European Commission

Cumulative Cost Assessment (CCA) of the EU Glass Industry

Key Findings

&

Executive Summary

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Key findings

A Cumulative Cost Assessment (CCA) aims to identify, assess and, where possible, quantify the **cumulative cost** generated by **selected areas of EU legislation** on a **given industrial sector**. It is **retrospective** and **strictly centred on EU rules**. **The CCA is all about regulatory costs**. Hence, it does not include the benefit side of rules, nor does it assess the cost-benefit balance of the legislation.

Against this background, the CCA of the EU glass industry has measured regulatory costs borne by **EU manufacturers of packaging glass, glass tableware and flat glass** (limited to the basic float glass segment) and linked to EU legislation in the following areas: i) Internal Market; ii) energy; iii) climate; iv) environment; v) workers' and workplace safety; and vi) consumers and health legislation.

While **regulatory costs have been assessed over the period 2006-15**, this document shows key findings for 2015, which allows for capturing the most recent impact of EU legislation on the EU glass industry (Table 1 and Table 2).

Table 1. Overview of regulatory costs generated by EU legislation on EU manufacturers of glass in 2015: Breakdown by category of costs

		Unit	Packaging glass	Glass tableware	Flat glass
Regulatory costs	Total	€/tonne	12.31	33.19	9.74
	Administrative burdens	€/tonne	0.55	3.92	0.44
	Substantive compliance costs	€/tonne	5.51	13.30	3.75
	Direct charges	€/tonne	0.92	3.46	1.32
	Indirect costs	€/tonne	5.33	12.51	4.22

Source: Author's own elaboration.

Table 2. Overview of regulatory costs generated by EU legislation on EU manufacturers of glass in 2015: Comparison with key performance indicators

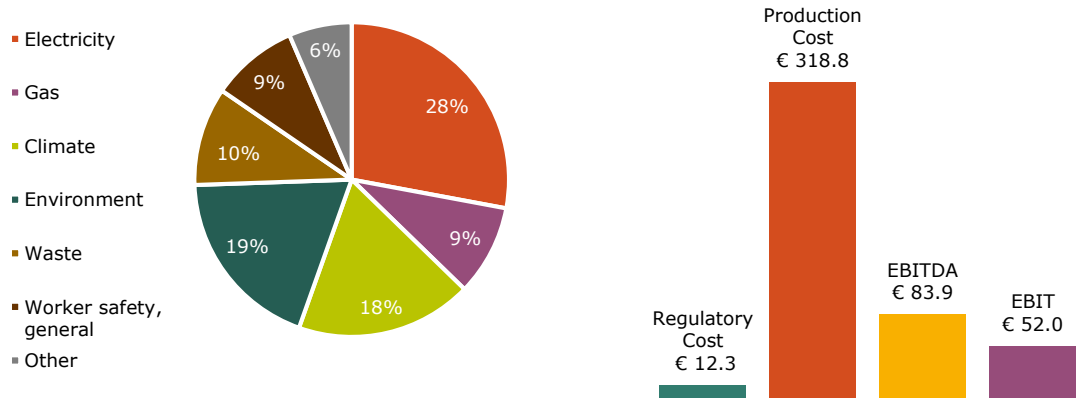
		Unit	Packaging glass	Glass tableware	Flat glass
Regulatory costs/ Production costs	Production costs	€/tonne	318.83	1,445.07	285.12
	Total	%	3.9%	2.3%	3.4%
	Administrative burdens	%	0.2%	0.3%	0.2%
	Substantive compliance costs	%	1.7%	0.9%	1.3%
	Direct charges	%	0.3%	0.2%	0.5%
	Indirect costs	%	1.7%	0.9%	1.5%
Regulatory costs/EBITDA	EBITDA	€/tonne	83.86	150.78*	31.11
	Total	%	14.7%	22.0%	31.3%
	Administrative burdens	%	0.7%	2.6%	1.4%
	Substantive compliance costs	%	6.6%	8.8%	12.1%
	Direct charges	%	1.1%	2.3%	4.3%
	Indirect costs	%	6.4%	8.3%	13.6%

Regulatory costs/EBIT	EBIT	€/tonne	52.03	n.a.**	12.44
	Total	%	23.7%	n.a.**	78.3%
	Administrative burdens	%	1.1%	n.a.**	3.6%
	Substantive compliance costs	%	10.6%	n.a.**	30.1%
	Direct charges	%	1.8%	n.a.**	10.6%
	Indirect costs	%	10.2%	n.a.**	33.9%

*Note: *As EBITDA in 2015 were negative, regulatory costs are compared with EBITDA registered in 2014.*
***Due to the limited number of sampled plants and volatile trends in the glass tableware subsector, data for EBIT cannot be presented, as no meaningful average can be computed.*
Source: Author's own elaboration.

In 2015, EU producers of **packaging glass** incurred **cumulative regulatory costs equal to €12.31/tonne of output**. The largest share of regulatory costs was generated by rules affecting the electricity price (€3.44/tonne), followed by environmental legislation regulating industrial emissions (€2.34/tonne) and climate change legislation (€2.24/tonne). In the same year, **regulatory costs represented 3.9% of production costs**,[1] 14.7% of EBITDA[2] and 23.7% of EBIT[3] per tonne of output registered by the sector (Figure 1 and Table 3).

Figure 1. Packaging glass - Regulatory costs generated by EU legislation in 2015: Breakdown by area of legislation (%, left-hand side) and comparison with key performance indicators (€/tonne, right-hand side)



Source: Author's own elaboration.

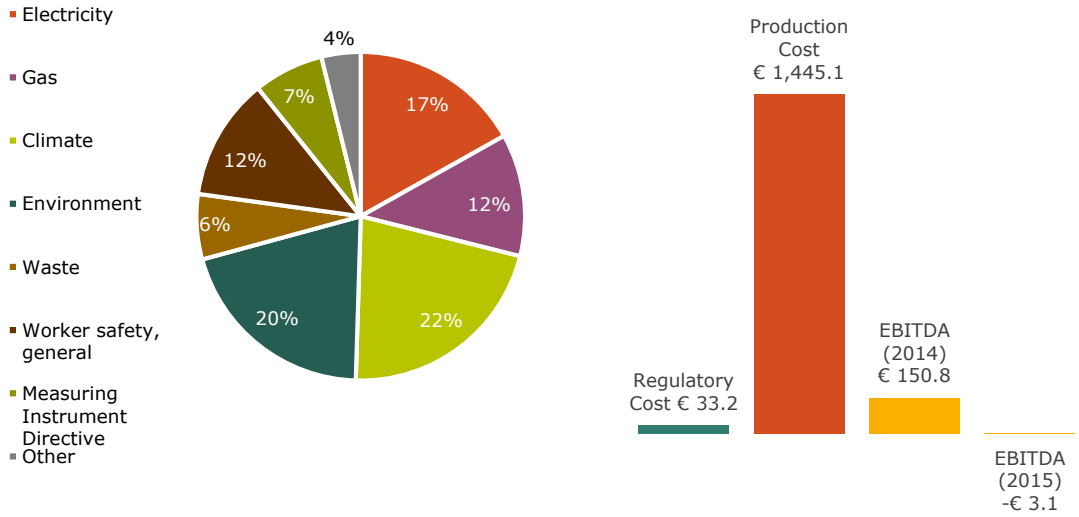
Table 3. Packaging Glass - Regulatory costs as a share of key performance indicators by area of legislation, 2015

		€/tonne	% Production costs	% EBITDA	% EBIT
Regulatory costs	Total	12.31	3.9%	14.7%	23.7%
	Electricity	3.44	1.1%	4.1%	6.6%
	Environment	2.34	0.7%	2.8%	4.5%
	Climate	2.24	0.7%	2.7%	4.3%
	Waste	1.25	0.4%	1.5%	2.4%
	Gas	1.15	0.4%	1.4%	2.2%
	Worker safety, general	1.10	0.3%	1.3%	2.1%
	Other	0.80	0.2%	1.0%	1.5%

Source: Author's own elaboration

Cumulative regulatory costs borne by EU manufacturers of **glass tableware** were equal to **€33.19/tonne in 2015**. Climate change legislation was responsible for the biggest chunk of such costs (€7.16/tonne), followed by rules on industrial emissions (€6.73/tonne) and rules affecting the price of electricity (€5.60/tonne). **The share of regulatory costs out of production costs incurred by glass tableware plants was equal to 2.3%.** Regulatory costs were higher than EBITDA in 2015, which was a very bad year for this subsector due to a considerable drop in demand as well as some plant-specific reasons. In this respect, it is worth noticing that in 2014 regulatory costs were in the region of 20% of EBITDA (Figure 2 and Table 4).

Figure 2. Glass Tableware - Regulatory costs generated by EU legislation in 2015: Breakdown by area of legislation (%, left-hand side) and comparison with key performance indicators (€/tonne, right-hand side)



Note: Due to the limited number of sampled plants and volatile trends, data for EBIT cannot be presented, as no meaningful average can be computed.
Source: Author's own elaboration.

Table 4. Glass Tableware - Regulatory costs as a share of key performance indicators by area of legislation, 2015

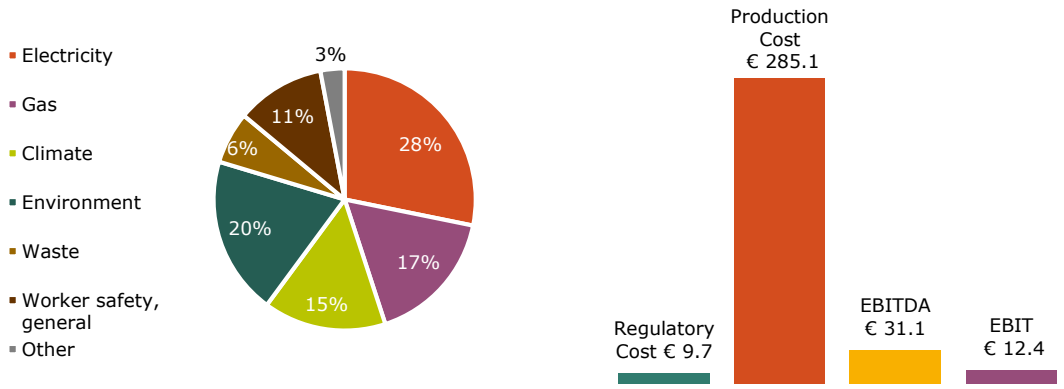
		€/tonne	% Production costs	% EBITDA (2014)*
Regulatory costs	Total	33.19	2.3%	22.0%
	Climate	7.16	0.5%	8.5%
	Environment	6.73	0.5%	8.0%
	Electricity	5.60	0.4%	6.7%
	Worker safety, general	4.00	0.3%	4.8%
	Gas	4.00	0.3%	4.8%
	Measuring Instrument Directive	2.29	0.2%	2.7%
	Waste	2.13	0.1%	2.5%
	Other	1.28	0.1%	1.5%

*Note: *As EBITDA in 2015 were negative, regulatory costs are compared with EBITDA registered in 2014.*
Source: Author's own elaboration.

Finally, in the same year, cumulative regulatory costs incurred by EU producers of **basic float glass** amounted to **€9.74/tonne**, including €2.75/tonne generated by energy legislation in the field of electricity, €1.90/tonne by environmental legislation regulating industrial emissions and €1.64/tonne by rules affecting the price of gas. In this sector,

regulatory costs were 3.4% of production costs, 31.3% of EBITDA and 78.3% of EBIT per tonne of output registered in 2015 (Figure 3 and Table 5).

Figure 3. Flat Glass - Regulatory costs generated by EU legislation in 2015: Breakdown by area of legislation (%, left-hand side) and comparison with key performance indicators (€/tonne, right-hand side)



Source: Author's own elaboration.

Table 5. Flat Glass - Regulatory costs as a share of key performance indicators by area of legislation, 2015

		€/tonne	% Production costs	% EBITDA	% EBIT
Regulatory costs	Total	9.74	3.4%	31.3%	78.3%
	Electricity	2.75	1.0%	8.8%	22.1%
	Environment	1.90	0.7%	6.1%	15.3%
	Gas	1.64	0.6%	5.3%	13.1%
	Climate	1.48	0.5%	4.7%	11.9%
	Worker safety, general	1.07	0.4%	3.4%	8.6%
	Waste	0.62	0.2%	2.0%	5.0%
	Other	0.29	0.1%	0.9%	2.3%

Source: Author's own elaboration.

Executive Summary

Introduction

A Cumulative Cost Assessment (CCA) aims to identify, assess and, where possible, quantify the **cumulative cost** generated by **selected areas of EU legislation** on a **given industrial sector**. It is **retrospective** and **strictly centred on EU rules**.[4] **The CCA is all about regulatory costs**. Hence, it does not include the benefit side of rules, nor does it assess the cost-benefit balance of the legislation.[5]

Against this background, the CCA of the EU glass industry has measured regulatory costs (administrative burdens, substantive compliance costs, direct charges and indirect compliance costs)[6] borne by **EU manufacturers of packaging glass, glass tableware and flat glass**[7] (limited to the basic float glass segment) and linked to the following areas of EU legislation **over the period 2006-15**[8]:

- **Internal Market legislation**
  - Internal Market for chemicals (REACH and CLP)
  - Internal Market for construction products (CPR/CPD)
  - Other Internal Market legislation (Measuring Instrument Directive)
- **Energy legislation**
  - Electricity (Internal Energy Market, Renewable Energy, Energy Taxation)
  - Gas (Internal Energy Market, Energy Taxation)
  - Energy efficiency (Energy Efficiency Directive)
- **Climate legislation** (EU ETS, Verification, Monitoring and Reporting of greenhouse emission)
- **Environmental legislation**
  - Industrial emissions (IPPC/IED)
  - Waste (Waste Framework Directive and Landfill of Waste)
  - Packaging and packaging waste
- **Workers' and workplace safety legislation**
  - General workers' health and safety and workplace safety (Minimum Safety and Health Requirements of Workers and Workplace)
  - Special workers' health and safety (Minimum Safety and Health Requirements of Workers regarding exposure to i) Physical agents such as Noise, Electromagnetic Fields and Artificial optical radiation and ii) Chemical agents)
- **Consumers and health legislation** (General Product Safety and Contact with Food)

All regulatory costs measured in this CCA are **net of the business as usual (BAU) factor**, i.e. net of the share of 'regulatory' costs that a company would bear even in the absence of a regulation.[9]

Sample

The Study does not rely upon a statistically representative sample. In fact, the number of observations required by a statistically representative sample would have not allowed for the collection of data via interviews with plant operators, especially in light of

the amount and level of detail of data required to cover all the pieces of legislation encompassed by this CCA. In this respect, **data on regulatory costs have been collected from a small sample of 'typical' plants**,[10] selected on the basis of the following sampling criteria:

- sectors (flat glass,[11] hollow glass);
- geographical distribution (Central-Eastern Europe, Northern-Western Europe, Southern Europe);
- plant features (limited to the hollow glass sector: packaging glass, glass tableware).

Results presented below are based on plant-level data collected from a sample of EU glass producers that is composed as follows (Table 6):[12]

- **Packaging glass.** The sample includes 26 plants. Nonetheless, it was possible to use only 21 questionnaires to assess regulatory costs generated by EU rules on packaging glass; in fact, five questionnaires were compiled by installations manufacturing special products, which cannot be considered 'typical plants' for the purpose of this Study. The sample used for cost assessment represents more than 15% of the total value of production sold by EU producers of packaging glass (Table 7).
- **Glass tableware.** The sample is composed of five plants covering more than 40% of the total value of production sold by EU producers of glass tableware (Table 7).
- **Flat glass (float glass)**. The sample comprises 15 plants, which are responsible for more than 35% of the total value of production sold by EU producers of float glass (Table 7).

Table 6. Sample

	Packaging glass	Glass tableware	Flat glass (float glass)
Southern Europe	10	5	5
Central-Eastern Europe	6		5
Northern-Western Europe	10		5
Total	**26 (21)***	**5**	**15**

*Note: *Five respondents manufacture special products and cannot be considered 'typical plants', hence, their data were not used to assess regulatory costs.*
Source: Authors' own elaboration.

Table 7. Turnover of sampled plants as a share of total value of production sold by the EU glass sectors under evaluation (%)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Packaging glass***	12.9**	14.0**	13.4**	14.4**	14.7**	15.2**	15.8**	15.2**	15.2**	15.7**
Glass tableware	70.6****	36.5	38.0	37.7	38.3	39.9	56.5	36.4	38.3	41.7
Flat glass (float glass)	23.7*	32.9*	31.9*	35.2*	34.7*	35.1*	33.1*	33.2*	34.2*	36.6*

*Note: *Missing data for two plants over the entire period and for a third plant over the period 2006-11.*
***Missing data for one plant over the period 2006-11 and for another plant over the period 2006-09.*
****Turnover based on a sample of 21 plants used to assess regulatory costs. ****For 2006, the high value*

is due to lack of data from PRODCOM for the product "Other drinking glasses" (23131290). Float glass includes the NACE Rev. 2 category 23.11.12. Hollow glass packaging includes the NACE Rev. 2 categories 23.13.11.10/20/30/40/50/60/80. Hollow glass tableware includes the NACE Rev. 2 categories 23.13.12.20/40/60 and 23.13.13.50/90.
Source: Authors' own elaboration on PRODCOM and plant-level data.

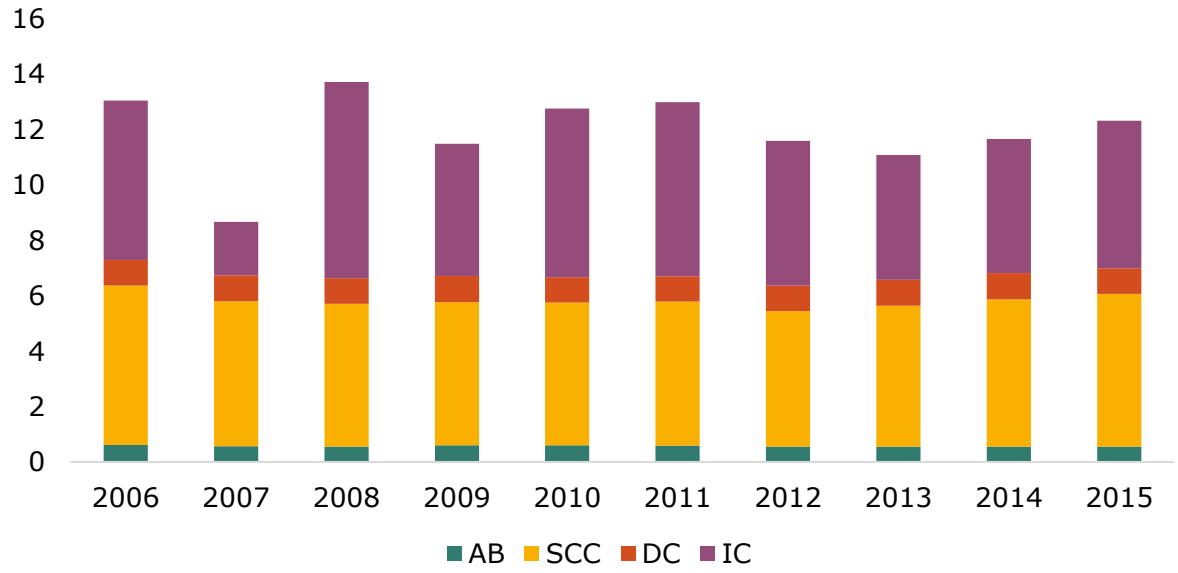
Results

Packaging glass

The EU rules in the scope of the CCA generated regulatory costs for the EU packaging glass subsector in the range of **€8.66 to €13.70 per tonne of output** (Figure 4). Substantive compliance costs and indirect costs represented the bulk of regulatory costs in all the years under observation, with the exception of 2007 when indirect costs triggered by climate legislation collapsed as a result of low prices for European Union Allowances (EUAs). Over the entire period, **climate legislation and legislation in the field of electricity were the most burdensome areas of legislation, each generating costs of €2.60/tonne**. Environmental legislation and waste legislation followed at an average of about €2.4/tonne each (Figure 5).

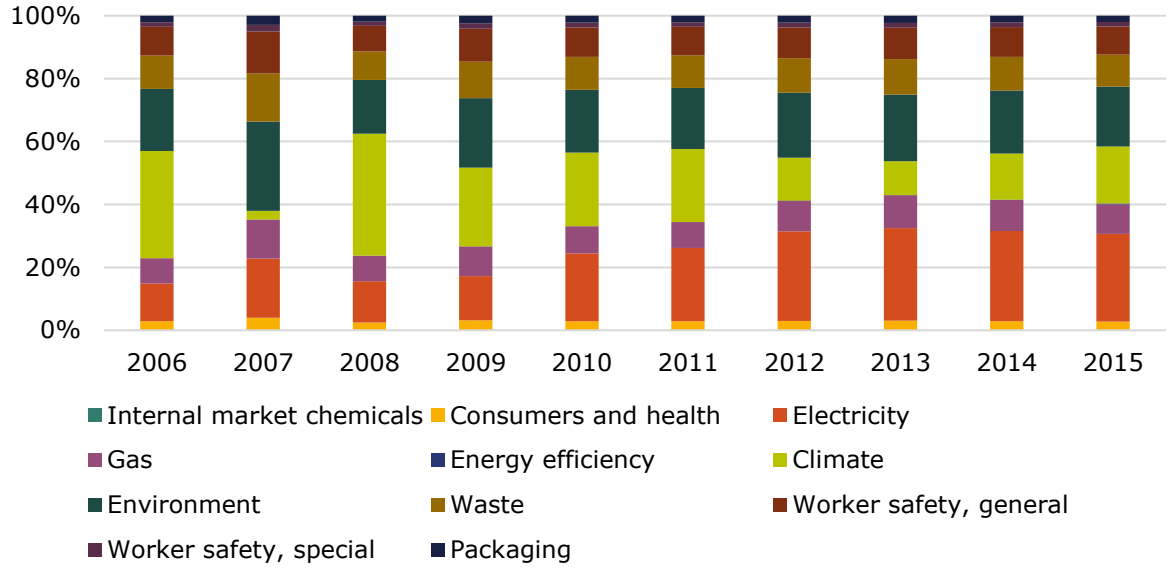
In 2015, the cumulative regulatory costs were equal to €12.31/tonne, including €0.55/tonne of administrative burdens, €5.51/tonne of substantive compliance costs, €0.92/tonne of direct charges and €5.33/tonne of indirect costs (mainly generated by energy and climate legislation). Rules affecting electricity price generated 28% of total regulatory costs followed by environmental legislation (19%) and climate legislation (18%).

Figure 4. Packaging glass - Cumulative cost by category of regulatory costs (€/tonne)



Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.
Source: Author's own elaboration.

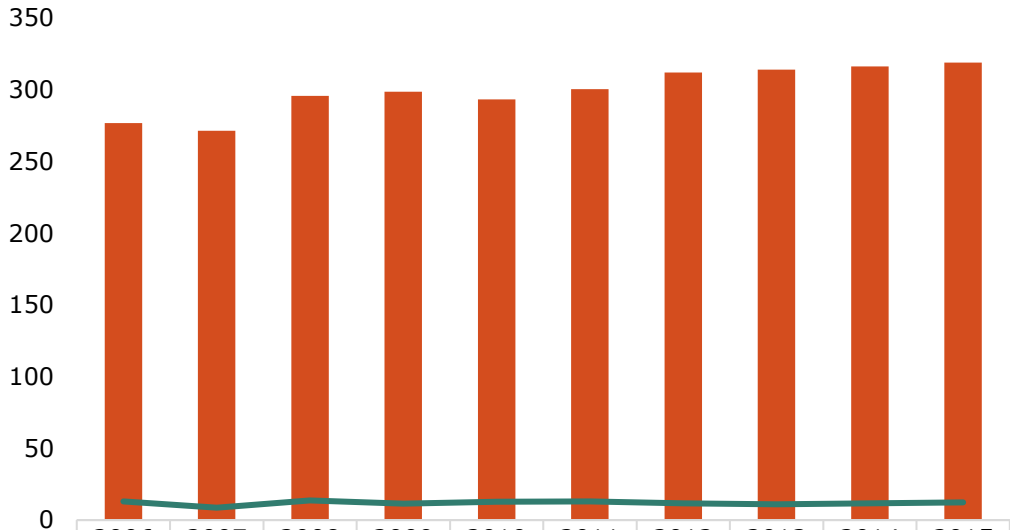
Figure 5. Packaging glass - Cumulative cost by area of legislation (%)



Source: Author's own elaboration.

Cumulative regulatory costs were in the area of **3.2% to 4.7% of production costs**[13] incurred by producers of packaging glass across the period under investigation (Figure 6 and Table 8). **EBITDA**[14] of the subsector were consistently above €70/tonne; hence, regulatory costs represented on average **15% of this key performance indicator** (Figure 7 and Table 9).

Figure 6. Packaging glass - Cumulative cost versus production costs (€/tonne)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Production costs	276.7	271.4	295.8	298.7	293.4	300.4	312.0	314.1	316.2	318.8
Regulatory costs	13.0	8.7	13.7	11.5	12.8	13.0	11.6	11.1	11.7	12.3

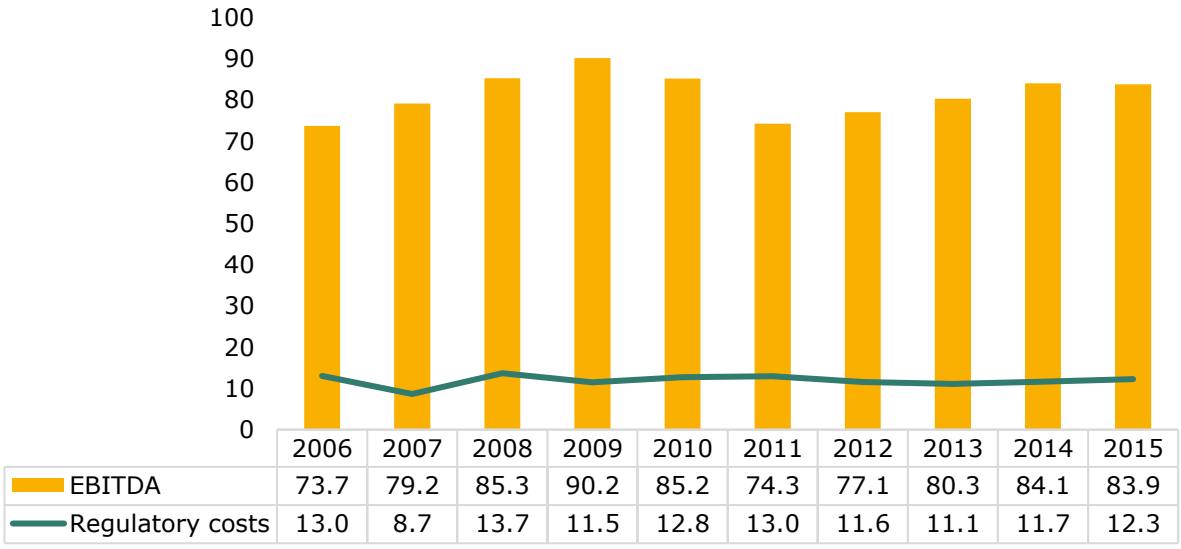
Note: Production costs are estimated on a sample of 19 plants in 2006, 20 between 2007 and 2010 and 21 plants between 2011 and 2015.
Source: Author's own elaboration.

Table 8. Packaging glass - Regulatory costs as a share of production costs

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	4.7%	3.2%	4.6%	3.8%	4.3%	4.3%	3.7%	3.5%	3.7%	3.9%
Administrative burdens	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Substantive compliance costs	2.1%	1.9%	1.7%	1.7%	1.8%	1.7%	1.6%	1.6%	1.7%	1.7%
Direct charges	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Indirect costs	2.1%	0.7%	2.4%	1.6%	2.1%	2.1%	1.7%	1.4%	1.5%	1.7%

Note: Production costs are estimated on a sample of 19 plants in 2006, 20 between 2007 and 2010 and 21 plants between 2011 and 2015.
Source: Author's own elaboration.

Figure 7. Packaging glass - Cumulative cost versus EBITDA (€/tonne)



Note: EBITDA are estimated on a sample of 19 plants in 2006, 20 between 2007 and 2010 and 21 plants between 2011 and 2015.
Source: Author's own elaboration.

Table 9. Packaging glass - Regulatory costs as a share of EBITDA

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	17.7 %	10.9 %	16.1 %	12.7 %	15.0 %	17.5 %	15.0 %	13.8 %	13.9 %	14.7 %
Administrative burdens	0.8%	0.7%	0.7%	0.7%	0.7%	0.8%	0.7%	0.7%	0.7%	0.7%
Substantive compliance costs	7.8%	6.6%	6.0%	5.7%	6.0%	7.0%	6.3%	6.3%	6.3%	6.6%
Direct charges	1.3%	1.2%	1.1%	1.1%	1.1%	1.2%	1.2%	1.2%	1.1%	1.1%
Indirect costs	7.8%	2.4%	8.3%	5.3%	7.1%	8.5%	6.8%	5.6%	5.8%	6.4%

Note: EBITDA are estimated on a sample of 19 plants in 2006, 20 between 2007 and 2010 and 21 plants between 2011 and 2015.
Source: Author's own elaboration.

Glass tableware

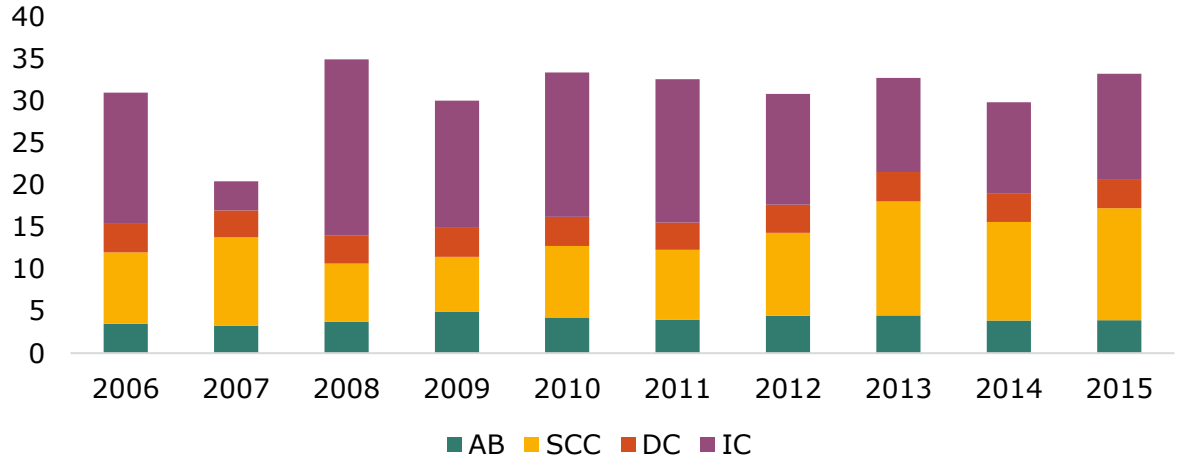
The EU rules in the scope of the CCA generated regulatory costs for the EU glass tableware subsector of between **€20.39 and €34.89 per tonne of output** (Figure 8). In the same way as for packaging glass, substantive compliance costs and indirect costs represented

the bulk of regulatory costs in all the years under observation, except for 2007 when indirect costs triggered by climate legislation collapsed as a result of low prices for EUAs.

Over the period under observation, environmental legislation represented the most burdensome area, with regulatory costs in the region of €6.88/tonne, followed by climate legislation (€5.54/tonne), legislation in field of electricity (€4.67/tonne) and general workers' health and safety and workplace safety (€4.09/tonne; Figure 9). Interestingly, climate legislation became the most burdensome area in 2015, accounting for 22% of regulatory costs.

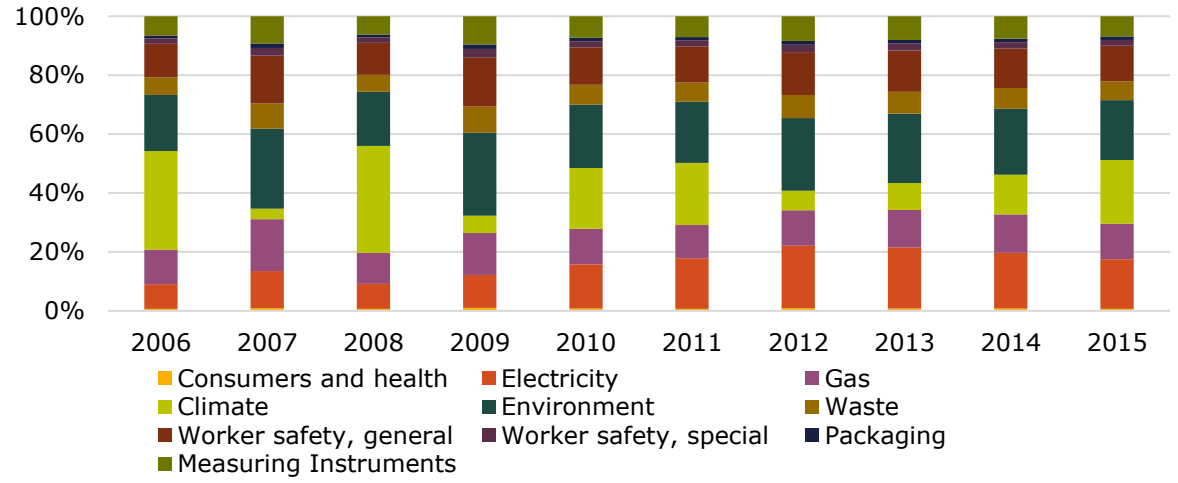
In 2015, the cumulative regulatory costs were equal to €33.19/tonne, including €3.92/tonne of administrative burdens, €13.30/tonne of substantive compliance costs, €3.46/tonne of direct charges and €12.51/tonne of indirect costs (mainly generated by energy and climate legislation).

Figure 8. Glass tableware - Cumulative cost by category of regulatory costs (€/tonne)



Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.
Source: Author's own elaboration.

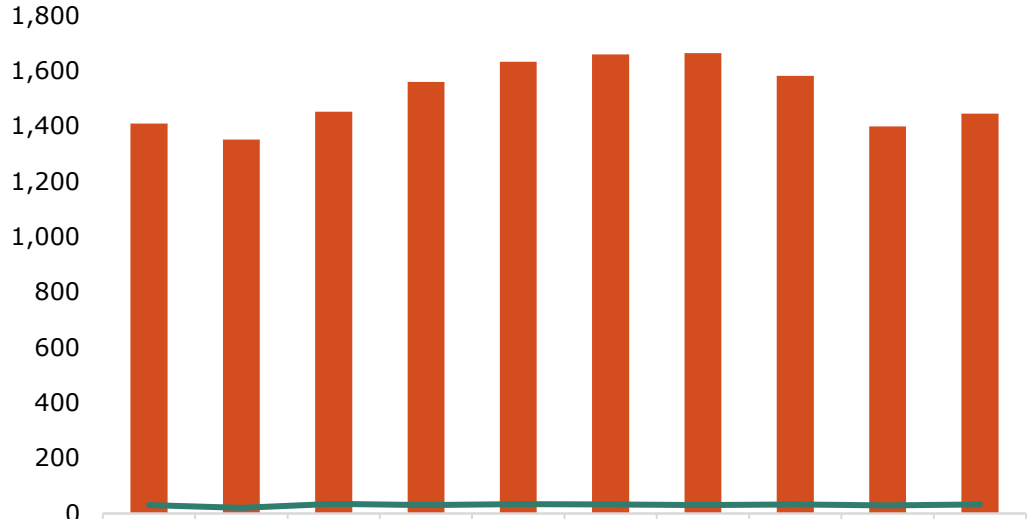
Figure 9. Glass tableware - Cumulative cost by area of legislation (%)



Note: Costs for "Internal market for chemicals" and "energy efficiency" cannot be shown due to confidentiality reasons.
Source: Author's own elaboration.

Cumulative regulatory costs were in the area of **1.5% to 2.4% of production costs** incurred by producers of glass tableware across the period under investigation (Figure 10 and Table 10); production costs per tonne were substantially higher than those borne by packaging glass manufacturers. EBITDA in the tableware subsector recorded a volatile trend (Figure 11). Therefore, while in the majority of the years covered by this study regulatory costs were in the region of **15% to 25% of this key performance indicator**, in 2009 and 2013 they represented more than 50% of the EBITDA (Table 11). Interestingly, **in 2015 regulatory costs were even higher than EBITDA**, which registered a negative value. Apparently, this negative value was due to the overall slowdown of EU demand for glass tableware coupled with some plant-level problems, e.g. interruption the production to rebuild a furnace, shortage in inventories detected by the introduction of new stock-taking technologies, etc.

Figure 10. Glass tableware - Cumulative cost versus production costs (€/tonne)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Production costs	1,408.8	1,351.1	1,451.4	1,559.7	1,632.4	1,659.2	1,663.9	1,581.4	1,398.2	1,445.1
Regulatory costs	30.9	20.4	34.9	30.0	33.3	32.5	30.8	32.7	29.8	33.2

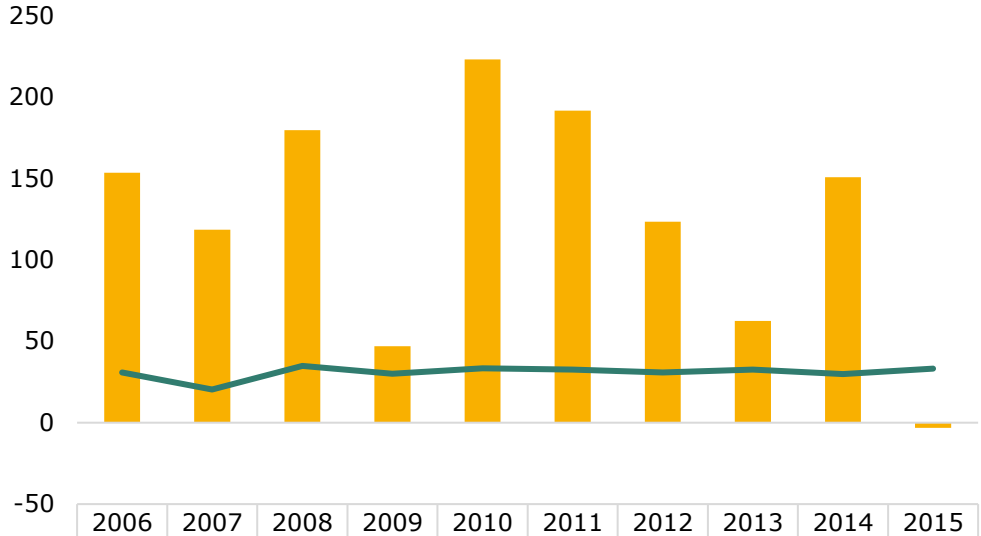
Note: Production costs are estimated on a sample of five plants.
Source: Author's own elaboration.

Table 10. Glass tableware - Regulatory costs as a share of production costs

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	2.2%	1.5%	2.4%	1.9%	2.0%	2.0%	1.8%	2.1%	2.1%	2.3%
Administrative burdens	0.2%	0.2%	0.3%	0.3%	0.3%	0.2%	0.3%	0.3%	0.3%	0.3%
Substantive compliance costs	0.6%	0.8%	0.5%	0.4%	0.5%	0.5%	0.6%	0.9%	0.8%	0.9%
Direct charges	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Indirect costs	1.1%	0.3%	1.4%	1.0%	1.1%	1.0%	0.8%	0.7%	0.8%	0.9%

Note: Production costs are estimated on a sample of five plants.
Source: Author's own elaboration.

Figure 11. Glass tableware - Cumulative cost versus EBITDA (€/tonne)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EBITDA	153.5	118.6	179.7	47.0	223.1	191.6	123.5	62.5	150.8	-3.1
Regulatory costs	30.9	20.4	34.9	30.0	33.3	32.5	30.8	32.7	29.8	33.2

Note: EBITDA are estimated on a sample of five plants.
Source: Author's own elaboration.

Table 11. Glass tableware - Regulatory costs as a share of EBITDA

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	20.2 %	17.2 %	19.4 %	63.8 %	14.9 %	17.0 %	24.9 %	52.3 %	19.7 %	n.a.*
Administrative burdens	2.3%	2.8%	2.1%	10.5 %	1.9%	2.1%	3.6%	7.2%	2.6%	n.a.*
Substantive compliance costs	5.5%	8.8%	3.8%	13.9 %	3.8%	4.3%	8.0%	21.6 %	7.8%	n.a.*
Direct charges	2.2%	2.7%	1.8%	7.5%	1.6%	1.7%	2.7%	5.6%	2.3%	n.a.*
Indirect costs	10.2%	2.9%	11.7%	31.9%	7.7%	8.9%	10.6%	17.9%	7.2%	n.a.*

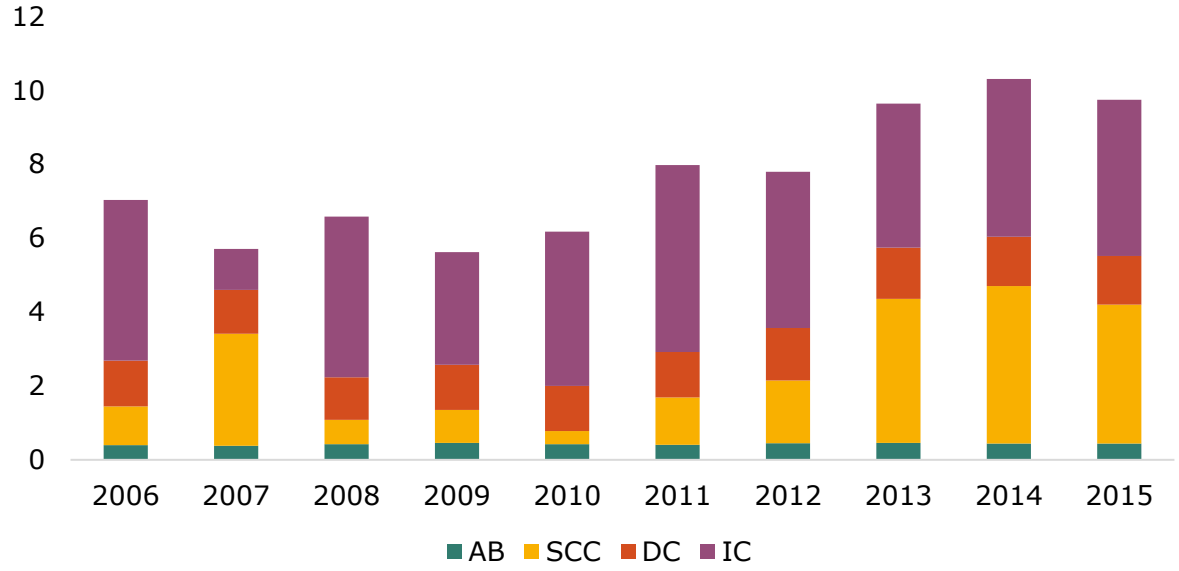
Note: EBITDA are estimated on a sample of five plants; shares for 2015 are not meaningful due to negative EBITDA.
Source: Author's own elaboration.

Flat glass

The EU rules covered by this Study have generated regulatory costs on EU flat glass manufacturers of between **€5.60 and €10.30 per tonne of output** (Figure 12). While in the later years under study substantive compliance costs and indirect costs represented the bulk of regulatory costs, between 2006 and 2012 sampled producers had the opportunity to generate potential revenues by selling EUAs on the carbon market, with the sole exception of 2007 when low prices for EUAs influenced both substantive compliance costs and indirect costs linked to climate legislation.[15] On average, **legislation affecting the price of electricity generated the highest regulatory costs (€1.95/tonne),** followed by environmental legislation (€1.90/tonne) and legislation in the field of gas (€1.53/tonne; Figure 13).

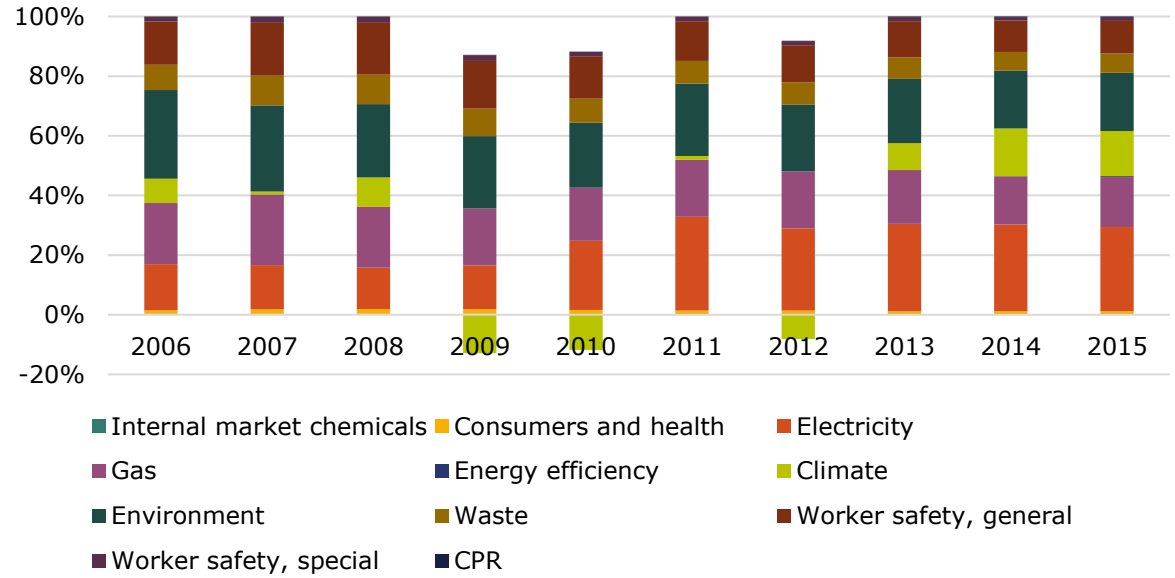
In 2015, the cumulative regulatory costs were equal to €9.74/tonne, comprising €0.44/tonne of administrative burdens, €3.75/tonne of substantive compliance costs, €1.32/tonne of direct charges and €4.22/tonne of indirect costs (mainly generated by energy and climate legislation). Rules affecting the electricity prices generated 28% of total regulatory costs, followed by environmental legislation (20%), rules affecting the gas price (17%) and climate legislation (15%).

Figure 12. Flat glass - Cumulative cost by category of regulatory costs (€/tonne)



Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.
Source: Author's own elaboration.

Figure 13. Flat glass - Cumulative cost by area of legislation (%)

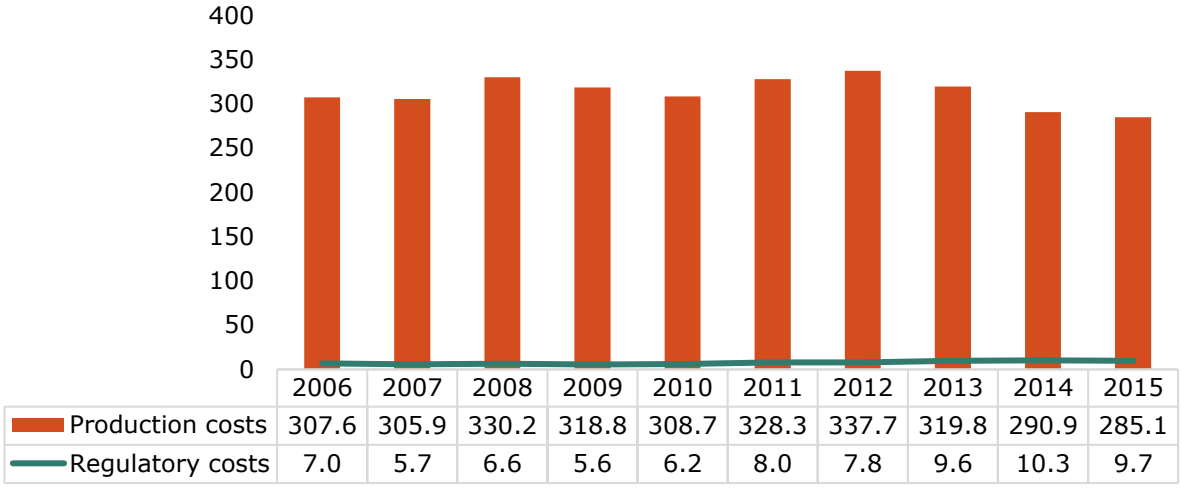


Note: In 2009, 2010 and 2012 climate legislation might have led to potential net revenues generated by the opportunity to sell EUAs on the carbon market.
Source: Author's own elaboration.

Cumulative regulatory costs represented between **1.9% and 3.5% of production costs** incurred by producers of flat glass in the time span covered by this CCA (Figure 14 and Table 12). Interestingly, the share of regulatory costs over production was higher in the later years under study (3% in 2013, 3.5% in 2014 and 3.4% in 2015), for two main reasons: i) production costs per tonne of output decreased; ii) regulatory costs generated by the EU Emission Trading System increased. EBITDA in the flat glass sector were rather volatile over the years (Figure 15 and Table 13); accordingly, whereas regulatory costs represented only **4.9% of this key performance indicator in 2007**, they were **above**

50% of EBITDA in 2014 and higher than EBITDA in 2013, when the indicator was negative. In 2015, regulatory costs represented 31.3% of EBITDA, due to the indicator's growing trend in the later years under study.

Figure 14. Flat glass - Cumulative cost versus production costs (€/tonne)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Production costs	307.6	305.9	330.2	318.8	308.7	328.3	337.7	319.8	290.9	285.1
Regulatory costs	7.0	5.7	6.6	5.6	6.2	8.0	7.8	9.6	10.3	9.7

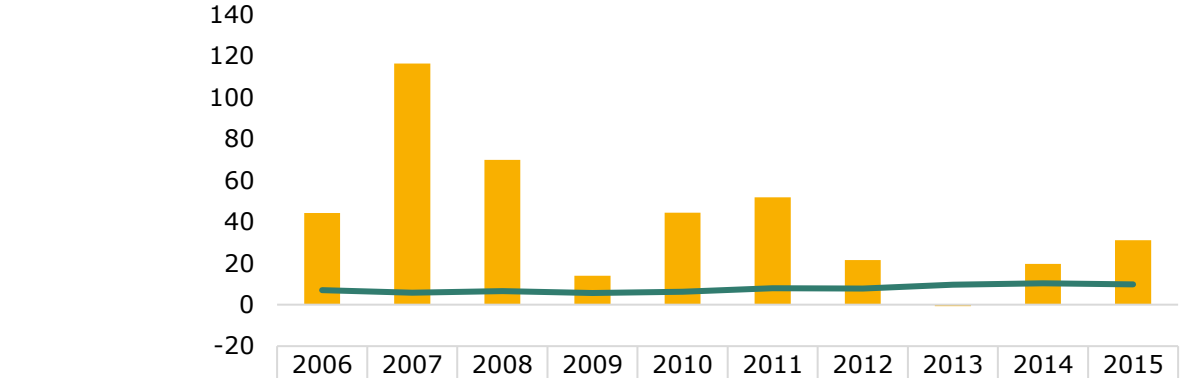
Note: Production costs are estimated on a sample of nine plants in 2006, 12 plants between 2007 and 2008, and 13 plants between 2009 and 2015.
Source: Author's own elaboration.

Table 12. Flat glass - Regulatory costs as a share of production costs

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	2.3%	1.9%	2.0%	1.8%	2.0%	2.4%	2.3%	3.0%	3.5%	3.4%
Administrative burdens	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%
Substantive compliance costs	0.3%	1.0%	0.2%	0.3%	0.1%	0.4%	0.5%	1.2%	1.5%	1.3%
Direct charges	0.4%	0.4%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%
Indirect costs	1.4%	0.4%	1.3%	1.0%	1.4%	1.5%	1.3%	1.2%	1.5%	1.5%

Note: Production costs are estimated on a sample of nine plants in 2006, 12 plants between 2007 and 2008, and 13 plants between 2009 and 2015.
Source: Author's own elaboration.

Figure 15. Flat glass - Cumulative cost versus EBITDA (€/tonne)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EBITDA	44.2	116.3	69.7	13.9	44.3	51.8	21.5	-0.8	19.7	31.1
Regulatory costs	7.0	5.7	6.6	5.6	6.2	8.0	7.8	9.6	10.3	9.7

Note: EBITDA are estimated on a sample of nine plants in 2006, 12 plants between 2007 and 2008, and 13 plants between 2009 and 2015.
Source: Author's own elaboration.

Table 13. Flat glass - Regulatory costs as a share of EBITDA

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	15.9 %	4.9%	9.4%	40.3 %	13.9 %	15.4 %	36.2 %	n.a.*	52.4 %	31.3 %
Administrative burdens	0.9%	0.3%	0.6%	3.3%	1.0%	0.8%	2.1%	n.a.*	2.2%	1.4%
Substantive compliance costs	2.4%	2.6%	0.9%	6.4%	0.8%	2.5%	7.9%	n.a.*	21.7 %	12.1 %
Direct charges	2.8%	1.0%	1.6%	8.8%	2.8%	2.4%	6.6%	n.a.*	6.8%	4.3%
Indirect costs	9.8%	1.0%	6.2%	21.9 %	9.4%	9.8%	19.6 %	n.a.*	21.7 %	13.6 %

*Note: EBITDA are estimated on a sample of nine plants in 2006, 12 plants between 2007 and 2008, and 13 plants between 2009 and 2015. *Shares for 2013 are not meaningful due to negative EBITDA.*
Source: Author's own elaboration.

[1] Production costs include all costs, both OPEX, CAPEX and other expenses, borne by the plant and directly relating to the manufacturing process.
[2] EBITDA, i.e. earnings before interest, taxes, depreciation and amortisation are a proxy of the plant's current operating profitability. Positive EBITDA indicate that operating revenues are higher than variable costs, i.e. labour costs, energy costs, raw material costs, etc. By contrast, negative EBITDA show that the plant is not able to fully cover such variable costs nor to cover yearly depreciation and amortisation of CAPEX as well as financial interest and income tax expenses.
[3] EBIT, i.e. earnings before interest and taxes, are a proxy of the plant's operating income. Positive EBIT indicate that operating revenues are high enough to cover all variable costs (including yearly depreciation and amortisation of CAPEX). By contrast, negative EBIT show that the plant is not able to cover such costs nor to cover financial interests and income tax expenses.
[4] As opposed to an impact assessment, the CCA does not compare different policy options or costs generated by EU rules with costs hypothetically generated by national rules which would develop in the absence of harmonising EU rules (the so-called 'baseline scenario'). This type of analysis would require devising complex 'counterfactual scenarios' that may undermine the essence of the CCA, which is based on hard-data collected from plants based in the EU. Comparing regulatory costs against hypothetical counterfactual scenarios is out of the scope of the CCA.
[5] It is worth remarking that the Better Regulation Toolbox includes 'cost savings' generated by EU rules within the scope of direct regulatory benefits. In fact, the main benefit of Internal Market harmonisation lies in cost savings following the replacement of 28 different national rules with one harmonised EU regime. Therefore, cost savings are out of the scope of the CCA.
[6] In the context of this Study, in line with the Better Regulation "Toolbox", four categories of regulatory costs have been quantified: i) administrative burdens, i.e. compliance costs incurred by companies to provide information to public authorities and/or third parties; ii) substantive compliance costs, i.e. expenditures faced by businesses to comply with requirements imposed by legal rules; iii) direct charges, i.e. costs generated by provisions requiring businesses to bear monetary costs such as costs of fees, taxes and levies; and iv) indirect compliance costs, i.e. compliance costs experienced by entities operating in sectors and markets other than those under evaluation and transmitted to the sectors under evaluation through regulation-induced price rises and/or the change in quality or availability of inputs, e.g. goods and services.
[7] The Technical Specifications for the present Study listed three glass sectors. The Research Team, in agreement with the Commission and the relevant EU sectoral associations decided to focus the CCA only on two sectors: hollow glass and flat glass. In 2015, these sectors were responsible for some 79% of the overall turnover of the EU glass sectors listed in the Technical Specifications. In this respect, it is worth remarking that the EU association representing the remaining glass sector was contacted during the Inception Phase of this Study to enquire about the willingness of its members to provide cost data for the CCA. In this respect, the association explained that any attempt to collect primary data at plant level from its members would have faced major obstacles, mainly due to the highly fragmented structure of the sector. Hence, any cost assessment for this glass sector would have relied almost exclusively on secondary sources and theoretical cost modelling, which would compromise the ultimate accuracy of the results. Furthermore, an additional methodological obstacle existed: the high level of heterogeneity in terms of products, production processes and technologies as well as value chains featuring this sector would make it quite difficult to identify 'typical' plants and thus to aggregate data.
[8] Regulatory costs generated by electricity, gas, energy efficiency and climate legislation as well as key performance indicators, production costs and quantities of output were collected for each year of the time span covered by the CCA. Regulatory costs generated by legislation in the field of Internal Market for chemicals, Internal Market for construction products, the Measuring Instruments Directive, waste (including packaging waste), general workers' health and safety and workplace safety, special worker's health and safety and consumers and health were quantified for a 'typical year'. With regard to regulatory costs generated by environmental legislation, a cumulated approach was adopted as, in any given year, each plant incurs costs related to investments made in the same year as well as costs linked to investments made in previous years.
[9] With respect to BAU, three cases may occur. First, certain obligations have by their very nature a BAU factor of 0%. This is the case with respect to certain activities, e.g. the surrender of European Union Allowances to cover greenhouse gas emissions, which companies carry out only because it is mandated by the legislation. Secondly, certain obligations are assigned a BAU factor of 100%, because they are part and parcel of good business practices and are usually requested by customers. This is the case with respect to certain quality control activities codified under the CPR. A third case concerns obligations whose activities are only partly done because of normal business practices and partly because of legislative requirements. For instance, investments made to comply with applicable environmental standards are only partially motivated by environmental legislation; in fact, other company motivations may apply, such as the achievement of energy savings or other types of cost savings. In the latter case, companies participating in the CCA were requested to estimate the extent to which 'activities' (and costs) related to EU rules would occur even in the absence of any specific legal obligation.
[10] This approach is compliant with the "principle of a proportionate analysis" and the International Standard Cost Model (also quoted in the Better Regulation "Toolbox") and international best practices, e.g. the OECD Regulatory Compliance Cost Assessment Guidance.
[11] Whereas the flat glass sector is rather homogeneous in terms of product range, it includes two main production technologies, namely float glass and rolled and patterned glass. Nonetheless, according to Eurostat PRODCOM data, in 2015 some 87% in value of production sold by EU plants was based on the float process. Hence, the proposed sample comprises only plants manufacturing float glass.
[12] As not all pieces/areas of legislation are relevant to all plants, the assessment of regulatory costs generated by specific pieces/areas of legislation may be based on a number of observations lower than the total number of plants included in the sample.

[13] Production costs include all costs, both OPEX, CAPEX and other expenses, borne by the plant and directly relating to the manufacturing process.
[14] EBITDA, i.e. earnings before interest, taxes, depreciation and amortisation are a proxy of the plant's current operating profitability. Positive EBITDA indicate that operating revenues are higher than variable costs, i.e. labour costs, energy costs, raw material costs, etc. By contrast, negative EBITDA show that the plant is not able to fully cover such variable costs nor to cover yearly depreciation and amortisation of CAPEX as well as financial interest and income tax expenses.
[15] Note that both revenues and costs generated by either selling or purchasing EUAs are based on a model presented in the chapter of the Study detailing costs generated by climate legislation.

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