dimensions and registration documents, and charges on excess weight.

⁴³ Directive 2002/7/EC of the European Parliament and of the Council of 18 February 2002 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic.

Figure 47 Evolution of direct regulatory costs for manufacture of pulp as % of added value for the period 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

The analysis of cost ratios trends (time frame 2005-2014) demonstrate that direct regulatory costs ratios nearly tripled over the time period. Direct costs relating to the climate and energy legislative package have increased significantly between 2006 and 2007, and have then remained stable until 2012 when we start seeing another increase in costs. Costs for the environmental legislative package increased significantly in 2009.

In 2008, the EU set a series of climate and energy targets to, amongst other things, meet its "20-20-20" targets. However, in contrast to other industries, the pulp industry cannot easily reduce its production since operating costs are high. It is likely that the significant increase in costs for the pulp-producing sub-sector in 2006-2007 is interlinked with investments to meet forthcoming legal obligations. This was connected to the impact of the Renewable Energy Directive and the launch of the third phase of the ETS, both happening in 2009. For instance, pulp was covered by the ETS since its start in 2005. The second increase in 2012/2013 may also be linked to the ETS, e.g. from 2013 the ETS requires a reduction of -21% compared to 2005. The Energy Efficiency Directive also came into force during this period and it would have been preceded by investments to meet new legal requirements.

The environmental package is also characterised by high costs in this instance, with a significant increase of costs in the 2008-2009 period. This is interlinked to a number of directives that came into force during this period. Most notably amongst these was the Waste Framework, as well as the Directive for Ambient Air Quality and Cleaner Air (Directive 2008/50/EC). Together with the IED, this legislation has generated the increasing cost figures that can be found for the environmental package, and would have been preceded by significant investment costs as well as running operational and maintenance costs following on from the adoption.

Costs related to forest-related policies started to become significant after the EUTR regulation was concluded in 2010 and moreover it came into force in 2013. Compared to costs arising from the implementation of other legislative package, it does however appear to be less substantial.

It should be noted that indirect regulatory costs are described for the whole pulp, paper and paperboard sub-sector under chapter 5.6. and so are not included in the chapter for the manufacture of pulp only.

5.8 Cumulative cost assessment of manufacture of paper and paperboard (17.12)

Eurostat definition of manufacture of paper and paperboard

NACE Rev.2: C1712

NACE Rev. 1.1: C2112

This sub-sector includes the manufacture of paper and paperboard intended for further industrial processing, the further processing of paper and paperboard (coating, covering and impregnation of paper and paperboard, the manufacture of creped or crinkled paper and the manufacture of laminates and foils, of laminated paper or paperboard), the manufacture of handmade paper, the manufacture of newsprint and other printing or writing paper, the manufacture of cellulose wadding and webs of cellulose fibres and the manufacture of carbon paper or stencil paper in rolls or large sheets. Eurostat, 2016

The following eight legislative packages were prioritised for the manufacture of paper and paperboard sub-sector: competition, climate and energy, environment, forest-related, employment, products, transport and trade legislative packages. The company survey did however only assess direct costs for seven packages as the competition package was addressed qualitatively. The results indicate that it is especially the climate and energy (fees, CAPEX) as well as the environment (CAPEX, OPEX) legislative packages that generated significant costs for manufactures of paper and paper products. Legislative packages concerned with employment, product and transport remained on a similar and lower level over time as regards to generating costs. Nearly no costs have been reported by companies of this sub-sector for the forest-related and trade legislative packages, for which the quantification exercise appeared to be difficult. Overall, it can be noted that the manufacture of paper and paperboard sub-sector demonstrate similar costs as the pulp sub-sector.

Direct regulatory costs for the sub-sector reach 0.9% of turnover, 4.1% of added value and 10.9% of gross operating surplus of companies, which can be broken down between cost categories as follows in the table below. Other comparators are presented as well, e.g. regulatory costs as shares of EBITDA, of EBIT and regulatory costs per tonne of sold product.

Table 37: Direct regulatory costs for manufacture of paper and paperboard by package and comparison with main financial indicators – annual average for 2005-2014

	% turnover	% AV	% GOS	% EBITDA	% EBIT	EUR/tonne	Share of total regulatory costs
Climate & Energy	0.37%	1.8%	4.7%	3.1%	9.0%	2.82 €	42.5%
Environment	0.28%	1.4%	3.6%	2.4%	6.8%	2.13 €	32.1%
Forest	0.02%	0.1%	0.3%	0.2%	0.5%	0.17 €	2.6%
Employment	0.07%	0.3%	0.9%	0.6%	1.7%	0.53 €	8.0%
Product	0.07%	0.3%	0.9%	0.6%	1.8%	0.55 €	8.3%
Transport	0.04%	0.2%	0.5%	0.4%	1.0%	0.32 €	4.8%
Trade	0.01%	0.1%	0.2%	0.1%	0.3%	0.11 €	1.7%
Total	0.9%	4.2%	11.1%	7.4%	21.1%	6.6 €	100.0%

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

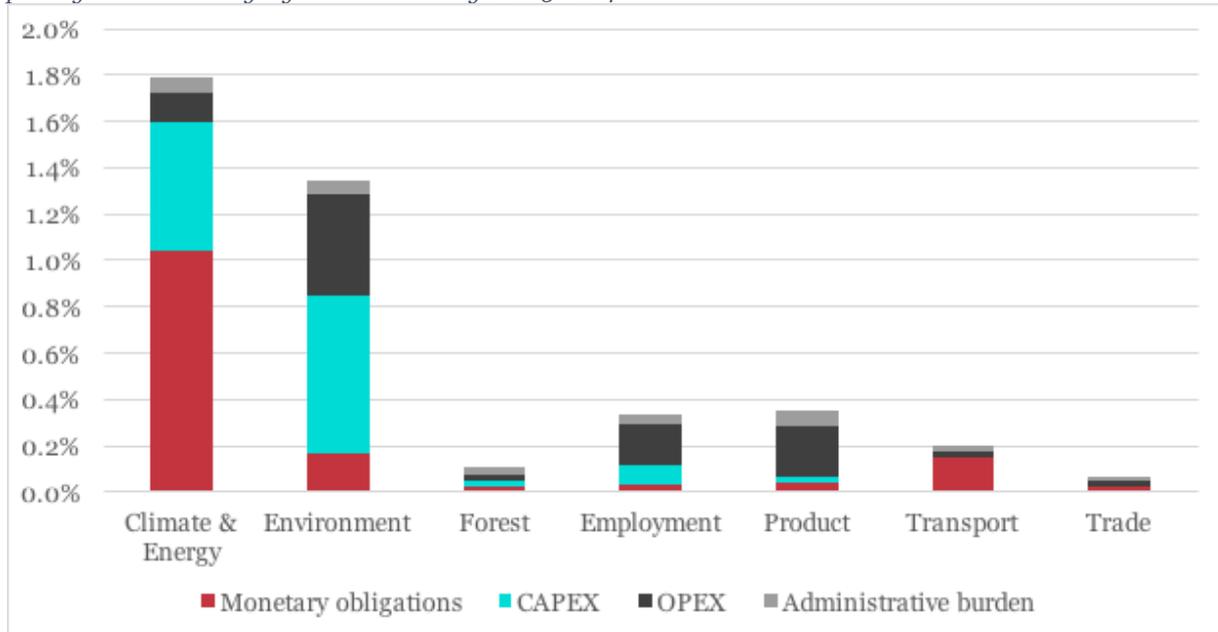
Table 38 Direct regulatory costs for manufacture of paper and paperboard by package and comparison with main financial indicators – annual average for 2005-2014

	% turnover	% AV	% GOS	% EBITDA	% EBIT	EUR/Tonne
Monetary obligations	0.3%	1.5%	3.9%	2.6%	7.4%	2.33 €
CAPEX	0.3%	1.4%	3.6%	2.4%	6.9%	2.17 €
OPEX	0.2%	1.0%	2.7%	1.8%	5.2%	1.63 €
Administrative burden	0.07%	0.3%	0.9%	0.6%	1.6%	0.52 €
Total	0.9%	4.2%	11.1%	7.4%	21.1%	6.6 €

Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

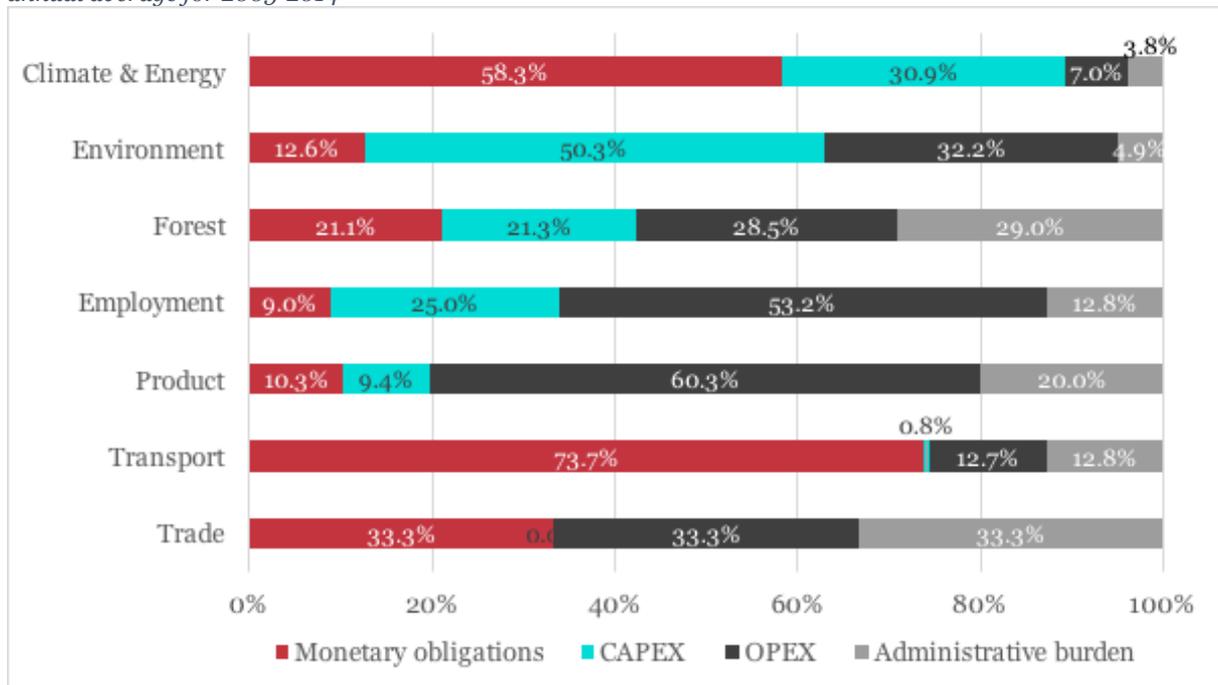
Direct costs from EU regulation can be split by package and by cost categories. The following paragraphs elaborate on the pieces of legislation and related cost categories driving the direct regulatory costs.

Figure 48 Direct regulatory costs for manufacture of paper and paperboard as % of added value, by legislative package and cost category – annual average 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

Figure 49 Share of categories of direct regulatory costs for manufacture of paper and paperboard by package – annual average for 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

The **climate and energy legislative package** is the most important package, representing 42.5% of total direct regulatory costs (1.8% of added value).

The purchase of CO₂ allowances under the ETS system represent a significant cost for manufactures of paper and paperboard. The compliance of the industry with the ETS is managed at the plant level, which also means that the administrative burden (e.g. related to greenhouse gas emission permits and/or accounting) is carried by the companies. Overall, the main cost items are monetary obligations (58.2% of the package) and capital expenditures (30.9% of the package). Substantive obligations resulting from the ETS include investments for emission abatement equipment, energy and process efficiency. Utility companies also pass on some of their ETS-related costs to the paper industry, in particular as the manufacture of paper and paperboard is very energy intensive.

Investments to reduce energy consumption (e.g. through improved process efficiency) and greenhouse gas emissions amongst manufactures of paper and paperboard have been made, in some cases this means that mills have their own power supply that generates energy for parts of its factory's needs (e.g. in integrated pulp, paper and paperboard mills), which in turn improve energy efficiency.

In addition to investments costs (e.g. equipment or new systems of procedures to comply with the provision for a 20% reduction in greenhouse gas emission), the Energy Efficiency Directive foresees independent energy audits for large companies. Energy audits do however also imply fees and regulatory charges, which constitute an administrative burden for manufactures of paper and paperboard. It should also be noted that benefits (cost savings) from increasing energy efficiency, such as heat recovery from refiner steam, as part of reducing overall production costs are not accounted for in this assessment.

The **environmental legislative package** is the second most important package, accounting for 32.1% of total direct regulatory costs (1.4% of added value). Manufactures of paper and paper products were required to reduce industrial emissions under the IPPC Directive for the period under review of this study (IPPC directive has been repealed by the IED starting from 7th January 2014). They are also required to have licences or emission permits and pay fees and charges associated with these. Permit conditions are constantly updated by the EU Member States.

Capital expenditures and operation costs are a key cost item of the package, representing 50.3% of environmental costs. Investment in new installations as well as maintenance costs for equipment and supplies are interlinked with these costs as the sub-sectors operating under IED permit are obliged to invest in Best Available Technologies (BATs). Also referring to investments concerned with air quality (Directive on Ambient Air Quality and Cleaner Air for Europe), air emissions and waste management (e.g. Waste Framework Directive). For instance, costs for permits for waste (as well as waste water) treatment are significant costs that arise for manufactures of paper and paperboard. Several large companies have their own landfills where operating costs for the maintenance of its equipment and supplies are also generated. CAPEX and OPEX-related costs are for this reason the most significant expenditure for this legislative package and allude to the types of investments that have been made to comply with the directives in question.

Administrative burden is associated with the registration, notification or permitting of certain activities or costs sustained for the supply of data or information for monitoring in accordance with the Industrial Emissions Directive. The IPPC directive and its successor IED have impacted on costs in relation to permits that take into account the whole environmental performance of the plant based on BATs. There are also requirements for waste management documentation, and depending on the product type (including hazardous waste) and waste management method, these would also generate administrative burden for the manufactures of paper and paper products.

National Emission Ceilings for certain pollutants (NEC Directive) sets upper limits for each Member State for the total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution (sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia). Since member states had to limit their annual national emissions of those pollutants by

2010 to an amount not exceeding the emission ceilings, this Directive generates investment and administrative burden for the manufactures of paper and paper products.

The **product legislative package** represents 6.3% of total direct regulatory costs (0.3% of added value). Operating costs are the key cost item from this package (60.3% of the package) and mostly refer to the eco-label, from life-cycle assessment, training of personnel to fulfil eco-design requirements, obligations connected to distribution and labelling, or providing information about product supply chains.

The Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation has been noted as generating significant cost. This includes activities such as testing, investing in laboratory equipment, labelling equipment and databases for chemicals to be used in the varied manufacturing processes associated with different paper and paper products.

Monetary obligations represent 10.3% of the package. As a matter of fact, all substances registered with ECHA are also subject to a fee. These registration fees do however vary depending on the volume of substances and size of companies (e.g. small companies pay less). Furthermore, fees are associated with the applications for authorisation of a new substance to come into contact with food and/or annual licence fees connected with labelling products under the EU Eco-label. These regulations would in turn also produce monetary obligations for manufactures of paper and paper products. In the case of the Eco-label Regulation, these are, on the one hand, entirely voluntary and do not impose any specific obligations on the industry. On the other hand, it has been argued that green public procurement requirements have provided an incentive for products to have an eco-label (i.e. the eco-label is a way of proving compliance with specifications in public tenders). In either case, if a company choose to use the eco-label (and meet the requirements) an annual fee arise.

Information obligations and administrative burden arise in relation to REACH regulation, including costs for administrative personnel, and amount for 20% of the package.

The **employment legislative package** represents 8% of total direct regulatory costs (0.3% of added value). Operation costs and capital expenditures respectively represent 53.2% and 25% of the package as manufacturers of paper and paper products do need to invest in health and safety standards, buy personal safety equipment as well as equipment to limit exposure substances including hazardous ones according to the EU regulation (as well as invest in training). Investment and operating costs also arise from the monitoring procedures and protective equipment for work at night that have to be established because of the EU Working Time Directive.

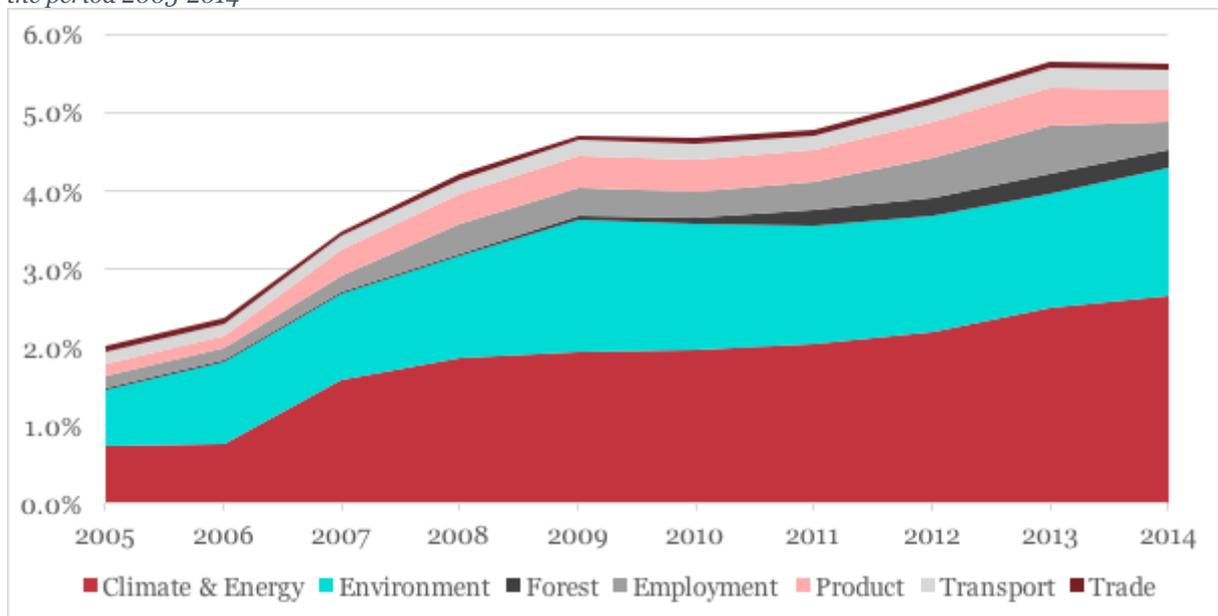
The administrative burden that are associated with this package (12.8% of the package) arise because of the preparation of audits, carrying out health and safety checks or developing new measures for the use and handling of hazardous substances. The Working Time Directive generate additional administrative burden because of the administrative personnel in charge of monitoring working hours of personnel as well as monitoring obligations in relation to night work.

With respect to the **transport legislative package**, this sub-sector uses shipping as well as road transport of raw material to the location where paper and paperboard are manufactured, but also for the delivery of paper and paperboard to its customers. Monetary obligations are a key cost item (73.2% of the package) and are principally associated with taxation of sulphur emissions or other related fees, such as charges for determining notifications under the Waste Shipment Regulation.

Similarly to the pulp sector, the harmonisation of dimensions and maximum weights for national and international lorry journeys affects the manufacturers of paper and paper products in limiting the weight and size of transport, which possibly leads in turn to investments (capital expenditures and operating expenditures) related to the dimension and weight of haulage vehicles or proof of fulfilment by providing the manufacturer's plate with an additional plate showing dimensions or registration documents, along with charges on excess weight.

The Waste Shipment Regulation requires a financial guarantee or insurance and may include investments in infrastructure as all companies have a duty to manage the process in a way that protects the environment and human health.

Figure 50 Evolution of direct regulatory costs for manufacture of paper and paperboard as % of added value for the period 2005-2014



Source: Authors' elaboration based on cost data from companies' books and online survey; comparators of turnover, AV and GOS from Eurostat, Structural Business Statistics and EBIT, EBITDA and production quantities from CEPI, RISI database

The analysis of cost ratios trends (time frame 2005-2014) demonstrate that direct regulatory costs nearly tripled over the time period. Direct costs ratios relating to the climate and energy legislative package have increased significantly between 2006 and 2009, and have then remained stable. Costs for climate and energy increased significantly in 2006 and 2009, and have since then seen a slow but gradual increase, while cost for the environment legislative package increased significantly in 2009, after which it has decreased slightly.

With respect to the **energy and climate package**, these increases in costs for manufactures of paper and paperboard are interlinked with investments to meet forthcoming legal obligations. This was connected to the publishing of the Renewable Energy Directive and the launch of the second phase of the ETS, both happening in 2009. For instance, manufactures of paper have been covered by the ETS since its start in 2005 (some exclusions apply). The Energy Efficiency Directive has been followed by investments to meet legal requirements such as investments in gauges, frequency variators and converters, electrical motors, engine cogeneration, etc.

The **environmental package** is also characterised by high costs. In this case, we see a significant increase of costs in the 2008-2009 period. This is interlinked to a number of directives that came into force during this period. Most notably amongst these would be the Waste Framework Directive as well as the Ambient Air Quality and Cleaner Air for Europe Directive. Together with the IED, these legislative acts have generated the increasing cost figures that can be found for the environmental package, caused by significant investment costs, as well as running operational and maintenance costs, following on from their implementation, e.g. for additional and higher steam input to reduce NOx emissions, adaptation of effluent for treatments of plants, etc.

Costs related to **forest-related policies** start to become more significant when the EUTR regulation was adopted in 2010 and when it was implemented in 2013. Overall it is however less significant than costs arising from the implementation of other legislation.

Please note: Indirect regulatory costs are described for the whole pulp, paper and paperboard industry under chapter 5.6. and are thus not included in the chapter for the manufacture of paper and paperboard only.

5.9 Expected future costs for the period 2014-2030

Following the assessment of the present effects of current EU legislation on the forest-based industries, this section elaborates on future regulatory costs likely to impact the forest-based industries, either based on current legislation with future cost impacts or future legislation (i.e. drafted or already in the adoption process phase as of the end of 2014). The original objective for this task required the elaboration of cost-related indicators covering 2014-20130 for energy and climate policies and 2014-2020 for other policies. However, some aspects from the regulatory implementation cannot be measured, e.g. its future regulatory cost impact, as important limitations in the availability of data prevent the elaboration of a proper cost assessment for future years. In this regard, the considerations presented in this section are based on desk research and the feed-back from the associations involved in this study, enquired about possible future impacts of legislation, policy strategies and documents linked to the policy packages included in this study.

Overall, in a Communication⁴⁴ 2013 related to the new EU Forest Strategy for forests and the forest-based sector, the European Commission re-iterated its position to further support and develop the sector for the coming years, based on the guiding principles of sustainable forest management, the multifunctional role of forests, its resource efficiency, and global forest responsibility. EU legislation and policy is thus considered as primordial – through new developments and the revision of existing acts – in order to ensure forest protection, foster growth and job creation and guarantee the sustainable production and consumption of the various products emanating from these industries. However, as mentioned in an Opinion of the European Economic and Social Committee (EESC) on ‘Opportunities and challenges for a more competitive European woodworking and furniture sector’, from 2012, “unfortunately there are currently some key inconsistencies between certain parts of some EU policies and initiatives which are having a serious impact on the forest-based industries’ competitiveness and profitability⁴⁵”

Future costs for the EU forest-based industries as a whole:

Climate and Energy legislation

While non-legislative policy strategies do not present quantifiable direct or indirect costs for the forest-based industries, they are good indications as to what policy-makers may decide in the future and what policy priorities may be made. The roadmap for moving to a competitive low-carbon economy in 2050, the 2030 climate & energy **framework** and the **energy roadmap 2050**⁴⁶ all share the idea of reducing carbon emission and reducing energy consumption by making it more efficient. However, decarbonising energy generation will require substantial investments and may result in higher per-unit energy prices.

It is also expected that the proposal under the **Clean Air Policy Package**⁴⁷ will replace the existing legislation (Directive 2001/81/EC no National Emission Ceilings Directive) to further reduce harmful

⁴⁴ Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, on “A new EU Forest Strategy: for forests and the forest-based sector”, SWD (2013) 342 final

⁴⁵ Opinion of the European Economic and Social Committee on ‘Opportunities and challenges for a more competitive European woodworking and furniture sector’, 2012/C 24/04

⁴⁶ 2050 Low Carbon Economy, http://ec.europa.eu/clima/policies/strategies/2050/index_en.htm

⁴⁷ Clean Air Policy Package, http://ec.europa.eu/environment/air/clean_air_policy.htm