



# Cumulative Cost Assessment (CCA) of the EU Ceramics 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 ceramics industry has measured regulatory costs incurred by **EU manufacturers of bricks and tiles, ceramic tiles, fired refractories and unfired shaped refractories** 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 ceramics industry (Table 1 and Table 2).

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

		Unit	Bricks and tiles	Ceramic tiles	Fired refractories	Unfired shaped refractories
Regulatory costs	Total	€/tonne	5.00	12.41	28.52	14.77
	<i>Administrative burdens</i>	€/tonne	0.36	0.61	3.56	2.96
	<i>Substantive compliance costs</i>	€/tonne	1.46	4.18	15.14	4.06
	<i>Direct charges</i>	€/tonne	0.40	0.85	1.02	0.51
	<i>Indirect costs</i>	€/tonne	2.78	6.77	8.81	7.24

Source: Author's own elaboration.

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

		Unit	Bricks and tiles	Ceramic tiles	Fired refractories	Unfired shaped refractories
Regulatory costs/ Production costs	Production costs	€/tonne	92.74	458.95	1,164.50	670.12
	Total	%	5.4%	2.7%	2.4%	2.2%
	<i>Administrative burdens</i>	%	0.4%	0.1%	0.3%	0.4%
	<i>Substantive compliance costs</i>	%	1.6%	0.9%	1.3%	0.6%
	<i>Direct charges</i>	%	0.4%	0.2%	0.1%	0.1%
	<i>Indirect costs</i>	%	3.0%	1.5%	0.8%	1.1%
Regulatory costs/ EBITDA	EBITDA	€/tonne	22.77	124.46	154.53	34.74
	Total	%	21.9%	10.0%	18.5%	42.5%
	<i>Administrative burdens</i>	%	1.6%	0.5%	2.3%	8.5%
	<i>Substantive compliance costs</i>	%	6.4%	3.4%	9.8%	11.7%
	<i>Direct charges</i>	%	1.8%	0.7%	0.7%	1.5%
	<i>Indirect costs</i>	%	12.2%	5.4%	5.7%	20.9%

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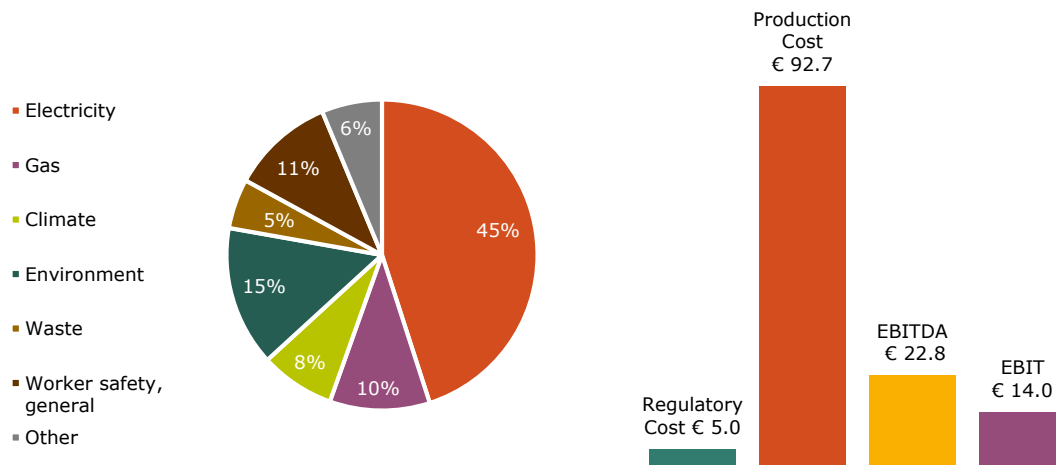
Regulatory costs/EBIT	EBIT	€/tonne	13.95	76.71	105.33	n.a.*
	Total	%	35.8%	16.2%	27.1%	n.a.*
	Administrative burdens	%	2.6%	0.8%	3.4%	n.a.*
	Substantive compliance costs	%	10.4%	5.4%	14.4%	n.a.*
	Direct charges	%	2.9%	1.1%	1.0%	n.a.*
	Indirect costs	%	20.0%	8.8%	8.4%	n.a.*

Note: \*Due to the limited number of sampled plants and volatile trends in the unfired shaped refractories subsector, data for EBIT cannot be presented, as no meaningful average can be computed.

Source: Author's own elaboration.

In 2015, EU producers of **bricks and tiles** incurred **cumulative regulatory costs equal to €5.00/tonne of output**. The largest share of regulatory costs was generated by rules affecting electricity price (€2.25/tonne), followed by environmental legislation regulating industrial emissions (€0.73/tonne) and general workers' and workplace safety legislation (€0.54/tonne). In the same year, **regulatory costs represented 5.4% of production costs**,<sup>1</sup> 21.9% of EBITDA<sup>2</sup> and 35.8% of EBIT<sup>3</sup> per tonne of output registered by the sector (Figure 1 and Table 3).

**Figure 1. Bricks and Tiles - 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. Bricks and Tiles - Regulatory costs as a share of key performance indicators by area of legislation, 2015**

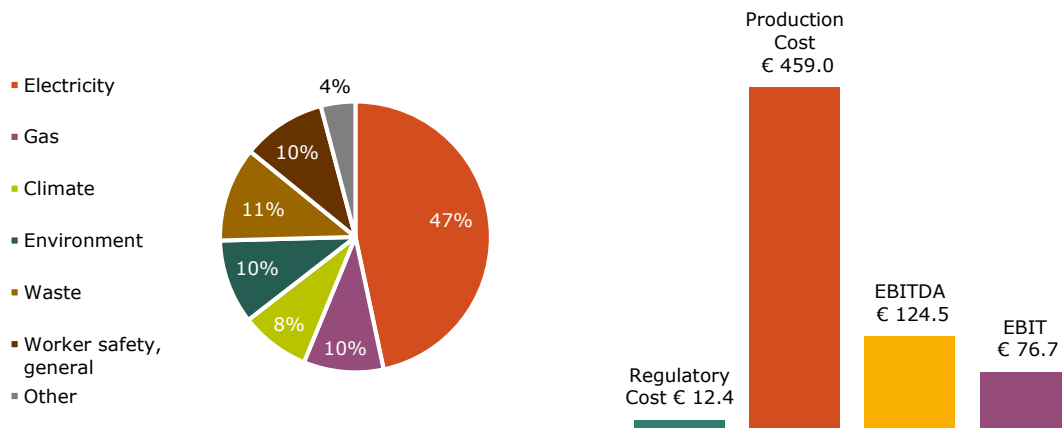
		€/tonne	% Production costs	% EBITDA	% EBIT
Regulatory costs	Total	5.00	5.4%	21.9%	35.8%
	Electricity	2.25	2.4%	9.9%	16.1%
	Environment	0.73	0.8%	3.2%	5.2%
	Worker safety, general	0.54	0.6%	2.4%	3.9%
	Gas	0.52	0.6%	2.3%	3.7%
	Climate	0.39	0.4%	1.7%	2.8%
	Other areas	0.31	0.3%	1.4%	2.3%
	Waste	0.26	0.3%	1.1%	1.9%

Source: Author's own elaboration.

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Cumulative regulatory costs borne by EU manufacturers of **ceramic tiles** were equal to **€12.41/tonne in 2015**. Rules affecting electricity price were responsible for the biggest chunk of such costs (€5.79/tonne), followed by waste legislation (€1.4/tonne) and rules on industrial emissions (€1.25/tonne). **The share of regulatory costs out of production costs incurred by ceramic tiles producers was equal to 2.7%**; regulatory costs were 10% of EBITDA and 16.2% of EBIT (Figure 2 and Table 4).

**Figure 2. Ceramic Tiles - 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 4. Ceramic Tiles - Regulatory costs as a share of key performance indicators by area of legislation, 2015**

		€/tonne	% Production costs	% EBITDA	% EBIT
Regulatory costs	Total	12.41	2.7%	10.0%	16.2%
	Electricity	5.79	1.3%	4.7%	7.5%
	Waste	1.40	0.3%	1.1%	1.8%
	Environment	1.25	0.3%	1.0%	1.6%
	Worker safety, general	1.24	0.3%	1.0%	1.6%
	Gas	1.18	0.3%	1.0%	1.5%
	Climate	1.03	0.2%	0.8%	1.3%
	Other areas	0.51	0.1%	0.4%	0.7%

Source: Author's own elaboration.

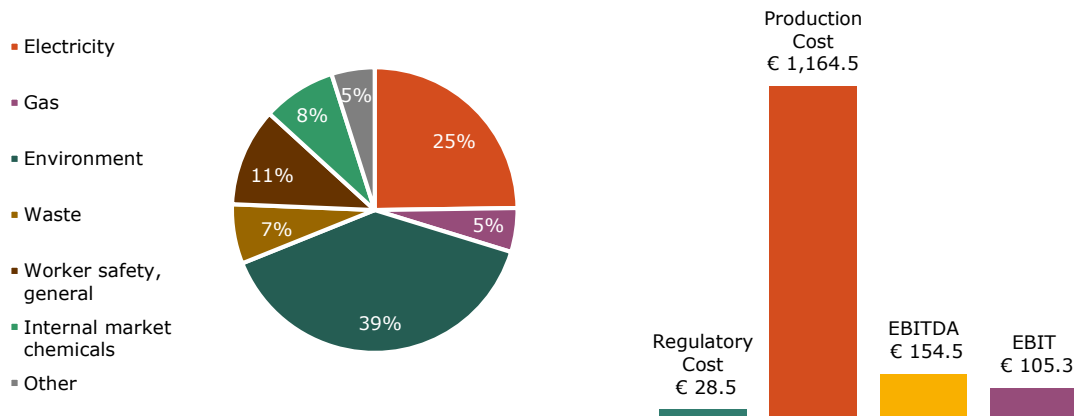
In the same year, cumulative regulatory costs incurred by EU producers of **fired refractories** amounted to **€28.52/tonne**, including €11.17/tonne generated by environmental legislation regulating industrial emissions, €7.07/tonne by energy legislation in the field of electricity and €3.18/tonne by general workers' and workplace safety legislation. In this sector **regulatory costs were 2.4% of production costs**, 18.5% of EBITDA and 27.1% of EBIT per tonne of output registered in 2015 (Figure 3 and Table 5).

Finally, producers of **unfired shaped refractories** experienced regulatory costs equal to **€14.77/tonne in 2015**. Rules affecting electricity price represented the largest share of

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regulatory costs (€6.50/tonne), followed by legislation in the field of chemicals (€2.42/tonne) and waste legislation (€2.26/tonne). Cumulative regulatory costs were equal to **2.2% of production costs** and 42.5% of EBITDA registered by EU manufacturers of unfired shaped refractories in the same year (Figure 4 and Table 6).

**Figure 3. Fired Refractories - 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. Fired Refractories - Regulatory costs as a share of key performance indicators by area of legislation, 2015**

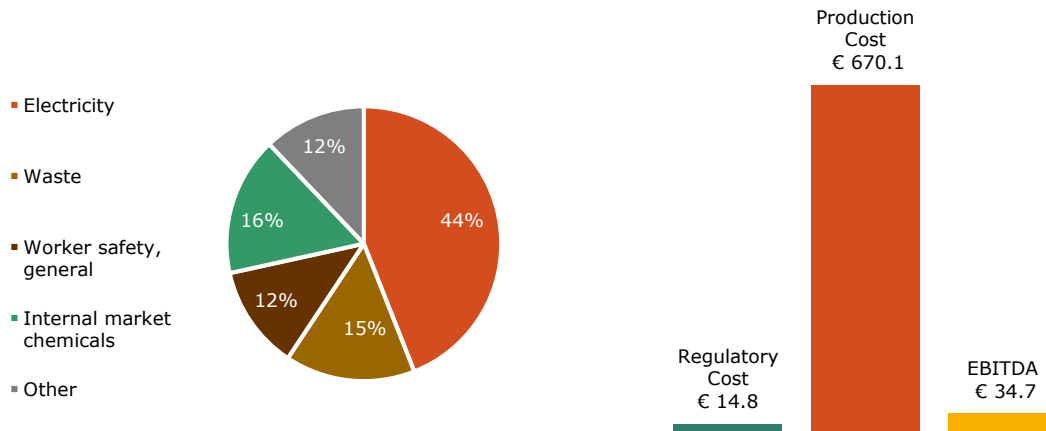
		€/tonne	% Production costs	% EBITDA	% EBIT
Regulatory costs	Total	28.52	2.4%	18.5%	27.1%
	Environment	11.17	1.0%	7.2%	10.6%
	Electricity	7.07	0.6%	4.6%	6.7%
	Worker safety, general	3.18	0.3%	2.1%	3.0%
	Internal market chemicals	2.37	0.2%	1.5%	2.3%
	Waste	1.92	0.2%	1.2%	1.8%
	Gas	1.42	0.1%	0.9%	1.3%
	Other	1.40	0.1%	0.9%	1.3%

Source: Author's own elaboration.



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**Figure 4. Unfired Shaped Refractories - 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 6. Unfired Shaped Refractories - Regulatory costs as a share of key performance indicators by area of legislation, 2015**

		€/tonne	% Production costs	% EBITDA
Regulatory costs	Total	14.77	2.2%	42.5%
	Electricity	6.50	1.0%	18.7%
	Internal market chemicals	2.42	0.4%	7.0%
	Waste	2.26	0.3%	6.5%
	Worker safety, general	1.81	0.3%	5.2%
	Other areas	1.79	0.3%	5.1%

*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.*

# 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**.<sup>4</sup> **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.<sup>5</sup>

Against this background, the CCA of the EU ceramics industry has measured regulatory costs (administrative burdens, substantive compliance costs, direct charges and indirect compliance costs)<sup>6</sup> incurred by **EU manufacturers of bricks and tiles, ceramic tiles, fired refractories and unfired shaped refractories**<sup>7</sup> and linked to the following areas of EU legislation over the period **2006-15**<sup>8</sup>:

- **Internal Market legislation**
  - Internal Market for chemicals (REACH and CLP)
  - Internal Market for construction products (CPD/CPR)
- **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)
- **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.<sup>9</sup>

## *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**

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collected from a small sample of 'typical' plants,<sup>10</sup> selected on the basis of the following sampling criteria:

- sectors (bricks and tiles, ceramic tiles, refractories);
- geographical distribution (Central-Eastern Europe, Northern-Western Europe, Southern Europe);
- company size/ownership (limited to the bricks and tiles and ceramic tiles sectors: large companies, SMEs);
- plant features (limited to the refractories sector: fired refractories, unfired shaped refractories).

Results presented below are based on plant-level data collected from a sample of EU ceramics producers that is composed as follows (Table 7):<sup>11</sup>

- **Bricks and tiles.** The sample comprises 23 plants representing more than 5% of the total value of production sold by EU producers of bricks and tiles (Table 8).<sup>12</sup>
- **Ceramic tiles.** The sample includes 16 plants covering more than 10% of the total value of production sold by EU producers of ceramic tiles (Table 8).<sup>13</sup>
- **Refractories.** The sample is composed of 11 plants producing **fired refractories** and four producing **unfired shaped refractories**. Sampled plants cover more than 25% of the total value of production sold by EU producers of fired refractories and more than 15% of the total value of production sold by EU manufacturers of unfired shaped refractories (Table 8).

**Table 7. Sample**

	Bricks and tiles	Ceramic tiles	Refractories
Southern Europe	6	7	6*
Central-Eastern Europe	5	5	2
Northern-Western Europe	12	4	7*
<b>Total</b>	<b>23</b>	<b>16</b>	<b>15**</b>

Note: \*This figure includes two producers of unfired shaped refractories; \*\*this figure includes four producers of unfired shaped refractories.

Source: Authors' own elaboration.

**Table 8. Turnover of sampled plants as a share of total value of production sold by the EU ceramics sectors under evaluation (%)**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bricks and tiles	2.8**	2.9**	4.0**	3.8**	4.5**	4.9**	4.8**	5.0**	5.0**	5.1**
Ceramic tiles	3.9*	4.0*	6.0*	6.9*	7.1*	10.1*	10.3*	10.2*	10.7*	11.2*
Fired refractories	21.8	21.4	23.9	27.7	25.5	25.5	26.2	27.2	27.9	25.7
Unfired shaped refractories	11.1	12.6	14.1	10.5	19.3	18.2	17.2	17.1	18.7	15.4

Note: \*Missing data for one plant over the period 2006-14; for a second plant over the period 2006-10; for a third plant over the period 2006-08; for a fourth plant over the period 2006-07. \*\*Missing data for three plants over the entire period, and for another two plants over the period 2006-07. Bricks and tiles include the NACE Rev.2 category 23.32. Ceramic tiles include the NACE Rev.2 category 23.31. Fired refractories include the NACE Rev. 2 categories 23.20.11 and 23.20.12. Unfired shaped refractories include the NACE Rev. 2 category 23.20.14.

Source: Authors' own elaboration on PRODCOM.

## Results

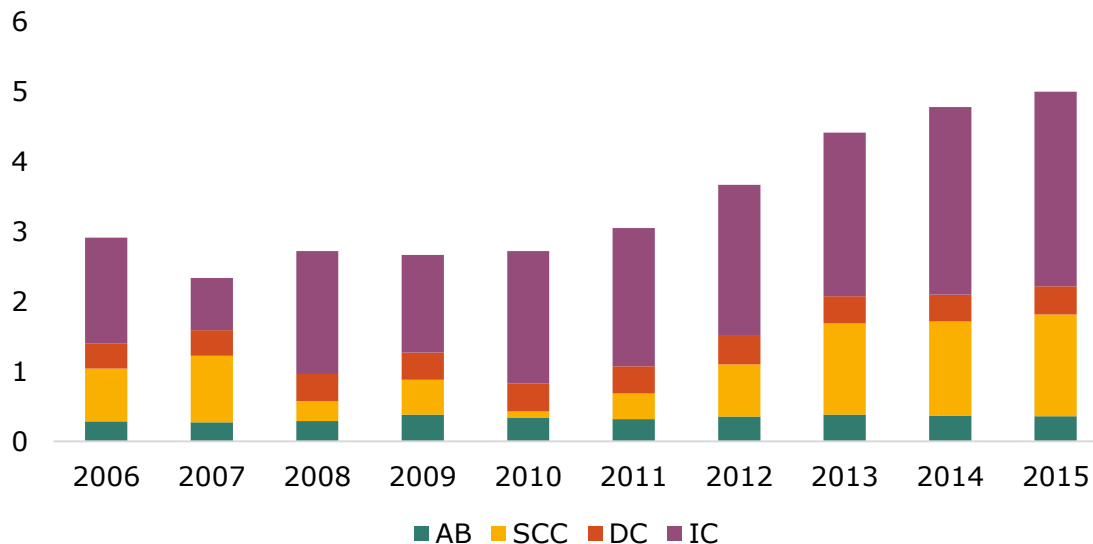
### Bricks and tiles

EU legislation covered by this Study generated regulatory costs for the EU bricks and tiles sector in the range of **€2.30 to €5 per tonne of output** (Figure 5). Substantive compliance costs and indirect costs were the largest portions of regulatory costs in the later years of the study period; interestingly, costs registered between 2006 and 2012 were affected by potential revenues stemming from the first two phases of the EU Emission Trading System.<sup>14</sup> Over the entire period, rules affecting electricity price proved to be the most burdensome (€1.24/tonne), followed by environmental legislation (€0.64/tonne; Figure 6).

**In 2015, cumulative regulatory costs were equal to €5/tonne**, including €0.36/tonne of administrative burdens, €1.46/tonne of substantive compliance costs, €0.40/tonne of direct charges and €2.78/tonne of indirect costs (generated by energy and climate legislation). **Energy legislation in the field of electricity** generated 45% of total regulatory costs, followed by **environmental legislation** (15%), **general workers' and workplace safety legislation** (11%) and rules affecting gas price (10%).

Cumulative regulatory costs were between **3.2% and 5.4% of production costs**<sup>15</sup> incurred by producers of bricks and tiles over the period 2006-15 (Figure 7 and Table 9). Importantly, in the later years under study, their share out of total production costs increased (4.9% in 2013, 5.3% in 2014 and 5.4% in 2015), mainly due to higher costs generated by the proper functioning of the EU Emission Trading System and growing regulatory costs paid in the electricity bill. As EBITDA<sup>16</sup> of the sector were above €15/tonne for the entire period, regulatory costs represented on average **18% of this key performance indicator** (Figure 8 and Table 10).

**Figure 5. Bricks and Tiles - Cumulative cost by category of regulatory costs (€/tonne)**

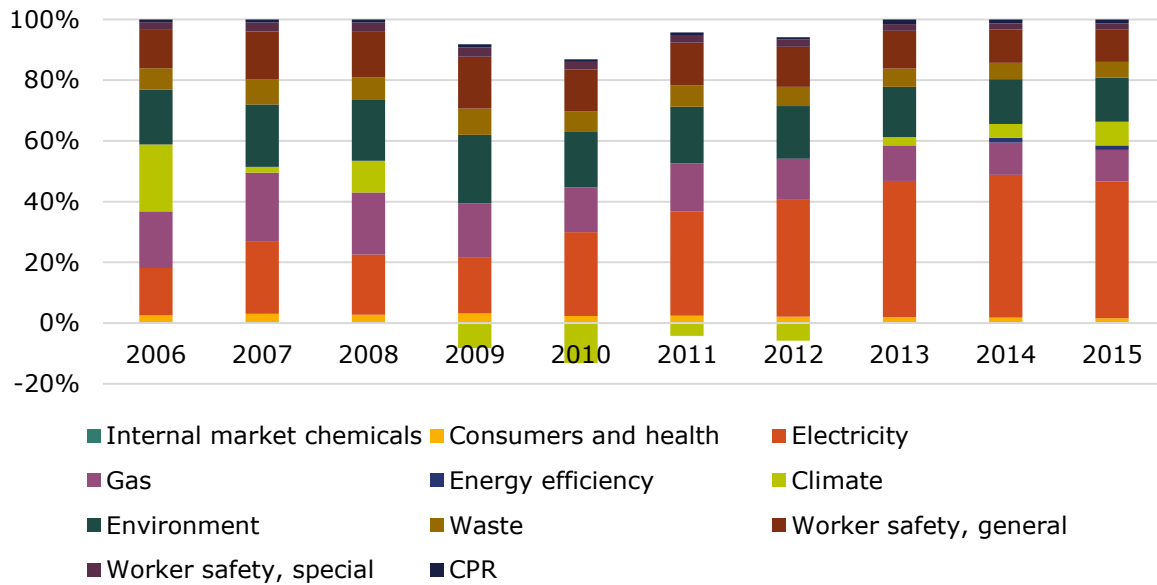


Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.

Source: Author's own elaboration.

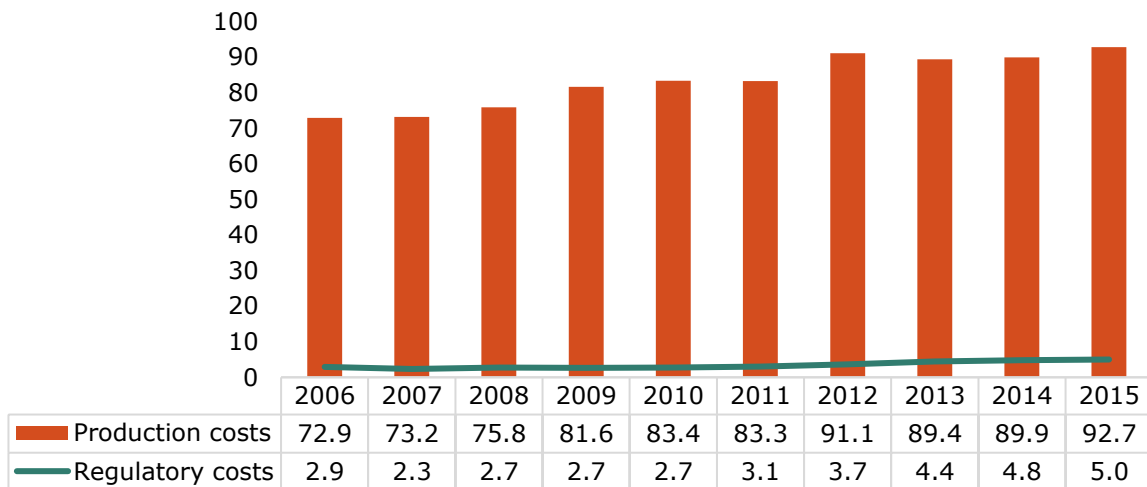
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**Figure 6. Bricks and Tiles - Cumulative cost by area of legislation (%)**



Note: Between 2009 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.

**Figure 7. Bricks and Tiles - Cumulative cost versus production costs (€/tonne)**



Note: Production costs are estimated on a sample of 15 plants in 2006 and 2007 and 17 plants in other years.  
Source: Author's own elaboration.

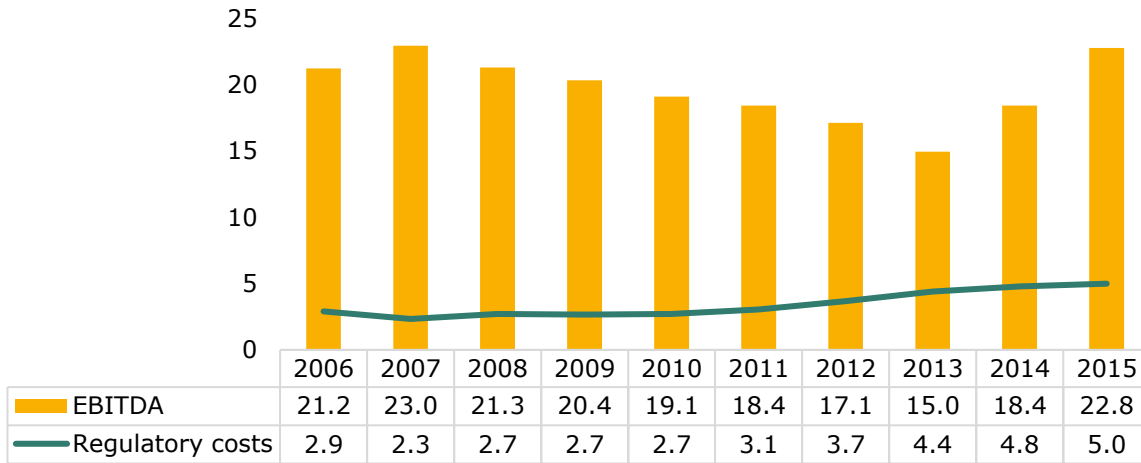
**Table 9. Bricks and Tiles - Regulatory costs as a share of production costs**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	4.0%	3.2%	3.6%	3.3%	3.3%	3.7%	4.0%	4.9%	5.3%	5.4%
Administrative burdens	0.4%	0.4%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Substantive compliance costs	1.0%	1.3%	0.4%	0.6%	0.1%	0.4%	0.8%	1.5%	1.5%	1.6%
Direct charges	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%
Indirect costs	2.1%	1.0%	2.3%	1.7%	2.3%	2.4%	2.4%	2.6%	3.0%	3.0%

Note: Production costs are estimated on a sample of 15 plants in 2006 and 2007 and 17 plants in other years.  
Source: Author's own elaboration.

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**Figure 8. Bricks and Tiles - Cumulative cost versus EBITDA (€/tonne)**



Note: EBITDA are estimated on a sample of 15 plants in 2006 and 2007 and 17 plants in other years.  
Source: Author's own elaboration.

**Table 10. Bricks and Tiles - Regulatory costs as a share of EBITDA**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	13.7%	10.2%	12.8%	13.1%	14.2%	16.5%	21.4%	29.5%	25.9%	21.9%
Administrative burdens	1.3%	1.2%	1.4%	1.9%	1.8%	1.7%	2.1%	2.6%	2.0%	1.6%
Substantive compliance costs	3.6%	4.1%	1.3%	2.4%	0.4%	2.0%	4.3%	8.7%	7.3%	6.4%
Direct charges	1.7%	1.6%	1.8%	1.9%	2.1%	2.1%	2.4%	2.6%	2.1%	1.8%
Indirect costs	7.1%	3.3%	8.2%	6.8%	9.9%	10.7%	12.6%	15.6%	14.5%	12.2%

Note: EBITDA are estimated on a sample of 15 plants in 2006 and 2007 and 17 plants in other years.  
Source: Author's own elaboration.

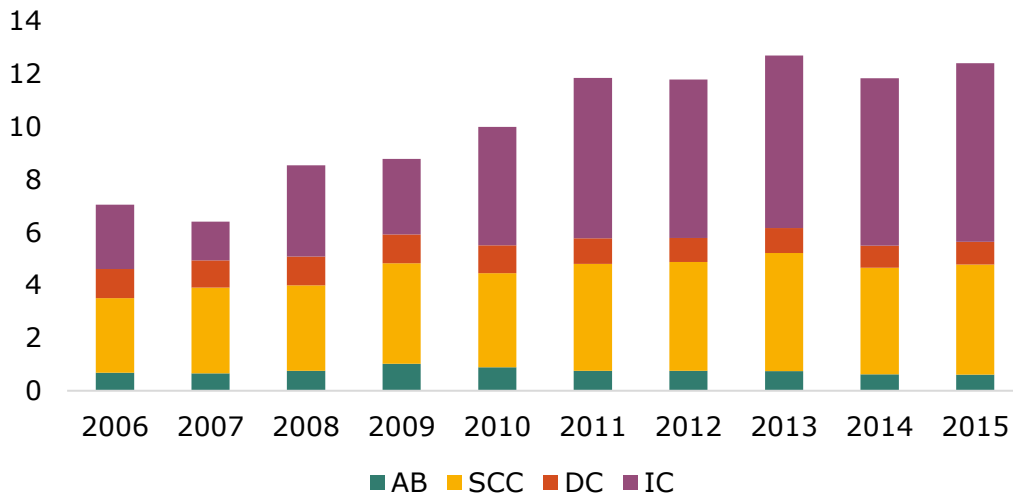
### Ceramic tiles

The EU rules under investigation were responsible for regulatory costs borne by EU ceramic tile producers of between **€6.40 and €12.40 per tonne of output** (Figure 9). Substantive compliance costs and indirect costs represented the bulk of regulatory costs, especially in the later years under study; interestingly, in 2007 indirect costs were very low as a result of low prices for European Union Allowances (EUAs; climate legislation). On average, over the entire period under observation **rules affecting electricity price were the most burdensome** (generating regulatory costs equal to €3.48/tonne), followed by **general workers' health and safety and workplace safety legislation** (€1.73/tonne) and **waste legislation** (€1.39/tonne; Figure 10).

**In 2015, cumulative regulatory costs were equal to €12.40/tonne**, including €0.61/tonne of administrative burdens, €4.18/tonne of substantive compliance costs, €0.85/tonne of direct charges and €6.77/tonne of indirect costs (mainly generated by energy and climate legislation). **Energy legislation in the field of electricity** generated 47% of total regulatory costs, followed by **waste legislation** (11%), environmental legislation and general workers' and workplace safety legislation (both at 10%).

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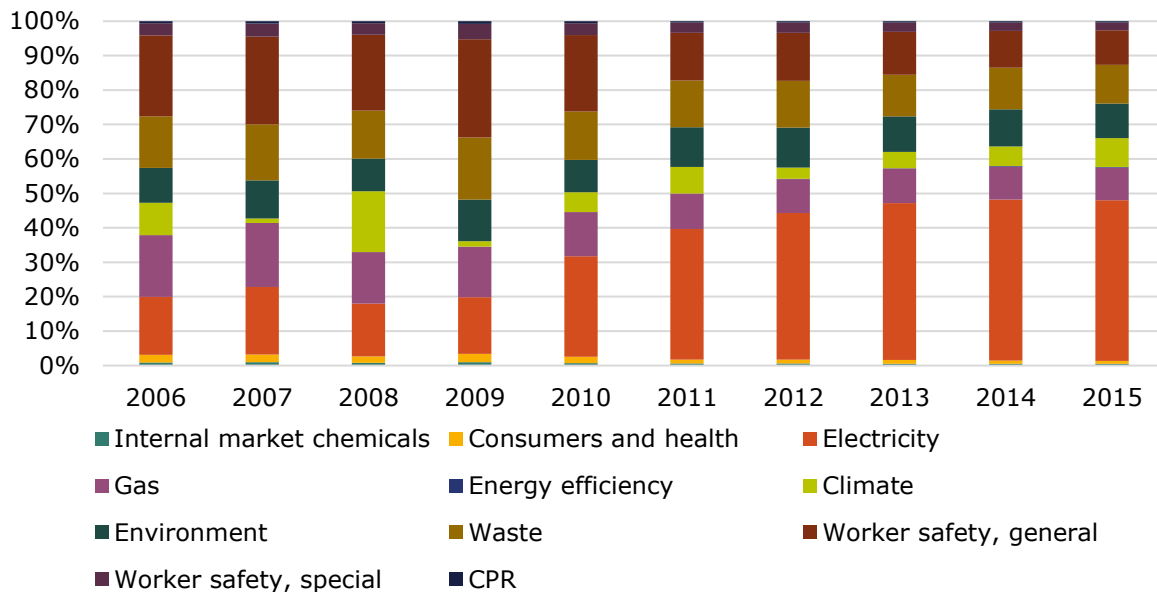
**Figure 9. Ceramic Tiles - Cumulative cost by category of regulatory costs (€/tonne)**



Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.

Source: Author's own elaboration.

**Figure 10. Ceramic Tiles - Cumulative cost by area of legislation (%)**

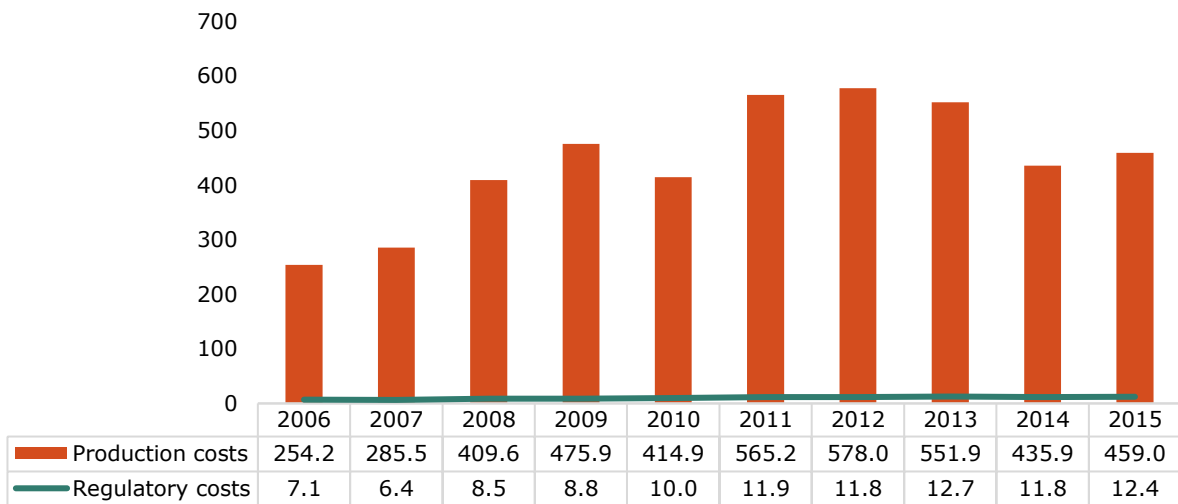


Source: Author's own elaboration.

Cumulative regulatory costs were between **1.8% and 2.8% of production costs** incurred by producers of ceramic tiles over the period 2006-15 (Figure 11 and Table 11). Interestingly, in the later years under study, the share of regulatory costs over production costs was close to 3% (2.7% in 2014 and 2015), as a result of lower production costs as well as higher regulatory costs generated by climate and energy legislation. EBITDA in the ceramic tiles sector was always positive and above €60/tonne (Figure 12 and Table 12); hence, on average, regulatory costs were in the region of **9% of this key performance indicator**.

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

**Figure 11. Ceramic Tiles - Cumulative cost versus production costs (€/tonne)**



Note: Production costs are estimated on a sample of 10 plants between 2006 and 2007, 12 plants in 2008, 13 plants between 2009 and 2013 and 15 in other years.

Source: Author's own elaboration.

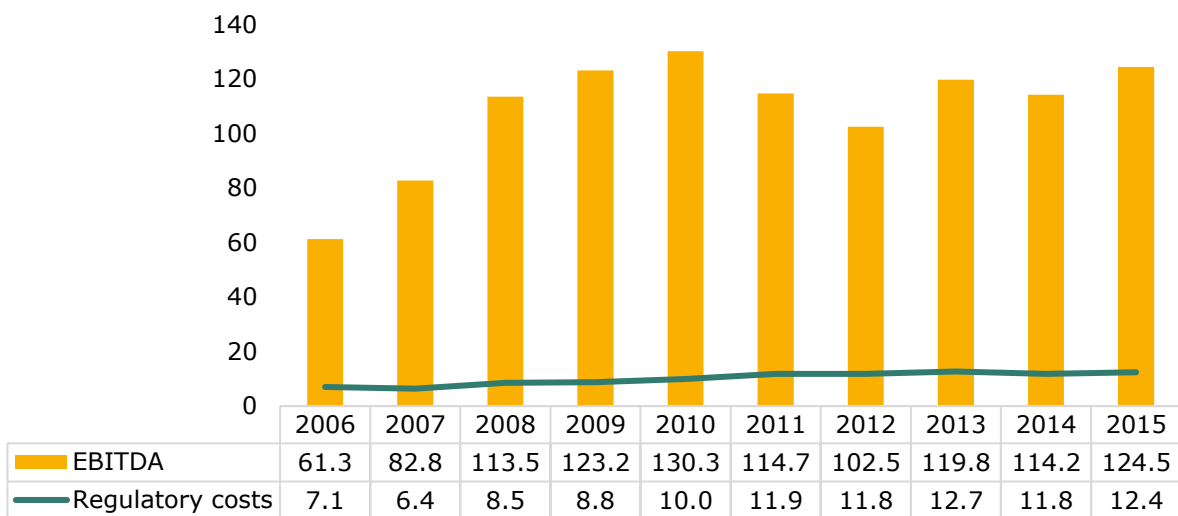
**Table 11. Ceramic Tiles - Regulatory costs as a share of production costs**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	2.8%	2.2%	2.1%	1.8%	2.4%	2.1%	2.0%	2.3%	2.7%	2.7%
Administrative burdens	0.3%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
Substantive compliance costs	1.1%	1.1%	0.8%	0.8%	0.9%	0.7%	0.7%	0.8%	0.9%	0.9%
Direct charges	0.4%	0.4%	0.3%	0.2%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%
Indirect costs	1.0%	0.5%	0.8%	0.6%	1.1%	1.1%	1.0%	1.2%	1.5%	1.5%

Note: Production costs are estimated on a sample of 10 plants between 2006 and 2007, 12 plants in 2008, 13 plants between 2009 and 2013 and 15 in other years.

Source: Author's own elaboration.

**Figure 12. Ceramic Tiles - Cumulative cost versus EBITDA (€/tonne)**



Note: EBITDA is estimated on a sample of 10 plants between 2006 and 2007, 12 plants in 2008, 13 plants between 2009 and 2013 and 15 in other years.

Source: Author's own elaboration.



## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

**Table 12. Ceramic Tiles - Regulatory costs as a share of EBITDA**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	11.5%	7.7%	7.5%	7.1%	7.7%	10.3%	11.5%	10.6%	10.4%	10.0%
Administrative burdens	1.1%	0.8%	0.7%	0.8%	0.7%	0.7%	0.7%	0.6%	0.5%	0.5%
Substantive compliance costs	4.6%	3.9%	2.9%	3.1%	2.7%	3.5%	4.0%	3.7%	3.5%	3.4%
Direct charges	1.8%	1.2%	1.0%	0.9%	0.8%	0.8%	0.9%	0.8%	0.7%	0.7%
Indirect costs	4.0%	1.8%	3.0%	2.3%	3.4%	5.3%	5.8%	5.5%	5.6%	5.4%

Note: EBITDA is estimated on a sample of 10 plants between 2006 and 2007, 12 plants in 2008, 13 plants between 2009 and 2013 and 15 in other years

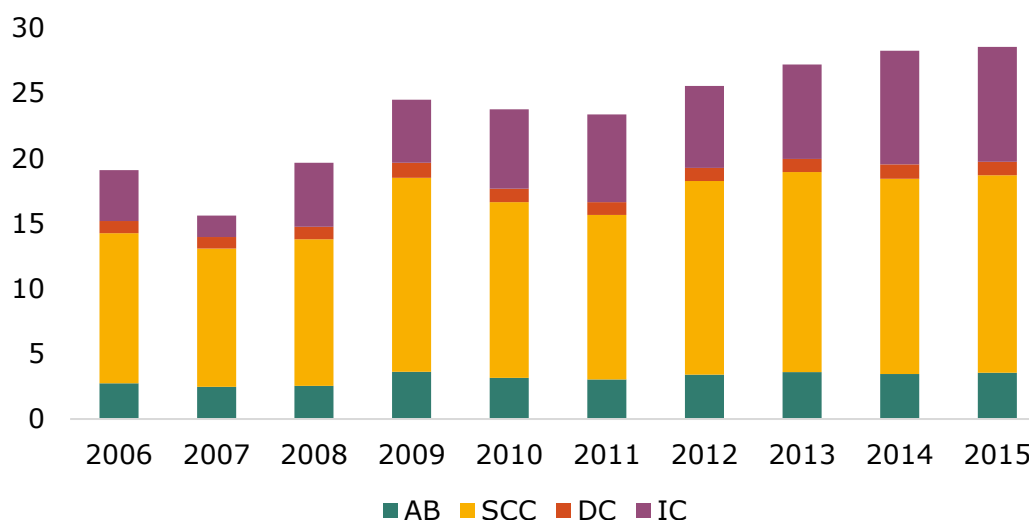
Source: Author's own elaboration.

### Fired refractories

The EU rules in the scope of this CCA generated regulatory costs for the EU fired refractories subsector of between **€15.60 and €28.50 per tonne of output** (Figure 13). Substantive compliance costs were the bulk of regulatory costs. This was mainly due to **environmental legislation**, which was on average the most burdensome area over the period under observation (**€9.84/tonne on average**), followed by **rules affecting the price of electricity** (€3.74/tonne) and **general workers' health and safety and general workplace safety** (€2.86/tonne) (Figure 14).

**In 2015, the cumulative regulatory costs were equal to €28.52/tonne**, comprising €3.56/tonne of administrative burdens, €15.14/tonne of substantive compliance costs, €1.02/tonne of direct charges and €8.81/tonne of indirect costs (mainly generated by energy and climate legislation). Environmental legislation generated 39% of total regulatory costs, i.e. €11.17/tonne, followed by rules affecting the electricity price (25%) and general workers' health and safety and workplace safety legislation (11%).

**Figure 13. Fired Refractories - Cumulative cost by category of regulatory costs (€/tonne)**

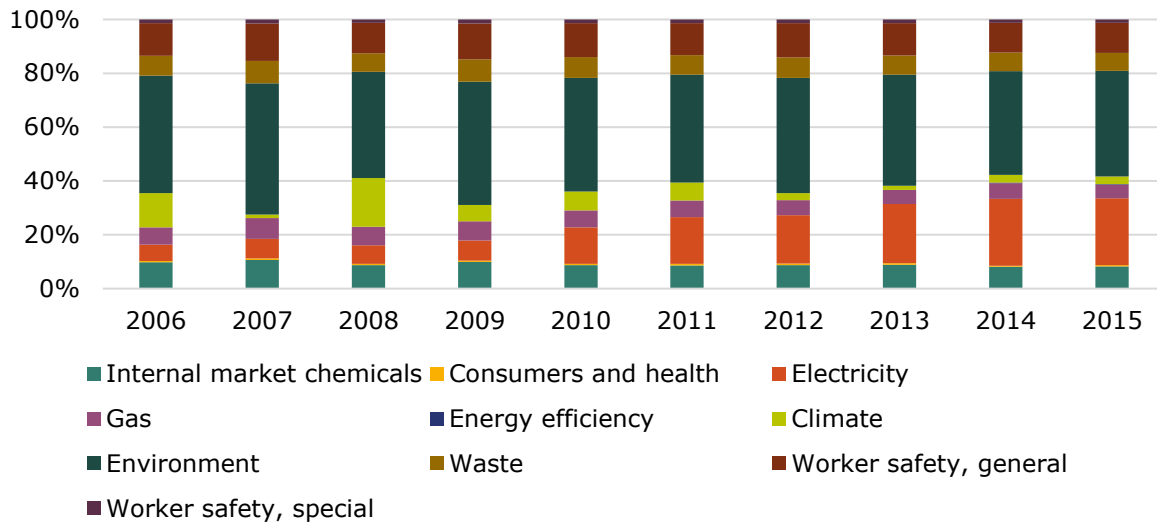


Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.

Source: Author's own elaboration.

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

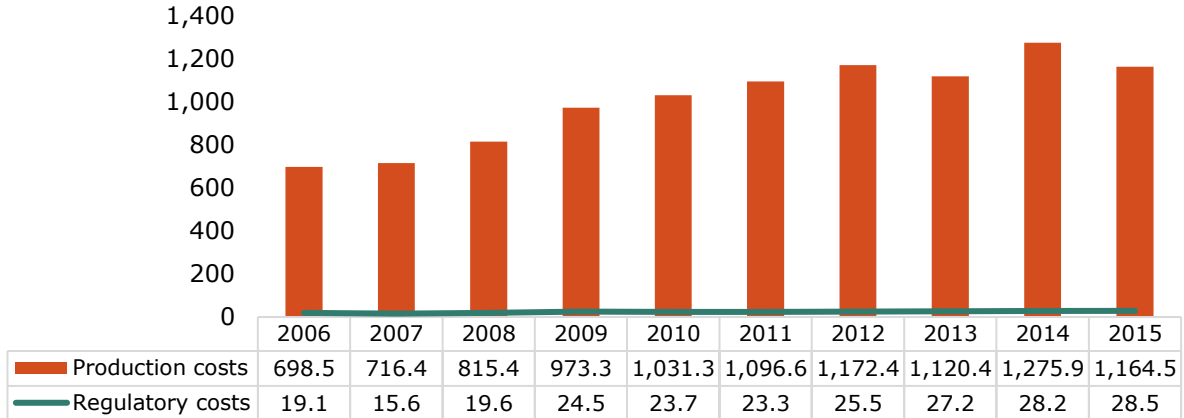
**Figure 14. Fired Refractories - Cumulative cost by area of legislation (%)**



Source: Author's own elaboration.

Cumulative regulatory costs represented a **stable share of production costs** borne by EU producers of fired refractories (**between 2.1% and 2.7%**; Figure 15 and Table 13). EBITDA of the sector were rather stable and constantly above €150/tonne over the period 2006-15 (Figure 16 and Table 14); accordingly, regulatory costs were in the region of **13% of this key performance indicator**, ranging from 9.3% in 2007 to 18.5% in 2015.

**Figure 15. Fired Refractories - Cumulative cost versus production costs (€/tonne)**



Note: Production costs are estimated on a sample of 11 plants.

Source: Author's own elaboration.

**Table 13. Fired Refractories - Regulatory costs as a share of production costs**

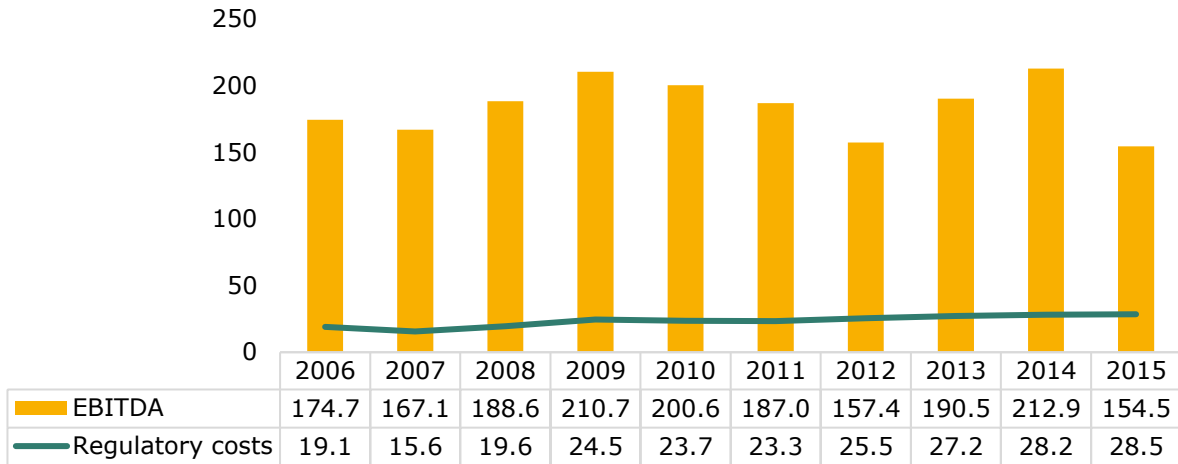
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	2.7%	2.2%	2.4%	2.5%	2.3%	2.1%	2.2%	2.4%	2.2%	2.4%
Administrative burdens	0.4%	0.3%	0.3%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Substantive compliance costs	1.6%	1.5%	1.4%	1.5%	1.3%	1.1%	1.3%	1.4%	1.2%	1.3%
Direct charges	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Indirect costs	0.6%	0.2%	0.6%	0.5%	0.6%	0.6%	0.5%	0.6%	0.7%	0.8%

Note: Production costs are estimated on a sample of 11 plants.

Source: Author's own elaboration.

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

**Figure 16. Fired Refractories - Cumulative cost versus EBITDA (€/tonne)**



Note: EBITDA is estimated on a sample of 11 plants.  
Source: Author's own elaboration.

**Table 14. Fired Refractories - Regulatory costs as a share of EBITDA**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	10.9%	9.3%	10.4%	11.6%	11.8%	12.5%	16.2%	14.3%	13.3%	18.5%
Administrative burdens	1.6%	1.5%	1.3%	1.7%	1.6%	1.6%	2.2%	1.9%	1.6%	2.3%
Substantive compliance costs	6.6%	6.3%	6.0%	7.1%	6.7%	6.7%	9.4%	8.0%	7.0%	9.8%
Direct charges	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.6%	0.5%	0.5%	0.7%
Indirect costs	2.2%	1.0%	2.6%	2.3%	3.0%	3.6%	4.0%	3.8%	4.1%	5.7%

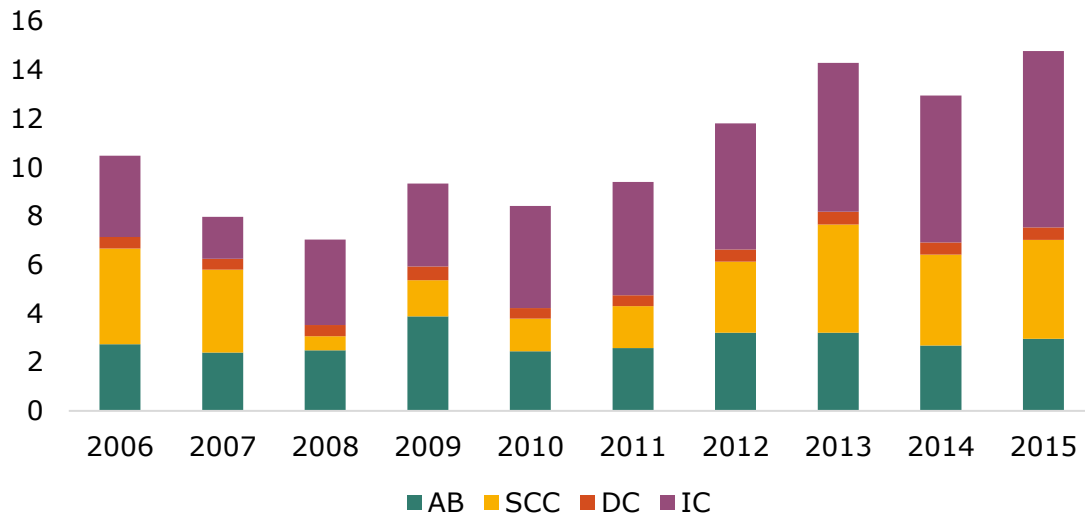
Note: EBITDA is estimated on a sample of 11 plants.  
Source: Author's own elaboration.

### Unfired Shaped Refractories

The EU rules covered by this CCA generated regulatory costs for the EU unfired shaped refractories subsector of **between €7.03 and €14.77/tonne**. In 2015, indirect costs amounted to €7.24/tonne, substantive compliance costs amounted to €4.06/tonne, administrative burdens to €2.96/tonne and direct charges to €0.51/tonne, **for a total of €14.77€/tonne** (Figure 17). In the same year, the most burdensome areas of legislation were: i) **rules affecting the price of electricity** (44% of total costs); ii) **Internal market for chemicals** (16% of total costs); iii) **waste legislation** (15%) and **general workers' and workplace safety legislation** (12%) (Figure 18). In this subsector, environmental legislation did not generate any costs, as producers of unfired shaped refractories were generally not covered by the IED. In addition, a very limited number of sampled plants were covered by the EU Emission Trading System (climate legislation) and between 2008 and 2012 might have sold extra allowances generating potential net revenues; the remaining plants were affected by indirect Emission Trading System costs.

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

**Figure 17. Unfired Shaped Refractories - Cumulative cost by category of regulatory costs (€/tonne)**

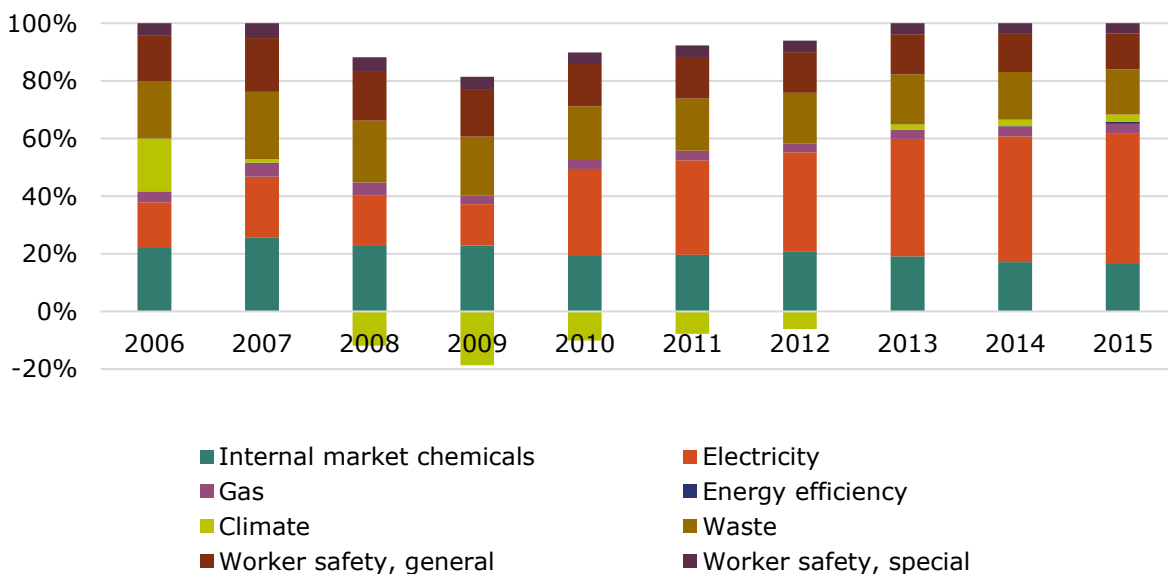


Note: AB=administrative burdens; SCC=substantive compliance costs; DC=direct charges; IC=indirect compliance costs.

Source: Author's own elaboration.

The share of regulatory costs out of production costs was on average 1.8% over the period under observation. In later years, **the share slightly increased, reaching 2.2% in 2015** (Figure 19 and Table 15); again, the proper functioning of the EU Emission Trading System and regulatory components of the electricity bill represented the main drivers behind the increase. EBITDA of the unfired shaped refractories subsector fluctuated severely over the 10-year period, and beginning in 2012 decreased. In 2015, the EBITDA fell to €34.70/tonne while regulatory costs reached their peak at €14.77/tonne; accordingly, **in the last year under analysis, regulatory costs were 42.5% of EBITDA** (Figure 20 and Table 16).

**Figure 18. Unfired Shaped Refractories - Cumulative cost by area of legislation (%)**

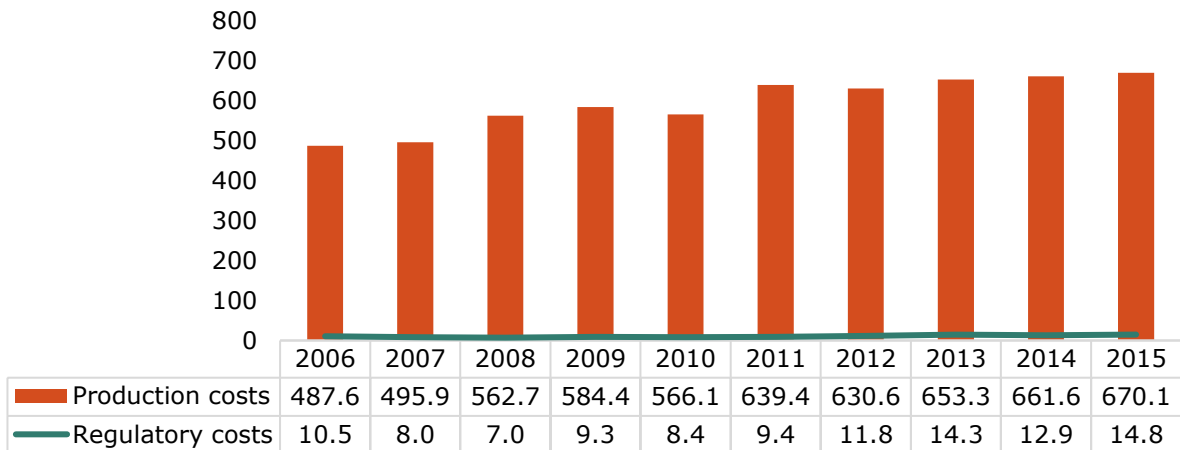


Note: Between 2008 and 2012 climate legislation might have led to potential net revenues generated by the opportunity to sell EUAs on the carbon market; costs for "Consumers and health" cannot be shown due to confidentiality reasons.

Source: Author's own elaboration.

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

**Figure 19. Unfired Shaped Refractories - Cumulative cost versus production costs (€/tonne)**



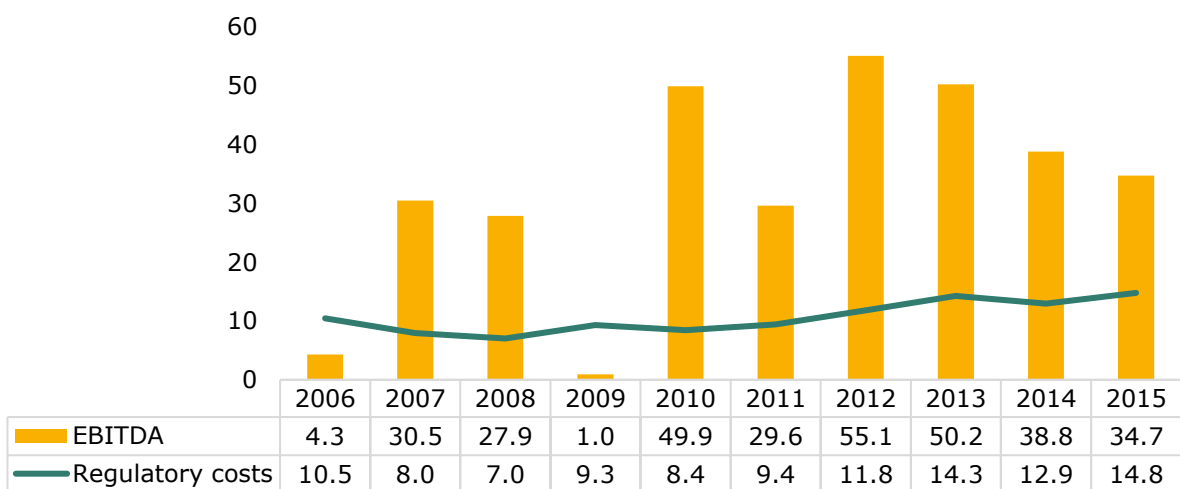
Note: Production costs are estimated on a sample of four plants.  
Source: Author's own elaboration.

**Table 15. Unfired Shaped Refractories - Regulatory costs as a share of production costs**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	2.1%	1.6%	1.2%	1.6%	1.5%	1.5%	1.9%	2.2%	2.0%	2.2%
Administrative burdens	0.6%	0.5%	0.4%	0.7%	0.4%	0.4%	0.5%	0.5%	0.4%	0.4%
Substantive compliance costs	0.8%	0.7%	0.1%	0.3%	0.2%	0.3%	0.5%	0.7%	0.6%	0.6%
Direct charges	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Indirect costs	0.7%	0.3%	0.6%	0.6%	0.7%	0.7%	0.8%	0.9%	0.9%	1.1%

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

**Figure 20. Unfired Shaped Refractories - Cumulative cost versus EBITDA (€/tonne)**



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

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

**Table 16. Unfired Shaped Refractories - Regulatory costs as a share of EBITDA**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regulatory costs	242%	26.2%	25.2%	975%	16.9%	31.8%	21.4%	28.4%	33.4%	42.5%
<i>Administrative burdens</i>	63.4%	7.9%	8.9%	405%	4.9%	8.7%	5.8%	6.4%	6.9%	8.5%
<i>Substantive compliance costs</i>	90.9%	11.2%	2.0%	155%	2.7%	5.8%	5.3%	8.8%	9.6%	11.7%
<i>Direct charges</i>	11.0%	1.5%	1.6%	59.2%	0.9%	1.5%	0.9%	1.0%	1.3%	1.5%
<i>Indirect costs</i>	77.2%	5.6%	12.6%	355%	8.4%	15.7%	9.4%	12.2%	15.6%	20.9%

*Note: EBITDA is estimated on a sample of four plants.*

*Source: Author's own elaboration.*

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

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<sup>1</sup> Production costs include all costs, both OPEX, CAPEX and other expenses, borne by the plant and directly relating to the manufacturing process.

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> 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.

<sup>5</sup> 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.

<sup>6</sup> 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.

<sup>7</sup> The Technical Specifications for the present Study listed nine ceramics sectors. The Research Team, in agreement with the Commission and the relevant EU sectoral associations decided to focus the CCA only on three sectors: bricks and tiles, ceramic tiles and refractories. In 2015, these sectors were responsible for some 67% of the overall turnover of the EU ceramic sectors listed in the Technical Specifications. In this respect, it is worth remarking that the EU associations representing the remaining ceramics sectors were contacted during the Inception Phase of this Study to enquire about the willingness of their members to provide cost data for the CCA. In this respect, they explained that any attempt to collect primary data at plant level from their members would have faced major obstacles, mainly due to the highly fragmented structure of the sectors. Hence, any cost assessment for these ceramics sectors 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 these sectors would make it quite difficult to identify 'typical' plants and thus to aggregate data.

<sup>8</sup> 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, 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.

<sup>9</sup> 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.

<sup>10</sup> 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.

## Cumulative Cost Assessment (CCA) of the EU Ceramics industry

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<sup>11</sup> 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.

<sup>12</sup> The number of SMEs participating in the data collection phase was too limited to draw any conclusion concerning regulatory costs borne by small players. Therefore, the sample does not fully reflect the structure of the EU bricks and tiles sector, which is dominated by SMEs.

<sup>13</sup> The number of SMEs participating to the data collection phase was too limited to draw any conclusion concerning regulatory costs borne by small players. Therefore, the sample does not fully reflect the structure of the EU ceramic tiles sector, which is dominated by SMEs.

<sup>14</sup> 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.

<sup>15</sup> Production costs include all costs, both OPEX, CAPEX and other expenses, borne by the plant and directly relating to the manufacturing process.

<sup>16</sup> 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.



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