ASSESSMENT OF CUMULATIVE COST IMPACT FOR THE STEEL INDUSTRY

FINAL REPORT

CONTRACTOR
Centre for European Policy Studies

Prof. Dr. Andrea Renda (Project Coordinator)

Prof. Dr. Jacques Pelkmans	Federica Mustilli
Prof. Christian Egenhofer	Federico Infelise
Andrei Marcu	Wijnand Stoefs
Dr. Lorna Schrefler	Jonas Teusch
Dr. Giacomo Luchetta	Julian Wieczorkiewicz
Dr. Felice Simonelli	Alessandro Fumagalli
Dr. Diego Valiante	

PARTNER
Economisti Associati

Roberto Zavatta
Enrico Giannotti
Giulia Maria Stecchi

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LIST OF ABREVIATIONS

ACER	Agency for the Cooperation of Energy Regulators
AD	Anti-dumping Duties
ARM	Approved Reporting Mechanism
BAT	Best Available Techniques
BAU	Business-As-Usual
BDEW	Bundesverband der Energie- und Wasserwirtschaft
BOF	Basic Oxygen Furnace
BREF	BAT Reference Documents
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditures
CCS	Carbon Capture and Storage
CIF	Cost Insurance and Freight
CIS	Commonwealth of Independent State
CISA	China Iron and Steel Association
CRC	Cold Rolled Coils
DG ENTR	Directorate-General of Enterprise and Industry
DG TRADE	Directorate-General for Trade
DRI	Direct Reduced Iron
EAF	Electric Arc Furnaces
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
ECHA	European Chemicals Agency
ECSC	European Coal and Steel Community
EDF	Electricité de France
EFTA	European Free Trade Association
EIB	European Investment Bank
EIP	European Innovation Partnership
ELV	Emission Limit Values
ELVD	End of Life Vehicles Directive
EMAS	Eco-Management and Audit Scheme
EMIR	European Market Infrastructure Regulation
ENTSO-E	European Network of Transmission System Operators For Electricity
EPA	Environmental Protection Agency
EPE	Environmental Protection Expenditures
ERU	Emission Reduction Units
ESMA	European Securities and Markets Authority
ETS	European Emission Trading System
EU TL	EU Transaction Log
EUA	European Emission Allowances
FC	Financial Costs
GAINS	Greenhouse gas - Air pollution Interactions and Synergies
GATT	General Agreement on Tariffs and Trade
GBER	General Block Exemption Regulation
GDP	Gross Domestic Product
GHG	Greenhouse Gas

GPP	Green Public Procurement
GSF	Global Steel Financial Reports
GSIS	Global Steel Information System
GSP	Generalised Scheme of Preferences
HRC	Hot Rolled Coils
IC	Investment Costs
IED	Industrial Emission Directive
IEP	Integrated Environmental Permits
IIASA	International Institute for Applied Systems Analysis
IMPEL	EU Network for the Implementation and Enforcement of Environmental Law
IO	Information Obligations
IPP	Integrated Product Policy
IPPC	Integrated Pollution Prevention and Control
IPPCD	IPPC Directive
ISIDP	Iron and Steel Industry Development Policies
LCA	Life Cycle Assessment
LCP	Large Combustion Plants
LDR	Lesser Duty Rule
LNG	Liquefied Natural Gas
MAD	Market Abuse Directive
MAR	Market Abuse Regulation
MARPOL	International Convention for Preventing Pollution from Ships
MES	Minimum Efficient Scale
MiFID	Markets in Financial Instruments Directive
MiFIR	Markets in Financial Instruments Regulation
MO	Monetary Obligations
MRV	Monitoring Reporting and Verification
MTF	Multilateral Trading Facilities
NAP	National Allocation Plans
NDCR	National Development and Reform Commission
NER	New Entrance Reserve
NRA	National Regulatory Authorities
OC	Operating Costs
OECD	Organisation for Economic Co-operation and Development
OHF	Open Heart Furnaces
OPEX	Operating Expenditures
OTC	Over The Counter
OTF	Organised Trading Facility
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RES	Renewable Energy Sources
RFCS	Research Fund on Coal and Steel
RM	Regulated Markets
SASAC	State-owned Assets Supervision and Administration Commission of the State Council
SBS	Structural Business Statistics
SDS	Safety Data Sheets
SES	Safety Information Sheets
SHEC	Safety, Health, Environmental and Consumer

SIEF	Substantial Information Exchange Forum
SME	Small Medium Enterprise
SO	Substantive Obligations
SPIRE	Sustainable Process Industry through Resource and Energy Efficiency
SVHC	Substances of Very High Concerns
TDI	Trade Defence Instruments
TFEU	Treaty on the Functioning of the European Union
TRG	Top Gas Recycling
TSO	Transmission System Operator
ULCOS	Ultra-Low Carbon dioxide (CO2) Steelmaking
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WFD	Waste Framework Directive
WR	Wire Rods
WSD	World Steel Dynamics
WSR	Waste Shipment Regulation
WTO	World Trade Organization

ASSESSMENT OF CUMULATIVE COST IMPACT FOR THE STEEL INDUSTRY

ABSTRACT

This study contains an assessment of the cumulative costs of EU legislation on the European steel industry, as well as an evaluation of how these costs affect the competitiveness of this industry from an international standpoint. Cumulative costs are compared to production costs and current margins of the European steel industry, as well as to the production costs of international steel competitors.

Cumulative regulatory costs represent approximately 3% of the total cost of production of EAF wire rods, and less than 2% of the total cost of producing HRCs and CRCs for BOF producers. As far as the price-raw material margin is concerned, in 2012 regulatory costs represent about 7% of this margin for EAF products and less than 5% of the margin for BOF products. For EAF producers regulatory costs represent about a quarter of their EBITDA; whereas for BOF producers, regulatory costs represent between 15% and 33% of the EBITDA.

As far as margins for the period 2002-2011 are concerned, it becomes clear that the steel industry has the typical features of a pro-cyclical industry: the significance – and thus the impact – of regulatory costs changes accordingly to the cycle. Specifically, cumulative regulatory costs over EBITDA were in the area of 7% in the boom years; while in times of crisis, regulatory costs may be even higher than EBITDA (e.g. in 2009), and more generally fall in the area of 20% to 30% of the EBITDA.

ASSESSMENT OF CUMULATIVE COST IMPACT FOR THE STEEL INDUSTRY

KEY FINDINGS

- **Blast Oxygen Furnace (BOF) and Electric Arc Furnace (EAF) producers faced different breakdowns of regulatory costs in 2012, and ultimately EAF producers face a higher cost per tonne of finished products.** This is due to the higher impact that the electricity-related costs, that are indirect ETS costs, transmission tariffs and RES support, have on electro-intensive EAF producers, and to the fact that the latter did not benefit from ETS over allocation as much as BOFs. Differently, investment costs generated by environmental legislation represent a significant burden for BOF producers, which also have to bear higher administrative costs across all policy areas.

- **In 2012, for BOF producers, regulatory costs amount to 7.7 – 9.7 €/tonne of finished product.** The largest burden is due to compliance with environmental protection legislation, mostly implying significant operational costs; the cost of energy inputs is also relevant, in particular for CRC, whose production process is more energy intensive. Climate change legislation did not impose any cost in 2012 on BOFs, due to the over allocation of emission allowances (EUAs), which more-than-compensated indirect costs passed-on in the form of higher electricity prices.

- **In 2012, for EAF producers, regulatory costs amount to 14.2 €/tonne of finished product.** The largest costs arise from the energy area, due to high electricity intensity of the production process, followed by investments in environmental protection triggered by legislation. Legislation related to climate change featured in 2012 a cost of about 2.6 €/tonne.

- **Typical regulatory costs in the period 2002-2012 amount to 10.66 €/tonne for BOF producers; and 13.37 €/tonne for EAF producers.** Again, costs are higher for EAF compared to BOF producers due to higher electricity costs, and also due to the fact that so far the ETS did not impose any direct cost on steel makers.

- **Cumulative regulatory costs represent approximately 3% of the total cost of production of EAF wire rods, and less than 2% of the total cost of producing HRCs and CRCs for BOF producers**.

- **As far as the price-raw material margin is concerned, in 2012 regulatory costs represent about 7% of this margin for EAF products and less than 5% of the margin for BOF products.**

- **In 2012, for EAF producers regulatory costs represent about a quarter of their EBITDA; whereas for BOF producers, regulatory costs represent between 15% and 33% of the EBITDA.**

- As far as margins for the period 2002-2011 are concerned, it becomes clear that the steel industry has the typical features of a pro-cyclical industry: the significance – and thus the impact – of regulatory costs changes accordingly to the cycle. Specifically:

  o *Cumulative regulatory costs over EBITDA were in the area of 7% in the boom years*, *i.e.* from 2006 to 2008. Such a share of regulatory costs over EBITDA is unlikely to jeopardize the sustainability and the international competitiveness of EU steel makers;

  o *In times of crisis, regulatory costs may be even higher than EBITDA (e.g. in 2009), and more generally fall in the area of 20% to 30% of the EBITDA*. At this level, they may endanger the viability of the industry, as the EBITDA needs to cover financial expenditures, depreciation and amortization, that is the cost of capital. The same reasoning goes for the share of regulatory costs over the price-raw materials margin. The competitive position of the EU steel industry is sharply different if 3% to 4% of actionable costs are spent to comply with EU regulation, as in the boom years, or whether this share reaches up to almost 10%, as it was the case in 2002 or 2011.

- As for the cost differentials with the least cost producer, our results show the following:

  o *For EAF wire rods, regulatory costs account for a significant share* (33.8%) of the cost differential with the least cost producers (the US EAF plants).

  o *For BOF producers, the impact of regulatory costs is much smaller* (5.3% for CRC and 5.8% for HRC). The least cost producers in this case are Russian steel makers.

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EXECUTIVE SUMMARY[1]

A. Scene Setter

This study aims at understanding the impacts of the costs of EU regulation on the cost structure of the European steel industry and on its international competitiveness. The study followed an approach similar to a "fitness check", except that it only focused on the burdensome nature of EU legislation and not on its effectiveness, efficiency and coherence.

The following regulatory costs were analysed in the study:

1. Administrative costs: costs incurred by firms to provide information to public authorities and third parties;

2. Compliance costs: costs stemming from a requirement for the firm to take actions to adapt its productive process to comply with the legal act.

3. Indirect costs: costs of regulation which have an impact on steel producers not as direct addressees, but as counterparts of direct addressees.

The following policy areas were analysed in the study: : i) general policies (such as, *e.g.* the Europe2020 strategy); ii) the commodity market regulation; iii) legislation related to climate change; iv) competition policy; v) energy policy; vi) environmental legislation; vii) trade policy; viii) product regulation and life-cicle assessment (LCA).

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[1] The information and views set out in this summary are those of the authors and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein.

B. Key Conclusions

1. **Cumulative regulatory costs**: these are **low** compared to the overall cost of steel production. For Electric Arc Furnaces (EAF) wire rods, they represent about 3% of total costs. For Basic Oxygen Furnace (BOF) producers, they represent less than 2% of the cost of producing Hot Rolled Coils (HRCs) and Cold Rolled Coils (CRCs).

2. In order to provide an indication of the relative importance of the impact of EU legislation on the steel industry's operations, <u>regulatory costs per unit of output were compared with key performance indicators, such as price-cost margin, EBIT and EBITDA.</u>

    The steel industry is a pro-cyclical industry. Cumulative regulatory costs over EBITDA were in the area of 9-14% in the boom years, i.e. from 2006 to 2008. Such a share of regulatory costs over EBITDA is unlikely to put EU steel makers in a dangerous competitive position.

    However in times of crisis, regulatory costs may be even higher than EBITDA, such as was the exceptional case of 2009, or, more often, fall in the area of 28% to 35% of the EBITDA. <u>At this level, they may endanger the viability of the industry,</u> as the EBITDA needs to cover financial expenditures, depreciation and amortization, that is the cost of capital.

    The year 2012 has been a bad year for the steel industry, with low margins, tight competition and a situation of overcapacity due to the economic cycle. Hence, the cumulative regulatory costs, albeit low in absolute terms, **could have bitten away profitability**. And indeed this is confirmed by the share of regulatory costs over EBITDA. For EAF producers, regulatory costs measured in this study represented about a quarter of their EBITDA for 2012; for BOF producers, regulatory costs represent between 15% and 33% of their EBITDA for 2012.

3. **BOF and EAF** producers faced **different regulatory costs** in 2012.

    - **EAFs bear the higher cost per tonne of finished products**. This is due to the higher impact that the electricity-related costs, that are indirect **ETS costs, transmission tariffs and RES support**, have on electro-intensive EAFs, and to the fact that they did not benefit from ETS over allocation as much as BOFs.

    - BOF producers also have to bear marginally higher **administrative costs**.

- Across the different policy areas, for **BOF producers** the largest burden is due to **environmental protection**, with a large share of environmental costs due to <u>operational costs;</u> energy costs are also relevant for BOF plants, and more so for CRC, whose production process is more energy intensive. Climate change legislation did not impose any cost in 2012 on BOFs, due to the over allocation of EUAs, which more than compensated indirect costs passed on through electricity prices.

4. **Price-raw material margin**: in 2012 regulatory costs represented about 7% of this margin for EAF products and less than 5% of the margin for BOF products.

5. **Cost differentials for European steel makers compared to other world areas are mainly due to prices for iron ore, electricity, and gas.** Natural gas and electricity prices are the main drivers of competitive advantage for US producers. In some cases, e.g. compared to Russia and Ukrainian producers, part of the cost differential is compensated by the higher efficiency of European steel plants.

6. It is worth stressing that the national turnover of the steel industry has a crucial role in the economic system of several EU member states, even when the quantities produced are limited in absolute value.

C. Typical cumulative cost of regulation

- For **Basic Oxygen Furnace (BOF) plants** (which generally produce high value-added products) the largest burden is due to the <u>operational costs related to environmental protection measures</u>. Due to over-allocation of carbon permits, climate legislation did not impose any cost on BOF plants in 2012.

- For **Electric Arc Furnace (EAF) plants** (which generally produce low value-added products) the cost of <u>electricity and energy regulation</u> (indirect ETS costs, transmission tariffs and renewable energy support) represent a major share of the cumulative cost of regulation.

Table A. Cumulative cost of regulation (€/tonne)

	BOF HRC	EAF WR	Steel Industry
ETS	0.74	5.85	2.79
Energy	3.67	8.12	5.46
Environment	6.15	3.39	5.04
Product (REACH)	0.10	0.05	0.08
Total	**10.66**	**17.41**	**13.37**

Depending on future EUA prices, the scenario analysis therein reported for a single plant seems to indicate that the regulatory cost advantage of BOFs is likely to disappear.

D. Cost comparison

The production cost comparison for flat products focuses on fully integrated BOF steel making plants delivering both Hot Rolled Coils (HRC) and Cold Rolled Coils (CRCs) as finished products. Western European companies incur the highest costs per tonnes of HRC and CRC, followed by US plants which are slightly less competitive than Central Eastern European facilities. Russian steel makers are the least cost producers, their cost advantage, with a cost differential of 165-171$ for CRC and 216-240$ for HRC.

The production cost comparison for long products is mainly centred on EAF steel making plants delivering wire rods as finished products, as well as on Chinese and Ukrainian BOFs. A tonne of wire rods costs in European EAF plants less than in Chinese EAFs. Wire rods made in Ukrainian BOFs are the least cost output, while US and Russian companies are the least cost EAF producers.

ANNEX

Assessment of the cumulative cost impact for the steel industry

A. Some methodological notes

- <u>Not all relevant areas are included</u> in the cost assessment (e.g. labour);

- The study quantified costs stemming from <u>4 policy areas</u>: climate change, energy, environmental and product policy (REACH) and assessed <u>3 typologies of costs</u>: compliance, administrative and indirect costs;

- The study was conceived as a backward looking <u>stock-taking exercise</u> and does not include estimates of future costs;

- The study <u>only looked at steel makers *stricto sensu*</u>, thus excluding non-integrated players which operate in the industry value chain without producing crude steel. Figures need to be interpreted knowing that there are <u>different types of steel producers</u> on which different policies have different impacts.

B. Detail of breakdown

Table B. Types of Plants

BOF (Basic Oxygen Furnace)	EAF (Electric Arc Furnace)
High value-added products	Low value-added products
Produce HRC (Hot Rolled Coils) and CRC (Cold Rolled Coils)	Produce bars and wired rods (WR)

Figure A. BOF Production costs 2012 (in $)
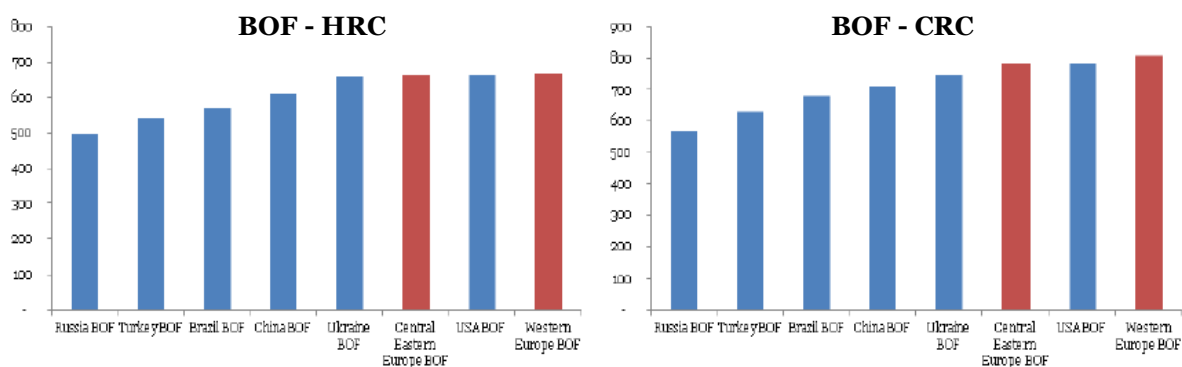
For **BOF plants** Western European companies incur the highest production costs per tonnes of HRC and CRC, followed by US plants which are slightly less competitive than Central Eastern European facilities. Russian steel makers are the least cost producers, their cost advantage, with a cost differential of 165-171$ for CRC and 216-240$ for HRC.

Figure B. EAF Production costs 2012 (in $)
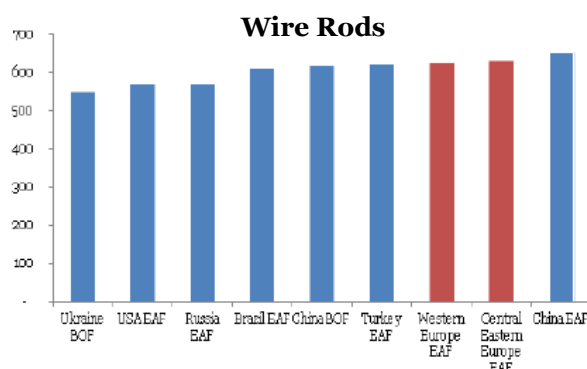
Concerning **EAF plants** a tonne of wire rods costs in European EAF plants less than in Chinese EAFs. Wire rods made in Ukrainian BOFs are the least cost output, while US and Russian companies are the least cost EAF producers. In general, the cost curve is flatter compared to flat products, i.e. cost differentials for long products are narrower.

Table C. Cumulative cost of regulation 2012: breakdown per policy area (€/tonne)

			BOF CRC	BOF HRC	EAF WR
ETS		Direct	-2.69	-2.69	-0.54
		Indirect	0.45	0.29	3.06
		Administrative	0.13	0.13	0.10
		Sub-Total	**-2.12**	**-2.27**	**2.62**
Energy		Transmission	2.40	1.58	3.48
		RES	3.18	2.09	4.65
		Sub-Total	**5.58**	**3.67**	**8.12**
Environment	Direct	Investment	1.35	1.35	0.74
		Financial	0.73	0.73	0.40
		Operational	4.05	4.05	2.21
		Administrative	0.01	0.01	0.04
		Sub-Total	**6.15**	**6.15**	**3.39**
Product		Administrative – REACH	0.10	0.10	0.05
		Sub-Total	**0.10**	**0.10**	**0.05**
		Total	**9.72**	**7.65**	**14.18**

BOF and EAF producers faced different regulatory costs in 2012:

- For **BOF** producers the largest burden is due to <u>environmental protection</u>, with a large share of environmental costs due to operational costs. <u>Energy costs</u> are also relevant for BOF plants, and more so for CRC, whose production process is more energy intensive. <u>Climate change</u> legislation did not impose any cost on BOFs in 2012, due to the over-allocation of emission allowances, which more than compensated indirect costs passed on through electricity price.

- **EAFs** bear the higher cost per tonne of finished products due to the higher impact of the <u>electricity-related costs</u> (indirect ETS costs, transmission tariffs and RES support) on electro-intensive EAFs, and to the fact that they did not benefit from ETS over-allocation as much as BOFs. <u>Climate change legislation</u> imposed on EAFs has a cost of about <u>2.6 €/tonne</u> due to indirect ETS costs.

C. The impact of cumulative regulatory costs 2002-2012

The steel industry is a pro-cyclical industry. Results thus need to be interpreted in relation to the economic circumstances:

- **Relative to EBITDA:**

  - From **2006 to 2008** cumulative regulatory costs only accounted for <u>9-14% of EBITDA</u>, which seems like a "fair price" to pay to enjoy the benefits of Europe, such as proximity to high value-added costumers and a skilled labour force.

  - **In times of crisis** regulatory costs may present <u>28-35% of EBITDA</u>. In the case of **2009** they were even <u>higher than EBITDA</u>. At this level they may endanger the <u>viability</u> of the industry, as the EBITDA needs to cover for the cost of capital (i.e. financial expenditures, depreciation and amortization).

- **Relative to Price-Materials margin:**

  - The <u>same reasoning</u> goes for the share of regulatory costs over the price-raw materials margin. The competitive position of the EU steel industry is sharply different if <u>3% to 4%</u> of actionable costs are spent to comply with EU regulation, as in the <u>boom years</u>, or whether this share reaches up to more than <u>8%</u>, as it was the case in <u>2002</u> or <u>2011</u>.

Table D. The impact of cumulative regulatory costs – 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
EBITDA	28.1%	18.9%	13.4%	17.3%	9.4%	12.2%	14.5%	-53.9%	35.0%	30.9%
Price-Raw Mat. (HRC)	8.1%	6.1%	3.4%	3.9%	4.3%	4.0%	3.4%	7.3%	5.5%	8.2%

Price-Raw Materials (or margin over raw materials) is the difference between market prices and cost incurred by BOF producers to purchase the required amount of coal, coke, iron ore, and scrap; and by EAF ones for scrap, pig iron, and Direct Reduced Iron. Price-raw materials margins are important, and according to many interviewees are customarily kept under control by both steel makers and customers, and constitute a fair proxy of the value added generated by the industry, especially for BOF producers (which are characterized by relatively lower costs for electricity and gas and higher efficiency in energy recovery).

PART I

THE CUMULATIVE COST ASSESSMENT

1 The Competitiveness of the EU Steel Industry

1.1 Methodology and data source

This section compares production costs for steel making businesses on a worldwide basis, and accordingly assesses the current competitiveness of EU producers *vis-à-vis* their international competitors. The following countries/regions are included in the comparison: i) Brazil; ii) Central Eastern Europe; iii) China; iv) Russia; v) Turkey; vi) Ukraine; vii) US; viii) Western Europe. In particular, Brazil is selected due to its large availability of raw materials (especially iron ore); China for the high installed capacity; Russia, Turkey, and Ukraine based on their geographical proximity to Europe; and the US due to its similarity to Europe in term of economic fundamentals. All of these countries represent important commercial partners for the EU in terms of steel trade volumes.[2]

As explained in more detail in Section 4 below, steel making plants can be broadly classified in two different groups: integrated plants adopting Basic Oxygen Furnace (BOF) technology; and minimills, smelting scrap in Electric Arc Furnaces (EAFs). A twofold classification is also made for steel making final output, where "long" and "flat" products are distinguished as two separated markets. Whereas the former are rolled in bars and wire rods from blooms and billets and are considered low added value products, the latter are rolled in sheets and coils from slabs and are deemed high added value outputs. The combination of these two dimensions enables classifying up to 4 categories of steel making plants (see Table 1).

Table 1 Prototypical plants

Market➜ Production technology⬇	Flat products	Long products
BOF	**BOFs making flat products**	BOFs making long products
EAF	EAFs making flat products	**EAFs making long products**

In what follows, cost production comparison is centred only on two categories, i.e. BOFs making flat products and EAFs making long. This selection is based on the evidence that EAF producers usually are specialized in long products, while BOF producers are focused on flat ones. Indeed, tramp metals contained in scrap usually lower the

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[2] See below, Table 19 and accompanying text.

metallurgical quality of steel produced in minimills, thus resulting in a competitive disadvantage for EAF flat products and discouraging to a large extent this kind of production. For these two categories a prototypical plant was selected for each country included in the analysis. In addition, for Ukraine – where in 2010 only 4.5% of total steel production was made in EAFs[3] – and for China – where 10.4% of total steel production was made in EAFs[4] – prototypical BOF plants are also included when comparing production costs for long products, being their production more frequently performed in integrated plants in these two countries. To ensure homogeneity, prototypical plants do not represent producers of specialty steel, thus focusing exclusively on commodity grades.

The analysis is carried out at three different stages of the production process, thus comparing the cost per tonne of liquid steel, semi-finished products (slabs for flat steel and billets for long) and finished products (hot rolled coils and cold rolled coils for flat steel; wire rods for long). Furthermore, the main cost components are investigated to single out sources of competitive advantage/disadvantage.

The comparison relies on data referred to December 2012 and mainly drawn from the Global Steel Information System (GSIS), an interactive platform provided by World Steel Dynamics (WSD) comprising, *inter alia*, two comprehensive databases:

-    "World Cost Curve for Steel Sheet Producers", with cost models for steel flat products; and

-    "World Cost Curve for Billet and Wire Rod Producers", with cost models for steel long products.

These tools offer a cost estimation for a large number of steel making plants located all over the world as well as for several typical plants in specific regions. Prototypes adopted in the analysis are based on WSD typical plants or, whenever a WSD general model is not available, on cost models for real facilities deemed representative for a given country. Furthermore, in order to ensure consistency with the analysis on cost of regulation of EU energy policies included in the study, cost models for EU plants are customized by changing the price parameters for electricity and natural gas. For gas, a weighted average annual price paid by the largest industrial customers - relying on data provided by EUROSTAT - has been included in the models.[5] Similarly, weighted

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[3]   World Steel, 2012.

[4]   Id.

[5]   National prices (2012) for energy intensive industrial customers - included in the higher consumption band available - provided by EUROSTAT are averaged adopting as weights the total production of crude steel (in tonnes) for each EU countries in 2012 (data provided by World Steel, 2013). Separate

averages based on EUROSTAT data have been used to customize electricity prices. For BOF producers, the weighted average of electricity prices also reflects the prices reported during the interviews.[6]

1.2 Production costs for flat products

As mentioned above, production cost comparison for flat products focuses on fully integrated BOF steel making plants delivering both Hot Rolled Coils (HRC) and Cold Rolled Coils (CRCs) as finished products.[7]

The following prototypical plants have been selected and compared:

- Brazil HRC/CRC BOF;

- Central Eastern Europe HRC/CRC BOF;

- China HRC/CRC BOF;

- Russia HRC/CRC BOF;

- Turkey HRC/CRC BOF;

- Ukraine HRC/CRC BOF;

- USA HRC/CRC BOF;

- Western Europe HRC/CRC BOF.

As for liquid steel, the first steel making production stage considered (see Figure 1), EU companies register the highest costs per tonne. One tonne of liquid steel costs 507$ in Western European plants and 505$ in Central Eastern European ones. These costs are comparable with those incurred by US (504$) and Ukrainian (503$) producers, while are about 28% higher than costs of Russian BOF plants (396$). By contrast, the highest costs per tonne of slab (see Figure 2) are incurred by Ukrainian plants (570$), followed by US (551$), Western European (550$), and Central Eastern European (549$) steel makers. European slabs cost about 29% more than Russian ones (426$). A closer look to finished products (see Figure 3 and Figure 4) shows that Western European companies

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averages have been computed for Central Eastern Europe (BG, CZ, HU, LV, PL, RO, SK, and SI) and for Western Europe (AT, BE, FI, FR, DE, GR, IT, NL, PT, ES, SE, and UK).

[6] Eurostat prices in countries were the interviewed plant operator is based are substituted by the prices reported in the interviews. Prices reported by companies have been validated by the consultants.

[7] Production costs are ex works costs.

incur the highest costs per tonnes of HRC (669$) and CRC (808$), followed by US plants (respectively 663$ and 786$) which are slightly less competitive than Central Eastern European facilities (662$ and 784$). Russian steel makers (497$ and 569$) confirm their cost advantage, with a gap of 171$ per tonne of HRC (+34%) and 240$ per tonne of CRC (+42%) when compared to Western Europe finished products and of 165$ per tonne of HRC (+33%) and 216$ per tonne of CRC (+38%) compared to Central Eastern European production. These values are consistent with the aggressive price strategies of CIS steelmakers in Central and Eastern Europe, where thanks to these cost differentials, they are able to undercut European producers' prices by about 30 to 40 €/tonne.

Figure 1 Production costs per tonne of liquid steel ($ 2012)
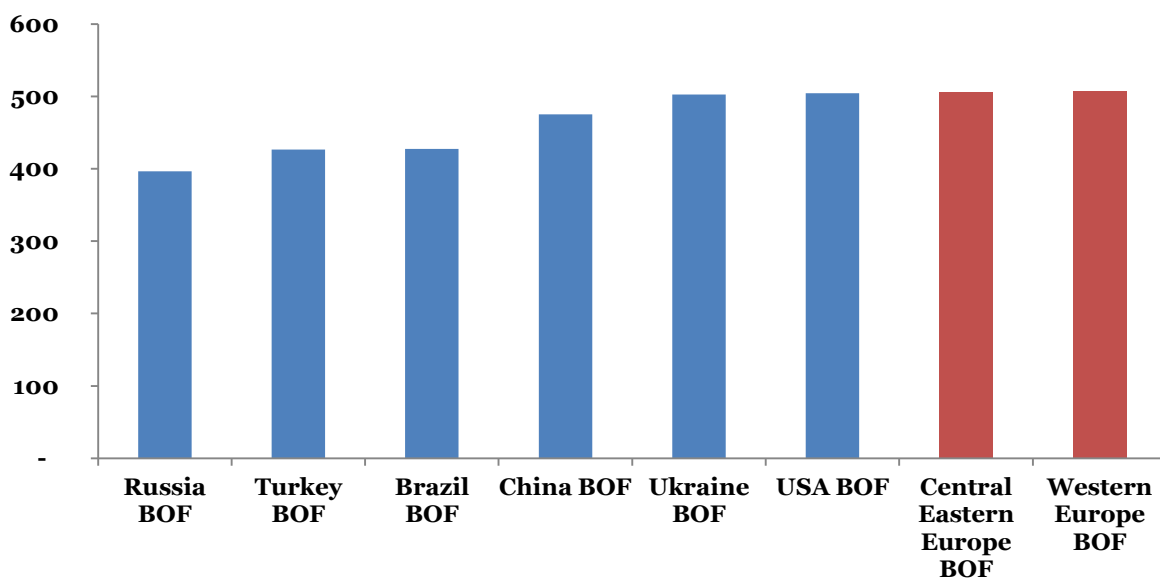
Source: Authors' elaboration on WSD, 2012

Figure 2 Production costs per tonne of slabs ($ 2012)
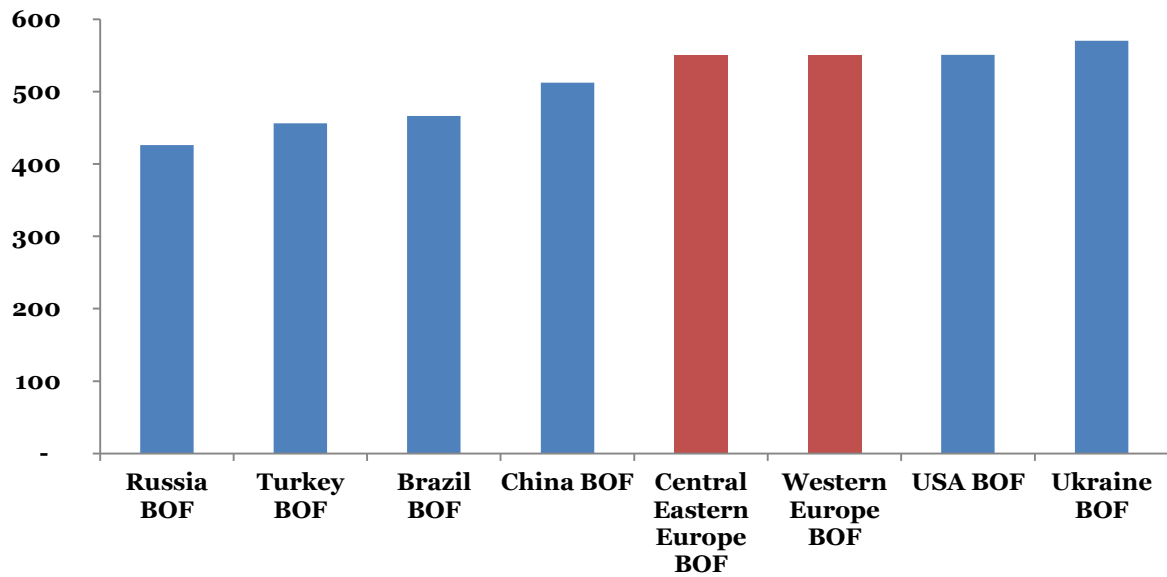
Source: Authors' elaboration on WSD, 2012

Figure 3 Production costs per tonne of hot rolled coils ($ 2012)
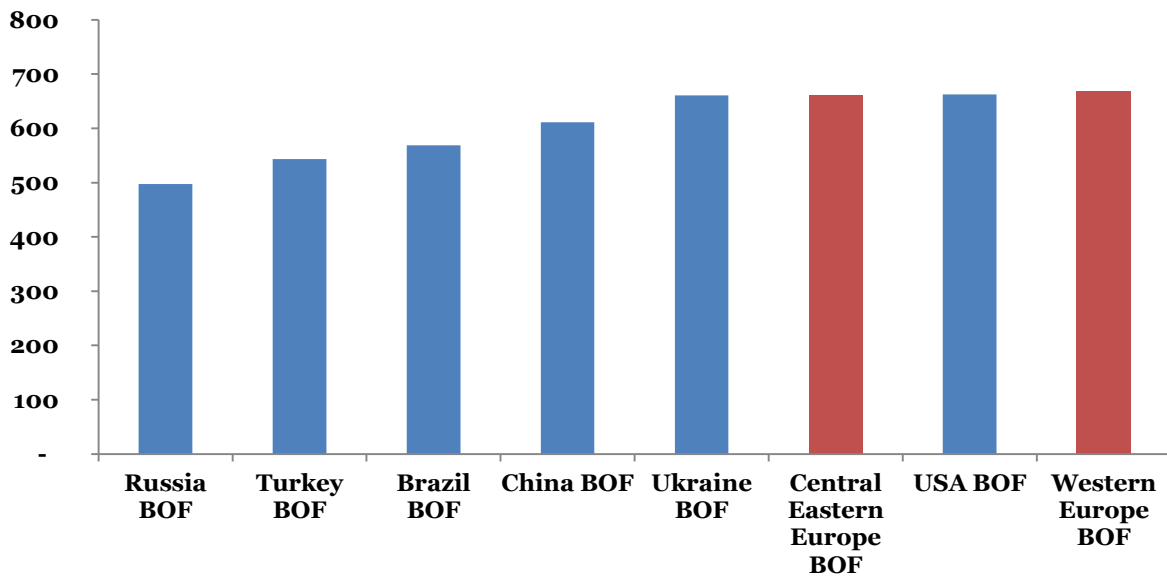
Source: Authors' elaboration on WSD, 2012

Figure 4 Production costs per tonne of cold rolled coils ($ 2012)
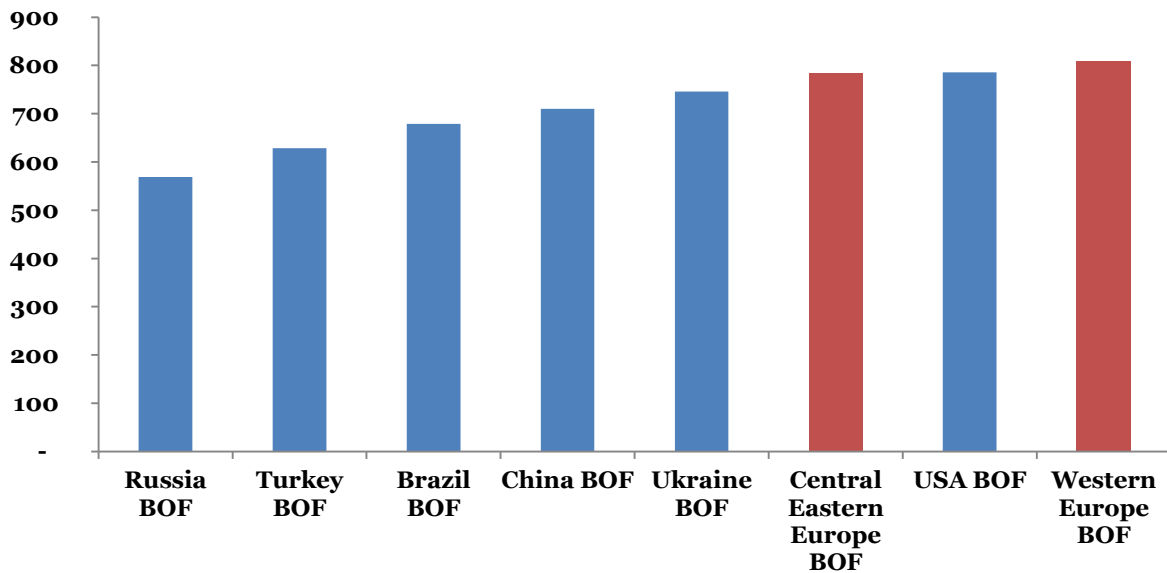
Source: Authors' elaboration on WSD, 2012

1.2.1 Production cost differential for HRC and CRC

The cost differentials in the production of HRCs between European steel makers and the least cost producers, *i.e.* Russian BOFs plants (see Table 3), are mainly due to the cost of procuring raw materials, hiring labour, the supply of natural gas, and electricity. In relative terms, the natural gas share of costs is almost treble, and the electricity price share of costs is 35% higher in Western Europe and 82% higher in Central Eastern Europe.[8] Similar findings emerged for the most advanced production stage (CRC): here too, differentials with Russia are mostly due to raw materials, labour, natural gas, and electricity. However, labour costs, albeit higher in nominal terms, do not emerge as a clear source of competitive disadvantage, considering that these comparisons do not follow a purchasing power parity approach which would be crucial to analyse wage differentials. All in all, raw materials and energy costs constitute the most significant factors that hamper the competitiveness of EU steel makers vis-à-vis their international competitors. It is worth noticing that European BOFs are very efficient in recovering energy and scrap, thus explaining the negative differential when compared to Russian plants[9].

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[8] Cost differentials are the combination of different prices and different efficiency.

[9] Benchmarks for the iron and steel industry are reported in Methodology for the free allocation of emission allowances in the EU ETS post 2012. Sector report for the iron and steel industry. Study for

Table 2 Cost differential between EU steel makers and least cost producers in absolute value for HRCs ($ 2012)[10]

	Central Eastern Europe BOF	Western Europe BOF
Raw materials	120	112
Labour	36	49
Electricity	12	5
Natural Gas	34	29
Other energy	9	7
Other costs	13	-0
Energy/Scrap Credit	-44	-34
TOTAL	**179**	**168**

Source: Authors' elaboration on WSD, 2012

Table 3 Cost differential between EU steel makers and least cost producers in absolute value for CRCs ($ 2012)

	Central Eastern Europe BOF	Western Europe BOF
Raw materials	125	116
Labour	53	88
Electricity	20	10
Natural Gas	55	46
Other energy	9	7
Other costs	18	3
Energy/Scrap Credit	-48	-35
Overheads, depreciation, and interest	-17	5
TOTAL	**216**	**240**

Source: Authors' elaboration on WSD, 2012

1.2.2 Costs for raw materials, electricity, and gas

As anticipated in the previous section, EU companies face the highest production costs per tonne of both HRC and CRC in terms of raw materials (respectively 432$ and 451$ for Western plants, 439$ and 461$ for Central Eastern, see Figure 5 and Figure 6

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the European Commission by Ecorys; Fraunhofer Institute for Systems and Innovation Research; and Öko-Institut. Available at: http://ec.europa.eu/clima/policies/ets/cap/allocation/docs/bm_study-iron_and_steel_en.pdf

[10] Production cost differentials for HRC do not include overheads, depreciation, and interest.

below). Looking at electricity (see Figure 7 and Figure 8 below), Ukrainian producers pay 53$ per tonne of HRC and 68$ per tonne of CRC, followed by Central Eastern European ones (26$ and 44$), Chinese (23$ and 38$) and Western European ones (19$ and 33$). Also for natural gas (see Figure 9 and Figure 10), costs incurred by BOF located in Ukraine (87$ per tonne of HRC and 114$ per tonne of CRC) are larger than those of Central Eastern (48$ and 77$) and Western European (43$ and 68$) integrated plants.

While cost differentials between Central Eastern and Western producers as well as between them and Ukrainian BOFs – which incur the highest energy expenditures – stem to a large extent from an existing gap in plant efficiency, differentials with other regions are mainly due to prices of iron ore, electricity, and gas. Natural gas and electricity prices are the main drivers of competitive advantage for US producers. Indeed, if US producers were to pay the energy prices paid by Western European industrial customers – something which was almost the case before the shale gas revolution – the US CRCs would cost about 822$ per tonne, *i.e.* 14$ more than Western European coils.

Figure 5 Raw material costs per tonne of hot rolled coils ($ 2012)
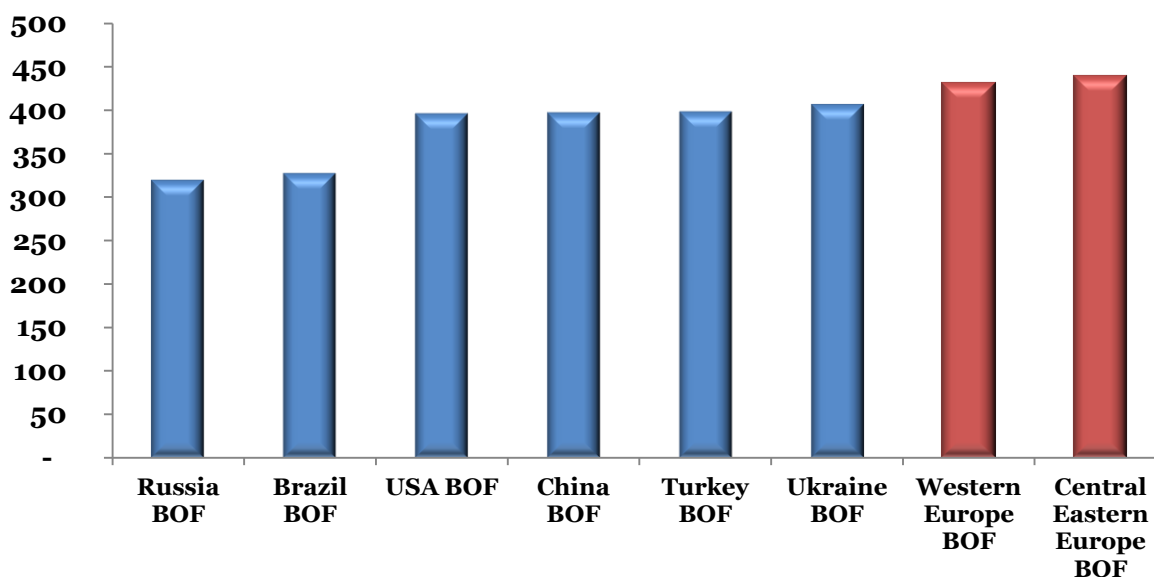
Source: Authors' elaboration on WSD, 2012

Figure 6 Raw material costs per tonne of cold rolled coils ($ 2012)
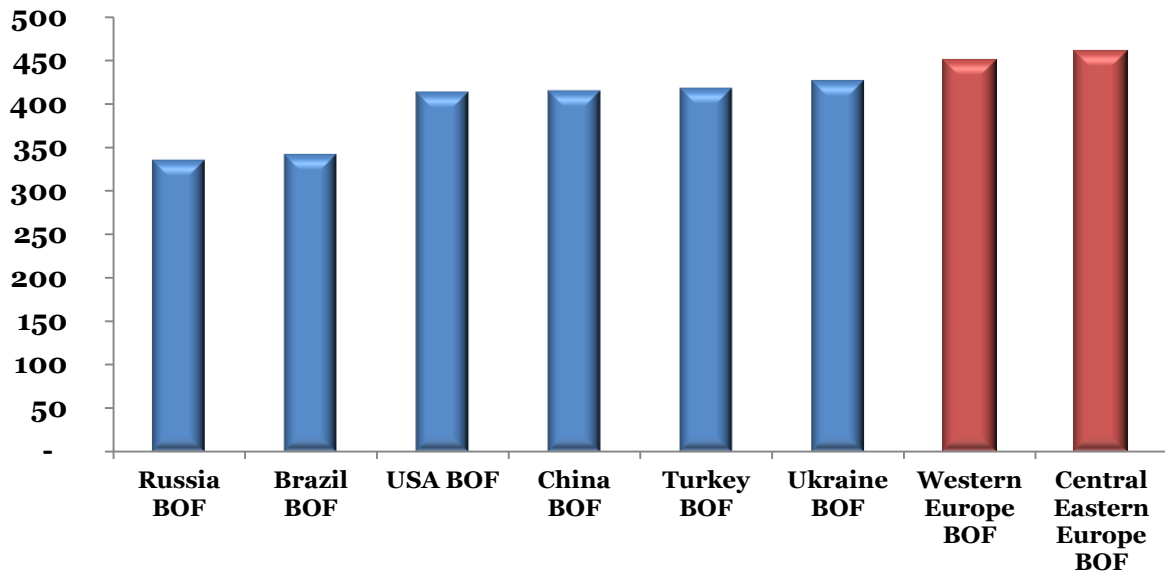
Source: Authors' elaboration on WSD, 2012

Figure 7 Electricity costs per tonne of hot rolled coils ($ 2012)
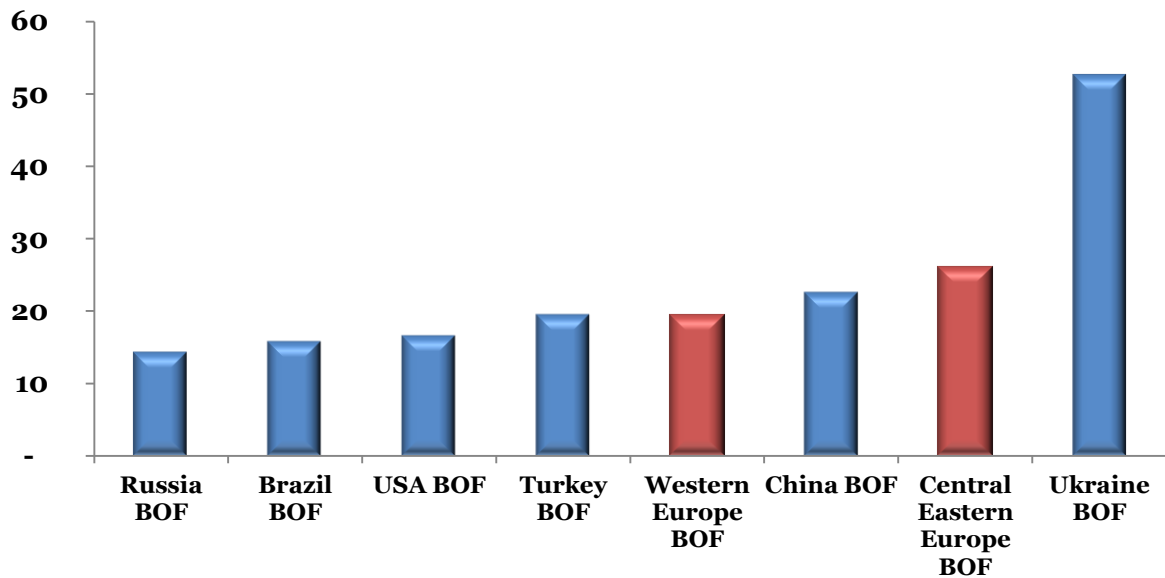
Source: Authors' elaboration on WSD, 2012

Figure 8 Electricity costs per tonne of cold rolled coils ($ 2012)
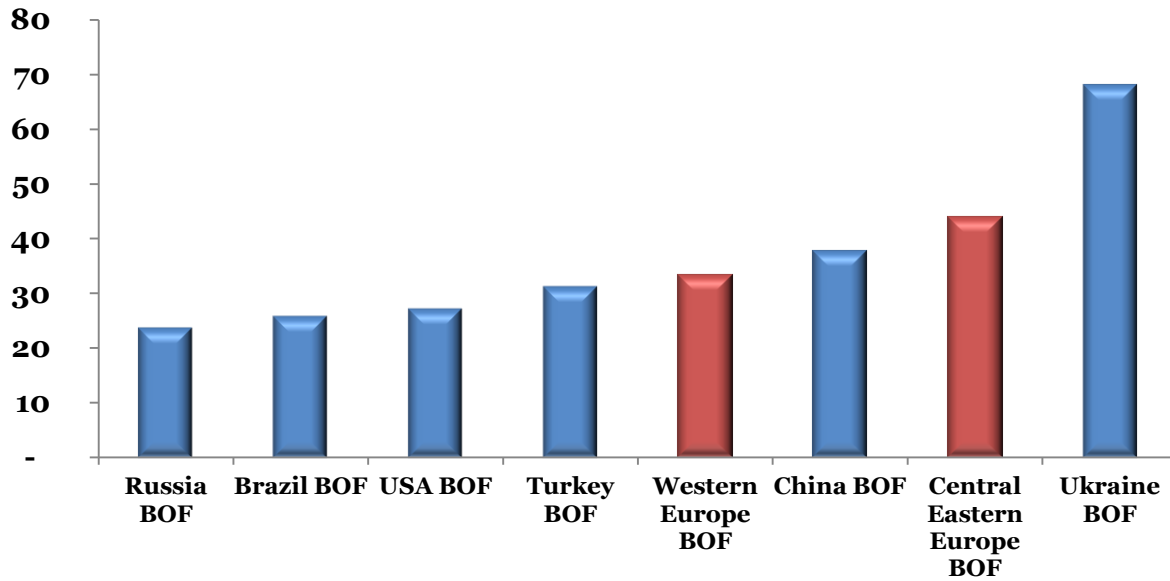
Source: Authors' elaboration on WSD, 2012

Figure 9 Natural gas costs per tonne of hot rolled coils ($ 2012)
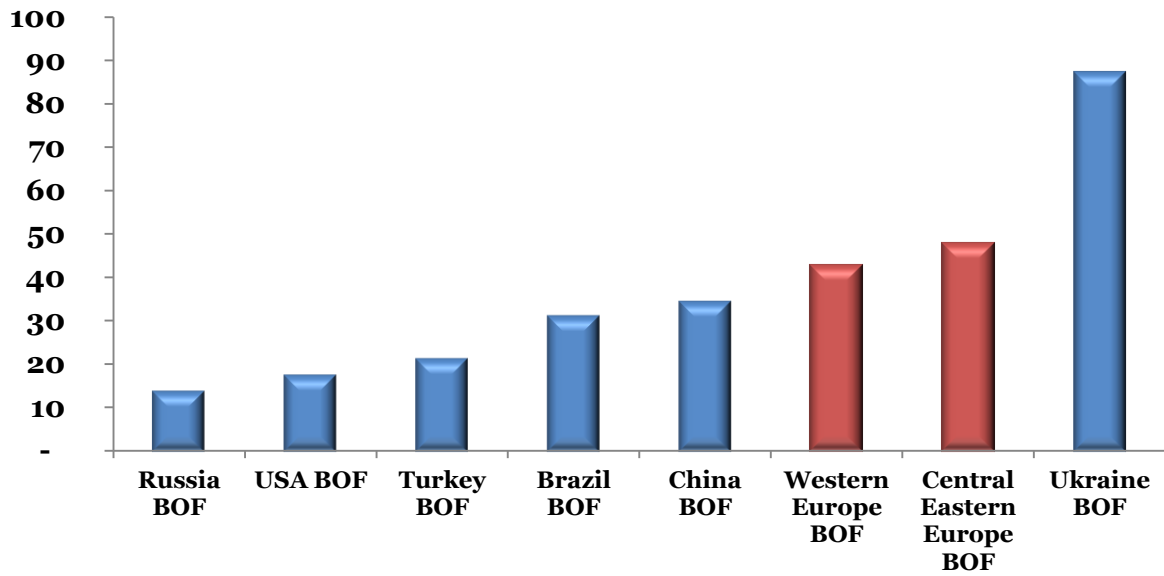
Source: Authors' elaboration on WSD, 2012

Figure 10 Natural gas costs per tonne of cold rolled coils ($ 2012)
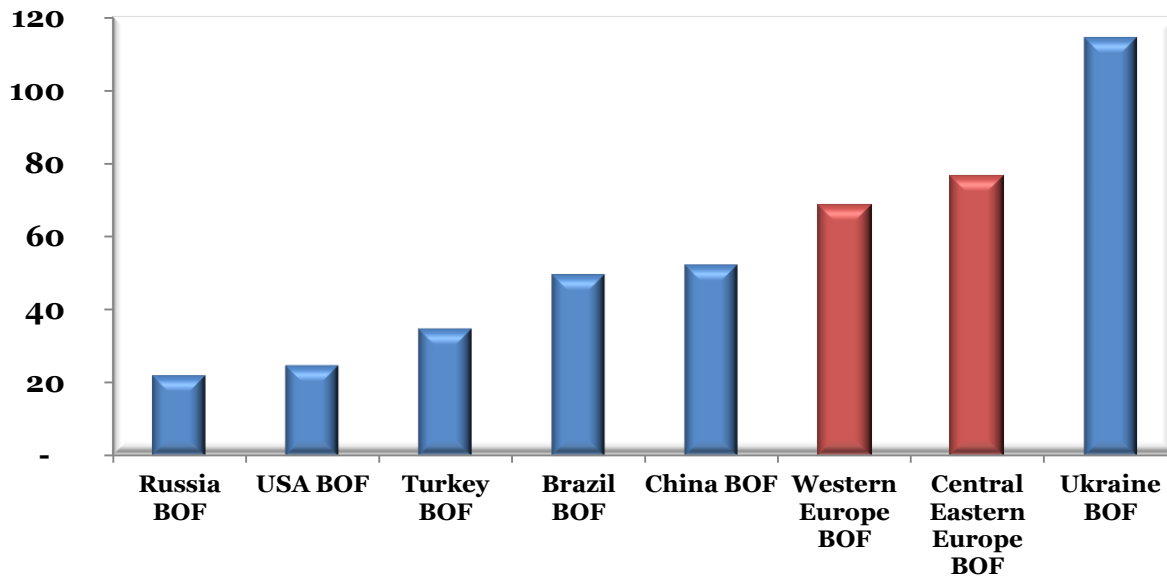
Source: Authors' elaboration on WSD, 2012

1.2.3 Breakdown of production costs per tonne

A closer look at the breakdown of costs per tonne of CRCs shows that variable costs[11] always account for the lion's share, ranging between 72% of total costs in the US and as high as 86% in Ukraine (see Figure 11 below). In particular, while variable costs account for 75% of total costs per tonne in Western Europe (raw material expenditures representing 49% and energy purchases 12%), they reach up to 81% in Central Eastern Europe (50% for raw materials and 15% for energy) where labour costs and investment costs are lower.

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[11] Not including labour costs, which are quasi-fixed in the short-term.

Figure 11 Breakdown of production cost per tonne of cold rolled coils ($ 2012)
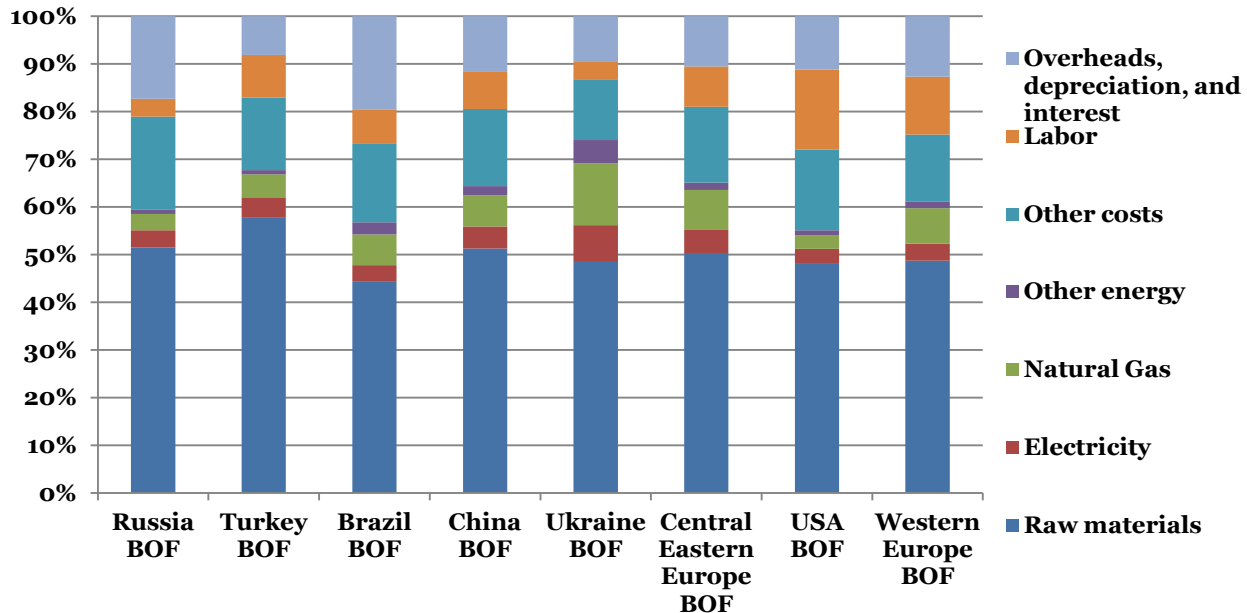
Source: Authors' elaboration on WSD, 2012

1.3 Production costs for long products

Production cost comparison for long products is mainly centred on EAF steel making plants delivering wire rods as finished products. The sample has been constructed by considering only commodity steel, with an average quality score based on WSD classification. As explained above, for China and Ukraine also fully integrated BOF plants have been included in the analysis, considering that the BOF technology has a predominant role in these countries. Nonetheless, data for BOF plants have been used only in the aggregate cost comparison to assess the relative competitiveness of EU producers *vis-à-vis* their international competitors. When breaking down costs, a comparison among BOF and EAF steel makers becomes of course meaningless, due to structural differences between these two production processes.

The following prototypical plants have been selected and compared:

- Brazil wire rod EAF;

- Central Eastern Europe wire rod EAF;

- China wire rod BOF;

- China wire rod EAF;

- Russia wire rod EAF;

- Turkey wire rod EAF;

- Ukraine wire rod BOF;

- USA wire rod EAF;

- Western Europe wire rod EAF.

At the liquid steel production stage (see Figure 12), Western European companies are the highest cost producers, one tonne costing 522$. This cost figure is comparable with expenditures incurred by Chinese (521$) and Turkish (519$) EAFs and 19% higher than Brazilian production costs. Central Eastern European plants register a cost per tonne equal to 510$, 16% higher than Brazilian ones. As for the intermediate production stage (see Figure 13), both Western (555$) and Central Eastern European (555$) steel makers have a cost advantage over billets made in Turkish (558$) and Chinese EAFs (580$) and BOFs (556$). European billets cost 14% more than Ukrainian BOF semi-finished products (486$) and 11% more than US EAF ones (501$). Focusing on the last production stage (see Figure 14), a tonne of wire rods costs 623$ in Western European plants and 630$ in Central Eastern ones, which is lower than the production costs incurred by Chinese EAFs (652$). As mentioned above for BOF plants, these values are consistent with the aggressive price strategies of CIS steelmakers in Central Eastern Europe, where thanks to these cost differentials, they are able to undercut European producers' prices by about 30 to 40 €/tonne. While wire rods made in Ukrainians BOFs are the least cost output (549$), US (570$) and Russian (571$) companies are the least cost EAF producers. In general, cost differentials for long products are narrower.

Figure 12 Production costs per tonne of liquid steel ($ 2012)
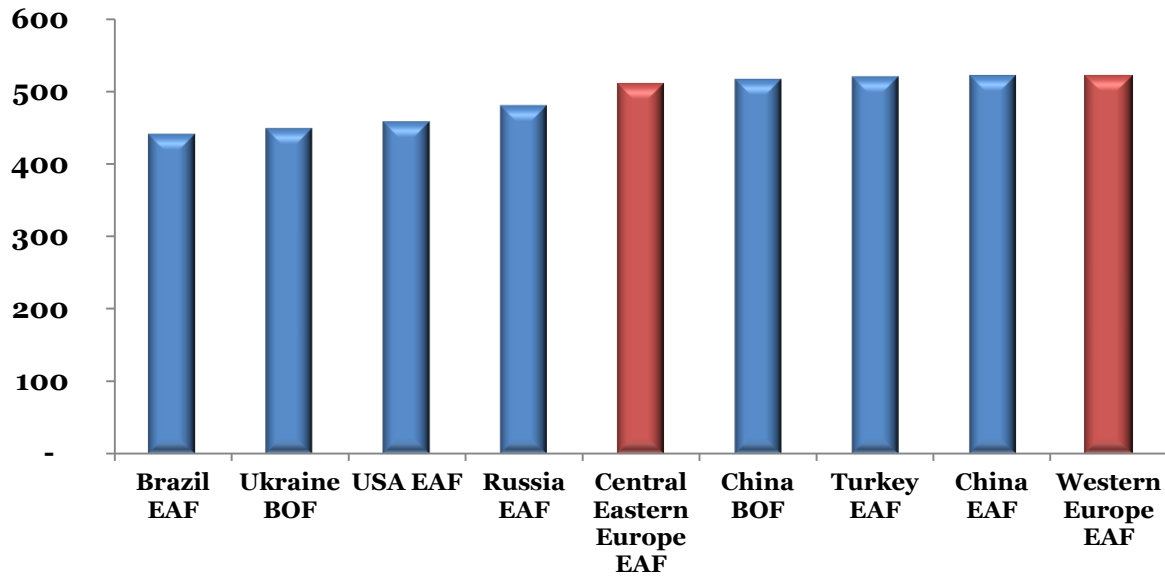
Source: Authors' elaboration on WSD, 2012

Figure 13 Production costs per tonne of billets ($ 2012)
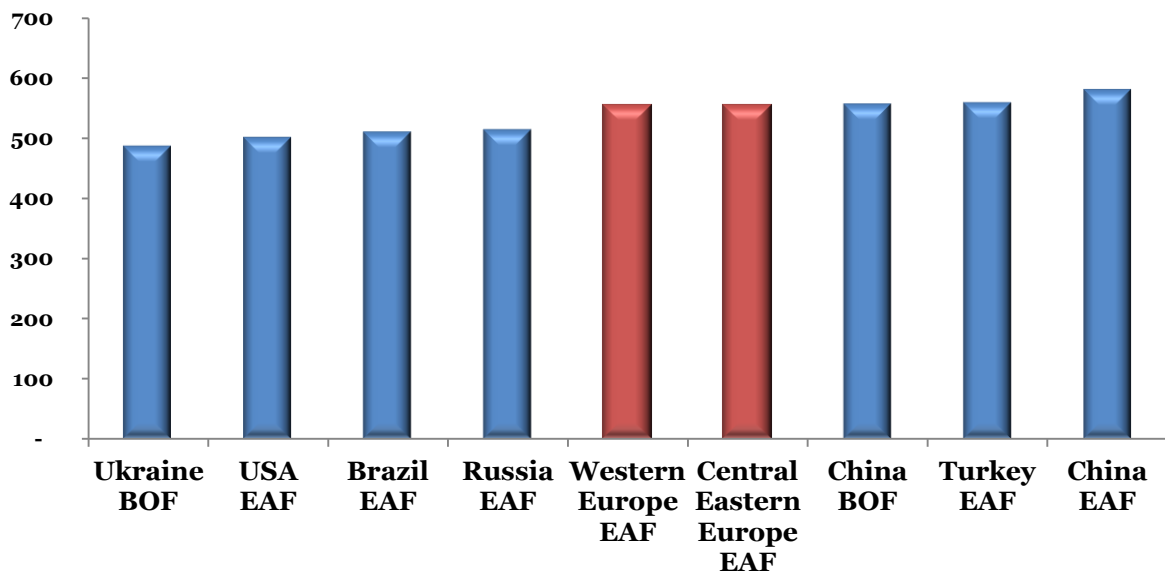
Source: Authors' elaboration on WSD, 2012

Figure 14 Production costs per tonne of wire rod ($ 2012)
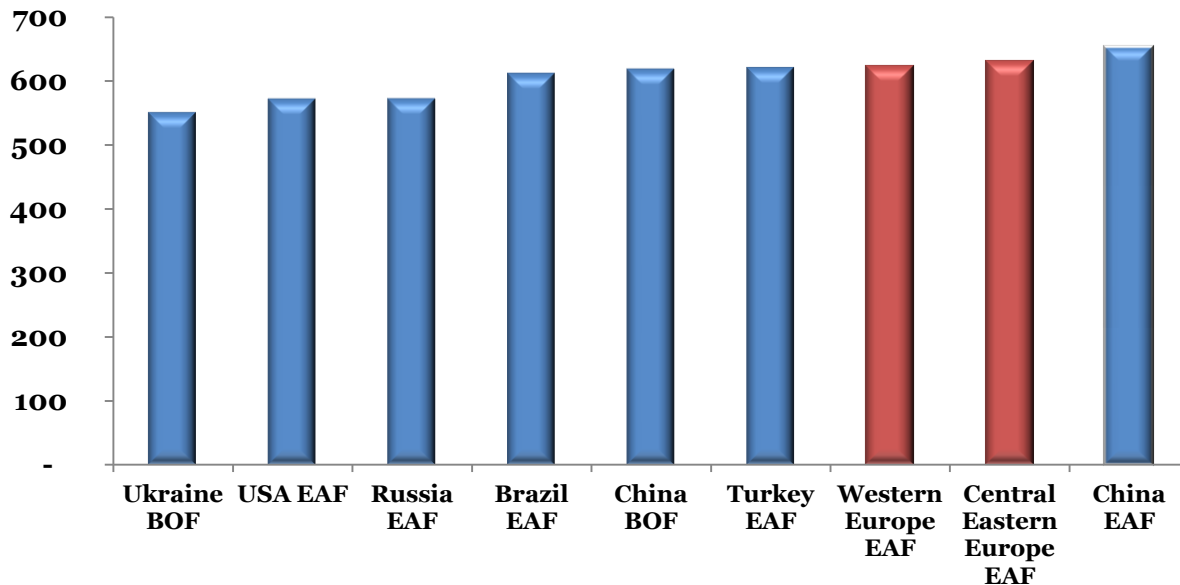
Source: Authors' elaboration on WSD, 2012

1.3.1 Production cost differential for wire rods

Cost differentials for European long products compared to the least cost EAF producers, i.e. US plants (see Table 4), are less marked than those registered for flat products. Central European wire rods cost 60$ more than US production (+10%), while Western European ones cost 53$ more (+9%). The existing differential mainly stems from expenditures for raw materials and electricity, confirming the burdens hampering EU steel making which emerged in the analysis for flat steel. Labour cost in the US is quite high, mainly due to differences in purchasing power parity, in particular compared with Central Eastern European countries.

Table 4 Cost differential between EU steel makers and least cost producers for wire rod ($ 2012)

	Central Eastern Europe EAF	Western Europe EAF
Raw materials	39	41
Labour	-37	-13
Electricity	39	32
Natural Gas	6	3
Other energy	-0	-0
Other costs	3	20
Energy/Scrap Credit	-4	-2
Overheads, depreciation, and interest	14	-28
TOTAL	**60**	**53**

Source: Authors' elaboration on WSD, 2012

1.3.2 Costs for raw materials, electricity, and gas

Western European (411$) steel makers and Central Eastern ones (410$) incur in similar costs per tonne of wire rods with regard to raw materials (see Figure 37), whereas Central Eastern companies have higher expenditure for electricity (78$, see Figure 38) and natural gas (15$, see Figure 39), also due to a higher energy intensity per tonne of output. The lowest costs for raw materials are incurred in Brazil (301$), with a differential higher than 100$ when compared to European production costs. Russian steel makers incur in the lowest costs per tonne both for electricity (37$, less than half of the Central Eastern European levels) and for gas (3$, one fifth of Central Eastern European costs). It is worth stressing that US and Brazilian facilities include production of Direct Reduced Iron (DRI), which is a gas-intensive process, thus explaining large costs for natural gas incurred by Brazilian EAF producers; indeed this effect is less immediate for US EAF producers, due to availability of low cost shale gas.

Figure 15 Raw material costs per tonne of wire rod ($ 2012)
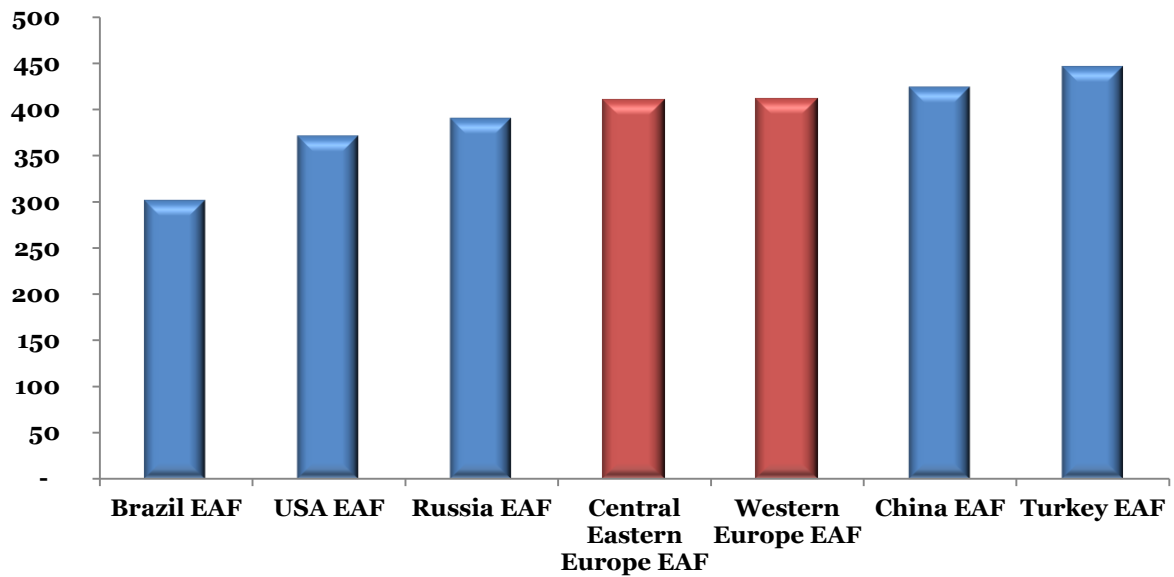
Source: Authors' elaboration on WSD, 2012

Figure 16 Electricity costs per tonne of wire rod ($ 2012)
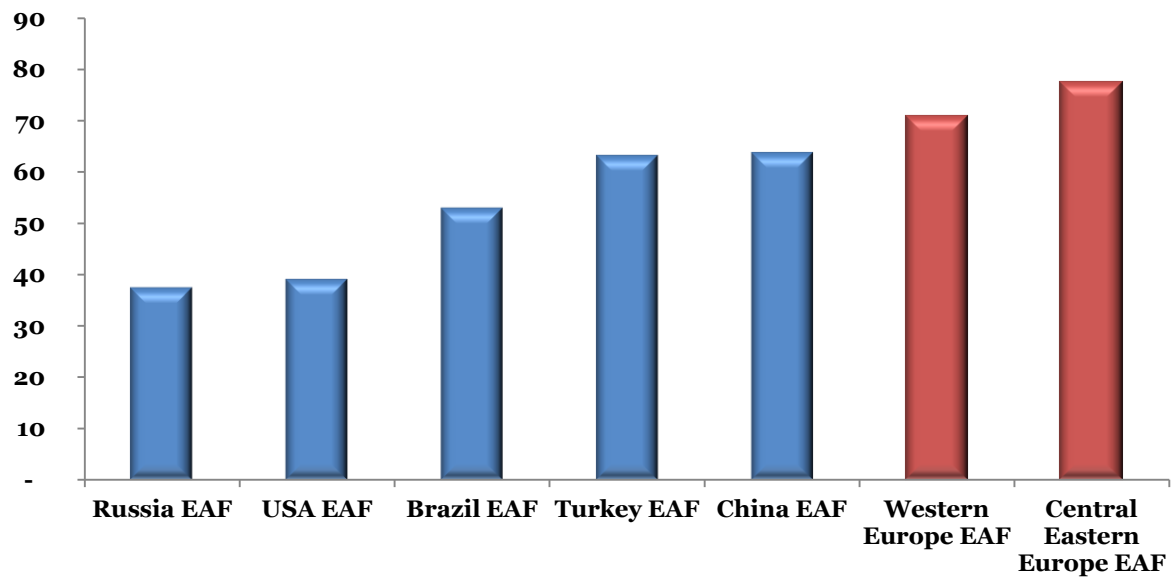
Source: Authors' elaboration on WSD, 2012

Figure 17 Natural gas costs per tonne of cold rolled wire rod ($ 2012)
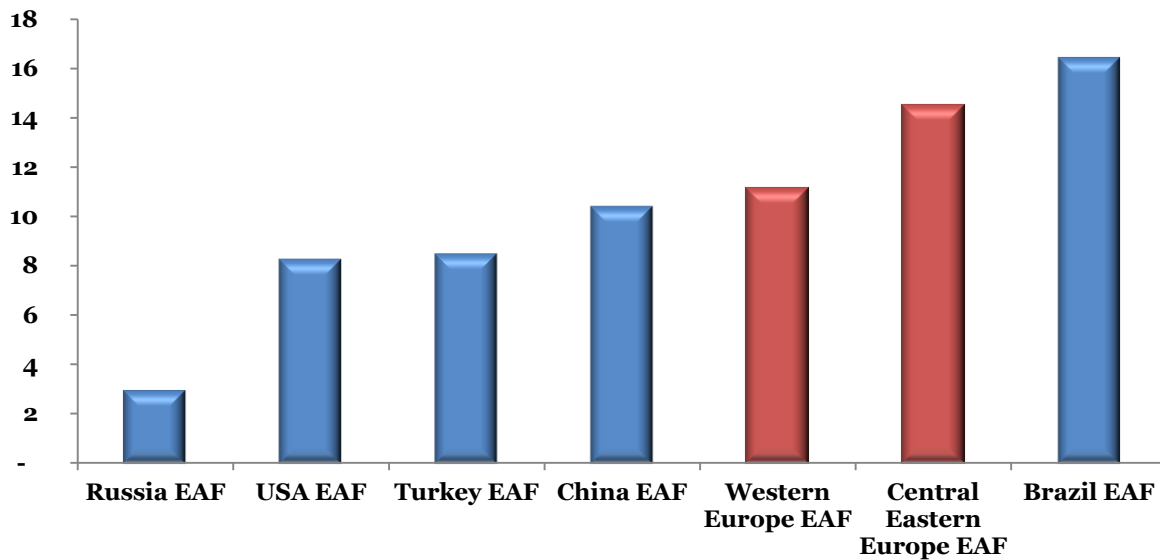
Source: Authors' elaboration on WSD, 2012

1.3.3 Breakdown of production costs per tonne

Focusing on cost breakdown per tonne of wire rods, it emerges that variable costs account for an even larger share of total costs compared to the case of BOF[12]: variable costs as indeed account for more than 80% of total production cost in all countries, except for US plants where labour costs are significant and for Brazilian ones where the cost for DRI facilities weighs significantly on total costs, due to high depreciation and interest expenditures (see Figure 18 below). A closer look at the cost structure of Western European plants shows that raw materials account for 63% of total costs and energy for 13%. Likewise, expenditures for raw material are equal to 62% of overall production costs in Central Eastern European facilities, while costs for energy reach up to 14%.

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[12] Not including labour costs, which are quasi-fixed in the short-term.

Figure 18 Breakdown of production cost per tonne of wire rod

Legend:
- Overheads, depreciation, and interest
- Labor
- Other costs
- Other energy
- Natural Gas
- Electricity
- Raw materials

Categories (x-axis): USA EAF, Russia EAF, Brazil EAF, Turkey EAF, Western Europe EAF, Central Eastern Europe EAF, China EAF
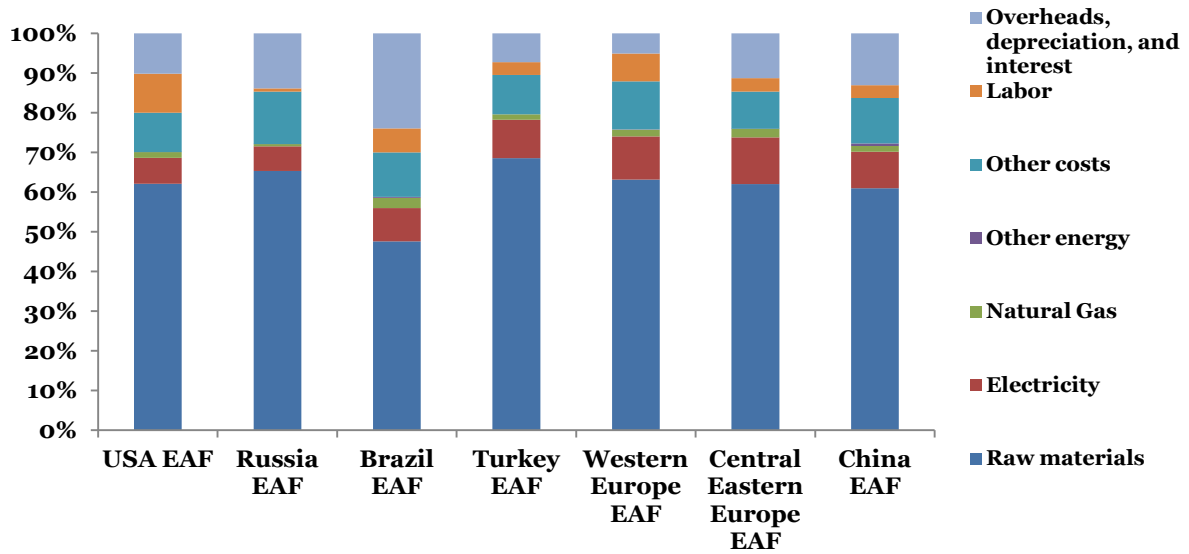
Source: Authors' elaboration on WSD, 2012

2 Cumulative Cost Assessment

This section provides an overview of the cumulative regulatory costs borne by the EU steel industry as a result of EU legislation. This assessment is based on the analysis included in Part IV of the present report, where the acts for each policy area are analysed and the methodology for each quantification is reported.

The analysis covers, to a varying degree, *three typologies of costs*, namely: (i) compliance costs (or direct costs), i.e. the costs incurred for fulfilling the substantive obligations spelled out in EU legislation (e.g. the respect of certain emission limits); (ii) administrative costs, comprising the costs incurred to fulfil the administrative obligations stipulated in the legislation (e.g. the costs for obtaining certain permits or authorizations); and (iii) indirect costs, which refer to the costs incurred by steelmakers as a result of regulatory measures that affect other operators along the value chain.

While the study analyzed the effects in no less than eight EU policy areas, regulatory costs were identified and could be quantified in *four areas*, namely: (i) climate change policy, (ii) energy policy, (iii) environmental policy, and (iv) product policy. The cumulative cost exercise covers the *2002–2012 period*. In some cases (e.g. environmental policy, climate change policy) it was possible to compute estimates for all (or most of) the years. In other cases (e.g. energy policy), reference was made to 2012. Different estimation methodologies were used, making use of a combination of primary and secondary sources. In some cases, estimates were based on information retrieved at plant level from both public databases and interviews with plant operators. In other cases, reference was made primarily to sector statistics, complemented as needed with information derived from interviews with selected steel makers. In other still, data were provided by industry associations, other stakeholders, published research or national regulations.

Estimated cumulative costs are presented *in terms of cost per unit of output* (€/tonne of steel). In order to provide an indication of the relative importance of the impact of EU legislation on the steel industry's operations, regulatory costs per unit of output were compared with key performance indicators, such as price-cost margin, EBIT and EBITDA. Also, whenever feasible, separate estimates were derived for the two main categories of steel makers, i.e. integrated plants ("BOF producers") and electric mills ("EAF producers"), as well as for a selection of steel products.

Two points are worth highlighting at the outset. First, the analysis inevitably suffers from some limitations. In particular, some regulatory costs are likely to have been incurred by the steel industry also in areas not covered by this study (e.g. labour

regulation) and/or for which no meaningful quantification was possible (e.g. some administrative costs linked to product regulation). In this respect, the figures presented here may under estimate the actual burden placed by EU legislation on the steel industry. At the same time, there are areas (namely, energy and environmental policies) where the separate impacts of EU policy and national policies are difficult to disentangle. In those cases, most of the effects were attributed to EU policy, which therefore leads to an overestimate of impact of EU regulation. Overall, as the different biases work in opposite directions, the figures presented here are believed to provide a reasonably accurate picture of the burden for the steel industry.

Secondly, no attempt was made to provide a comprehensive view of regulatory costs that might be incurred in the future. Some indications regarding future costs could be derived in some policy areas (e.g. climate change, environmental policy). Nevertheless, in most cases, estimating future costs requires a set of assumption and forecast which would force this study to depart from its hard-fact approach.

The section proceeds as follows. First, the cumulative regulatory costs are quantified; then, the production costs and margins for the EU steel industry are accounted for; and finally, cumulative regulatory costs are compared against a set of margin indicators and of production costs.

2.1 Cumulative costs of EU regulation

Here below, the categories of regulatory costs which could undergo quantification are listed:

1. **Climate Change**. Costs due to the ETS legislation have been quantified, in terms of:

   a. *Direct Costs*. These refer to the cost of purchasing CO_2 permits under the ETS system on top of the free allocations. The proceeds from the sale of ETS permits are regarded as negative costs. The cost estimate does not include the investment, financial and operating costs incurred by steel makers to reduce the CO_2 emissions, as these costs are not easily separable from measures to reduce environmental impacts. These costs are considered below under the heading Environmental Policy;

   b. *Indirect Costs*. These refer to the higher electricity prices paid as a result of the price of CO_2 permits passed on through electricity price, assuming that these costs were entirely passed on to steel makers. Indirect costs have been calculated based on the electricity intensity of steel production, the carbon

intensity of electricity generation and the price of EUAs. Differently from the analysis reported in Section 7, which focuses on crude steel, electricity intensity has been increased to reflect the higher amount of electricity required to produce finished products. Electricity intensity of finished products has been retrieved from WSD prototypical plants data. The following values have been estimated, as an average between Western and Central Eastern European steel makers, weighted by 2011 production volumes:

   i.   CRC: 0.433 MWh/tonne;
   ii.   HRC: 0.285 MWh/tonne;
   iii.   WR: 0.647 MWh/tonne.[13]

c.   *Administrative Costs.* These refer to the one-off costs incurred by steel makers for setting up the infrastructure for the measurement of CO_2 emissions as well as the recurrent costs for monitoring, reporting and verification.

For direct, indirect and administrative ETS costs, a weighted average of the values for the plants in the sample has been calculated based on production (BOFs) and capacity where, production was not available (EAFs).

2.   **Energy**. Two components of the electricity tariffs have been decomposed and quantified:

a.   *Transmission Costs.* Although the general organization of the electricity market depends on the EU *acquis*, the amount of transmission tariffs charged to large industrial customers depends on national policies. It should also be noted that in every world area, albeit different policies may result in a different burden sharing between large industrial customers and other market segments, either the customers or the public finances must bear transmission costs. To estimate average transmission costs, national values have been estimated based on ENTSO-E data and information retrieved from the interviews (as reported in Section 9). For three countries, direct information from interviewees was available. Reported data have been validated through official sources and information provided by other industrial customers; furthermore, they have made consistent, by considering only transmission costs and not other charges. For five countries, information from ENTSO-E was relied upon. Based on these data, a weighted average of national values has been calculated based on 2011 production volumes. There

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[13]   Average electricity intensity for crude steel: 0.179 MWh/tonne for BOF; 0.536MWh/tonne for EAF

is a certain variance among national transmission costs, but not as pronounced as for RES support. The average transmission costs are in the area of 7-7.5 €/MWh,[14] and five countries out of eight fall in a ±1.5% range. Two countries impose a transmission costs about 50% lower.

b. *RES support*. Although the EU has set mandatory targets for the national share of electricity generated through renewable sources, EU policies do not specify the amount of support for RES, nor how this burden is shared among different segments of customers, including large industrial customers. These decisions, which eventually determine if and how much steel makers pay for RES support, fall within the sphere of competence of member states. Combining information retrieved from interviews and estimates from secondary sources, the amount of RES support for steel makers has been estimated for six out of the eight countries in the scope of the study, as reported in Section 9.[15] These countries represent 69% of crude steel production in 2011. A weighted average of national values has been calculated based on 2011 production volumes. It should be noted that the average hides a large variance, where the difference between least and the most costly countries amounts to an order of magnitude. Although the weighted average is in the area of 5-5.5 €/MWh,[16] in the sample there are countries where RES costs are in the area of 1€/MWh; countries close to the average; and countries in the area of €10/MWh;

Energy taxes have not been included, as they cannot be attributed to any extent to the EU regulation on electricity taxation (see Section 9.3.5).

3. **Environment**. In the case of environmental policy, the analysis covered two typologies of regulatory costs:

a. *Direct costs* refer to the costs incurred by steel makers to comply with the substantive obligations of EU legislation in terms of pollution prevention and control. Direct costs are further subdivided into three sub-categories, namely: (a) investment costs (i.e. the money spent on pollution abatement measures depreciated over the estimated life of assets), (b) financial costs (i.e. the interest charges linked to investment outlays), and (c) operating costs (i.e. the

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[14] The weighted average varies for BOFs and EAFs, depending on country production volumes for each techonology.

[15] Missing value for HU and PT.

[16] The weighted average varies for BOFs and EAFs, depending on country production volumes for each techonology.

incremental expenses for personnel, raw materials, consumables, etc. associated with environmental protection interventions). The estimate of direct costs is subject to a certain margin of variability due to two (i) the existence of different estimates of environmental protection investments, and (ii) the concurrence of EU and national legislation.

b. *Administrative costs* refer to the expenses incurred by steel makers in connection with the issuance/renewal of the integrated environmental permits and with inspections for compliance checking.

Steel makers also sustained some indirect costs, in the form of higher electricity prices resulting from the expenses incurred by power producers in order to conform to emission limits. However, these indirect costs, conceptually analogous to those identified above in the case of climate change policy, could not be estimated due to lack of data.

4. Products and LCA. In the case of product policy, the analysis focused on the administrative costs related to the REACH Regulation. These encompass five sub-categories of costs, namely: (i) the registration of substances, (ii) the updating of registrations, (iii) the pre-registration of substances, (iv) the requirement to provide information to downstream users, and (v) the submission of documentation as part of the authorization/restriction process for dangerous substances.

Cumulative regulatory costs have been estimated for the year 2012 and for a typical year, as discussed in the section below.

2.1.1 Cumulative costs of EU rules in 2012

For some regulatory costs, as in the case of ETS, the availability of public information complemented by sound assumptions allowed to carry out a diachronic analysis, i.e. throughout the whole period of application of the legislation. For some other categories of costs, the analysis is synchronic. In some cases, this is the outcome of the methodology adopted. For example, for environmental cost a cumulated approach was chosen as the most correct; however, this also means that a realistic cost estimate is possible only for the last year of the period under analysis. In other cases, problems were linked to data availability. E.g., in case of RES support, it has already proven extremely difficult to retrieve information about the actual tariffs from secondary sources and interviewees, let alone digging back in the past. For this reason, first the cumulative regulatory costs are assessed for 2012, as this estimation for all cost categories is available. Costs expressed in tonne of finished products are reported in Table 5 for three finished products, HRCs, CRCs, and wire rods.

Table 5 Cumulative regulatory costs in 2012 (€/tonne)

			BOF HRC	BOF CRC	EAF WR
ETS		Direct	-2.69	-2.69	-0.54
		Indirect	0.29	0.45	3.06
		Administrative	0.13	0.13	0.10
		Sub-Total	*-2.27*	*-2.12*	*2.62*
Energy		Transmission	1.58	2.40	3.48
		RES	2.09	3.18	4.65
		Sub-Total	*3.67*	*5.58*	*8.12*
Environment	Direct	Investment	1.35	1.35	1.13
		Financial	0.73	0.73	0.61
		Operational	4.05	4.05	3.39
		Administrative	*0.01*	*0.01*	*0.04*
		Sub-Total	*6.15*	*6.15*	*3.39*
Product	Administrative – REACH		0.10	0.10	0.05
	Sub-Total		*0.10*	*0.10*	*0.05*
		Total	**7.65**	**9.72**	**14.18**

Source: Authors' elaboration

BOF and EAF producers face different regulatory costs in 2012, and EAFs bear the higher cost per tonne of finished products. This is due to the higher impact that the electricity-related costs, that are indirect ETS costs, transmission tariffs and RES support, have on electro-intensive EAFs, and to the fact that they did not benefit from ETS over allocation as much as BOFs. On the contrary, environmental investments represent a significantly burden for BOF producers, which also have to bear marginally higher administrative costs.

Across the different policy areas, for BOF producers the largest burden is due to environmental protection, with a large share of environmental costs due to operational costs; energy costs are also relevant for BOF plants, and more so for CRC, whose production process is more energy intensive. Climate change legislation did not impose any cost in 2012 on BOFs, due to the over allocation of EUAs, which more than compensated indirect costs passed on through electricity price. As recalled, for EAF producers, the largest costs arise from the energy area, due to high electricity intensity, followed by investments in environmental protection. Climate change legislation imposed on EAFs a cost of about 2.6 €/tonne due to indirect ETS costs.

2.1.2   Typical cumulative cost of EU regulation in a "typical year"

Due to the fact that providing a diachronic regulatory cost analysis was not possible, an index of the typical cumulative cost has been constructed to assess the impact of regulatory costs in the period 2002-2011. This is based on 2012 information, adjusted where needed as explained below, hence should be considered an estimation of the cost of the EU regulation as it stands now. Consequently, it is a good proxy to compare the cost of the <u>current state of the EU legislation</u> for the steel sector against the different margins that the EU industry has experienced in the decade from 2002 to 2011, as done in section 1.3 below.

The following adjustments apply:

1.   Benefits due to over allocation of EUAs have not been included in the typical cumulative regulatory costs, as they are mostly a result of the economic crisis and of the lack of reliable information on CO_2 emissions per industrial installations at the start of the scheme. Hence, this should be considered a one-off event which does not reflect the current state of the EU legislation as per its purposes and current application;

2.   Indirect costs of ETS have been average out throughout the period 2005-2012;

Typical cumulative costs have been calculated for both BOF-produced Hot Rolled Coils and EAF-produced Wire Rods. Costs for both products are reported in Table 6.

Table 6 Cumulative regulatory costs in a typical year (€/tonne)

	BOF HRC	EAF WR
ETS	0.74	5.85
Energy	3.67	8.12
Environment	6.15	3.39
Product (REACH)	0.10	0.05
Total	**10.66**	**17.41**

Source: Authors' elaboration

Again, costs in a typical year are higher for EAF than for BOF producers due to the higher electricity-related cost, and to the fact that so far the ETS did not impose any direct cost on steel makers. However, as reported in Section 7, the ETS system is in a state of flux, as the third phase has just been entered into since January 2013. While no cost assessment can be carried out at this stage, as any evaluation should be based on

forecasts rather than on actual data, and thus not in line with the analysis presented above, the future direct costs of ETS will increase and become positive. Depending on future EUA prices, the scenario analysis therein reported for a single plant seems to indicate that the regulatory cost advantage of BOFs is likely to disappear.

Given that margins for the period 2002-2011 are available for the steel industry as a whole, rather than for specific products,[17] the typical cumulative cost has also been calculated for a non-technology specific plant. This value results from the average of the BOF and EAF costs weighted by the EU cumulated production through both routes in the period 2002-2011; it is reported in Table 7 below.

Table 7 Cumulative regulatory costs in a typical year – Non-technology specific plant (€/tonne)

	Typical Year
ETS	2.79
Energy	5.46
Environment	5.04
Product (REACH)	0.08
Total	**13.37**

Source: Authors' elaboration

2.2 Production costs and margins of the EU steel industry

2.2.1 Production costs and margins of the EU steel industry in 2012

Production costs

Per-tonne production costs incurred by steel makers have been estimated in Section 1 by relying on data provided by WSD and updated to December 2012. In particular, costs for EAF wire rods and for HRC and CRC made in integrated plants have been detected. In order to account for the existing differences in terms of input prices and technical efficiency between plants located in old member states and those located in new member states, cost were separately estimated for Western Europe and Central Eastern Europe. Here, to ensure comparability with cumulative costs of EU regulation

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[17] This is also the custom comparison in this industry, as reported by Eurometal.

summarized in the previous section, per-tonne costs for a typical European BOF producer as well as for a typical EAF plant have been estimated, as an average between production costs incurred by Western and Central Eastern European steel makers, weighted by their 2011 production volumes (see last row in Table 8).[18] In addition, costs have been converted in Euro.[19]

Margins

The assessment of margins registered by the EU steel industry is not an easy task. Indeed it is very hard to retrieve meaningful information from companies' balance sheet data, since many companies – especially the largest ones accounting for very high share of EU steel production – are involved in several business lines, thus making it complex to single out balance sheet indicators such as profits/losses, EBIT, or EBITDA representative of steel making activities and, even worse, on particular production segments.

One way to estimate margins is to consider the price-cost mark-up, by computing the differential between market prices and production costs for finished products, differentiating between full production costs, capital costs, financial costs and the costs of raw materials. Average market prices per tonne of wire rod, HRC, and CRC registered in 2012 are drawn from MEPS.[20] Table 8 shows a set of margin proxies calculated for each finished product in scope of this Section:

1. Price-cost margin, i.e. the difference between market price and overall production costs;

2. EBIT, i.e. the difference between market price and production costs, excluding interest and taxes;

3. EBITDA, i.e. the difference between market price and production costs, excluding interest and depreciation;

4. Margin over raw materials, i.e. the difference between market prices and cost incurred by BOF producers to purchase the required amount of coal, coke, iron ore, and scrap; and by EAF ones for scrap, pig iron, and DRI.

In 2012 margins for integrated plants making flat products are very narrow and even negative when looking at price-cost margins and EBIT for CRC. On the contrary, EAFs

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[18] Production volumes by country and production process are provided by World Steel (2012).

[19] USD/EUR exchange rate: 1.285 (2012 annual exchange rate, source: ECB).

[20] MEPS EU Carbon steel prices with individual product forecasts, available online at http://www.meps.co.uk/EU%20price.htm, last accessed on 31 May 2013.

making long steel enjoyed better results. EBITDA figures for HRC made in BOF and wire rod made in EAF are comparable, in line with the higher capital intensity of integrated producers. The largest differential between market price and raw material is registered by CRC, representing the most energy intensive production as well as the highest added value output (see Table 9).

Table 8 Production costs and margins of the EU steel industry (2012 - €/tonne)

	Wire rod (EAF)	HRC (BOF)	CRC (BOF)
Price-Cost margin	38	-3	-34
EBIT	43	9	-20
EBITDA	58	50	30
Price-Raw Materials	203	179	240
Production costs	485	519	626

Source: Authors' elaboration on WSD, 2012; and MEPS, 2013.

Table 9 Margins of the EU steel industry (% over market price)

	Wire rod (EAF)	HRC (BOF)	CRC (BOF)
Price-Cost margin	7.2%	-0.6%	-5.7%
EBIT	8.2%	1.7%	-3.3%
EBITDA	11.2%	9.6%	5.0%
Price-Raw Materials	38.9%	34.8%	40.5%

Source: Authors' elaboration on WSD, 2012; and MEPS, 2013.

2.2.2 Margins of the EU steel industry between 2002 and 2011

Margins registered by the EU steel makers in 2012 might not be representative for the average profitability of the European steel industry, as they are largely affected by the overall economic downturn started in 2009.[21] For such a reason, an estimate of industry margins over the period 2002-2011 has been provided (see Table 10). Data on EBITDA per tonne of steel shipped by EU producers are reported in the "Global Steel Financial Reports" (GSFR) database, included in the GSIS platform compiled by WSD. GSFR includes per-tonne EBITDA for a sample of producers accounting for 22% of the total production capacity installed in the EU in 2010 (34% of total BOF capacity and 4% of total EAF).[22] In order to increase the representativeness of the sample, balance sheet data for 69 European steel makers – including both BOF and EAF producers and covering 17 member states - have been taken into account. Margins registered by these companies have been used to adjust the estimates provided by WSD, thus computing an

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[21] EU steel production in 2012 was lower than in 2002 and experienced a decrease when compared to 2011 levels.

[22] Steel Business Briefing & EuroStrategy Consultants, 2010.

average annual EBITDA for the EU steel industry. As a result, over the period 2002-2011, EBITDA went from – 25 €/tonne of steel in 2009 to 142 €/tonne in 2006.

With regards to HRC, figures for margin over raw materials have been estimated on data kindly provided by Eurometal. In the same period this margin went from € 132 per tonne in 2002 to € 315 per tonne in 2008.

Table 10 Margins of the EU steel industry (€/tonne at constant 2012 prices)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
EBITDA*	48	71	99	77	142	110	92	-25	38	43
Price-Raw Materials (HRC)**	132	174	312	275	248	266	315	147	194	130

Source: *Authors' elaboration on WSD, 2012;**Eurometal, 2013.

2.3 The impact of cumulative regulatory costs

This section presents the impact of the cumulative costs due to EU legislation on the margins and costs of the steel industry. Table 11 reports the comparison against costs and margins for 2012.

Table 11 The impact of cumulative regulatory costs – 2012

	Wire Rod (EAF)	HRC (BOF)	CRC (BOF)
Price-Cost margin	37.3%	-255.0%	-28.6%
EBIT	33.0%	85.0%	-48.6%
EBITDA	24.4%	15.3%	32.4%
Price-Raw Materials	7.0%	4.3%	4.1%
Production costs	2.9%	1.5%	1.6%

Source: Authors' elaboration

Cumulative regulatory costs are low compared to the overall cost of steel production. For EAF wire rods, they represent about 3% of total costs. For BOF producers, they represent less than 2% of the cost of producing HRCs and CRCs. As far as the price-raw material margin is concerned, in 2012 regulatory costs represent about 7% of this margin for EAF products and about 4% of the margin for BOF products. Raw materials costs are largely exogenous for European steel makers, given that they have almost no grasp on raw materials worldwide resources and thus price. Price-raw materials margins are important, and according to many interviewees are customarily kept under control

by both steel makers and customers, and constitute a fair proxy of the value added generated by the industry, especially for BOF producers (which are characterized by relatively lower costs for electricity and gas and higher efficiency in energy recovery).

As 2012 has been a bad year for the steel industry, with low margins, tight competition and a situation of overcapacity due to the economic cycle, the cumulative regulatory costs, albeit low in absolute terms, can bite away profitability. And indeed this is confirmed by the share of regulatory costs over EBITDA. For EAF producers, regulatory costs measured in this study represent about a quarter of their EBITDA; for BOF producers, regulatory costs represent between 15% and 33% of the EBITDA. At smaller margin proxies, that is the EBIT and the price-cost margin, the share of regulatory costs obviously increases.

Impacts of cumulative regulatory costs on production costs and margins are shown in Figure 19, Figure 20 and Figure 21 below.

Figure 19 Cumulative regulatory costs vs. margins and production costs – Wire rod (2012, €/tonne)
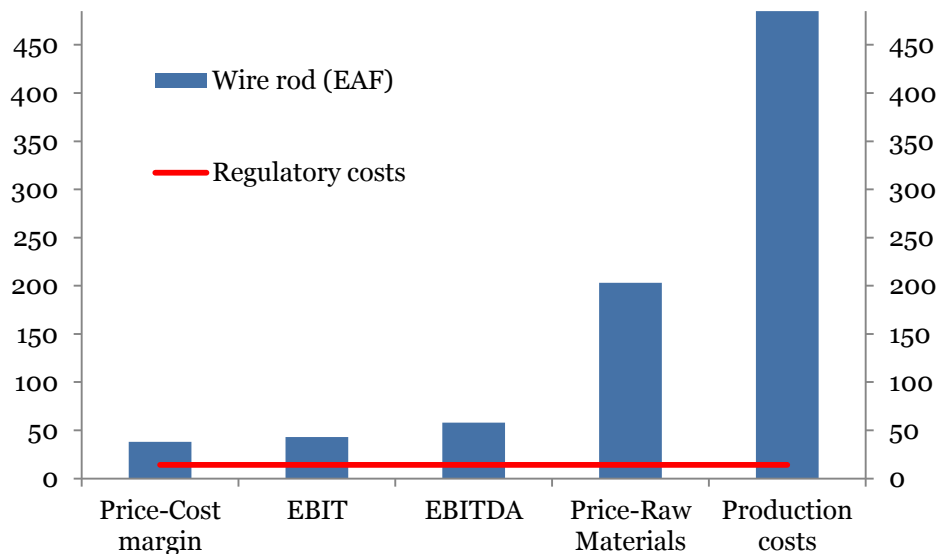
Source: Authors' elaboration

Figure 20 Cumulative regulatory costs vs. margins and production costs – HRC (2012, €/tonne)
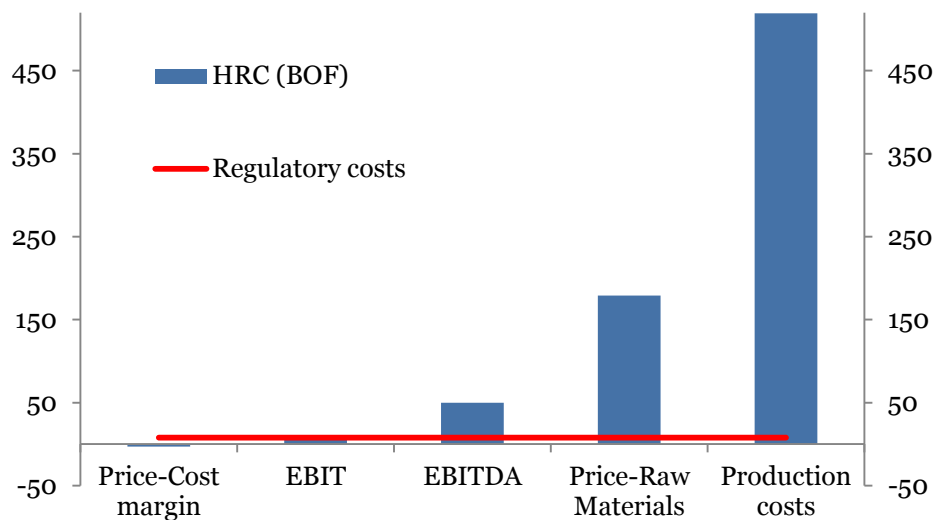
Source: Authors' elaboration

Figure 21 Cumulative regulatory costs vs. margins and production costs – HRC (2012, e/tonne)
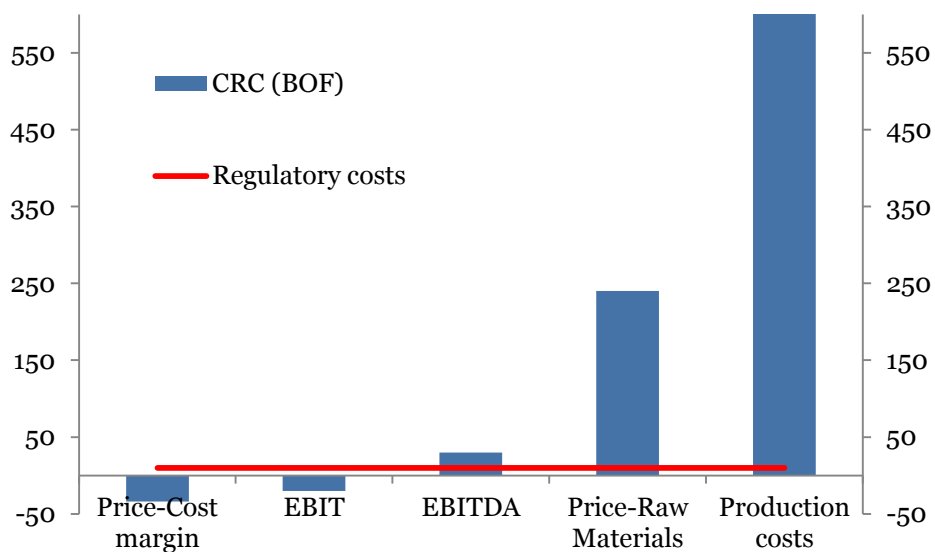
Source: Authors' elaboration

The steel industry is a pro-cyclical industry. Hence, to have a fuller picture, typical cumulative regulatory costs are compared with two proxies of the industry margins in the period 2002-2011. Here, it becomes clear as the significance, and thus the impact, of regulatory costs changes accordingly to the cycle. As shown in Table 12, Figure 22, and Figure 23, cumulative regulatory costs over EBITDA[23] were in the area of 9 to 15% in the boom years. Such a share of regulatory costs over EBITDA is unlikely to put EU steel makers in a dangerous competitive position. Actually, many would consider it a "fair price" to pay to enjoy the benefits of Europe, such as proximity to high-added value customers or the access to a skilled labour force. However in times of crisis, regulatory costs may be even higher than EBITDA, such as this was the exceptional case of 2009, or, more often, fall in the area of 28% to 35% of the EBITDA. At this level, they may endanger the viability of the industry, as the EBITDA needs to cover financial expenditures, depreciation and amortization, that is the cost of capital.

The same reasoning goes for the share of regulatory costs over the price-raw materials margin.[24] The competitive position of the EU steel industry is sharply different if 3% to 4% of actionable costs are spent to comply with EU regulation, as in the boom years, or whether this share reaches up to more than 8%, as it was the case in 2002 or 2011.

Table 12 The impact of typical cumulative regulatory costs – 2002 – 2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
EBITDA	28.1%	18.9%	13.4%	17.3%	9.4%	12.2%	14.5%	-53.9%	35.0%	30.9%
Price-Raw Mat. (HRC)	8.1%	6.1%	3.4%	3.9%	4.3%	4.0%	3.4%	7.3%	5.5%	8.2%

Source: Authors' elaboration

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[23] Regulatory costs: typical cumulative costs for the EU steel industry (13.37 €/tonne of finished product).

[24] Regulatory costs: typical cumulative costs for HRC (10.66 €/tonne of HRC).

Figure 22 Typical cumulative regulatory cost vs. steel EBITDA (2002-2011)
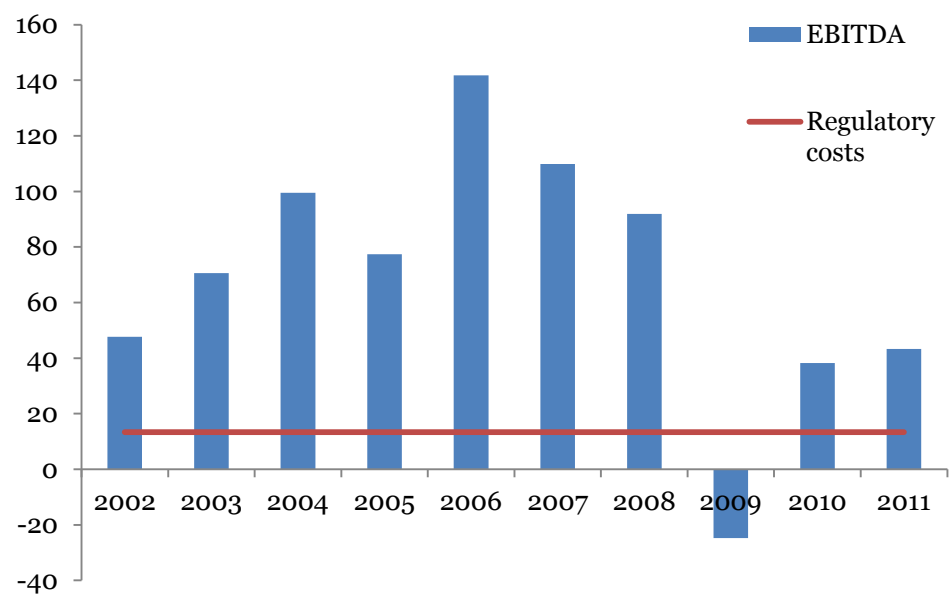
Source: Authors' elaboration

Figure 23 Typical cumulative regulatory cost vs. HRC Price-Raw Materials margins (2002-2011)
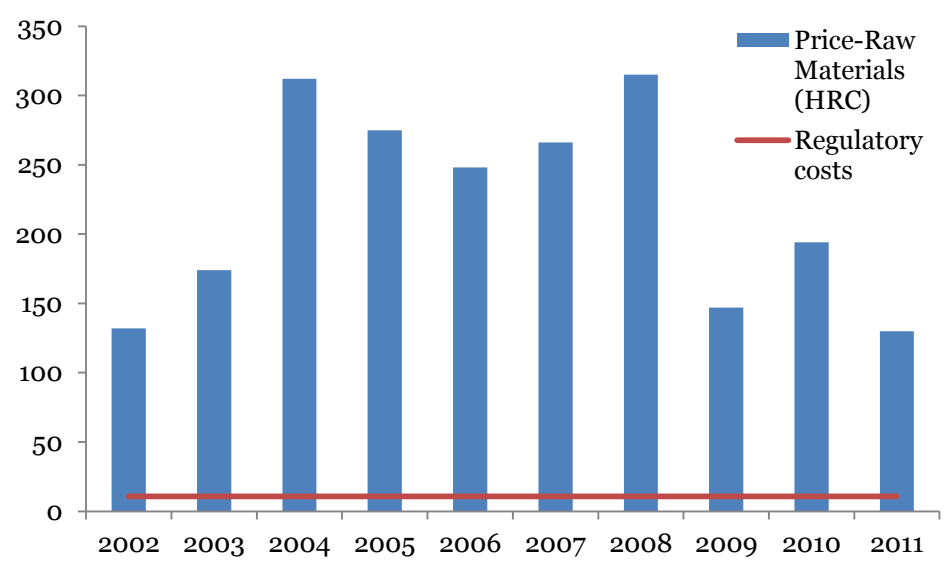
Source: Authors' elaboration

Finally, Table 13 and presents the comparison of cumulative regulatory costs in 2012 with the cost differentials with the least cost producer, as reported in Section 1 above.[25] Both cost differentials including and excluding raw materials are compared to. The latter is important as the cost of raw materials is, for most European steel makers, an exogenous factor. However, what determines the relative competitiveness of the EU steel industry is the former, i.e. the total cost differential including raw materials.

Importantly, the comparison has a certain degree of spuriousness. Indeed, in some cases EU producers are the only ones bearing certain categories of costs (e.g. REACH); in some other cases, European producers bear higher costs but other world areas have implemented or are going to implement similar regulations (e.g. RES support, carbon price mechanisms); in some other cases European producers are not at all at a measurable disadvantage (e.g. US steel makers, the least cost producers for wire rods, face comparable environmental protection standards). However, the following comparison provides an idea of how much regulatory costs impact on the EU international competitiveness.

Table 13 The impact of cumulative regulatory costs on cost differentials – 2012

	Wire Rod (EAF, US)	HRC (BOF, RUS)	CRC (BOF, RUS)
Cost Differential	35.60%	6.80%	6.00%
Cost Differentials w/o Raw Materials	109.08%	13.66%	8.24%

Source: Authors' elaboration

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[25] Average cost differentials for Western and Central Eastern European producers, weighted by relative share of EAF and BOF production volumes in 2011. USD/EUR exchange rate: 1.285 (2012 annual exchange rate, source: ECB).

Figure 24 The impact of cumulative regulatory costs on cost differentials - 2012
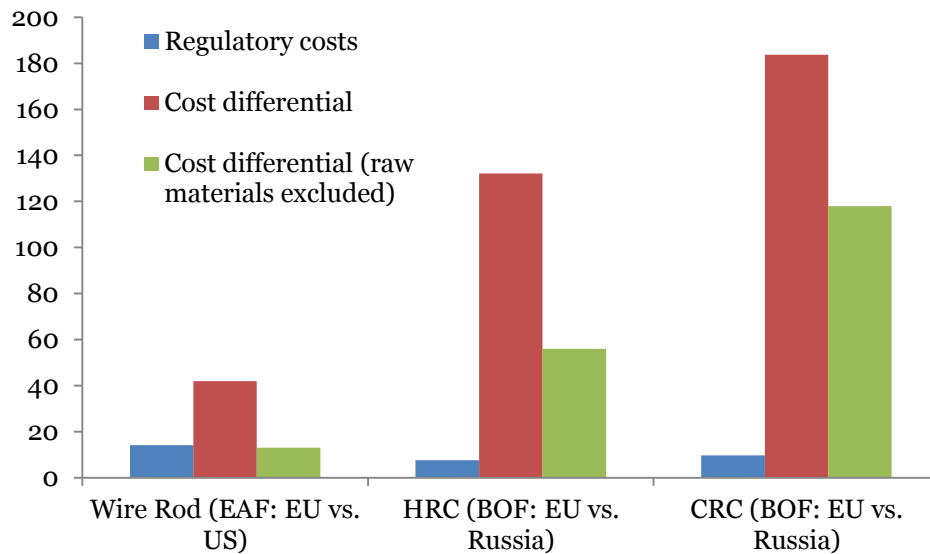
Source: Authors' elaboration

Results are not straightforward. On one side, the share of cumulative regulatory costs is relatively higher for EAF wire rods, for which they represent more than a third of the overall cost differential, and are slightly higher than this differential excluding raw materials. However, this is the finished product for which the cost gap is narrower, hence for which the competitiveness disadvantage of EU producers is smaller. In a nutshell, for EAF producers cumulative regulatory costs represent a large share of a small differential. Furthermore, given that the least cost producers are US EAFs, the regulatory cost differential would most likely be significantly smaller if a detailed analysis of US regulatory costs were included. On the contrary, for BOF products, where the least cost producers are Russian steel makers, and for which the regulatory cost differentials as reported above is likely to be a fairer proxy of reality, it appears that the causes of the cost differentials cannot be attributed, if not to a small extent, to EU regulatory costs, even when considering cost differentials without raw materials (on which the share of regulatory costs is obviously higher).

PART II

A METHODOLOGY FOR THE CUMULATIVE COST ASSESSMENT

3 A methodology for the assessment of cumulative costs on the steel industry

3.1 The framework of the study

The objective of the study is to identify, assess, and where possible quantify, the cumulative costs of the EU legislation on the steel sector. Before moving on to describe the methodology and the scope of the study in terms of objects of analysis and policy areas, it is important to clarify the reason why this research question is important. Indeed, this will help framing the perspective through which this study is carried out.

The relationship between EU industrial policies and the steel sector, as well as many other industries, can be framed as a trilateral relation, as shown in Figure 25.

Figure 25 The EU industrial policy trilateral relation
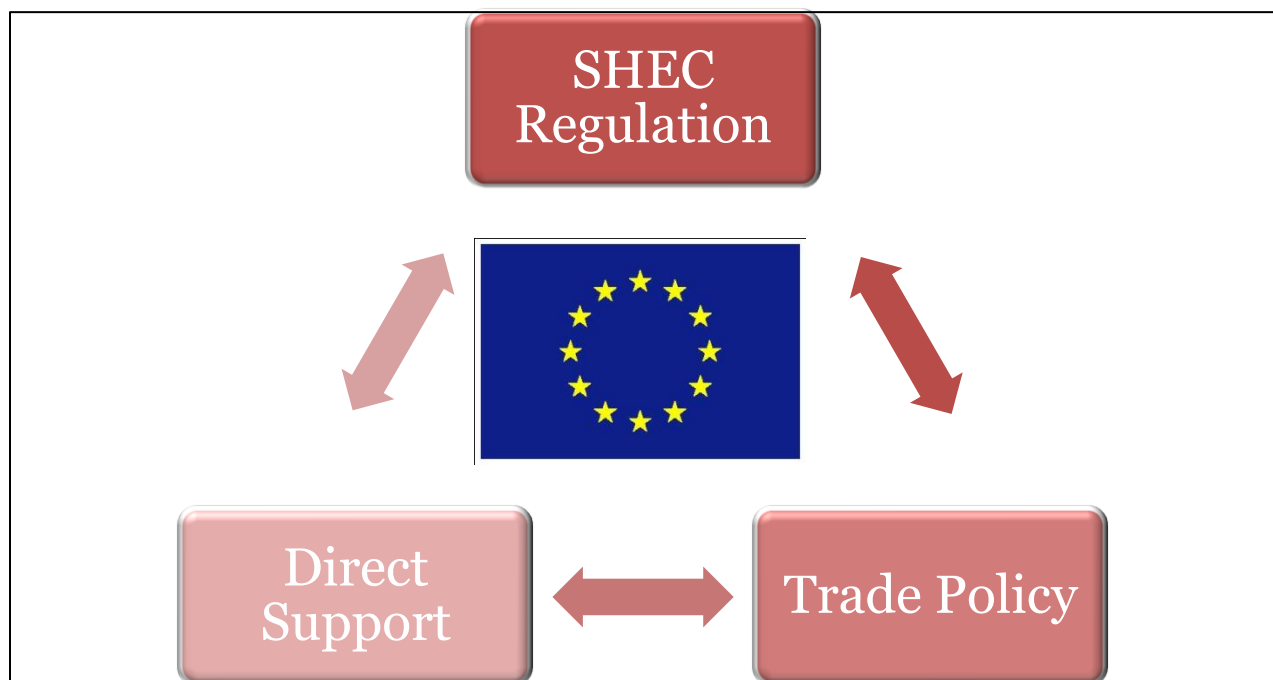
More specifically, the EU is currently:

1.   Imposing Safety, Health, Environmental and Consumer (SHEC) regulation on the steel industry. This body of regulation delivers benefits to the society at large which have to outweigh its costs; consistently with the "polluter-pays" principle, the cost

of avoiding/repairing harms falls on the addresses of the regulation, in this case the steel manufacturers;

2. Adopting a free trade policy makes the EU Single Market fully open to extra-EU steel products. A free trade policy is capable of delivering benefits to the society at large (including steel producers getting access to extra EU markets) which more than compensate its costs. Such a policy does not preclude the possibility of resorting to trade defence means (anti-dumping and countervailing duties) against unfair trade practices, when the necessary conditions are met. However, also in this case, while benefits materialise with consumers of (cheaper) steel products, the heightened competition resulting from free market access impinges on steel manufacturers;

3. Not providing direct support to steel production. With limited exceptions, the EU steel industry, especially after the privatisation process, is a non-subsidised free-market industry.[26] This policy delivers benefits for the society at large, as resources are free to flow towards the most productive sectors, rather than being artificially allocated to certain industries. However, the same free market approach is not always prevalent in other areas of the world and, as a result, EU steel producers may find themselves at a comparative disadvantage.

As briefly explained, these policies are beneficial *per se*. However, considered together, they present possible trade-offs. In a globalised world, if an economic area pursues these three policies at the same time in isolation – and this is not to claim that the EU is doing so –, its industry, in this specific study the steel sector, may be at risk of losing competitiveness. In particular, SHEC regulations create additional costs for the industry located within that economic area. At the same time, the lack of direct support prevents societal resources to compensate for these costs; and a free trade policy prevents price differentials with international competitors to be established, which would again compensate for SHEC costs. If SHEC regulatory costs are significant enough to overcome the benefits of proximity - transport cost savings, as well as less quantifiable benefits stemming from trust, close relationships with customers, and external network economies – producers will find it rational to invest in and import from other areas of the world, where SHEC regulation is partly or fully lacking.

To complete the picture, other exogenous factors impact on the cost structure of the steel industry, and thereby on its international competitiveness: the costs of energy not

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[26] The steel industry still benefits from certain exemptions aimed at lowering certain taxes or other costs (e.g. energy costs), as many other energy intensive industries. However, it is largely no longer the target of <u>direct</u> support, be it in-kind or monetary, as it still happening in other world areas.

attributable to regulation, the costs and distribution of raw materials, and the investment legacy, i.e. the relative efficiency of existing European vs. non-European steel making facilities. These factors play a role in creating positive or negative cost differentials, and therefore need to be taken into account in the analysis. However, from a policymaker's perspective, these costs are not directly actionable, meaning that they do not result directly from EU policies. EU policies may have an impact, but are not the drivers of these costs; most importantly, these cost differentials can hardly be modified through a change in legislation (albeit policymakers may decide to compensate for them).

Finally, it should be noted that the EU is not the only tier of government with the power to regulate the steel industry. Although trade policy is an exclusive competence of the EU, both SHEC regulation and financial support fall within the EU and Member States' sphere of competence. In the study, national policies will be taken into account where appropriate (e.g. regarding the differences in the costs of electricity), but should be considered another exogenous factor from the perspective of the EU policymakers.

The complete framework underpinning this study, with both endogenous policies and exogenous factors, is represented in Figure 26.

Figure 26 The EU industrial policy trilateral relation and exogenous factors
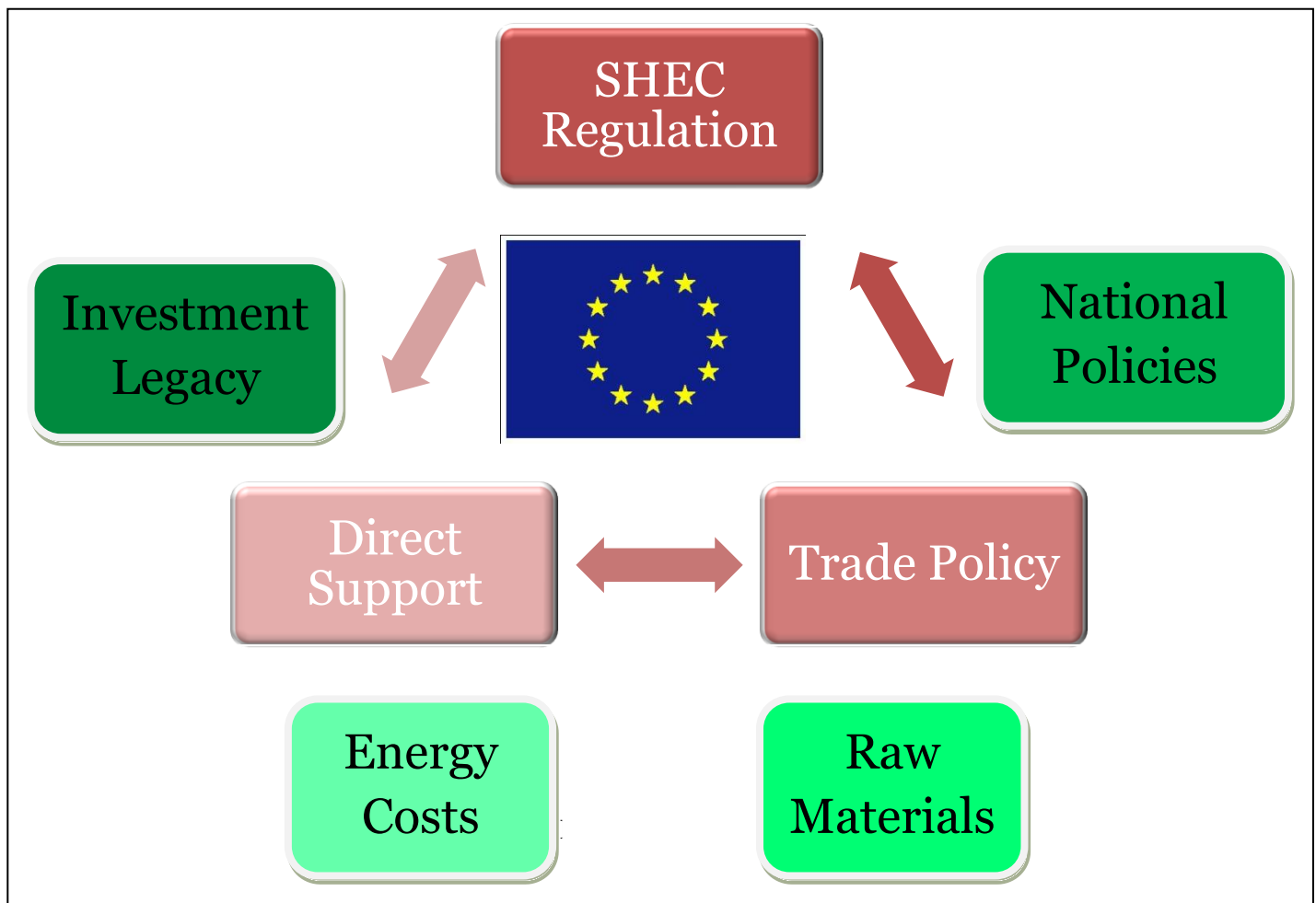
In light of the above, it is now possible to better operationalise the research question. Specifically, the aim of this study is to identify, where possible quantify, and assess, and the cumulative costs of selected EU legislation on the steel sector; compare these costs with the production costs of international steel competitors and understand if and how much the costs of EU regulation impact on the cost structure of the European steel industry and on its competitiveness.

Once the aim of the study has been identified, it is also worth clarifying what this study is not. In particular, **it is not an assessment of the costs compared to benefits of the legislation falling within the scope of the study**. The research question is limited to assessing only the costs of legislation and only on the steel industry. For example, this study does not assess whether the ETS system delivers net benefits to the EU society, or whether the net impact of competition policies on the steel industry is positive or negative. It only aims at calculating what the costs borne by the steel industry are. As such it is to be distinguished from a fully-fledged fitness check1, which would identify, quantify and assess the benefits of relevant legislation for a sector and compare them to burden such as costs. Fitness checks measure how far legislation has reached its initial objectives in an efficient and effective way, and are usually prepared in timeframes of around a year, allowing for a broader perspective than could be taken in this three-month exercise. Any assessment of the appropriateness, effectiveness and efficiency of the legislations as such, thus, falls out of the scope of this study.

Similar to a fitness check, this study considers several legislative acts having an impact on the steel industry, rather than a single act. However, its evaluation criteria are more limited than in a fitness check. Fitness checks assess the fitness, effectiveness, burdensomeness and coherence of the EU legislation in a given policy area or sector. Conversely, this study is focused on the third evaluation criterion, i.e. burdensomeness, as its target is to assess the cumulative cost impact of selected EU legislation on the steel industry.

Turning to more methodological questions, to assess regulatory costs, it is possible to adopt a top-down or a bottom-up approach. In the former case, regulatory costs would be assessed on the whole sector; in the latter, on a set of typified facilities. In principle, the study opts for a bottom-up approach, because of its higher accuracy, relevance, and actionability. As the aim of the study is to assess competitiveness and the impacts on investment decisions, overall impacts are likely to be less relevant and actionable for policymakers. Competition and investment decisions depend on the impact of regulation on each firm, rather than on the sector as a whole. Furthermore, a micro analysis of certain typified facilities is likely to ensure a higher degree of accuracy, and of comparability with foreign installations, as it requires a narrower set of assumptions (e.g. on the validity of certain findings for the whole firm population). To ensure the

external validity of the study, defining a sample of "representative" steel facilities becomes a key factor. Only when costs for certain typologies of plants are assessed, estimation for the whole sector can be carried out.

However, as the analysis proceeded, it became clear that the bottom-up approach is not suitable for all the policy areas. This is due mainly to two reasons:

1. Heterogeneity. For compliance with environmental standards, and in particular with the Industrial Emission Directive, the sampling strategy could not be successful, as the heterogeneity of steel plants in terms of *status quo* is both too high and impossible to comprehend *ex ante* based on secondary sources. A full-fledged bottom-up analysis would require access to detailed engineering data for each single plant, which is not feasible for the more than 200 EU plants currently in operations. Thereby, quantification of compliance costs in this policy area is based on a top-down survey of investments in environmental protection measures, complemented with interviews with plant operators;

2. Data availability. In some cases, granular data from plants will not possibly be retrieved, due to issues of confidentiality and timing of cooperation with industry representatives and operators. Where retrieval of data from primary sources is not possible, secondary sources, which in some cases adopt a top-down (i.e. sector-comprehensive) approach, are resorted to.

3.2 The object of analysis: the cost structure

The study considers the costs borne by the firms falling within the class 24.10 of the NACEv2 classification: manufacture of iron and steel and ferro-alloys (see Table 2 above).[27] This section includes steel makers *stricto sensu*, excluding "non-integrated" players which operate in the industry value chain without producing crude steel. Namely, the following entities are excluded: upward, manufactures of coke oven product; downward, companies transforming intermediate and semi-finished steel products into finished manufactures. Focusing on this class allows the study to treat similar entities, thereby increasing the degree of internal validity.

Within the steel industry, as defined above, the consultants study the cost structures of a set of typical plants. These cost structures are the core units of analysis of the study. Once defined, it is possible to assess the impact of regulatory costs on these structures, both in terms of operating expenditures and annualised capital expenditures.

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[27] Manufacture of tubes, pipes, hollow profiles and related fittings, of steel (NACEv2 24.20) is considered only if integrated, i.e. plants which also produce crude steel.

Furthermore, these cost structures can be compared with the cost structures of comparable international firms.

To define the cost structure of European steel makers, the consultants resort to a commercial data provider. Commercial providers maintain bases of data at plant level for several hundred worldwide facilities. The following providers were identified as suitable, and their respective coverage, methodology and data quality has been assessed in details to make a choice:

1.   World Steel Dynamics;

2.   Metal Bulletin; and

3.   CRU.

World Steel Dynamics provided the most suitable data for this study, and hence was chosen. This provider makes available the following data for 60 steel plants in Europe (including both BOF and EAF routes) and about 200 plants worldwide:

1.   Cost of production of flat rolled steel;

2.   Cost of production of billets and wire rods.

In addition, it also provides the following complementary information:

3.   Trade statistics;

4.   Financial data of steel companies.

Focusing on cost structure, World Steel Dynamics provides a detailed breakdown the following categories of costs: i) different raw materials; ii) different energy sources; iii) labour; iv) depreciation; v) overheads; and vi) financial costs. Costs of production are provided for each phase of the steel production process, i.e. coke making, pig iron, liquid steel, and the different semi finished products. Importantly, World Steel Dynamics allows varying the cost parameters to perform a sensitivity analysis.

Once the cost structures have been defined, the consultants perform an analysis based on the quantification of regulatory costs due to European legislation, which means:

1.   Quantifying the costs due to the European legislation. This important step is discussed in details in the section 3.3 below;

2.   Highlighting these costs in the steel maker cost structures and assess how they impact on the industry competitiveness (e.g. on the production costs, margins, and international cost differentials).

In order to assess the effects on international competitiveness, the costs borne by European steel makers are compared against the costs of typical facilities located in the following areas: United States, Turkey, China, Brazil, Russia, and Ukraine. These locations are among the top destinations for EU imports and exports (see Table 19 below), and represent a balanced mix of proximate and distant locations.

3.3 Assessment or regulatory costs

The study cannot resort to a consolidated methodology to assess the cumulative cost impact of all the EU legislation on a given industry. In uncharted waters, the consultants intend to combine three different approaches:

1. Measurement of administrative costs;

2. Measurement of compliance costs;

3. Measurement of indirect costs.

Administrative costs are those costs incurred by firms to provide information to public authorities and third parties. They are generated by Information Obligations (IOs) included in the legislative acts. Administrative costs are measured through the Standard Cost Model. The standard cost model methodology requires the identification of the annual cost of each IO. To do so, consultants quantify the time devoted to comply with the IO by a "normally efficient firm"; multiply this value by the salary rate of the personnel figure(s) carrying out the IO; and by the number of yearly occurrences (frequency) of the IO. Once the cost per IO is identified, it is possible to calculate aggregate costs for the whole industry, by multiplying the annual cost per IO by the number of firms affected (the population).

Administrative costs, even when significant for some policy areas, represent only a relatively small share compared to the category of compliance costs. The measurement of compliance costs can be done along the same steps; however, its scope is larger. Compliance costs include not only costs due to IOs, but also to Substantive Obligations (SOs) and Monetary Obligations (MOs). SOs are provisions which require the firm to take actions to adapt its productive process to comply with the legal act. The most common example would be the installation of anti-pollution filters to comply with emission limits. MOs are provisions which require the firm to bear monetary costs, such as costs of allowances, fees, taxes and levies.

Still, the methodology to assess compliance costs remains similar. Hence, the consultants will attempt to quantify the cost per occurrence for each SOs and MOs. This requires identifying the following categories of costs: i) Investment Costs (ICs); ii)

Operating Costs (OCs); and iii) Financial Costs (FCs). Once this is done, the annual cost is obtained by either multiplying the cost per occurrence by the annual frequency for recurring obligations; or by annualising the cost per occurrence in case of one-off obligations. As for IOs, once the cost per SO or MO is identified, it is possible to calculate aggregate costs for the whole industry by multiplying it by the number of firms affected (the population).

Administrative costs and compliance costs, which include investment, operating and financial costs, cover the set of direct costs imposed by the EU legislation on the steel industry.

Despite its apparent simplicity, the main challenge in the proposed methodology is estimating the cost per single occurrence, especially in the case of investment costs. Depending on the complexity of the regulatory provisions, and their burdensomeness, the consultants intend to resort to the following approaches:

1. Standardised estimates. These can be resorted to when obligations are relatively simple and do not represent a significant burden;

2. Desk research, retrieving from various sources estimates of administrative or compliance costs stemming from a specific act or provision. For example, the cost of certain provisions could have been estimated in Impact Assessments or external preparatory studies;

3. Consultation with stakeholders, in line with the standard methodologies for the assessment of administrative and compliance costs;

To produce a fair picture of the costs of EU regulation, the Business-As-Usual (BAU) factor and is to be taken into account. The BAU factor represents the share of regulatory costs which a firm would bear even absent a regulation. E.g., a steel maker must comply with certain energy efficiency limits; however, it would undertake some investments in energy efficiency even if there were no regulations, up to the point in which the marginal cost of investments equals marginal energy savings. Determining the BAU factor can sometimes result in establishing a challenging counterfactual, but it is important because it allows distinguishing between instances in which a regulation is only "consolidating" industry practices, and instances in which a regulation creates a truly additional burden. To provide an estimate of the BAU factor where relevant, the consultants resort to the same methods used to determine regulatory costs. The same reasoning applies concerning the legal origin of the regulatory costs, e.g. whether a cost is the result of international, EU or national policies. Given that disentangling these three effects on investment and operating expenditures is hardly possible, sensitivity logic is adopted when needed.

Finally, the issue of indirect costs needs to be unfolded. Indirect costs can be defined as costs of regulation which have an impact on steel producers not as direct addressees, but as counterparts of direct addressees. An example can be energy policies, whose addressees are i.a. electricity producers, which are suppliers of the steel industry; or product regulation, whose addressees are e.g. appliance producers, which are customers of the steel industry.

In this respect, clear boundaries need to be set to ensure that the study does not end up being too broad. First of all, the causation link between the act and the effects must be reasonably proximate. This means that only indirect effects originating from the most proximate counterparts of steel makers (such as suppliers) can be taken into account. Secondly, the indirect effects must be significant, i.e. resulting in a measurable cost differential for the steel industry.

3.4 The selection of typical facilities

As already recalled, the cost structures of typical European steel facilities are the objects of analysis of the study. In this section, the relevant criteria to define the sample of typical facilities are listed.

The first criterion to define the sample is the technology adopted. The following technologies are relevant in the EU market:

1.   Integrated BOF producers;

2.   Partially integrated BOF producers (i.e. without coke ovens and/or without blast furnace);

3.   EAF producers.

For each technology, plants may have different capacity. The sample is then to reflect a distribution of capacity similar to that of the steel making universe (as retrieved from The World Steel Capacity Book and other sources).

Technology and capacity could already allow characterizing a set of typical facilities. However, other criteria need to be taken into account to ensure that the sample provides an appropriate geographical coverage. The application of these criteria, as well as the exact capacity, is kept confidential, in order for facilities not to be singled out. Indeed, there are few hundred facilities in Europe, and if the geographical criteria were made public, each sampled facility could be directly identified. As regards the geographical coverage, the following criteria are applied.

1. Steel production per member state. As the most important steel producing member states (Germany, Italy, Spain, France, United Kingdom, Poland, Belgium, Austria, and the Netherlands), as identified in Figure 28 below, represent 76% of crude steel production, a comparable share of sampled facilities will be located therein;

2. Large vs. small member states. Facilities from both large member states, i.e. with population larger than 30 mln inhabitants (representing about 70% of EU citizens and 64% of the crude steel production), and small member states, with population smaller than 30 mln inhabitants, will be included in the sample according to the relative weight.

3. South. Vs. East. Vs. West/North. Facilities will reflect the relative weight of the following geographical areas:

   a. Southern European member states (Italy, Spain, Portugal, Greece, Malta, Cyprus), which represent 27% of crude steel production in 2011;

   b. Central Eastern European member states (Poland, Slovenia, Hungary, Romania, Bulgaria, Czech Republic, Slovak Republic, Estonia, Latvia, Lithuania), which represent 15% of crude steel production;

   c. Western and Northern European Member States, which represent 58% of production.

4. Coastal vs. Landlocked. Facilities should be located in both coastal and landlocked areas (taking into account landlocked locations which are served by inland waterways).

5. Owner. The sample will include facilities from Global Players, Regional Champions and Niche Specialists.

3.5 The scope of the study: the policy areas

Eight policy areas and 52 EU legislative acts and non-legislative polices fall within the scope of the study. They are listed in the Table 14 below. For commodity markets, 4 acts have been added compared to the list included in the Terms of Reference; they are shon in italic in the table below.

Table 14 List of legislation in scope of the study

Policy Area	Legislative acts and other policies
1. General Policies	- Europe 2020 A strategy for smart, sustainable and inclusive growth, COM(2010)2020 - An Integrated industrial policy for the globalisation era - Putting competitiveness and sustainability at centre stage, COM(2010) 614 - Roadmap to a resource efficient Europe, COM(2011) 571 2050 low carbon roadmap, (COM(2011) 112) 2050 energy roadmap, (COM(2011) 885) - Soil thematic strategy, COM/2006/0231 - Innovation Union - Europe 2020 flagship initiative, COM(2010) 546
2. Climate Change	- Carbon leakage list (Decision 24/12/2009) - Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community (ETS) - Directive 2009/29/EC - 3rd phase of ETS - Product-based benchmarks - Decision 2011/278/EU determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council - Regulation 601/2012 on monitoring and reporting
3. Commodity Markets	- Revision of directive on markets in financial instruments – MiFID (2004/39/EC) *Proposal for a Regulation of the European Parliament and of the Council on markets in financial instruments and amending Regulation [EMIR] on OTC derivatives, central counterparties and trade repositories, COM(2011)652* *Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories* *Directive 2003/6/EC of the European Parliament and of the Council on insider dealing and market manipulation (market abuse), as amended by Directive 2008/26/EC and Directive 2010/78/EU [MAD]. MAD is currently under review, cf. Proposal for a Directive of the European Parliament and of the Council on criminal sanctions for insider dealing and market manipulation, COM(2011)654* *Proposal for a Regulation of the European Parliament and of the Council on insider dealing and market manipulation (market abuse), COM(2011)651 [MAR]*
4. Competition Policy	- Revised State aid guidelines (financial compensation for indirect emissions) SWD(2012) 131 - Environmental state aid guidelines 2008/C 82/01 - Anti-trust Regulation (EC) No 1/2003 - Merger Control Regulation (EC) No 139/2004 - Guidelines on national regional aid FOR 2007-2013 (2006/C 54/08)
5. Energy Policy	3rd Energy Package: - Directive 2009/72/EC concerning common rules for the internal market in electricity - Directive 2009/73/EC concerning common rules for the internal market in natural gas

	• Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity • Regulation (EC) No 715/2009 on conditions for access to the natural gas transmission networks • Making the internal energy market work , COM(2012) 663 • Renewable Energy Directive (Directive 2009/28/EC) • Energy Efficiency Directive (Directive 2012/27/EC) • Energy Taxation Directive (Directive 2003/96/EC)
6. Environmental Policy	• REACH and related legislation • Industrial Emissions Directive (Directive 2010/75/EU) • Air quality framework Directive (Directive 96/62/EC) • Water Framework Directive (Directive 200/60/EC) • Waste Shipment Regulation 1013/2006/EC • End of life Directive 2008/98/EC (Waste Framework Directive) • Packaging and packaging waste directive (Directive 94/62/EC) • End-of-life Vehicles Directive 2000/53/EC • Council Directive 1999/31/EC on the Landfill of waste
7. Trade Policy	• Trade Defence Instruments (anti-dumping, anti-subsidy, safeguard measures) package • Anti-dumping: Regulation (EC) No 1225/2009 • Anti-subsidy: Regulation (EC) No 597/2009 • Safeguards (against WTO members): Regulation (EC) No 260/2009 • Safeguards (against non-WTO members): Regulation (EC) No 625/2009 • Generalised Scheme of Preferences (GSP) Regulation 978/2012
8. Products and Life Cycle Assessment	• Eco-design Directive 2009/125/EC and Ecodesign work plan 2013-2015 • Eco-label regulation 66/2010 • Energy Labelling Directive (Directive 2010/30/EU) • Green Public Procurement Criteria: • Directive 2004/18/EC • Directive 2004/17/EC • Construction Products Regulation No 305/2011 (CPR) • Energy performance Buildings Directive (Directive 2010/31/EU) • CO_2 from cars and vans regulations (Regulations 443/2009 and 510/2011) • Existing diverging methodologies for LCA • Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system COM(2011) 144 • Strategy for the sustainable competitiveness of the construction sector and its enterprises COM(2012) 433

The acts listed in the table above are very different in nature and in their effects on steel makers. Broadly speaking, the acts falling within the scope of the study can belong to three different categories from the perspective of the mapping process:

1. Binding acts which create direct obligations for the steel industry, and thus impose a direct cost;

2.   Binding acts which do not create a direct obligation for the steel industry, but may create an indirect cost;

3.   Non-binding acts and other policies, which may or may not create direct costs.

The mapping methodology varies across the different policy areas. The mapping process can identify regulatory provisions which create obligations, and thus costs, for the steel industry only for those acts falling within the first category. E.g., the Industrial Emission Directive requires firms to conform to Best Available Techniques (BATs); this provision imposes capital and operating expenditures on steel makers. For the other two categories, the mapping process will result in a survey of the effects of the acts on the steel industry. For example, the third gas and electricity package has no direct consequences for steel facilities; however, as it determines the competitive conditions in these two other markets, it may have an indirect effect on the steel sector via energy prices. The mapping sheets are enclosed in Annex 1.

This distinction is very important to explain the twofold approach to the policy areas and the related legislation. The consultants make a clear distinction between those acts which cause costs, be they direct or indirect, on the steel industry, through a proximate and clear causal relationship; and the acts which define the sectoral environment and the internal and external competitive constrains. For example, while the ETS system imposes a direct and indirect (via electricity prices) cost on steel industry, the trade policy does not, as its aim is to define when safeguarding measures can be taken. Climate change, commodity markets, energy policies and environmental legislation are likely to belong to the first class of acts. On the contrary, general policies, trade and competition policies are more likely to belong to the second class, as the causal linkage between them and the costs for companies is not so strong, hence an excessively high element of uncertainty and subjectivity in the quantification exercise would be introduced. For the latter class of policies, a qualitative approach is preferred.

Calculation of regulatory costs is possible for the first category of acts. For the other, the consultants carry out an analysis of the competitive constrains and opportunities that they cause for steel makers, and the effects on investments decisions, in comparison with international competitors, resorting to selected case studies, or to the full coverage of the Commission decisions where feasible. Theoretically, it could be argued that e.g. anti-dumping duties or subsidies to competitors have an impact on the cost competitiveness of the EU steel industry. For instance, the decision to impose a lower anti-dumping duty, possibly because of the application of the lesser duty rule, <u>could</u> be represented as a cost. However, both subsidies, including subsidies to foreign competitors and the EU state aid, and trade defence instruments are too specific to be included in the cost structure of either the whole industry or the representative sample. Indeed, trade defence measures always target a specific product in specific country(-ies),

and the same goes for subsidies. Therefore, albeit certain measures may be very significant for a subset of EU steel plants, they are too partial to have a clearly identifiable causal effect on the overall cost structure and competitiveness of the EU steel industry. The peculiarities of these two policy instruments are better taken into account by adopting a qualitative case-by-base assessment, as said, either through case studies or the evaluation of the universe of Commission decisions where feasible.

A separate analysis is devoted to two exogenous factors: energy costs and raw materials. These inputs represent the bulk of operating expenditures for steel makers. The EU legislation has an impact on these factors, albeit limited and indirect. For example, the EU legislation has an impact on energy costs via competition in the gas and electricity internal market and through environmental regulation. Taxation on energy is a shared responsibility between the EU, fixing the minimum level of excises, and the member states, which set excise duties and may impose other levies. However, energy prices depend on several other non-policy factors, such as worldwide markets for fuels or distribution of natural resources.

Although the costs of energy and raw materials are, strictly speaking, non-regulatory costs, given their significance, the consultants provide an analysis of these costs for the European industry and its competitors, identifying cost differentials even when they cannot be attributed to the EU legislation.

PART III

THE ECONOMICS OF THE STEEL INDUSTRY

4 The economic and technical analysis of the steel industry

4.1 The industry value chain

The steel industry value chain includes all the processes required to transform raw materials (mainly coal, iron ore, and scrap) into finished steel products. Generally, the following infrastructures are required to produce steel (EPA, 1995):

- Coke ovens;

- Blast furnaces;

- Steel furnaces;

- Rolling and finishing mills.

Sinter and pellet plants are additional facilities which may be adopted in the steel making industry.

Based on the degree of vertical integration, steel making plants can be broadly classified in two different groups, i.e. integrated plants and minimills. The former group includes fully integrated plants, where all the production stages are performed (from coke making to product finishing), and partially integrated plants, where coke ovens are not installed and coke making is outsourced. The latter group mostly includes plants comprising only steel furnaces and rolling and finishing facilities. Minimills utilise electric furnaces and mainly rely on scrap, and only partially on raw iron, which is usually purchased as processed input. Nonetheless, some minimills are moving toward upstream vertical integration, by adopting new iron-making technologies (e.g. direct reduction iron making, smelting reduction) requiring relatively limited capital investment and characterized by a minimum efficient scale lower than traditional blast furnaces.

A broader definition of the industry value chain would include upstream the suppliers of raw materials and, downstream, intermediaries (service centres, stockholding companies, and so on) and final customers (producers of steel end products).

4.1.1 The steel industry value chain and production technologies

<u>Coke making</u>

Coke making is the first production stage in fully integrated plants. Coke is the fuel and the carbon source adopted in iron making and is produced by processing low-ash low-

sulphur bituminous coal. Pulverized coal is added in the coke oven through an opening located in the top of the oven. When ports are sealed, the coal is heated, in the absence of oxygen, at high temperature (1200-1300°C). The necessary heat is provided by external combustion of fuels and recovered gases. Coke is the solid material remaining in the oven. Coke making is an energy intensive and relatively pollutant process. Despite coke is still essential in the production process, to increase cost effectiveness steel makers are adopting new technologies which aim at reducing the quantity of coke required. In particular, pulverized coal can be directly injected in blast furnaces rather than in the coke oven, thus lessening coke consumption up to 40%. In some facilities also waste plastic or other fuels, such as natural gas or oil, are injected (EPA, 1995; Ogaki *et al.*, 2001). Furthermore, new processes are progressively adopted to produce iron using gas or coal rather than coke.

<u>Iron making</u>

In partially integrated plants, coke is purchased as a processed input and steel making starts with the production of raw iron in blast furnaces. These furnaces are vertical cylindrical vessels (up to 35 meters high and up to 15meters wide) where iron ore, coke (the fuel), and limestone (the flux) are charged at the top and are subject to a smelting process mainly aiming at removing impurities from iron ore as well as oxides resulting from the reduction. Hot air, usually heated through recovered exhaust gases, is blown into the base of the vessel, thus supplying heat and oxygen for combustion. At the bottom of the furnace, molten iron and slag are collected as outputs. Molten iron may either be casted into ingots (the so-called pigs) or transferred directly to a connected steel furnace. Iron making in blast furnace is a continuous production process which requires the progressive addition of raw materials at the top of the vessel. Modern blast furnaces have 2,000 cubic meter capacities. The production of iron accounts for about 55% of the total cost per tonne of steel and constitute the largest cost category (Madar, 2009).

Also new technologies are being adopted for iron making. The Direct Reduction Iron making (DRI) is a new process, using gas rather than coke as a fuel, being particularly cheap in countries with access to low cost natural gas. DRI facilities are less capital intensive than traditional blast furnaces, and are efficient at smaller production volumes[28]. A slightly different technology, known as smelting reduction, replaces coal for coke. DRI and similar processes can be used both in integrated plants[29] and in minimills to substitute scrap. For minimills, DRI and similar processes represent the

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[28] At larger volume, BOF installations are cheaper in term of capital cost per unit of output.

[29] The use of DRI in integrated plants to substitute scrap as a cooling agent in the converter is very limited in Europe.

only viable technology to reduce their dependency on high quality scrap or pig iron made by integrated producers.[30] Nonetheless, there are still some factors limiting the adoption of this technology: i) DRI needs particular iron ores as an input; ii) its output (the so-called sponge iron) requires further processing to completely remove slag; and iii) production costs, and thus profitability, are highly dependent on the price of gas (BCG 2013).

In any case, blast furnaces are still deemed the best solution for integrated facilities, considering both their efficiency improvement, and their significant economies of scale. Furthermore, the availability of miniblast furnaces (whose capital investments is about only 17-19 million dollars rather than 400-900 million dollars for traditional vessels) constitute a viable alternative to DRI plants to contain capital expenditures (Madar, 2009).

Integrated mills may also install sinter and pellet plants, which are relatively common in Europe. Sintering is a process to agglomerate iron ore fines with other small particles (pollution control dusts, coke breeze, flux, and so on) at high temperature into a porous mass (sinter agglomerates) that can be added in the blast furnace. A sinter plant enables recycling of iron rich material, otherwise disposed as production waste (EPA, 1995). Pelletizing is a process to transform iron ore into pellets by processing iron ore with additional substances. Pellets are hard spheres which are preferred to lump ore in blast furnaces because hot air can circulate more freely, thus improving the efficiency of the iron making process.

Steel making

Steel making basically consists of a process to transform raw iron in steel by removing impurities (mainly carbon, phosphorus, and sulphur). The remaining quantity of carbon is crucial to determine the hardness of the steel. During the steel making process, other metals (manganese, nickel, chromium, and vanadium) may be added to create alloys, thus obtaining specific qualities of steel.

In steel making, the more production stages are integrated, the more production costs per ton are reduced; therefore, the industry is moving towards a full automation and continuous production flow.

Molten iron from blast furnaces is traditionally refined in Basic Oxygen Furnaces (BOF) which are cylindrical vessels lined with refractories where high purity oxygen is blown under pressure. To eliminate impurities, limestone and other flux are added in the BOF

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[30] As mentioned in the next paragraph, to improve the quality of their production EAFs have to rely on high purity input, i.e. high quality scrap, molten (or solid) pig iron, and/or DRI.

process, thus producing slag that is removed from molten steel. In BOFs, scrap iron and steel can be combined with molten iron up to 30%. Modern BOFs can take a charge of iron up to 350 tonnes per cycle (Ecorys, 2008).[31]

The Electric Arc Furnace (EAF) is a completely different technology for steel making; it is usually adopted in minimills. The main inputs for the EAF are scrap and electricity. Electrodes installed within the furnace melt scrap through the heat created by an electric arc. Limestone and other flux are added in the EAF to remove impurities from molten steel. When scrap contains other metal residuals (the so-called tramp metals), pig or sponge iron is also charged in the furnace to dilute them. Tramp metals usually lower the metallurgical quality of steel produced in minimills. The EAF has a cycle time of about 50 minutes to one hour. The size of EAFs ranges from very small units of one ton of capacity per cycle, to large facilities that can charge up to 400 tonnes (Ecorys, 2008). An EAF processing only scrap uses 10% of the energy needed by blast furnaces and BOFs. New technologies are enabling further reduction in energy consumption by pre-heating scrap with recovered hot gases. EAFs are economic and efficient at relatively small volumes of production compared to BOFs, in particular because they can be easily shut down and restarted.

In the 1950s, the continuous casting technology was introduced. Through this technology, molten steel is directly and continuously formed into blooms, billets, and slabs.[32] Molten steel is poured into a container (the so-called "tundish") from which it is released into the water cooled moulds of the casting machine. The metal is cooled as it descends through the moulds, thus a thick solid shell is formed. Progressively, on the run-out table, which operates at a constant speed and is cooled by water, also the centre solidifies, thus allowing cutting the cast shape into lengths (EPA, 1995). In term of efficiency improvements, continuous casting has been second only to BOF. In the 1980s, thin slab continuous casting was introduced, thus also eliminating several stages in the hot rolling process. This technology eased the entry of minimills in the hot-rolled product business, even though metal quality is still a limitation, as high-quality coiled sheets have to be free of tramp metals.

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[31] A different and older production process adopts Open-Hearth Furnaces (OHF) where impurities are removed from molten iron by blowing alternatively flames and heated air in alternating sequence on a pool of molten iron. The OHF process has been progressively abandoned since the 1950s, when BOF technology was introduced as it is more efficient at all levels of production.

[32] Previously, the steel-making process needed an additional intermediate stage (the so-called ingot teeming), where molten steel was poured into ingot moulds, thus allowing steel to cool and solidify. Ingots were then transformed in primary mills into blooms, billets, and slabs.

Rolling and finishing

Blooms, billets, and slabs are transformed into finished steel products in rolling facilities. A traditional distinction is made between "long" and "flat" products. Long products are rolled from blooms and billets. Blooms (characterized by a rectangular cross-section of 16cm or more) are rolled into structural beams. Billets (characterized by a square cross-section of 4 to 14 cm) are rolled into bars, rods, and wire. Long products have relatively limited production costs, and are to comply with lower standards (mainly strength requirements); hence, they are considered low added value products.

Slabs (flat cross-section) are rolled into steel plates and coiled sheets, which are produced in rolls. Coiled sheets are the most largely used steel product, automotive and appliance producers being the bigger customers. Rolling facilities form these products in a succession of stages where the steel passes through rollers characterized by narrower and narrower clearances. Two different types of rolling are possible: hot rolling (heated steel) producing coiled sheet with a rough surface; and cold rolling (unheated steel) adding strength to the metal and making the surface smooth and shiny. Flat products have relatively higher production costs and comply with higher standards (e.g. in terms of lightness, strength, corrosion resistance, flawless surface, special coatings, and so on) required by more demanding customers, thus being high added value products.

One of the most crucial aspects of a finished product is the quality of the surface. In particular, to avoid corrosion, a protective coating has to be applied. Common coating processes include: galvanizing (zinc coating), tin coating, chromium coating, aluminizing, and terne coating (lead and tin). Coated products may also be painted to further prevent corrosion (EPA, 1995).

Finished products also include tubes and pipes. The pipe and tube industry includes two main production processes: i) seamless pipes, which are made through hot rolling starting from billets; ii) and welded pipes, which are made through cold rolling starting from plates (large pipes) or coiled sheet (small pipes). Seamless pipes require special billets as inputs; hence, they are usually made in vertically integrated plants, comprising either an EAF or, less frequently, a BOF (mostly in Central Eastern Europe). On the contrary, welded pipes are usually made by companies buying steel on the market.

4.1.2 The upstream and downstream value chain

Upstream

The production of steel relies on the supply of three specific raw materials: iron ore, coking coal (or coke), and scrap. In addition, for steel makers adopting the EAF technology, electricity is a crucial input as well.

The iron ore industry is highly concentrated. 60% of production originates from Australia, Brazil, and China. Three global companies dominate the mining industry: Vale SA (Brazil), Rio Tinto PLC (UK/Australia), and BHP Billiton Limited & PLC (UK/Australia). These players control about the 75% of the world trade (Ecorys, 2008).

Iron ore is sold to steel makers on the basis of long-term contracts based on quarterly prices (Datamonitor, 2011). Customarily, the price negotiated by Japanese steel makers was the benchmark for contracts worldwide. Since the second quarter of 2012, contract pricing has been reportedly shifting towards an index-based mechanism (based on spot price in China). Consequently, a growing tendency toward monthly pricing mechanisms would be unfolding. European steel makers depend exclusively on overseas supply. Costs for iron ore are a relevant share of variable costs of production; hence, being independent of the iron ore global cartel can be crucial. As a result, upstream vertical integration and pursuing of mining investments have a pivotal role in growth strategies of steel makers, albeit this strategy is difficult to implement under the current economic and financial conditions (Madar, 2009; Datamonitor, 2011; Ernst and Young 2012).

European steel makers rely heavily on coal imports too. Although Germany and Poland have reserves of coking coal amounting to 5% and 6% of the total world reserves (Ecorys, 2008), the European coal production is expected to cease due to the termination of subsidies. Coal prices are negotiated; however the price set between Japanese steel makers and Australian coal suppliers is the beacon for all other contracts. Steel makers are starting to follow expansion strategies aiming at purchasing coal mines and processing facilities (Madar, 2009; Ernst and Young, 2012).

Scrap may have three different sources: leftovers from steel making process; "new scrap" from steel processing industries; "old scrap" from recycling of steel end products (Ecorys, 2008). Prices of scrap are increasing due to a growing demand (growth in production by EAFs) and a decreasing supply (both end product manufacturers and steel makers are becoming more efficient, thus reducing leftovers), albeit the price level has become more stable since 2011.

While electricity prices do not affect traditional integrated producers, they are the largest variable cost category for non-integrated steel makers adopting EAF. Hence, the access to a stable supply of low cost electricity becomes a crucial locational factor for minimills.

Downstream

Steel is an intermediate good, characterized by a derived demand which is inelastic in the short run, so that changes in price affect only marginally the overall amount of steel that can be sold worldwide. Nonetheless, the demand for end products which contain

steel strongly affects demand for steel and fluctuations in demand can have significant effects on prices and on profit margins of steel makers, whose individual demand is very elastic, being steel to a large extent a commodity. The end markets for steel products mainly comprise automotive, construction, packaging, durable consumer goods, and mechanical engineering industries (Ecorys, 2008). While it is very unlikely that steel buyers can undertake upstream vertical integration, some steel makers may integrate downstream; for instance, Nippon Steel operates also in the mechanical engineering and construction business (Datamonitor, 2011).

High-volume end users, such as automakers, usually purchase steel directly from steel makers on the basis of negotiated contracts. These large buyers demand high added value steel (mostly cold rolling products) for their production processes and may have enough bargaining power to obtain price discounts (Ernst and Young, 2012), due to their dimensions, to the competition intensity in their industries, and to the importance for steel makers of preserving long-term relations with these customers. Nonetheless, steel makers and large buyers have reciprocal incentives to cooperate in new product development, and to coordinate production schedule and supply chains. Thus, the location of steel making facilities - in terms of both proximity to the customers' plants and worldwide production to supply global customers in several markets - becomes a competitive advantage factor.

On the contrary, low-volume customers buy from steel intermediaries based on spot prices. While small buyers do not benefit from bargaining power, they may take advantage from a stronger competition among producers of standardized low added value steel products (Datamonitor, 2011).

Intermediaries operate in the value chain between rolling mills and end users. In the EU steel distribution includes seven typical operational models, grouped into two main categories (see Table 15): i) typical steel stocking (beam and profile centres and general stockists: reinforcing services; distribution of tubular products, stainless steel service centres, and high carbon and alloy steel stockists); and ii) flat steel services centres (strip mill products service centres; plate processors; and stockists).

Table 15 Operation models of steel intermediaries in the EU

Operational Models	Products and Services
Beam and profile centres and general stockists	**Products** Beams & profiles, hollow sections, angles, wide flats, commercial sheets **Processing services** Cut-to-length, shot blasting, primering, edging, bending, drilling, marking
Reinforcing services	**Products** Rebars, deformed rods, wire mesh, expanders **Processing services** Cut-to-length, decoiling, bending, fabricating, all-in service offers
Stainless steel service centres	**Products** Long stainless, flat stainless, stainless tubes **Processing services** Sawing, polishing, plasma-, waterjet and laser cutting
High carbon and alloy steel stockists	**Products** Tool steels, free cutting steel, engineering steel, special steel **Processing services** Sawing, bevelling, centring, drilling, milling, cutting, shearing, bending, edging, brushing, grinding
Distribution of tubular products	**Products** Welded tubes, seamless tubes, fittings **Processing services** Cut-to-length, shot blasting, primering, drilling, profiling, bending, markings, stamping
Strip mill products service centres	**Products** Hot rolled flats, cold rolled flats, galvanized & other coated flats **Processing services** Coil cleaning & pickling, customized cut to length, slitting, blanking, stamping, re-rolling, punching, shearing, folding
Plate processors and stockists	**Products** Quarto plates, hr flats, profiling and processing **Processing services** Shot blasting, primering, plasma- & flame cutting, drilling, punching, marking, stamping, bending,

Source: Eurometal, 2013

Several mismatches exist between producers and customers of steel. Steel makers produce in big volumes and long runs to achieve economies of scale. Customers want small orders, short lead times, and additional processing. Intermediaries work as matchmakers, thus creating value for the industry. One the one hand, towards the steel mills, they cluster and simplify orders, absorb mill lead times, and receive deliveries by rails or boats. On the other, towards customers, steel distributors ensure availability of a wide range of products, accept multiproduct orders, and provide further processing and

fast deliveries (the average lead time of distribution is between 24 to 48 hours). It is worth noticing that the distribution chain has been affected by the current economic crisis, thus re-shaping relationships among players. In particular, since 2008, while several intermediaries have been facing financial problems and poor liquidity, the EU demand for steel product has been weak and less predictable; hence, a tendency toward reducing stock levels and buying smaller lots has been registered. Hence, steel makers have reported that the supply risk has been increasingly shifted to them.

In the EU, about two thirds of the steel sales are direct to intermediaries (Ecorys, 2008; Eurometal, 2013). Most of large steel makers (such as ThyssenKrupp, Tata, Voestalpine, ArcelorMittal, and Ssab) are integrated downstream in steel distribution.

4.2 The economics of steel

4.2.1 Players

Boston Consulting Group (2007) classifies three different categories of players in the steel industry:

- Global players, which own a global network of facilities, provide a full range of steel products, are vertical integrated (even in the mining sector), and produce more than 50 million tonnes per year (the only example being ArcelorMittal);

- Regional champions, which produce between 5 to 50 million tonnes per year, have a strong regional presence, and can be divided into two sub-categories:

  o Type 1 includes companies which have access to low-cost countries and provide high added value products (technology leaders, such as ThyssenKrupp and Riva);

  o Type 2 includes companies which are based in low-cost countries and provide steel commodities (for instance steel makers located in new member states);

- Niche specialists, which provide only a narrow range of products, usually very specialized, are present in few locations, and produce less than 5 million tonnes.

The 25 largest steel companies in 2010 is reported in Table 16 (EU companies in bold).

Table 16 Largest Steel Companies

#	Company Logo	Company Name	Country	Crude Steel Output in 2010 year (tonnes)	#	Company Logo	Company Name	Country	Crude Steel Output in 2010 year (tonnes)
1		**ArcelorMittal**	**Luxembourg**	**97,200,000**	14		Gerdau	Brazil	20,500,000
2		Hebei Group	China	44,400,000	15		Nucor	USA	19,900,000
3		Baosteel	China	43,300,000	16		**Thyssenkrupp**	**Germany**	**17,900,000**
4		Posco	South Korea	39,100,000	17		Evraz Group	Russia	16,800,000
5		Wuhan Iron & Steel Group (Wisco)	China	37,700,000	18		Maanshan	China	16,700,000
6		Nippon Steel	Japan	33,400,000	19		Benxi	China	16,500,000
7		Jiangsu Shagang Group	China	31,900,000	20		Hyundai Steel (HSC)	South Korea	16,300,000
8		Shougang Group	China	30,000,000	21		**Gruppo Riva**	**Italy**	**16,100,000**
9		JFE Holdings	Japan	29,900,000	22		Valin Group	China	15,900,000
10		Anshan Iron & Steel Group (Ansteel)	China	29,800,000	23		Severstal	Russia	15,300,000
11		Shandong Group	China	24,000,000	24		Metinvest	Ukraine	14,400,000
12		Tata Steel	India	23,200,000	25		China Steel Corporation	Taiwan	14,000,000
13		U.S. Steel	USA	22,000,000					

Source: World Steel, 2012

4.2.2 High capital requirements and fixed costs

Facilities required to produce steel, from coke ovens to rolling mills, are large, highly specialized, complex and durable assets which require huge capital outlays leading to significant fixed production costs. As a result, break-even point is achieved only at very high capacity utilization. In particular, integrated plants need to produce more than 2 million tonnes per year to be profitable (Ecorys, 2008).

The introduction of new technologies had a twofold effect:

- Capital requirements for integrated mills increased, due to larger Minimum Efficient Scale (MES) and to the rising complexity and indivisibility stemming from the higher level of automation and integration among the infrastructures included in the value chain;[33]

- Continuous casting facilities, and, to a greater extent, EAFs lessened capital expenditures.

Hence, cost structures vary broadly between integrated plants and minimills; as well as among larger plants with different degrees of vertical integration. Capital expenditures for an integrated plant can reach up to 10 billion dollars, while a minimill can be installed for about 350 million dollar (Madar, 2009).

4.2.3 Scale economies and minimum efficient scale

The steel industry is characterized by significant economies of scale, i.e. production costs per unit fall as capacity increases. From an engineering standpoint, all the vessels required for coke making, iron making, and steel making comply with the so-called "square-cube law" (Carlton & Perloff, 2005). As the volume of these facilities grows faster than their surface, capacity grows faster than investment costs. This rule applies also to maintenance costs such as re-lining of refractories. Furthermore, efficiency gains (in particular savings generated by lower energy consumption for re-heating molten iron and molten steel) can be achieved through a stronger integration of all production stages in a single plant, thus enlarging the overall production scale because of the combination of adjoining facilities. From an organizational perspective, a single company is better suited to manage such a complex and continuous production flow and to exploit synergies.

The effect of scale economies and high fixed costs - indeed saturation of the installed capacity enables spreading fixed costs over a larger quantity of output, thus cutting total costs per tonnes as production grows - results in very large MES in steel making. While BOFs are characterized by a MES between 3 and 5 million tonnes per year, EAFs can be efficient at a scale ranging between 0.3 and 3.0 million tonnes. In integrated facilities, the overall MES is determined by the component with the highest MES. While cost efficiency in continuous casting facilities is achieved at 0.5 million tonnes per year (thus being compatible with minimill production), rolling mills require processing between 2 and 5 million tonne to be efficient. In integrated plants, traditional blast furnaces for

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[33] In particular, new investments to modernize parts of existing facilities often require costly changes to the adjoining infrastructures.

iron making set the MES between 3 and 7, even if in new mills MES can reach up to 10 million tonnes per year (Barnett and Crandall, 1986; O'Brien, 1992; Madar, 2009; Sato, 2009).

4.2.4 Product substitutability

When excluding highly specialized finished products, steel is a commodity complying with common global standards. Therefore, analogous steel products of different companies are almost perfect substitutes. Some quality differences still exist between steel produced by BOFs and steel produced by EAFs, due to the presence of tramp metals in the scrap processed by the latter, even if technology improvements are progressively bridging this gap.

Focusing on products of other industries, for instance aluminium and fibreglass (or other plastic materials) might substitute steel in motor vehicles and appliance production. Although substitutability is possible in the long run, switching costs might be very high due to the changes required in the downstream production process (Datamonitor, 2011). Furthermore, steel industry is following an innovation path aiming at meeting the new production needs of end users in order to retain customers. In a green economy, the threat from substitute products is also lowered by the particular environmental sustainability of steel, being 100% recyclable.

4.2.5 Barriers to entry and barriers to exit

High capital requirements to invest in a new installation or to add new facilities to existing plants constitute a structural barrier to entry, especially for BOF technology. As mentioned above, formidable capital expenditures are required to steel makers and the break-even point is achieved only at considerable production levels. Hence, a strong financial effort is required from potential newcomers, and this is of course particularly risky when price fluctuations are marked. Scale economies may further discourage entrance because the minimum yearly output to compete on the market can be even higher than the break-even quantity, larger competitors having a significant cost advantage. Technology specialisation may also prevent the entry in a different product range by incumbents, due to technical limitation in shifting part of mill facilities from one production to another.

Strategic barriers raised by incumbents are even higher, thus constituting a strong deterrence to entry. First, an increase in demand for steel can be easily met by existing facilities due to worldwide excess capacity, thus narrowing the room for new entries. Then, the strategy of expansion in terms of both horizontal and vertical integration increases entry costs. Indeed, to serve global customers, new competitors may have to enter multiple regional markets; besides, the access to mining is increasingly becoming

a competitive advantage factor, thus penalizing newcomers which have to purchase raw materials in an oligopolistic market.

Capital intensity is also the main barrier to exit, considering that investment in steel making facilities cannot be converted into any different use, and that scaling back of the output volume is not always economically sustainable in integrated plants using blast furnaces and BOFs. As a result, capital outlays results in very high sunk costs. Furthermore, in this industry the salvage value might also be negative, due to considerable dismantling costs. Also national policies aiming at protecting employment can result in institutional barriers to exit, discouraging plant shutdowns.

Both barriers to entry and to exit are considerably lowered by new technologies, whose impact can possibly advantage newcomers twofold:

- some technologies, such as EAFs adopted in minimills, may require smaller capital expenditures, be efficient at a smaller scale and enable a more flexible management of the production volume;

- other technologies, such as BOF and continuous casting, when compared to older processes such as OHF and ingot teeming, have led to a formidable reduction in production costs, thus allowing newcomers to benefit from a competitive advantage, being more efficient than incumbents, which were tied to sunk costs and depreciation time of existing plants.

4.2.6 Intra-sectoral competitive dynamics

As mentioned above, steel is an intermediate good whose market demand is quite inelastic, especially in the short run when the threat from substitute products is not significant. Hence, as demand grows, producers can increase output volume and prices, benefiting from the existing barriers to entry. Conversely, each steel firm's demand curve is usually very elastic due to high substitutability of steel products belonging to the same category. Therefore, rivalry among competitors become fierce during downturns, and steel makers are compelled to cut price rather than to scale back production, due to high barriers to exit. In particular, to cover high fixed costs (which become sunk costs in case of shutdown) steel makers keep on producing until prices are higher than variable costs, thus bearing losses. This issue is of key importance in this industry, where variable costs are significantly lower than average costs, due to huge capital outlays. Inevitably, as demand declines, less efficient producers with weaker financial positions are progressively expelled from the industry and consolidation occurs.

BOF plants are also facing a growing competition from more flexible EAF facilities, in particular in long product markets. As new technologies will provide efficient alternatives to blast furnaces, reducing minimill dependency on iron makers and scrap

supply and increasing the quality of scrap based molten iron, EAF producers will increase competitive pressure across the whole steel market.

4.3 The European Steel Market

4.3.1 Industry definition

According to the NACE (rev.2.0) statistical classification of economic activities in the European Community, steel makers are included in the class 24.10, comprising manufacturers of iron and steel and ferro-alloys (see Table 17).

Table 17 Production of iron and steel, NACE rev.2.0 classification[34]

Sub-sector	NACE	Definition
Manufacture of iron and steel and ferro-alloys	*Section: C* *Division: 24* *Group: 24.1* *Class: 24.10*	This class includes: - operation of blast furnaces, steel converters, rolling and finishing mills; - production of pig iron and spiegeleisen in pigs, blocks or other primary forms; - production of ferro-alloys; - production of ferrous products by direct reduction of iron and other spongy ferrous products; - production of iron of exceptional purity by electrolysis or other chemical processes; - re-melting of scrap ingots of iron or steel; - production of granular iron and iron powder; - production of steel in ingots or other primary forms; - production of semi-finished products of steel; - manufacture of hot-rolled and cold-rolled flat-rolled products of steel; - manufacture of hot-rolled bars and rods of steel; - manufacture of hot-rolled open sections of steel; - manufacture of sheet piling of steel and welded open sections of steel; - manufacture of railway track materials (unassembled rails) of steel. This class excludes: - cold drawing of bars (included in NACE rev2.0 24.31).

Source: EUROSTAT, 2008

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[34] Manufacture of tubes, pipes, hollow profiles and related fittings, of steel (NACEv2 24.20) is also considered, as long as integrated pipes producers are concerned (i.e. those producing crude steel as well).

4.3.2 Supply

Production of crude steel

After a steady growth between 2002 and 2007 (+12%), over the period 2007-2009 the production of crude steel in the EU fell by 34% (see Figure 27). The partial recovery shown in 2010 (+24%) and in 2011 (+3%) is threatened by a new reduction recorded in 2012 (-5%). The Compound Annual Growth Rate (CAGR) over a 10-year period (2002-2012) amounts to -1%. Trends are similar in both EU-15 countries and new EU member states, with a 10-year CAGR respectively of -1.1% and -0.8%.

Crude steel production is concentrated in a relatively limited number of EU countries. In 2012, 9 countries, which are Germany, Italy, France, Spain, United Kingdom, Poland, Belgium, Austria, and the Netherlands accounted for 82% of the total EU production (see Figure 28). Among these countries, Austria (CAGR +1.8%), Italy (CAGR +0.4%), and the Netherlands (CAGR +1.2%) experienced a production growth between 2002 and 2012, while Belgium (CAGR -4.2%), France (CAGR -2.6%), Poland (CAGR -0.003%), and the United Kingdom (CAGR -1.7%) recorded a decline (see Figure 29).

Few member states registered a positive variation in crude steel production over the period 2002-2012 (see Figure 6): Austria (+1.2 million tonnes), Italy (+1.2 million tonnes), the Netherlands (+749,000 tonnes), Slovak Republic (+128,000 tonnes) and Slovenia (+151,000 tonnes). Also Portugal (+951,000 tonnes) and Latvia (+48,000 tonnes) experienced a growth between 2002 and 2011.

Figure 27 Production of crude steel in the EU (thousand tonnes)[35]
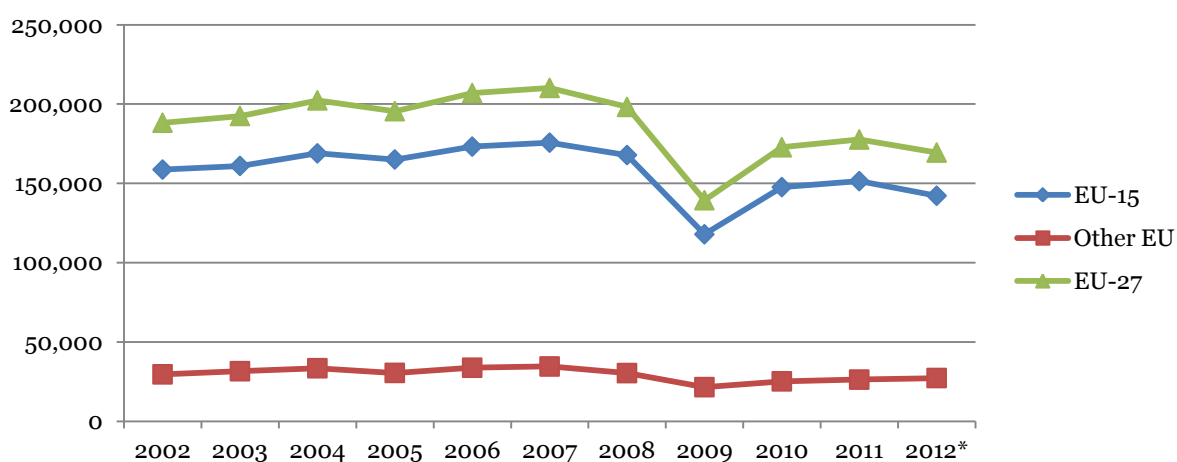
Source: Authors' elaboration on World Steel, 2012; World Steel Association Data 2013

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[35] *Missing value for DK, LV, and PT; estimated value for GR, LU, NL, RO, and other EU.

Figure 28 Share of crude steel production in the EU by member state – 2012[36]
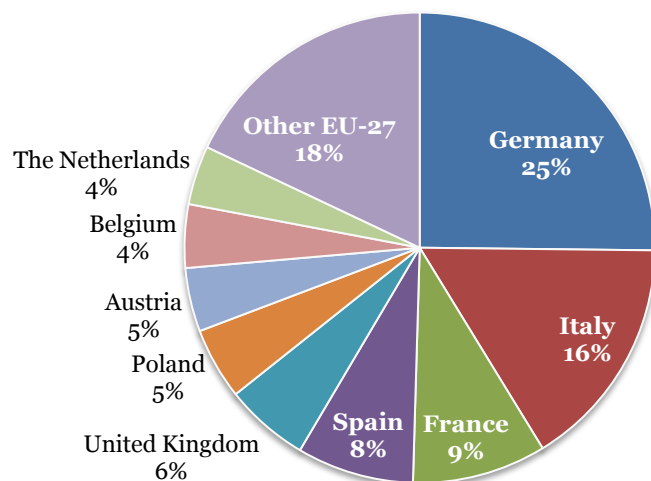
Source: Authors' elaboration on World Steel Association Data 2013

Figure 29 Production of crude steel in selected member states (thousand tonnes)[37]
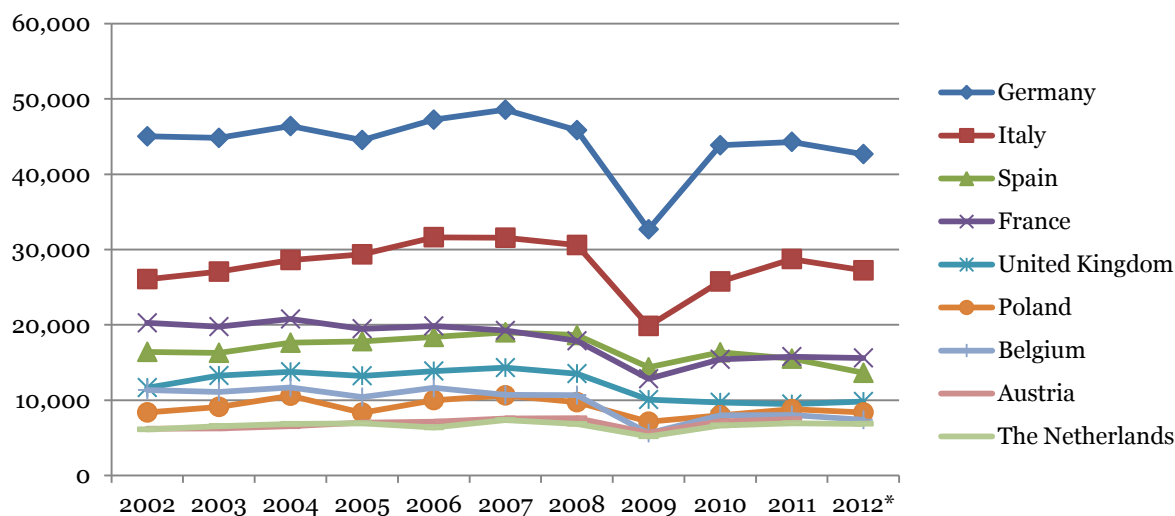
Source: Authors' elaboration on World Steel, 2012; World Steel Association Data 2013

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[36] Estimated value for NL.

[37] *Estimated value for NL.

Figure 30 Variation in production of crude steel – 2002-2012[38]
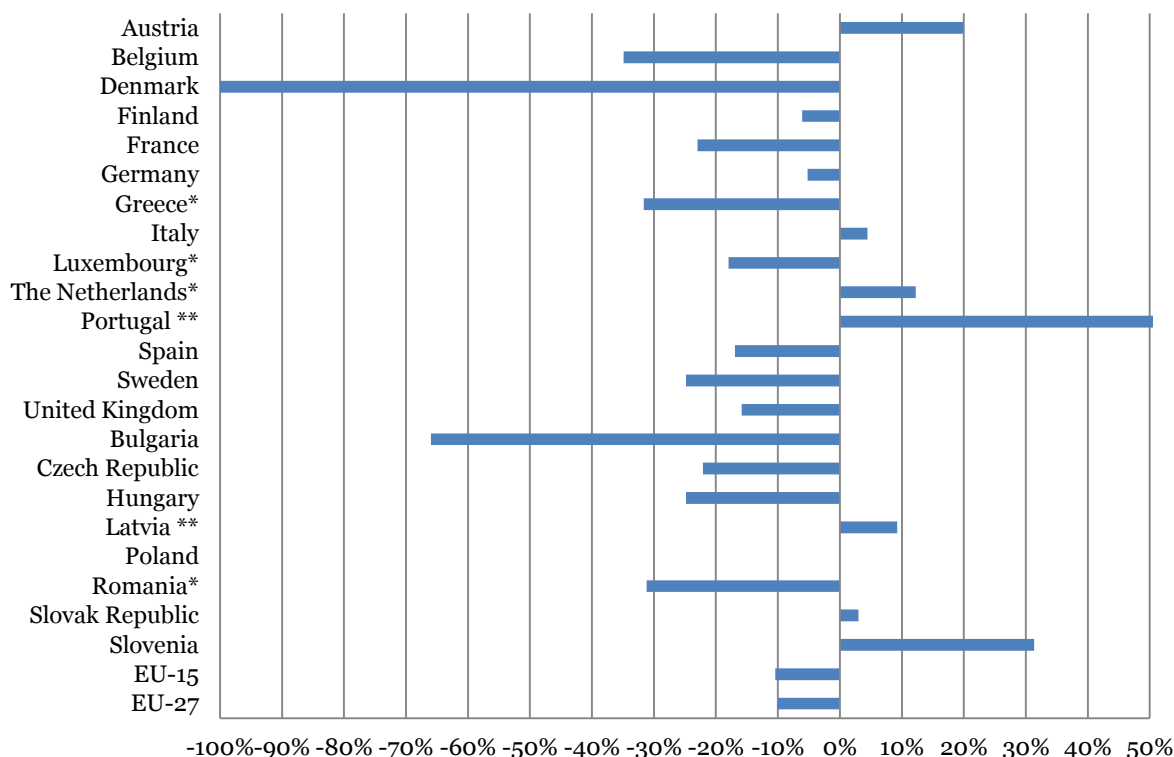
Source: Authors' elaboration on World Steel, 2012; World Steel Association Data 2013

Steel making technology and casting process

In the EU, a growing share of crude steel is produced in electric furnaces (see Figure 31). In 2002, about 62% of total production was carried out in BOFs, 37.7% in EAF, and less than 0.3% in Open Heart Furnaces (OHF); in 2011, EAFs accounted for about 42.6% of steel produced and BOFs for 57.4%. As a consequence of the overall downturn registered in 2008, several integrated plants have been shut down either permanently or temporarily , resulting in a decline in BOF production between 2007 and 2009, comparatively steeper than the one registered by minimills (-47 million tonnes for BOFs against -23 million tonnes for EAFs).

Among the EU member states where the overall production is concentrated, in 2011 EAF technology has the lion's share in Spain (75%) and Italy (66%) and accounts for almost half of the total output in Poland (49.6%); it is less widespread in France (39%),

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[38] *Estimated value in 2012 for GR, LU, NL, and RO; **variation over the period 2002-2011 for LV and PT.

Belgium (35%), Germany (32%), and United Kingdom (27%); and it has a modest role in Austria (9%) and the Netherlands (3%) (see Figure 32).

Continuous casting is the predominant casting process all over the EU, accounting for more than 94% of the total output in 2002 and for about 96% in 2011 (see Figure 33). When considering the larger producers, the share of continuous casting production goes from 95% for Italy and France to 100% for Belgium (see Figure 34). Indeed, the EU steel makers have completed the transition to the most cost efficient casting process.

Figure 31 Production of crude steel by steel-making technology (thousand tonnes)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
OHF	525	518	660	686	688	696	635	692	655	0
EAF	71,054	72,194	77,257	74,987	82,957	84,626	82,223	61,156	71,014	75,683
BOF	116,665	119,800	124,411	119,830	123,277	124,857	115,338	77,518	101,118	101,991
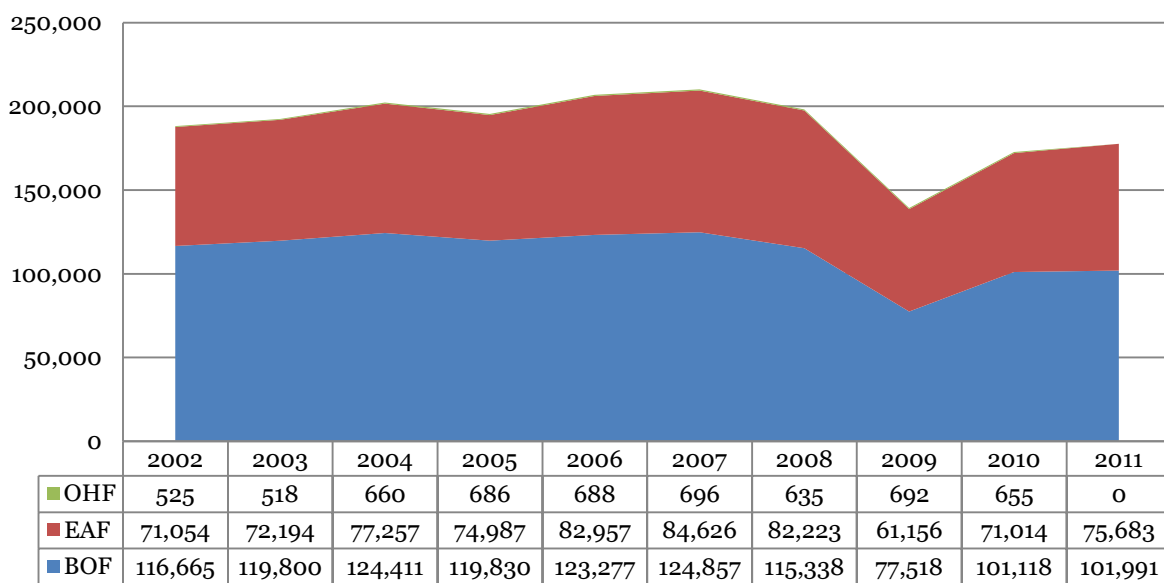
Source: Authors' elaboration on World Steel, 2012

Figure 32 Production of crude steel by steel-making technology in selected member states - 2011 (thousand tonnes)

	Germany	Italy	Spain	France	United Kingdom	Poland	Belgium	Austria	The Netherlands	Other EU-27
EAF	14,204	18,843	11,660	6,128	2,532	4,378	2,773	689	172	14,304
BOF	30,079	9,892	3,844	9,652	6,946	4,446	5,253	6,785	6,765	18,329
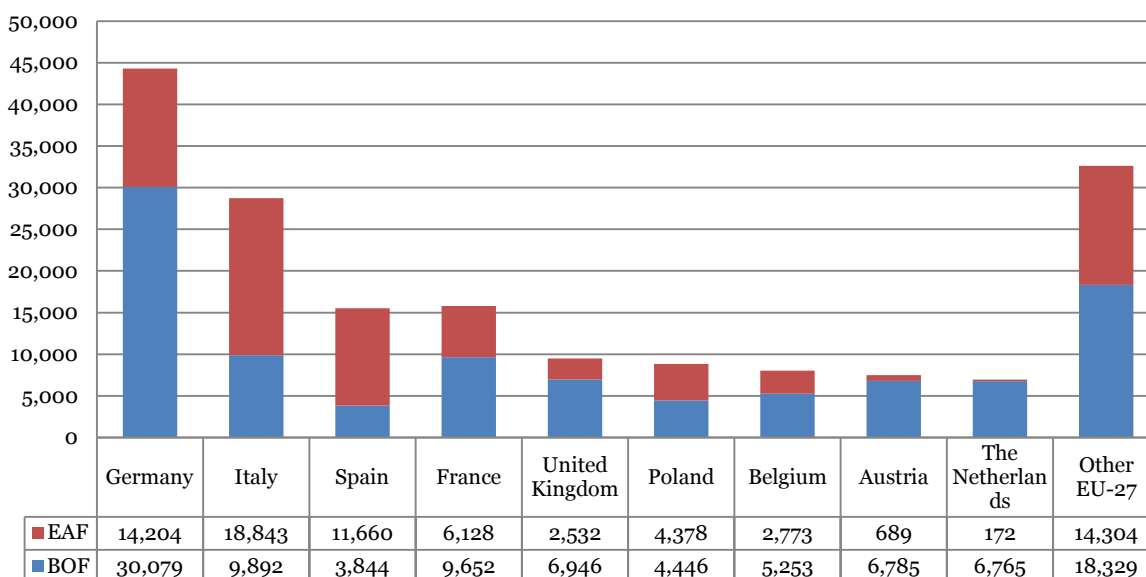
Source: Authors' elaboration on World Steel, 2012

Figure 33 Production of crude steel by casting process (thousand tonnes)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
LSC	1,077	1,013	459	459	549	554	492	328	332	346
CC	177,333	181,253	191,268	185,650	197,061	201,347	190,859	135,115	167,089	170,750
Ingots	9,447	10,038	10,474	9,417	9,492	8,209	6,875	3,922	5,199	6,016
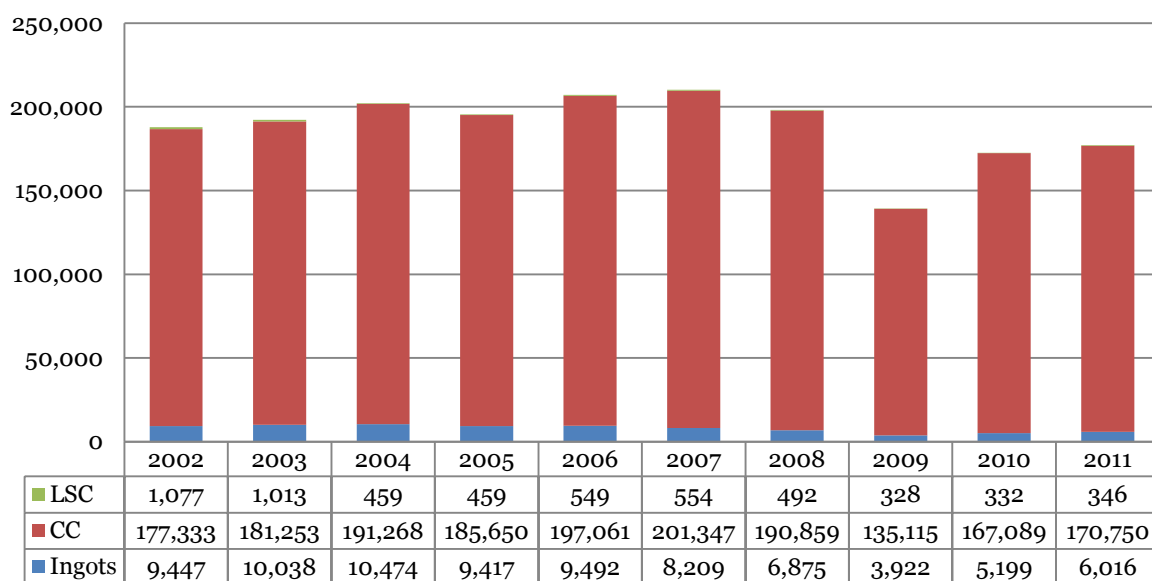
Source: Authors' elaboration on World Steel, 2012

Figure 34 Production of crude steel by casting process in selected member states - 2011 (thousand tonnes)

	Germany	Italy	Spain	France	United Kingdom	Poland	Belgium	Austria	The Netherlands	Other EU-27
LSC	11	146	0	1	11	0	0	10	1	177
CC	42,640	27,360	15,285	15,036	9,273	8,571	8,026	7,158	6,765	44,559
Ingots	1,633	1,229	220	743	194	208	0	306	172	1,789
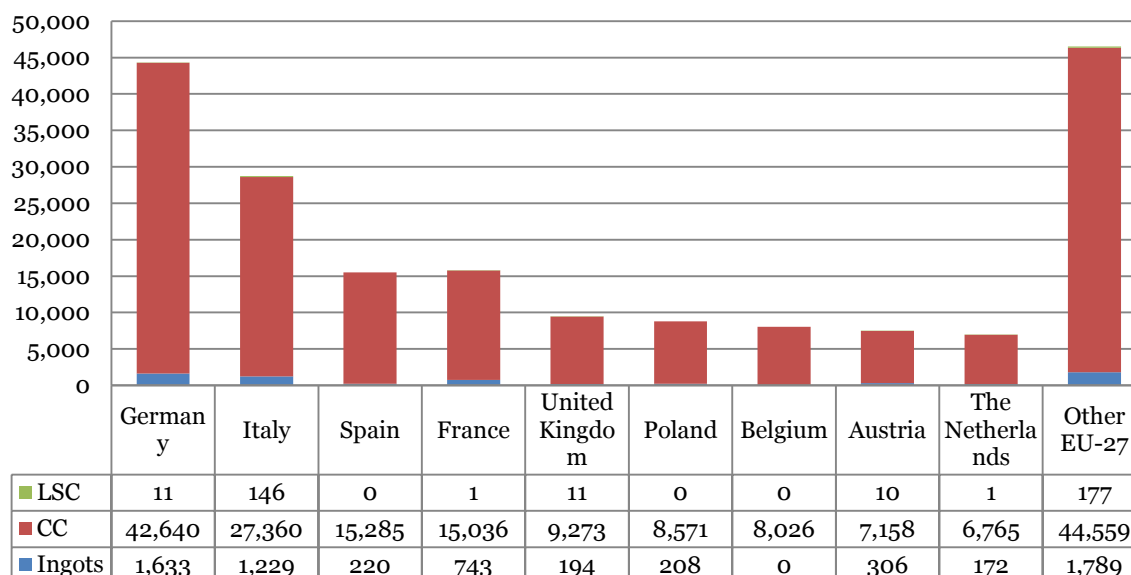
Source: Authors' elaboration on World Steel, 2012

Steel Products

Flat products represent approximately 60% of the EU hot rolled steel output; this proportion was constant over the period 2002-2011, meaning that EU countries maintained their solid position in the high added value portion of the steel market (see Figure 35). In 2011, in Austria (78%), Belgium (90%), France (69%), Germany (66%), and the Netherlands (97%), flat products had the lion's share. In Italy about half of the market (53%) is represented by flat products, while in Poland (35%) and Spain (32%) a higher share of long products was processed (see Figure 36). This uneven distribution reflects a different combination of production technologies, as Poland, Spain, and Italy as well produce a large percentage of crude steel in EAFs, whose output is usually less suitable for flat products.

Focusing on steel products of second transformation (see Figure 37), in 2009 coated sheet and strip (tinmill, other metallic, and non-metallic) accounted for more than one third of the total EU production, followed by wire rod (22%), concrete reinforcing bars (21%), other hot rolled bars (10%), and heavy sections (10%).

Figure 35 Production of hot rolled products in the EU (thousand tonnes)[39]

	2002	2003	2004	2005	2006	2007	2008	2009	2010^	2011^
■ HRFP	97,919	102,44	109,60	105,28	112,71	111,61	104,99	73,673	86,582	89,147
■ HRLPs*	65,434	67,171	71,133	67,345	74,739	76,071	73,658	56,119	60,122	62,663
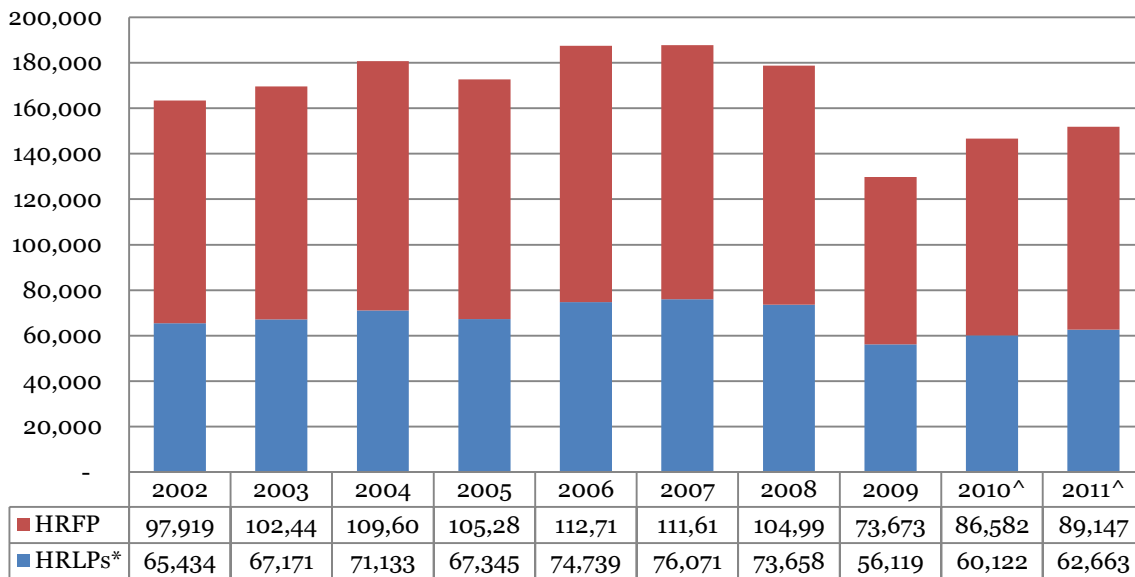
Source: Authors' elaboration on World Steel, 2012

Figure 36 Production of hot rolled products in selected member states – 2011 (thousand tonnes)[40]

	Germany	Italy	France	Spain	United Kingdom	Poland	Belgium	Austria	The Netherlands	Other EU-27^
■ HRFP	25,191	14,418	9,434	4,805	4,643	2,613	9,050	4,967	6,197	7,829
■ HRLP*	12,742	12,888	4,281	10,170	3,319	4,931	962	1,413	204	11,753
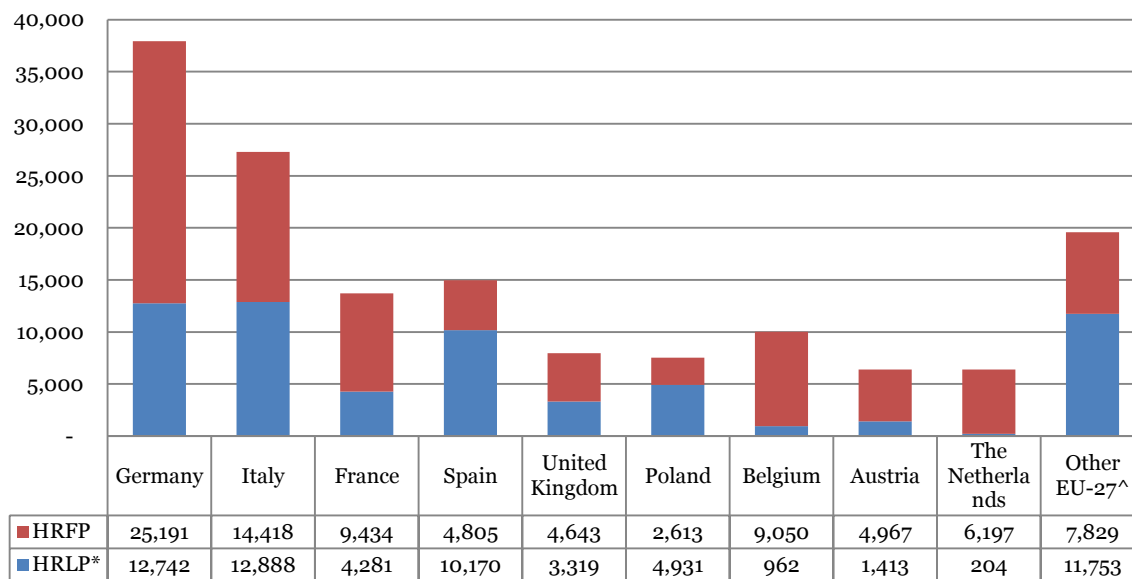
Source: Authors' elaboration on World Steel, 2012

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[39] *Seamless tubes excluded; ^data on hot rolled long products are missing for SE and SI; data for hot rolled flat products are missing for GR, SE, SK, and SI.

[40] *Seamless tubes excluded; ^data on hot rolled long products are missing for SE and SI; data for hot rolled flat products are missing for GR, SE, SK, and SI.

Figure 37 Production of steel products of second transformation in the EU – 2009 (thousand tonnes)[41]
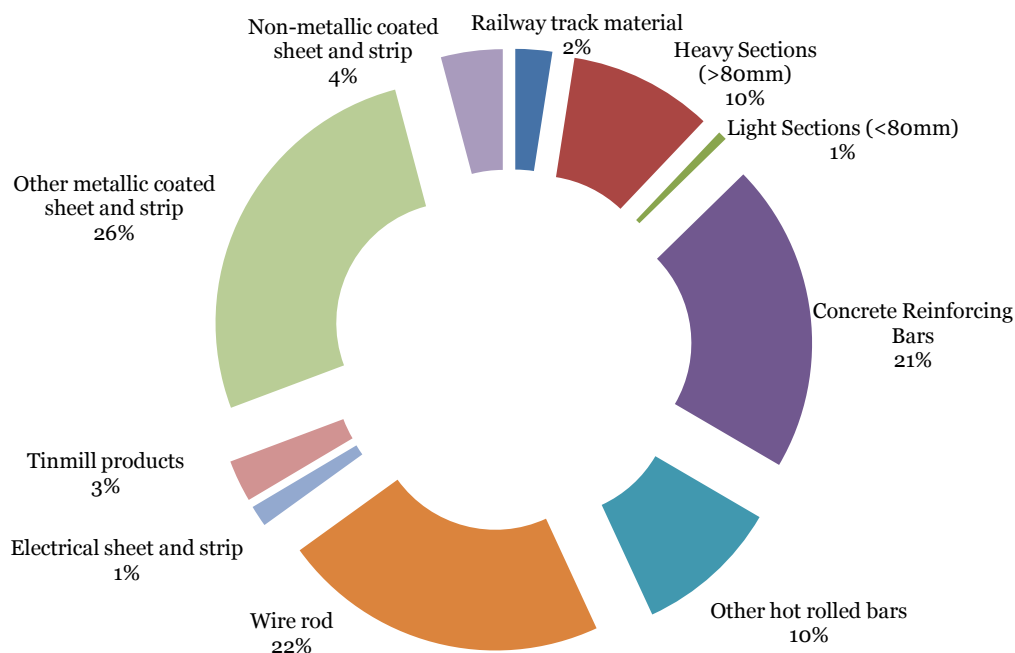
Source: Authors' elaboration on World Steel, 2012

Turnover, production value, value added, and gross operating surplus

The turnover of the EU steel industry experienced a sharp increase between 2002 and 2008 (+104% in absolute terms, CAGR +12.6%), followed by a dramatic decline between 2008 and 2009 (-41%) and by a partial recovery in 2010 (+27%) (see Figure 38). In particular, over the period 2002-2007 revenues grew faster than production (+101% in absolute terms against +12% registered in production of crude steel); revenues slightly grew also in 2009 (+1.8%) although output already started to decline. Analogously, the 2008-2009 downturn of turnover was steeper than in terms of output, thus signalling the high volatility of steel prices. The impressive growth in revenues, which was largely determined by a sharp increase in steel prices, did not lead to the expected positive effect in term of economic results for steel makers. It is worth stressing that national turnover of the steel industry has a crucial role in the economic system of several EU member states, even when quantity produced are limited in absolute value (see Figure

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[41] Data for 2010 and 2011 are scattered and fragmented.

39). In 2010, steel maker turnover accounted for 6.0% of GDP in Slovakia, for 3.7% in Luxembourg, for 3.2% in Latvia, for 3% in Czech Republic, for 2.9% in Finland and for 2.6% in Belgium. As a back of the envelope estimates, considering that in the same year valued added over sales for the EU steel industry was about 15%, steel making is worth 1 point of GDP in Slovakia and about 0.5 in the other mentioned countries.

Valued added[42] over sales went from 20.0% in 2002 to 22.3% in 2007, then falling in 2008 (18.6%) and reaching 15.3% in 2010 (see Figure 40). Considering that the negative difference between turnover and value added is mainly explained by the cost of goods and services, variable production costs (raw materials and energy) sharply increased over the period 2002-2010. According to Crompton & Lesourd (2004, cited in Ecorys, 2008), price of iron ore are the main driver of variable production costs. Therefore, it can be supposed that raw material suppliers, which benefit from a strong bargaining power, drained a significant share of the value generated in the industry. Indeed, iron ore price went from 12.68 US$ per dry tonne in January 2002 to 125.91 US$ in January 2010 (+893% in absolute terms, CAGR +33%).[43]

The ratio between gross operating surplus[44] (an indicator which is comparable to the EBITDA) and sales experienced a sharper fluctuation, swinging from 4.5% in 2002 to 13% in 2007 and back to 4.3% in 2010 (with a minimum of 0.4% in 2009). This trend, when compared to the one registered in value added over sales, indicates a certain degree of rigidity in labour cost in the EU steel industry.

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[42] "Value added at factor cost is the gross income from operating activities after adjusting for operating subsidies and indirect taxes. It can be calculated as the total sum of items to be added (+) or subtracted (-): turnover (+); capitalized production (+); other operating income (+); increases (+) or decreases (-) of stocks; purchases of goods and services (-); other taxes on products which are linked to turnover but not deductible (-); duties and taxes linked to production (-)" (EUROSTAT, Glossary, 2013, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Value_added_at_factor_cost)

[43] Index Mundi, Iron ore monthly price, (http://www.indexmundi.com/commodities/?commodity=iron-ore&months=180).

[44] Gross operating surplus is calculated from the value added at factor costs by subtracting personnel costs.

Figure 38 Aggregate turnover in the EU iron and steel industry – NACE rev.2 24.1 (mln €)[45]
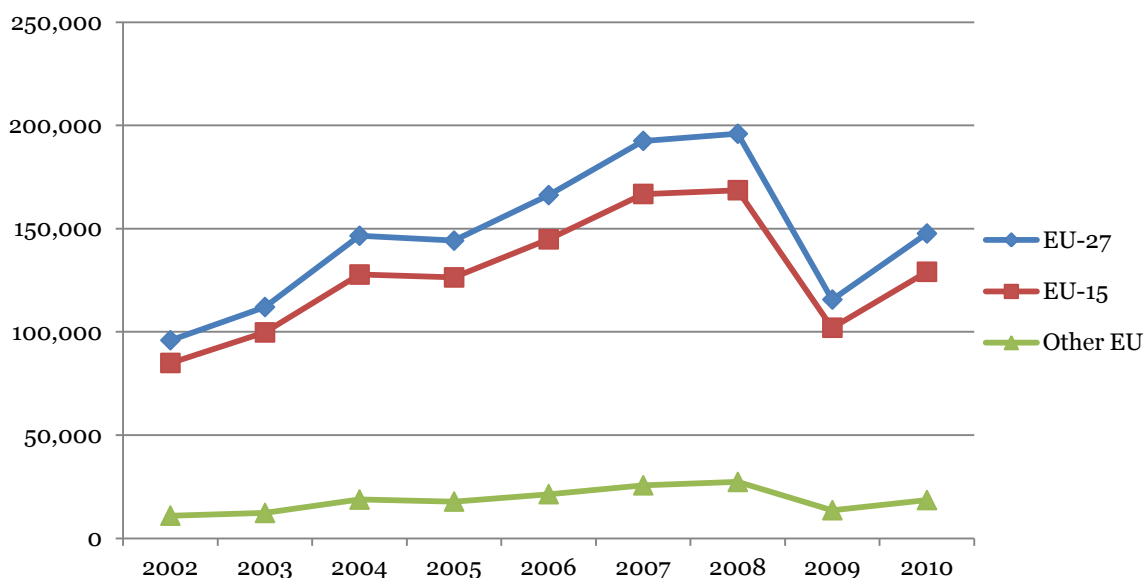
Source: Authors' elaboration on EUROSTAT

Figure 39 Turnover of the steel and iron industry over GDP– NACE rev.2 24.1[46]
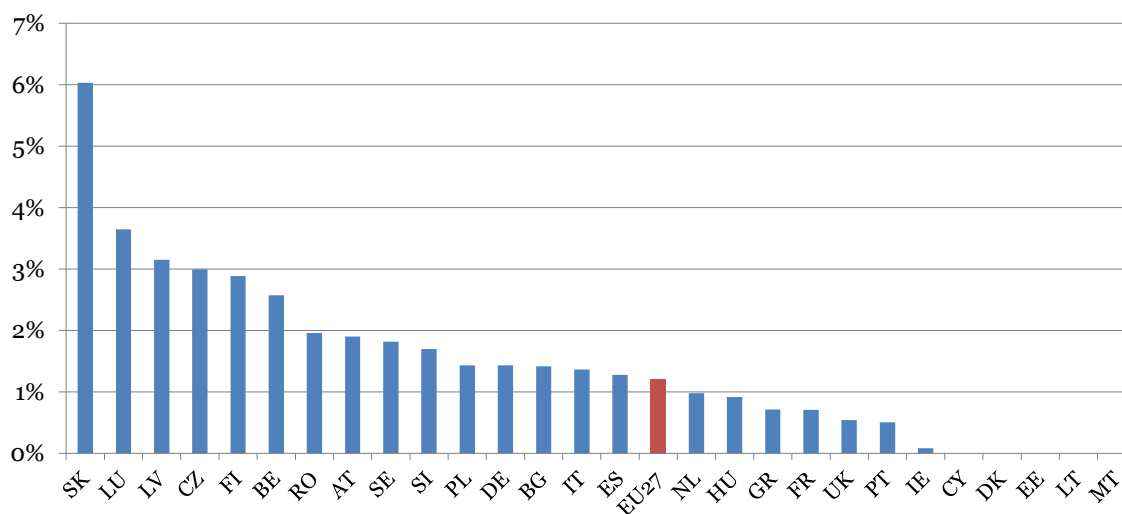
Source: Authors' elaboration on EUROST

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[45] Data estimated for BE in 2002; for CZ in 2002, 2005, and 2007-2010; for DK over the whole period; for GR in 2002, 2008, and 2010; for IE in 2002; for LV over the whole period; for LT in 2002 and 2005-2008; for LU in 2005-2010; for MT in 2002-2004, 2006, and 2008-2010; for PT in 2004 and 2007; for RO in 2008; for SK over the whole period; for SI in 2003 and 2004; for NL in 2002-2008 and 2010.

[46] Data estimated for CZ, DK, GR, LT, LU, MT, NL, and SK; GDP at current prices.

Figure 40 Value added over sales and gross operating surplus over sales value in the EU iron and steel industry – NACE rev.2 24.1[47]
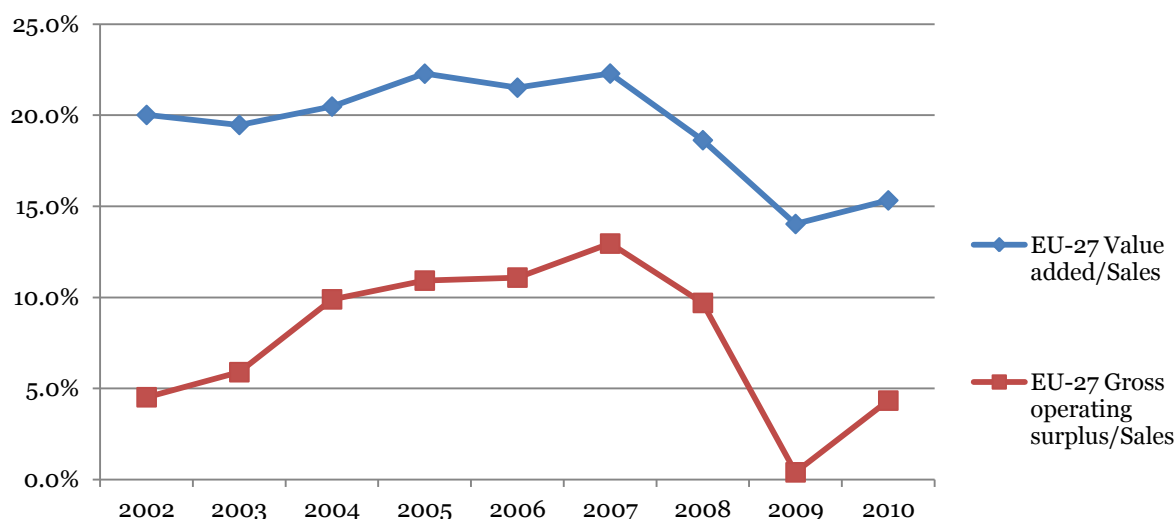
Source: Authors' elaboration on EUROSTAT

Employment and labour cost

EUROSTAT data on employment in the EU iron and steel industry are very fragmented. In 2010, based on the available information, 290,639 persons were employed in this industry (see Table 18). Germany (77,997) and Italy (42,751) accounted for the majority of jobs; in Spain, France, Poland, and Romania employment levels were higher than 20,000 units. In these member states, employment experienced a decline over the period 2002-2010: modest in Spain (-0.7%, -177 units), Germany (-2.9%, -2,351 units), and Italy (-4.0%, -1,759); dramatic in Poland (-20.2%, -6,108 units), France (-35.5%; -14,057 units), and Romania (-59.8%, -32,545 units). An occupation growth was on the contrary registered in Finland (+13.4%, +1,291 units), Austria (+9.5%, +1,291 units), and Sweden (+8.6%, +1,269 units). A general negative trend for employment in the EU steel industry is registered, and it is steeper in Eastern Europe, probably due to a progressive conversion toward less labour-intensive production technologies.

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47 Value added is measured at factor costs. Data for BE are missing for 2002; data for CZ are missing for 2002, 2005, and 2007-2010; data for DK are missing for the whole period; data for GR are missing in 2002, 2008, and 2010; data for IE are missing for 2002; data for LV are missing for the whole period; data for LT are missing for 2002 and 2005-2008; data for LU are missing for 2005-2010; data for MT are missing for 2002-2004, 2006, and 2008-2010; data for PT are missing for 2004 and 2007; data for RO are missing for 2008; data for SK are missing for the whole period; data for SI are missing for 2003 and 2004; data for NL are missing for 2002-2008 and 2010.

Table 18 Number of persons employed in the EU iron and steel industry -NACErev.2 24.1[48]

	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU-27	369,009	414,449	391,292	380,165	378,485	346,821	305,897	296,970	290,639
EU-15	263,466	291,510	279,051	269,860	270,593	269,362	229,425	230,198	230,531
EU-12	123,735	100,380	105,543	122,939	112,241	110,305	107,892	77,459	76,472
Austria	13,169	13,534	13,815	14,141	14,361	14,547	14,967	15,127	14,459
Belgium	NA	18,316	18,057	18,175	17,053	18,446	18,164	16,472	15,351
Bulgaria	10,954	10,957	9,830	9,299	9,332	8,728	7,351	5,871	2,769
Cyprus	0	0	0	0	0	0	0	0	0
Czech Republic	NA	26,751	25,060	23,970	23,188	NA	NA	NA	NA
Denmark	NA	NA	NA	NA	NA	NA	NA	NA	NA
Estonia	0	0	0	0	0	0	0	0	0
Finland	9,953	9,637	10,376	11,450	11,273	11,239	NA	11,280	11,244
France	39,648	39,794	36,525	34,688	33,315	30,315	NA	NA	25,591
Germany	80,348	81,677	81,819	79,702	78,964	78,250	80,556	79,600	77,997
Greece	NA	3,379	3,530	3,503	3,831	3,863	NA	2,822	NA
Hungary	7,147	7,725	6,689	7,582	6,999	6,886	7,564	7,125	6,009
Ireland	NA	522	625	809	1,027	1,308	1,308	959	1,003
Italy	44,510	46,843	44,176	42,418	44,997	44,605	45,680	44,273	42,751
Latvia	0	2,881	2,869	2,818	2,731	2,682	2,655	2,423	2,394
Lithuania	NA	109	0	NA	NA	NA	NA	0	0
Luxembourg	4,372	6,032	5,786	NA	NA	NA	NA	NA	NA
Malta	NA	NA	NA	0	NA	0	NA	NA	NA
The Netherlands	NA	NA	NA	NA	NA	NA	NA	NA	NA
Poland	30,187	29,511	27,830	25,568	28,264	24,840	25,742	23,157	24,079
Portugal	1,404	1,406	NA	1,338	1,271		1,180	1,113	1,099
Romania	54,409	45,005	39,963	38,290	34,481	31,310	29,639	25,116	21,864
Slovakia	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovenia	2,846	NA	NA	2,778	2,897	3,013	3,521	3,080	2,993
Spain	26,501	27,028	26,918	25,644	25,657	27,191	27,683	25,426	26,324
Sweden	13,443	14,709	15,867	14,381	15,735	16,191	16,237	13,620	14,712
United Kingdom	30,118	28,633	21,557	23,611	23,109	23,407	23,650	19,506	NA

Source: Authors' elaboration on EUROSTAT

4.3.3 Demand

Demand for steel finished products

Demand for finished steel products in the EU (see Figure 41) fell between 2007 and 2009 by 41% after a remarkable growth experienced over the period 2005-2007 (+21%), which in turn followed a period of relative stability in 2002-2005 (+2%). Signs of recovery were registered in 2010 (+24% on yearly basis) and 2011 (+5%), but total

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48 EU-27, EU-15 and EU-12 totals reflect the missing data points in the national series. Therefore, year to year variation can also depend on different data coverage.

demand is still below the 2007 level (about 50 million tonnes lower). Overall, trends registered in the EU-15 member states are comparable to those registered across new member states; nevertheless between 2002 and 2011 demand in EU-15 slightly decreased (CAGR -1.2%; -14 million tonnes), while a growth was registered in the new member states (CAGR +2.9%; +6 million tonnes).

In 2011, demand for finished steel products in the EU was geographically concentrated: Germany, Italy, France, Spain, Poland, United Kingdom, Czech Republic, Belgium (including data for Luxembourg), and Austria accounted for more than 84% of the total demand (see Figure 42). Demand variation diverged across EU member States over the period 2002-2011. Eleven countries out of 27 experienced an increase in demand (see Figure 43), namely Austria (+823 thousand tonnes), Belgium and Luxembourg (+40 thousand tonnes), Germany (+4.6 million tonnes), Sweden (+596 thousand tonnes), Czech Republic (+1.8 million tonnes), Estonia (+8 thousand tonnes), Latvia (+330 thousand tonnes), Lithuania (+102 thousand tonnes), Poland (+3.2 million tonnes), Romania (+460 thousand tonnes), and Slovak Republic (+473 thousand tonnes). A strong decline in absolute terms was registered in Spain (-6.5 million tonnes), the United Kingdom (-3.5 million tonnes), Italy (-2.5 million tonnes), Greece (-2 million tonnes), and France (-2 million tonnes).

Between 2002 and 2011, crude steel production in the EU is always higher than the entire demand for steel finished products (see Figure 44). Quantity produced did not experience the same sharp increase which characterized demand between 2005 and 2007, growing only by 11% in the period 2002-2007. On the contrary, a comparable and sharp decline was registered both for supply and demand between 2007 and 2009.

Figure 41 Apparent steel use in the EU (thousand tonnes)[49]
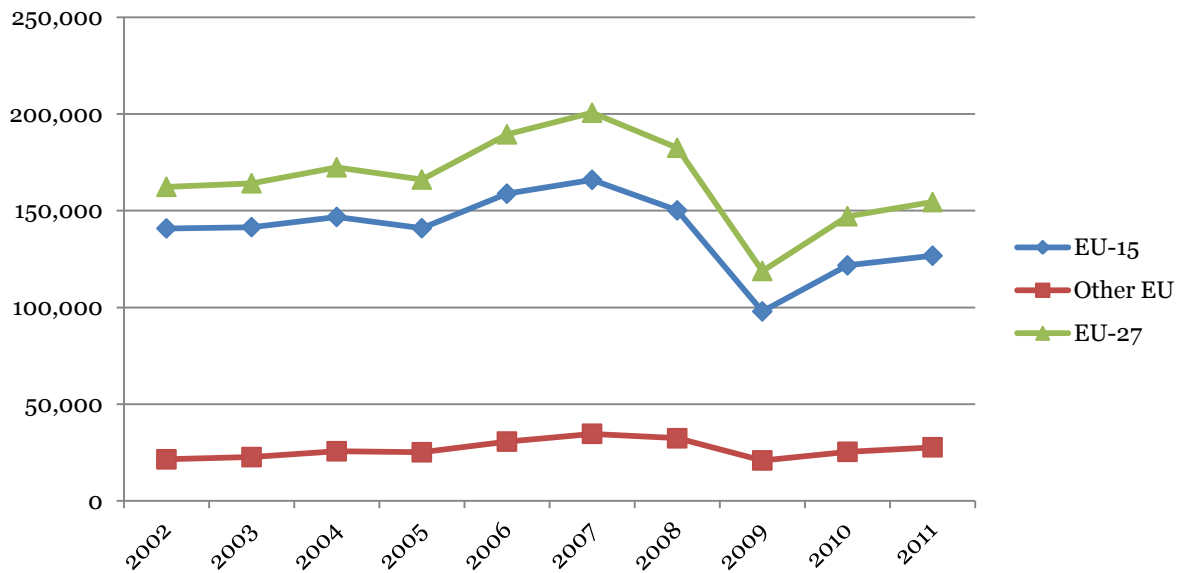
Source: Authors' elaboration on World Steel, 2012.

Figure 42 Country share of total European apparent steel use – 2011[50]
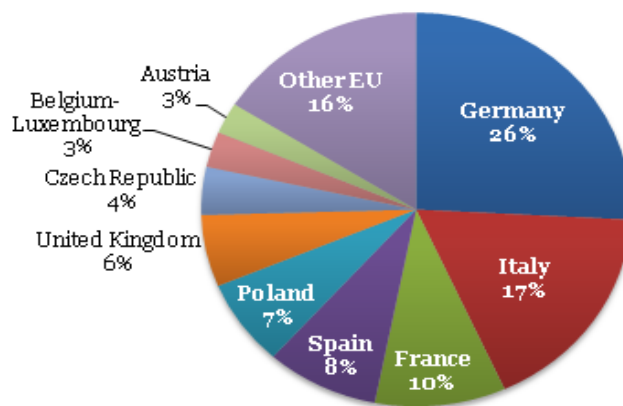
Source: Authors' elaboration on World Steel, 2012

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[49] Apparent steel use of finished steel products is expressed in volume terms as deliveries of finished steel minus net exports of steel industry goods.

[50] Apparent steel use of finished steel products is expressed in volume terms as deliveries of finished steel minus net exports of steel industry goods.

Figure 43 Variation in apparent steel use - 2002-2011[51]
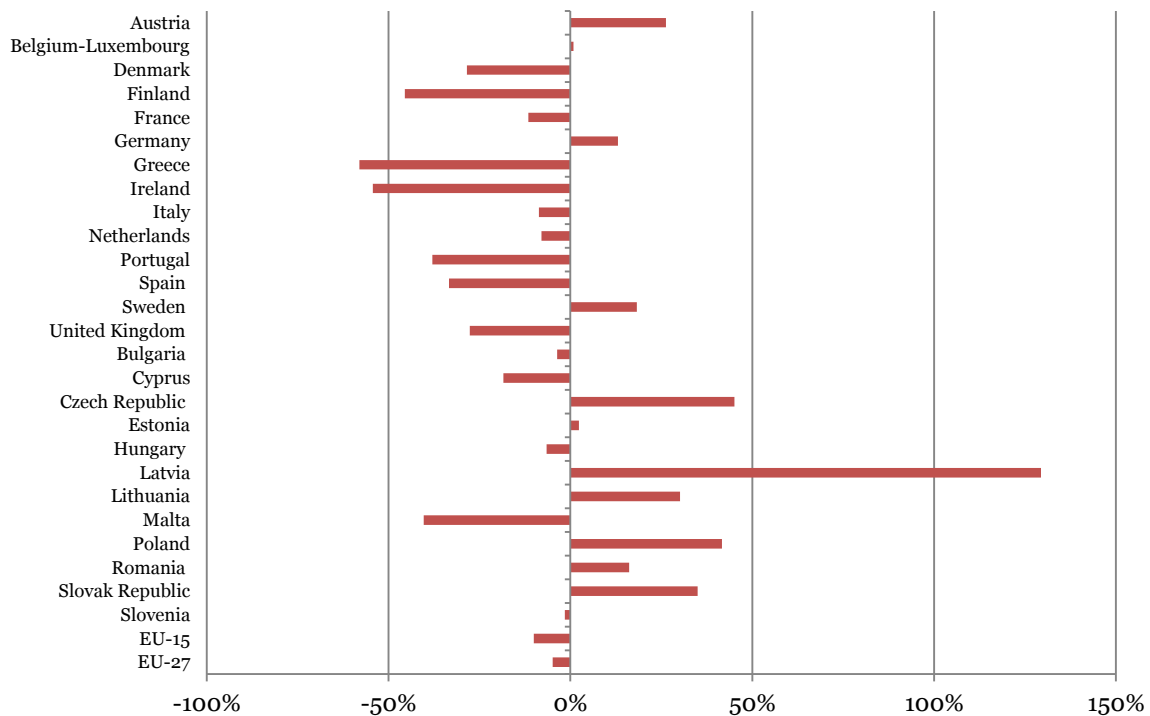
Source: Authors' elaboration on World Steel, 2012.

Figure 44 Apparent steel use and production of crude steel in the EU (thousand tonnes)[52]
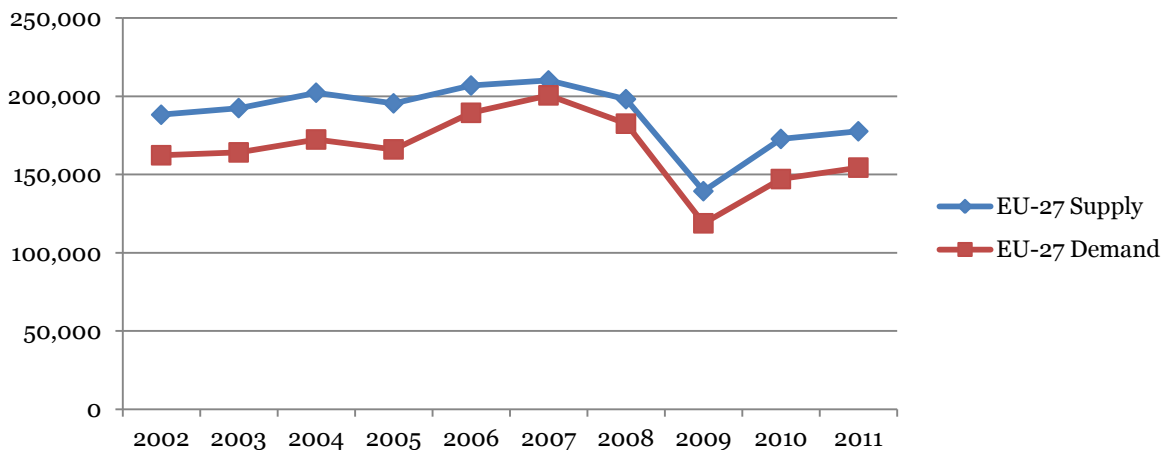
Source: Authors' elaboration on World Steel, 2012.

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[51] Apparent steel use of finished steel products is expressed in volume terms as deliveries of finished steel minus net exports of steel industry goods.

[52] Demand measures apparent steel use of finished steel products, expressed in volume terms as deliveries of finished steel minus net exports of steel industry goods; supply measures total production of crude steel.

Demand for steel end products

Automotive and construction sectors have usually been the two largest steel end users. Therefore, fluctuations in turnover in these industries significantly affect steel demand. As expected, trend in the EU motor vehicle industry revenues are comparable to the one registered in demand for finished steel products (see Figure 45). A strong growth between 2005 and 2007 (+18%), preceded by a more stable period between 2002 and 2005 (+1.5%), was followed by a remarkable decline by 25% over the period 2007-2009. As for steel demand, a new increase was registered in 2010 (+18% on a yearly basis). Analogous fluctuations affected the construction sector (see Figure 46), where a comparable downturn was experienced one year later and no sign of recovery could be noticed in 2010.

Figure 45 Total turnover in the EU motor vehicle industry – enterprises included in NACE rev.2 Division 29 (mln €)[53]
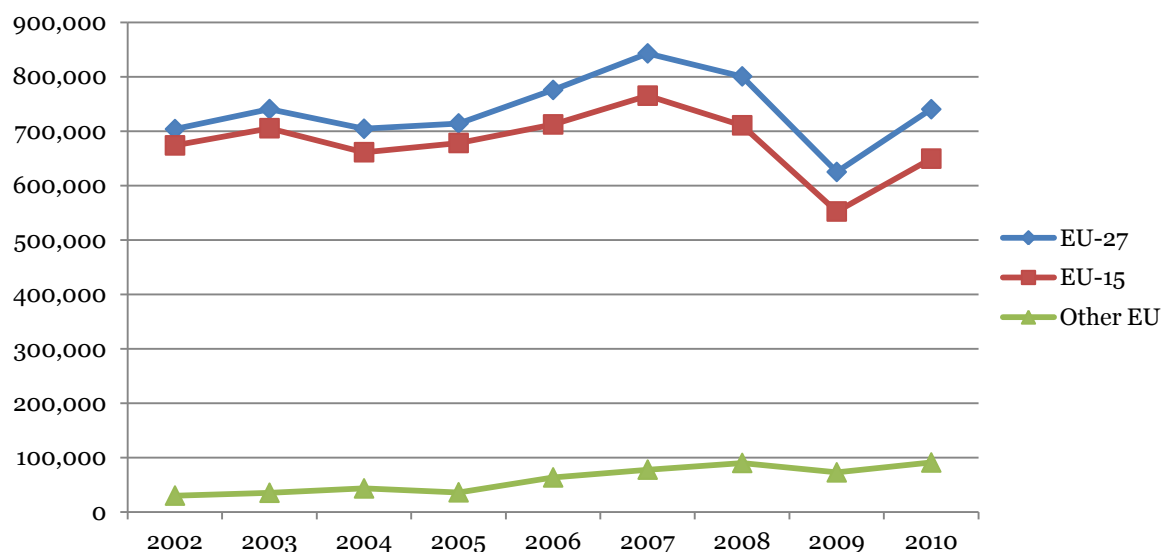
Source: Authors' elaboration on EUROSTAT

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[53] Data for BE are missing for 2002; data for GR are missing for 2002, 2008, and 2010; data for LU are missing for the whole period; data for MT are missing for 2006 and 2008-2010; data for PT are missing for 2006 and 2007.

Figure 46 Total turnover in the EU construction sector – enterprises included in NACE rev.2 Section F (mln €)[54]
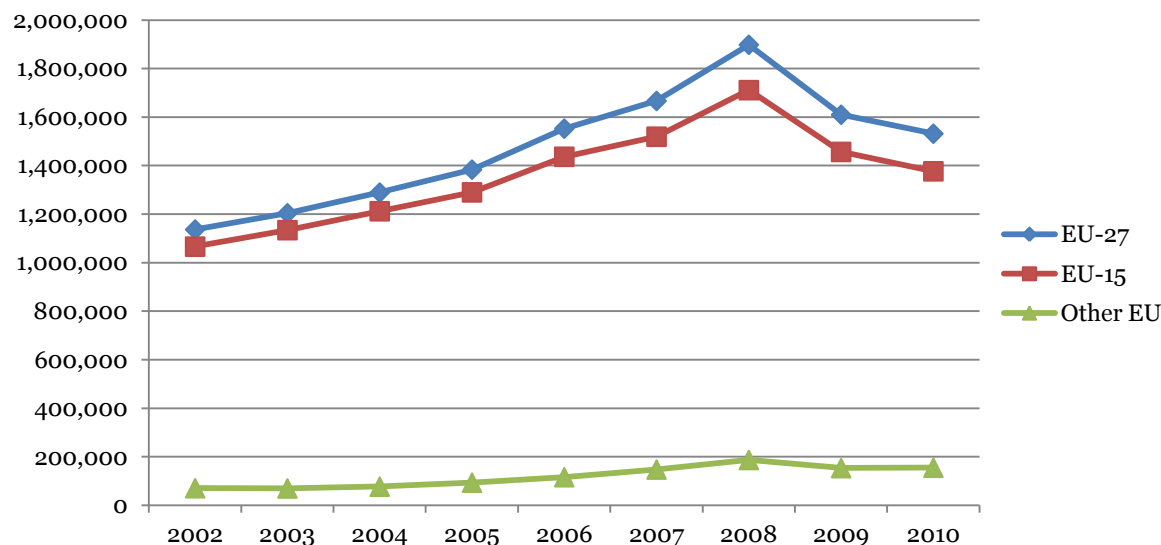
Source: Authors' elaboration on EUROSTAT

4.4 International trade of steel

4.4.1 World production and trade flows

The production trend of the steel industry has been subject to structural change over the last twelve years, mainly due to the increase in the Asian production. As this section will show later, this shift in relative market shares, together with the economic crisis, has modified the directions and volumes of trade flows. Figure 47 shows that, against a flat trend characterizing the production of crude steel in the historical locations such as the EU and the US, production of Asia and Oceania has increased at a steep pace, reaching almost 1 billion tonnes in 2012. The upward trend is led by the Chinese performance, fuelled by growing internal consumption and external demand of cheaper steel products. Beside, the Asian position as global leader, the EU-27 is the second biggest player, followed by North America and CIS, with an average of 200 million tonnes until 2008. In 2009, the production dropped by 24% in the EU-27, North America and CIS, and underwent a weak recovery in the three following years. These three regions, together with Asian countries, cover more than 90 percent of the world production.

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[54] Data for BE are missing for 2002; data for GR are missing for 2002, 2008, and 2010; data for MT are missing for 2006 and 2008-2010.

Figure 47 Crude Steel Production (thousand tonnes)[55]
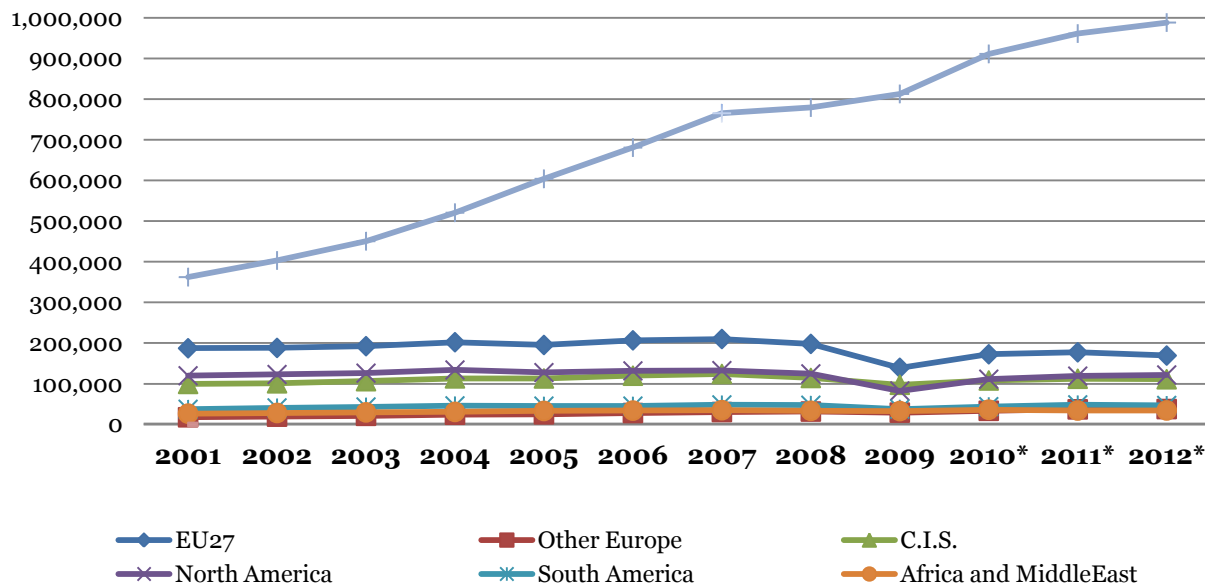
Source: Authors' elaboration on World Steel Association Data (2013)

The dynamics of the global steel production provides the background to analyze the net positions of semi-finished and finished products. As shown by Figure 48, EU-27, that used to be a net exporter, has turned into a net importer from 2006 to 2009 due to a marked increase of the imports volume; finally, the EU-27 turned back into a net exporter in 2010 and 2011. Since 2006, while the European countries reduced their steel production, Asian countries, mostly China, increased enormously their capacity, to satisfy both the internal and external demand. As a result, Figure 49 shows that exports market shares of semi-finished and finished steel products shift mainly from EU27 to Asia. From 2001 to 2011, the EU export share[56] decreased from 41% to 35% while for Asia and Oceania increased from 24% to 36%. Again, China played the lion's share in this shift, by increasing its exports share from 2%, in 2001, to 12% in 2011. Export shares for Japan, for instance, remained unchanged (10%), while for South Korea increased by 2% (from 5% to 7%).

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[55] * Estimates by World Steel Association.

[56] It is worth to notice that these data also include intra-EU trade. This could lead in Figure 25 to an overestimation of the EU export share compared to other exporting countries. However, this should not cause any problems in Figure 24, where intra-EU flows (imports and exports) balance each other out.

The CIS, led by Russia and Ukraine, has been a net exporter of semi-finished and finished steel products over the whole period, with a net balance slightly decreasing over time, on average equal to about 50 million tonnes, and an extremely low level of imports. As for Africa and Middle East, they are increasingly becoming net importers, mainly due to the rising dependence from production of Iran, Saudi Arabia and UAE. North America is on the contrary switching from its position of net importer due to a reduction of imports since 2006 (from 64 million tonnes in 2006 to around 29 million in 2009) and to a slow improvement of the export (the level of export was 25.5 million tonnes in 2011 compared to 15.3 in 2001). In 2010, South America (mainly Brazil, Argentina and Venezuela) turned into a net importer due to drop an imports' increase in almost all the countries (although Brazil remaining a net exporter), though reducing its negative balance to -442 thousand tonnes in 2011. Finally, Other Europe, mainly due to increasing exports volume of Turkey, has improved its net position by reporting a surplus of around 4.8 million tonnes in 2011.

Figure 48 Net flows of semi-finished and finished steel products – 2001-2011 (thousand tonnes)[57]
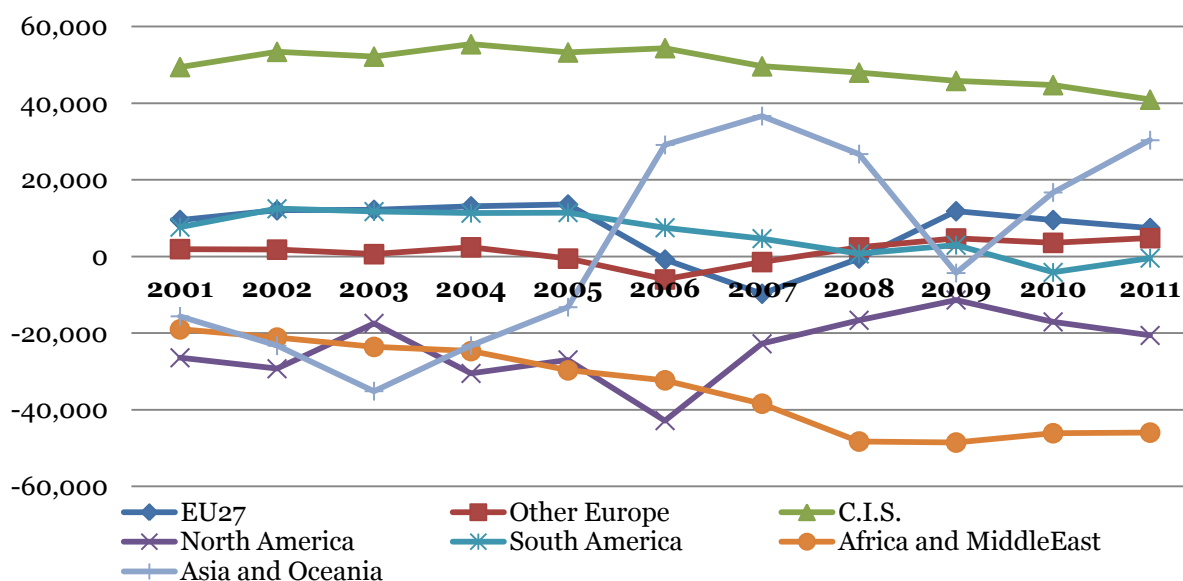
Source: Authors' elaboration on World Steel 2011; 2012

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[57] Data for 2010: estimates by World Steel Association.

Figure 49 Market shares of exports of semi-finished and finished steel products – 2001 and 2011.
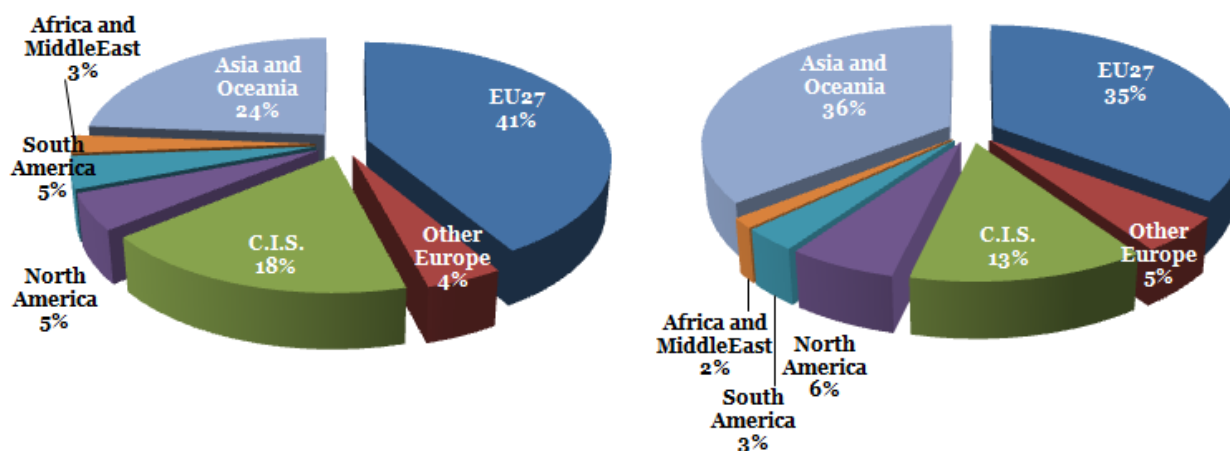
Source: Authors' elaboration on World Steel Association Data (2013)

4.4.2 EU trade flows

The European market for iron and steel[58] is mainly represented by intra-EU flows, as confirmed by Figure 50. Indeed, in 2012, intra-EU trade accounted for 72% of the total, while only 28% of trade was directed towards extra-EU economies. The same can be noticed for imports, where 74% has come from EU member states and 26% from outside EU borders. Based on COMEXT data, which disentangle between intra and extra-EU trade, the EU was a net importer of iron and steel from 2004 to 2008 and again in 2011. Finally, in 2012, EU recorded a positive net balance of 66.8 million tonnes.[59]

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[58] Iron and steel are here defined according to the category 67, SITC Rev. 3. The category includes: pig-iron, spiegeleisen, sponge iron, iron or steel granules and powders and ferro-alloys (671); Ingots and other primary forms, of iron or steel; semi-finished products of iron or steel (672); Flat-rolled products of iron or non-alloy steel, not clad, plated or coated (673); Flat-rolled products of iron or non-alloy steel, clad, plated or coated (674); Flat-rolled products of alloy steel (675); Iron and steel bars, rods, angles, shapes and sections (including sheet piling) (676); Rails or railway track construction material, of iron or steel (677); Wire of iron or steel(678); Tubes, pipes and hollow profiles, and tube or pipe fittings, of iron or steel (678).

[59] However, according to the data reported by ECORYS (2008), which take into account a smaller range of products, in particular, semi-finished and finished steel products, EU extra-regional imports overtook the exports in 2006, turning EU into a net importer back then.

The relative weight of intra- and extra-EU traded did not change substantially across the decade. In 2001 intra-EU imports and exports accounted for 78% and extra-EU for 21% of the trade flows; in 2012, intra-EU imports and exports accounted for 75% and 73% respectively while extra-EU imports and exports accounted for roughly 24% and 27%, respectively. It is evident from Figure 50that, intra-EU trade flows and extra-EU imports dramatically dropped in 2009 (the former by about one third, and the latter by almost half on a year-to-year basis), while extra-EU exports showed a slow but steady increase throughout the decade.

Figure 50 Intra and Extra-EU Trade of Iron and Steel - 2001-2012 (thousand tonnes)
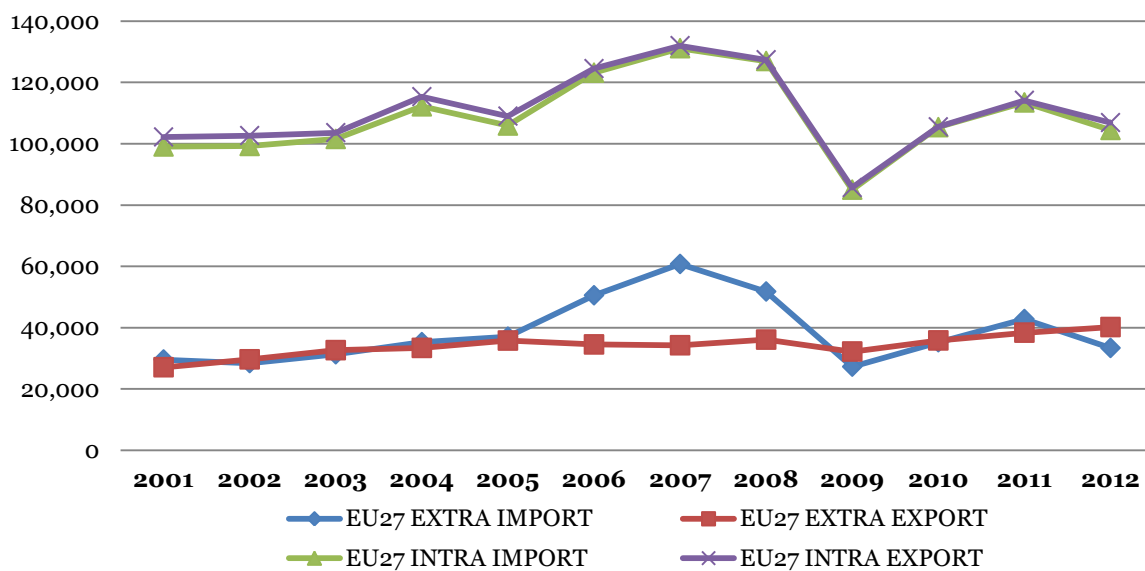
Source: COMEXT, 2013

Table 19 EU27 exports, imports and net positions in iron and steel by selected destination countries - 2001 and 2012 (thousand tonnes)

Destination Countries	2001			2012		
	Export	Import	Net	Export	Import	Net
Total Extra-EU	**27,048**	**29,573**	**-2,525**	**40,150**	**33,341**	**6,809**
Turkey	1,741	3,326	-1,584	5,284	1,830	3,454
USA	6,312	334	5,978	5,237	509	4,728
Algeria	562	133	429	4,603	34	4,569
Switzerland	2,179	1,051	1,128	2,478	1,251	1,228
India	449	326	123	1,432	1,585	-154
Russia	438	6,644	-6,207	1,299	8,322	-7,023
China	758	449	309	1,160	3,502	-2,342
Mexico	668	307	362	1,142	31	1,111
Morocco	689	15	674	1,035	38	997
Norway	1,120	1,656	-536	891	1,118	-227
Canada	939	168	771	812	130	682
Brazil	435	1,302	-867	791	1,388	-597
South Korea	300	737	-437	462	1,331	-869
South Africa	178	2,181	-2,003	423	1,332	-910
Ukraine	115	4,190	-4,075	350	6,084	-5,734
Japan	123	433	-310	152	316	-164

Source: Authors' elaboration on COMEXT, 2013

The destinations of extra-EU flows are diversified geographically, showing that the EU is fairly integrated in the global trade dynamics. Table 19, selects top sixteen destination economies of EU steel exports in 2012. It can be noticed that in 2012 almost 45% of EU exports were directed to Turkey, US, Algeria and Switzerland. The same year, 53% of total imports came from Russia (8,322 thousand tonnes), Ukraine (6,048), and China (3,502). Top origin and destination countries are quite similar compared to 2001, where more than 55% of total extra-EU exports were directed to US, Switzerland, Turkey, and Norway, while almost 63% of extra-EU imports come from Russia (6,644 thousand tonnes), Ukraine (4,190), Turkey (3,326), and South Africa (2,181).

Compared to 2001, when US and Russia were the first markets for EU exports and imports respectively, it is worth to observe the new prominent role acquired by China and India. In particular, Chinese exports to Europe grew eightfold in 12 years, while Indian fivefold. Remarkably, South Korea doubled its exports to Europe, overcoming Switzerland despite proximity, while Russia and Ukraine increased their exports volume by about 50%. In the same period, EU imports from Turkey, Norway and South Africa decreased by about one third to one half in terms of volume. As for EU exports, the most remarkable spike is on trade flows towards Algeria, which increased eightfold from 2001 to 2012, making it the second importer of European steel. Exports towards India,

Russia, and Turkey almost trebled, while exports towards China "only" increased by 50%.

PART IV

LEGAL ANALYSIS AND COST ASSESSMENT

5 General Policies

Regularly, the European Commission releases non-binding communications which pave the way for future policies. From the perspective of a regulatory cost analyst, these communications are strange animals. Being non-binding, they do not represent a direct or indirect cost for businesses. However, being released at the highest possible level of EU policymaking, they are good indicators of the political climate and of the direction which the EU intends to pursue in the following years, even decades. Given the particular nature of policymaking in Brussels, general policies represent a sort of consensus view within the Commission and among EU institutions. As such, although non-binding, they cannot be underestimated by businesses. Hence, it can be argued that they have a role in setting the business climate, even though they do not have an immediate impact on business operations. In a nutshell, they represent a policy risk, or policy opportunity.

Currently, the most important general policy, which should direct the EU action across all policy areas in the current decade, is the so-called EU2020 strategy.[60] The EU2020 strategy aims at ensuring that Europe achieves a smart, sustainable, and inclusive growth. It acknowledges that ensuring that Europe keeps and improves its industrial base and that its competitiveness is sustained through higher productivity is a pre-condition to achieve any growth. A competitive industry requires, and the Commission is committed to it, securing a better market access for EU businesses and a level playing field vis-à-vis our external competitors. The EU2020 strategy is articulated through seven so-called flagship initiatives, three of which have a specific relevance for the steel sector, as well as any other manufacturing industry:

1. An Industrial Policy for the Globalisation Era;

2. Resource Efficient Europe;

3. Innovation Policy.

The Communication on industrial policy[61] acknowledges that the manufacturing industry is a key driver of the European economy and employment levels, and that a "strong, competitive and diversified industrial manufacturing value chain" is of "central importance". The Commission undertakes to have a "fresh approach" to Industrial

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[60] Communication from the Commission, Europe 2020. A strategy for smart sustainable and inclusive growth, COM(2010)2020, 3.3.2010.

[61] Communication from the Commission, An Integrated Industrial Policy for the Globalisation Era. Putting Competitiveness and Sustainability at Centre Stage, COM(2010)614, 28.10.2010.

Policy. The Commission commits itself to craft direct that have a beneficial impact on costs, prices and innovation of industry in general and individual sectors in particular; and to take into account the competiveness effects of all other policy initiatives,[62] including transport, energy, environmental, social policies, consumer protection, single market and trade policies. Not the whole Communication on industrial policy is relevant for the steel industry, but several key points are touched upon: i) the completion of a single market for network industries, especially energy and railways; ii) a better access to financing and support for demonstration R&D projects; iii) the fight against trade restrictions, including distortions in raw material markets; iv) ensuring predictability and legal certainty of the energy and climate change EU strategies; v) helping the EU manufacturing industry to restructure in case of structural excess capacity, especially through the revision of the Rescue and Restructuring Aid Guidelines.

The 2010 industrial policy Communication was followed by and update in 2012,[63] when it is restated that "a strong industrial base is essential for a wealthy and economically successful Europe", so much that the Commission aims at "reindustrialising" Europe, raising the share of industry added value over GDP from 16% to 20%, and gross fixed investments as a share of GDP from 18.6% to 23%. More attention is paid to the issue of energy and raw material prices, which are higher than in most of other industrialised countries. The Commission better defines what intends for "industrial policy", stating that it shall not substitute market mechanisms, as competition is deemed the only way to ensure an efficient allocation of resources and a dynamic economy, and that public intervention should be aimed at creating the right business environment and at remedying to market failures. Among the six priorities, the steel industry is positioned to benefit in particular from the intention to set up markets for advanced clean technologies, including financing for demonstration of Carbon Capture and Storage (CCS) projects; and from the attention paid to sustainable construction and raw materials. The EIB, which has been endowed with an additional capital of €10bln by the Member States, is expected to step up its line of financing to resource efficiency investments, with up to €15-20bln of additional funding.

The steel industry is affected by resource efficiency policy in at least three respects: i) efficiency in the use of raw materials; ii) energy efficiency; and iii) carbon efficiency. In

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[62] The European Commission further developed this commitment by issuing guidance on evaluating competitiveness in Impact Assessments. See Commission Staff Working Document, Operational Guidance for Assessing Impacts on Sectoral Competitiveness within the Commission Impact Assessment System. A "Competitiveness Proofing" Toolkit for use in Impact Assessments, SEC(2012)91, 27.1.2012

[63] Communication from the Commission, A Stronger European Industry for Growth and Economic Recovery. Industrial Policy Communication Update, COM(2012)582, 10.10.2012.

all three respects, the challenge is to decouple output from use of natural resources that is to produce the same quantity of steel by using fewer raw materials, less energy and emitting less CO_2.

Energy and carbon efficiency are usually tangled concepts for many industries: the lower the energy consumed – usually burnt – the lower the carbon intensity. However, steel is peculiar, as it uses its main source of energy that is coke, not because of its thermal energy content, but as a reducing agent. Making steel through the BOF route requires carbon, and coal is the source of carbon. The chemical reaction which takes place in a blast furnace requires, at constant technology, a constant proportion of coke and iron ore. Thus, energy efficiency plays a role in reducing CO_2 emissions, but not as straightforward as in other "fuel-burning" energy intensive industries. It should be noted that extracting chemical energy from coal is a more efficient process compared to the production of thermal energy, up to twice efficient. However, the BOF steel making process results in very high direct emissions, between 1.5 and 2 tonnes of CO_2 per tonne of steel. Consequently, EU steel makers represent between 4 and 7% of all EU anthropogenic GHG emissions (JRC, 2012).

The EU has a very ambitious strategy to move to a competitive low carbon economy in 2050.[64] It aims at cutting GHG emissions by 80% in 2050 compared to 1990 levels. Current policies are estimated to lead to a 40% reduction, and additional efforts would be needed to meet the 80% level. As for sector-specific burden sharing, the industry is expected to cut emissions between 34 and 40% by 2030, and 83 to 87% by 2050. Such a bold target will require more efficient processes and equipments, increased recycling and abatement technologies. However, such targets would not be achievable through the usual retrofitting, but would rather require the development of entirely new solutions. Indeed, current technologies can lead the industrial sector only to cut emissions by about half, according to Commission forecasts. On top of this reduction, only CCS will be able to ensure such a level of decarbonisation. To ensure that EU competitiveness is not damaged, the Commission analysis "confirms earlier findings that the current measures provide adequate safe-guards", concerning the measures against carbon leakage – already in force – and, most notably, the possibility of including imports into the ETS system.

The Energy Roadmap 2050[65] explores a similar path towards the decarbonisation of the energy system. This is especially relevant for the EAF steel route, which uses no coke but electricity as the source of energy for transforming raw materials (mainly scrap) into

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[64] Communication from the Commission, A Roadmap for moving to a competitive low carbon economy in 2050, 8.3.2012, COM(2011)112.

[65] Communication from the Commission, Energy Roadmap 2050, COM(2011)885.

steel. Decarbonisation of the energy system will require substantial investments, both in new capacity and grid equipments (estimated at €1.5-2.2 bln over four decades). This will results in higher energy prices until 2030. According to the Commission, the adverse effect of price spikes on EU competitiveness is to be addressed through international policy coordination and the availability of sufficient safeguards for energy intensive industries at risk of carbon leakage. Furthermore, as some investments in energy have a public good character, the Commission considers that some support, e.g. via the EIB or the EBRD, can be warranted to early movers, including industrial players.

All of the interviewees from both Commission services and the industry agreed on the fact that the steel industry, as far as the BOF route is concerned, is close to its efficiency limits, estimating possible additional reduction of about 10%. ESTEP (2003) estimations come indeed close to these views, as it estimated that most efficient BOF plants consume about 18 GJ/tonnes of hot rolled steel, and that an average plant consumes 21 GJ/tonnes, i.e. between 15 and 20% more. The situation is different for the EAF route, where most efficient plants consume about 3 GJ/tonne, while the higher consumption range is in the area of 7 GJ/tonne, i.e. more than double. As dealt with more in details in Section 7.3 below, most of CO_2 emissions from EAF plants are indirect, i.e. results of the electricity consumption. For EAFs, decarbonisation depends on the underlying electricity decarbonisation, on top of their own efficiency investments.

For BOF producers, it is fair to say that to keep pace with Commission targets, a major technological breakthrough is needed. For this to happen, demand-pull factors, such as carbon price or public investments, are to be complemented with technology-push factor, i.e. R&D&D support.

A major breakthrough, not yet ready but not too far from being mature for market deployment (as reported in JRC, 2012, as well as by several interviewees), is the combination of Top Gas Recycling (TGR) with CCS. This is one of the technologies researched and developed by the ULCOS programme, co-financed by the EU.

TGR is a technology which can be applied to BFs in order to recovery energy, in the form of chemical reducing power, from furnace waste gases. In very simple terms, recovery of waste gases substitutes for part of the coke consumption, which decreases by about 25% (Birat and Lorrain, 2009).[66] Less coke means lower emissions, and a higher productivity in terms of tonne of steel per tonne of raw materials, translating into higher raw material efficiency and a significant cost reduction. Estimates reported by an interviewee indicate that the investment costs may vary between €200 and 350 mln per furnace, depending on the features of the BF on which TGR is to be applied. According

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[66] Total energy consumption decreased by about 10-12%, as part of coal is substituted by natural gas.

to one interviewee, some European steel companies were allegedly considering such investments on ground of productivity gains, but the crisis, with the consequent demand fall and capital drought, forced these plans to be postponed.

CCS cuts CO_2 emissions rather than increasing efficiency. It brings to steel makers no benefits in terms of increased productivity, although it allows them to save the cost of ETS allowances. The combination of TGR and CCS could bring about a reduction of GHG emissions by about 70%, thus close to the targets included the Commission decarbonisation plan. However, CCS is not yet a technology ready for market deployment, as it still has to undergo the demonstration phase. The industry, under the support of the instrument New Entrance Reserve (NER) 300, undertook to deploy a demonstrator in Florange. The demonstrator is planned to have a capacity of 1.7MMT of pig iron, and its cost reaches up to €650 mln. About €250 is expected to be covered by the NER-300. However, payments will be conditional on the successful implementation of the demonstrator over a certain number of years. Currently, the process was put o a halt because of the unwillingness of the industry to bear such a risk in a context of constrained capital resources and technical difficulties. EU innovation policies generally require industry participation to funding and risk, not being 100% subsidies. The question is how to strike the balance in terms of sharing costs and risks.

On top of the technological challenge of applying capturing carbon from the BF, the storing of CO_2 is another criticality, as this is an untested technology. Costs of setting up storage sites (e.g. in depleted gas fields) and of the carbon ducts needed to bring CO2 from steel installations to underground deposits are very large, and acceptance by local community may bring additional difficulties.

Given how natural resources are distributed across the world, non-energy resource efficiency[67] is crucial for Europe, as it is the world area with the highest net imports of resources per capita. The Commission released in 2011 its roadmap,[68] where an overall strategy for raw materials is deployed to overcome what have been considered the four most important barriers in this area: i) market prices, taxes and subsidies which do not

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[67] Land and soil are included among non-energy resources. The Commission launched a soil strategy in 2006, which is of relevance for the steel industry as it includes the duty to clean and restore industrial sites. The Commission also proposed a Framework Directive on soil protection to harmonise national standards, and introduce them where non-existing. However, the directive was never approved by the Council of the EU and is still pending. Cf. Communication from the Commission, Thematic Strategy for Soil Protection, COM(2006)231, 22.9.2006; and Proposal for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC, COM(2006)232, 22.9.2006.

[68] Communication from the Commission, Roadmap to a Resource Efficient Europe, COM(2011)571, 20.9.2011.

reflect real costs of resource use; ii) innovation in resource use by businesses; iii) R&D in resource efficiency; and iv) international competitiveness concerns. In the field of raw materials, the EU had launched an initiative already in 2008,[69] then updated in 2011.[70] The two most important challenges, e.g. the marked price volatility – or better, the sharp price increases – and export dependency, are to be tackled through:

1. Ensuring access to third countries mineral resources on an even and fair playing field, especially in Africa, through a better the coordination of Commission and EIB development policies; and ensuring that raw materials markets are not distorted through trade policy;

2. Fostering and coordinating Member States to improve access to European resources;

3. Developing efficiency in resource use, including boosting recycling of raw materials.

Access to raw materials at a reasonable cost and efficiency in the use of resources is an imperative for EU steel makers to remain competitive, as non-energy raw materials represent about 50% of total costs of production for BOF steelmakers.[71] At the same time, recycling policies are very important for EAF plants, as non-energy raw materials, mainly scrap, represent even a higher share, more than 60%, of total costs. Scrap is a scarce resource, given that steel products have an average life-cycle of about 40 years. This implies that today we are recycling, on average, steel produced 40 years ago, when the levels of production were much lower than the current level. Not much more can be recovered through increasing recycling, as recycling rates for steel in the EU are already in between 80% and 90%.[72] Scarcity of scrap is exacerbated by the exports of scrap materials towards low-cost countries, where scrap is treated at a much lower cost due to, among other reasons, lower requirements in terms of corporate social responsibility and environmental regulation.

The European Innovation Partnership (EIP) on raw materials[73] links policies on resource efficiency with the EU 2020 innovation policy.[74] An EIP, introduced by the

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[69] Communication from the Commission, The raw materials initiative — meeting our critical needs for growth and jobs in Europe, COM(2008)699, 4.11.2008.

[70] Communication from the Commission, Tackling the Challenges in Commodity Markets and on Raw Materials, COM(2011)25, 2.2.2011

[71] See Section 1 above.

[72] See also BCG 2013.

[73] Communication from the Commission, Making Raw Materials Available for Europe's Future Well-Being Proposal for a European Innovation Partnership on Raw Materials, COM(2012)82, 29.2.2012

Innovation Union Flagship Initiative, is a partnership launched "in cases where the combined strength of public and private efforts at regional, national and EU level in innovation and R&D and demand-side measures are needed to achieve societal targets quicker and more efficiently." The Commission considered in 2012 that a secure and sustainable supply of raw materials represents a challenge worth of being tackled through an EIP. The EIP on raw materials aims at contributing to the mid- and long-term security of sustainable supply of non-energy non-agricultural raw materials (including metallic ores). This will be achieved through a reduction of imports dependency which, in line with the raw materials initiative, requires increased levels of EU production, increased recycling, and increased resource efficiency. The industry, through ESTEP, participates to two of the five working groups within this EIP.

The EU innovation policies are of course not only relevant in terms of resource efficiency. As already discussed, a lot of attention is devoted to R&D in the context of energy and carbon efficiency. The iron and steel sector can also benefit from a dedicated R&D fund, the Research Fund on Coal and Steel (RFCS). Financed with the interests earned on ECSC liquidation fund, it provides about €55-58 mln per year to industrial R&D, of which about 27% is spent for research on coal, and the rest on steel. The main areas of intervention of the RFCS are coal extraction, coal utilisation, furnace technology, steel making processes, steel quality, steel environmental impact, and safety and health of steel workers. Finally, it is worth mentioning that the new Horizon 2020 programme,[75] still under legislative procedure, includes a public-private partnership, SPIRE, devoted to energy intensive industries, where the steel industry could benefit in terms of financing carbon abatement projects.

As stated at the beginning of this Section, the general EU policies described above may have a significant impact on the steel industry. They represent policy opportunities and risks. The risk evoked by the industry is that the policies towards a resource efficient Europe, especially as far as energy and carbon efficiency is concerned, discourage any additional investment by steelmakers in our continent. To avoid misunderstanding, this statement does not refer to investments in additional steel making facilities which, given the current market conditions, are not on the table, as much as they have not been on the table for the last 30 years. The investments at stake are those needed to continuously refurbish existing installations, improving their efficiency, and thus productivity, and increasing the quality, and thus the added value, of end products. Without

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[74] Communication from the Commission, Europe 2020 Flagship Initiative Innovation Union, COM(2010)546, 6.10.2010

[75] Communication from the Commission, Horizon 2020 - The Framework Programme for Research and Innovation, COM(2011)808, 30.11.2011. For the full legislative package, cf. http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020-documents.

refurbishments, current installations will lose their competitiveness and die at the end of their investment lifecycle. If the current policies give the message that steel making will become too onerous, e.g. because of meeting greening targets, the industry claims that steel makers will slowly but steadily disappear from Europe, as no one will be making any further investments, whose utilisation will fall under the period for which ambitious environmental targets are foreseen.

Albeit reasonable, it is difficult to assess empirically the validity of these claims. Any investment decision is confronted with specific policy risks or opportunities. Pakistan may have a booming market and very little environmental regulation, but it is at risk of turmoil. Latin American countries, among emerging countries, may be very good locations for investments but safety in terms of expropriation and capital movements are surely not on par with the European standards. The US have shale gas, but building steel plants there to re-import semi manufactured products into the EU, as some companies are doing or planning to do, will be subject to the currency risk. What can be fairly and clearly said is that if the EU intends to impose ambitious targets on its manufacturing base, it should at the same provide the tools to achieve them, and that this target should also be put in the current and foreseeable technological context. The JRC (2012) clearly pointed out that only a combination of technological-push and demand-pull factors, and among them both taxes, prices and caps as well as public subsidies and investments, procurement strategies, standards and certification policies, can meet the targets defined in the EU general policies.

6 Financial markets (commodity derivatives and other financial instruments)

This section presents a general overview of the legislation included in the list of relevant legislation. Besides the Markets in Financial Instruments Directive (hereinafter MiFID),[76] which is therein comprised, it was considered necessary to cover also the new proposed Markets in Financial Instruments Regulation (hereinafter MiFIR);[77] the European Market Infrastructure Regulation (hereinafter EMIR);[78] the Market Abuse Directive (MAD)[79] and the new proposed Market Abuse Regulation (MAR),[80] as all this legislation is part of the financial regulation which may have an impact on steel makers, both concerning trading of commodity derivates and financial instruments.

Most of the EU steel makers have their headquarters in the EU, and hence are most likely subject to EU financial regulation. As legislation covered in this section is horizontal by nature, an assessment of their cost effects on steel makers requires consultation with operators. The use of secondary sources would be inappropriate, as they focus in general on financial institutions. However, the section falls short of a detailed cost assessment, since companies are reluctant to provide information about underlying financial transactions due to the risks of unintended disclosure of their commercial policies. An interview was set up with a steel producer, which could not provide data about size of underlying business falling under financial markets

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[76] Directive 2004/39/EC of the European Parliament and of the Council on markets in financial instruments amending Council Directives 85/611/EEC and 93/6/EEC and Directive 2000/12/EC of the European Parliament and of the Council and repealing Council Directive 93/22/EEC, as amended by Directive 2006/31/EC, Directive 2007/44/EC, Directive 2008/10/EC, and Directive 2010/78/EU. MiFID is currently under review, cf. Proposal for a Directive of the European Parliament and of the Council on markets in financial instruments repealing Directive 2004/39/EC, COM(2011)656, 20.10.2011.

[77] Proposal for a Regulation of the European Parliament and of the Council on markets in financial instruments and amending Regulation [EMIR] on OTC derivatives, central counterparties and trade repositories, COM(2011)652, 20.10.2011

[78] Regulation (EU) No 648/2012 of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories

[79] Directive 2003/6/EC of the European Parliament and of the Council on insider dealing and market manipulation (market abuse) [MAD], as amended by Directive 2008/26/EC and Directive 2010/78/EU. MAD is currently under review, cf. Proposal for a Directive of the European Parliament and of the Council on criminal sanctions for insider dealing and market manipulation, COM(2011)654, 20.10.2011.

[80] Proposal for a Regulation of the European Parliament and of the Council on insider dealing and market manipulation (market abuse), COM(2011)651, 20.10.2011.

regulation. Another interview has been carried out with the trading desk of a primary aluminium producer; however, as the company is headquartered in the US, trading is centralised on the trading book of the US company, hence the EU financial regulation is only of marginal importance to it.

6.1 Markets in Financial Instruments Directive and Regulation (MiFID and MiFIR)

Steel producing companies are *commodities firms* that shall enjoy a broad exemption from the application of MiFID and the MiFIR.[81]

Information collected via interview suggests that steel companies trade commodity derivatives and other financial instruments on their own account (with no high-frequency algorithmic techniques) and do not provide intermediary services for other steel companies as main business (art. 2.1(i)). As a result, cumulative exemptions from the application of the Directive and Regulation specified in article 2.1(d), 2.1(i), and 2.1(o) MiFID apply to steel firms that deal on own account in commodity derivatives, emission allowances and other financial instruments, perform investment activities as ancillary to the main business (in commodities), or trade on behalf of electricity and natural gas undertakings.[82] An additional exemption (under article 2.1(p)) applies to those firms providing investment services on emission allowances for the purpose of hedging a commercial risk. Finally, intra-group transactions are exempted under art. 2.4(a). However, the inclusion of emission allowances among the list of financial instruments (as per Annex I Section C) may create space for interpretation about the application of the exemption in art. 2.1(i) as 'ancillary activity' for customers or suppliers of the main business. This is the case for some of the steel companies that regularly trade the certificates on behalf of third companies. The exemption will be applicable as long as these 'third companies' are customers or suppliers of the main business.

Two articles give rise to direct costs for the steel producers:

-   Art.59 MiFID, on position limits and position management controls in commodity derivatives. MiFID requires trading venues to monitor commodity derivatives positions. Commodities firms may be required to: i) provide additional information; ii) to reduce the size of their exposure; or even iii) to terminate it (on a temporary or permanent basis), to prevent market abuse or support orderly

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[81]   The text considered for the new MiFID and MiFIR is the Council compromise of April 15th.

[82]   As defined under indent 35 of art. 2 of Directive 2009/72/EC and indent 1 of art.2 of Directive 2009/73/EC).

pricing and settlement conditions. Where the position is ascertained as "dominant", the commodity firm may also be required to provide liquidity back to the market at agreed price and volume on a temporary basis. Besides the administrative costs to comply with these requirements, detailed disclosure of positions may cause investment costs by revealing the companies' position to the market. By disclosing this information to regulators on a confidential basis, costs may be substantially lower, also depending on the harmonisation of reporting standards across the different legislations.

- Art.35 MiFIR, on the obligation to trade on Regulated Markets (RMs), Multilateral Trading Facilities (MTFs) or Organised Trading Facility (OTFs). MiFIR provides that transactions in derivatives, which are not intra-group transactions as defined by art. 3 of EMIR, pertaining to a class of derivatives that has been declared subject to the trading obligation as a subset of derivatives that are subject to mandatory clearing obligation (under art. 5.2 and 5.4 EMIR), should be traded on RMs, MTFs or OTFs or third country's trading venues (in equivalent jurisdictions). This could increase financial and operating costs for commodities firms that need perhaps to unwind big OTC transactions and split in smaller transactions to be executed on an open and transparent platform. It may also cause investment costs, as liquidity in open markets may not be always favourable, especially when the position is sufficiently high to cause market impact.

Nevertheless, there is room for indirect costs to arise from some of the new provisions included in the legislative text. Immediate indirect costs will potentially come from the inclusion of emission allowances among financial instruments, which will require firms that trade allowances as main business (also on behalf of steel firms) to become a MiFID investment firm. This can potentially increase the cost of trading of such instruments, in particular for steel companies that provide trading services in emission allowances for third parties that are not directly linked to their main business.

Additional indirect costs may also come from the removal of exemption for those providing MiFID investment services (see annex I, section A) or dealing on own account in commodity derivatives as main business. Spot trading venues for emission allowances would also require MiFID authorisation as RM, MTF or OTF. This means that spot trading venues would need to apply tight requirements on transparency and supervision, which may increase cost of trading and produce exposure (in terms of transparency of positions) to steel companies. Under article 31 of MiFIR, the European Securities and Markets Authority (ESMA) or national competent authorities, which need to receive a non-binding opinion from ESMA, can restrict or prohibit the marketing, distribution or sale of a financial instrument (including commodity derivatives) or an activity if there is a threat for the orderly functioning and integrity of

the commodity markets. No distinction has been made between physical or derivatives commodities markets. Under art.35 of MiFIR, ESMA can limit the ability to enter into a commodity derivative to preserve stability of financial system and/or integrity of commodities markets. Art. 23 of MiFID obliges all investment firms to report transaction in financial instruments (or their underlying) listed on MiFID trading venues to competent authorities through an Approved Reporting Mechanism (ARM). Transactions that were not reported before are required now to be disclosed. This could potentially increase administrative costs, which may indirectly impose additional administrative burdens on commodities firms.

6.2 The European Market Infrastructure Regulation (EMIR)

Regulatory obligations for steel firms arise under EMIR, as steel and aluminium companies typically have exposures towards Over The Counter (OTC) derivatives.

Under EMIR derivative contracts are defined as financial instrument as defined by points (4) to (10) of Section C of Annex I to Directive 2004/39/EC as implemented in Article 38 and 39 of Regulation (EC) No 1287/2006. OTC means a derivative contract which execution does not take place on a regulated market as within the meaning of Article 4.1(14) of Directive 2004/39/EC or on a third-country market considered as equivalent to a regulated market in accordance with Article 19.6 of Directive 2004/39/EC. See art. 2.7 of EMIR.

Some exemptions from the application of EMIR apply. Intra-group transactions in derivatives contracts (as per art. 3) are not subject to the clearing obligation. Commodities firms will be exempted from the clearing obligation if the volume of the OTC derivatives trades does not exceed a certain threshold over a predefined period of time. These thresholds (of notional value for the whole group) are: €1 billion (each) for credit and equity derivatives and €3 billion (each) for interest rate, foreign exchange and commodity derivatives. When the amount for one class of OTC derivative contracts is surpassed, the commodity firm exceeds the clearing threshold and needs to undergo the clearing obligation. One additional exemption for non-financial counterparties (including commodities firms) is that OTC derivatives contracts that are objectively measurable as reducing risks directly related to the commercial or treasury financing activity should not be taken into account when determining the volume of OTC derivatives trades. This is also defined hedging exemption. More specifically, ESMA clarified that hedging for EMIR means:

- OTC derivative contracts entered into for the purpose of "proxy hedging" (i.e. risk reduction through entering into a closely correlated instrument rather than an instrument directly related to the exact risk);

- Transactions that are defined as "hedging" under IFRS (art.3 EC Regulation1606/2002) or GAAP accounting standards;

- OTC derivative contracts entered into as part of a portfolio hedging arrangement;

- OTC derivative contracts concluded in order to offset hedging derivatives contracts; stock options and OTC derivatives contracts related to employee benefits;

- OTC derivative contracts that reduce risks related to the acquisition of a company; and

- OTC derivative contracts that reduce credit risk.

Information gathered from steel companies confirm that trading in OTC derivatives contracts is only limited to activities falling under the "hedging" definition, so it appears unlikely that any of the European steel company will overcome the threshold for the mandatory clearing obligation.

EMIR articles giving rise to direct costs for steel producers are:

- Art.4 on clearing obligations. EMIR provides that above clearing thresholds, OTC derivatives contracts must be cleared through central counterparties (CCPs) if available.

- Art.9 on reporting obligations. EMIR provides that counterparties and CCPs shall ensure that the details of any derivative contract they have concluded and of any modification or termination of the contract are reported to a trade repository.

- Art. 10 on non-financial counterparties. EMIR provides that when a non-financial counterparty takes positions in OTC derivative contracts exceeding the clearing threshold, the non-financial counterparty shall: i) notify ESMA; ii) become subject to the clearing obligation (art. 4); and iii) clear all contracts within 4 months.

- Art.11 on risk-mitigation techniques for OTC derivative contracts not cleared by a CCP, such as timely confirmation, portfolio compression, and reconciliation services.

Interviews confirm that standardised reporting formats and key risk mitigation techniques (e.g., portfolio reconciliation and compression) are not yet adopted by steel companies. Costs are not quantifiable because information about derivatives positions, number and details of contracts are not disclosed by the companies to protect commercial strategies. In addition, fees for risk mitigation services are negotiated bilaterally and vary with the characteristics of the transaction. Costs would be partially

offset by the beneficial effects in terms of lower probability of litigation around the terms of the contract due to a better management of derivatives exposures. Finally, an alignment of reporting formats for disclosure under EMIR and REMIT may further reduce costs of legal provisions.

6.3 Market Abuse Regulation and Directive

The revision of MAD and the new MAR may indirectly affect steel producers. The Commission proposal extends the scope of MAD to any financial instrument admitted to trading on a MTF or an OTF (on top of RMs), as well as to any related financial instruments traded OTC that can have an effect on the covered underlying market.

The proposal will also cover commodity derivatives and the related spot commodity contracts, which will be addressed in part under the REMIT regulation.[83] The proposal extends the definition of inside information to price sensitive information relevant to the related spot commodity contract as well as to the derivative itself, to ensure consistency of the application of the regulation to both markets. It introduces a specific definition of inside information for emission allowances that reflects the new classification as a financial instrument under MiFID. For the purpose of detecting cases of insider dealing and market manipulation, competent authorities have to have the possibility to access private premises and to seize documents of the company. The definition of inside information therefore is applied for trading commodity derivatives and emission allowances to individuals that are part of the company (art. 6 of MAR). Overall, the legislation may increase administrative costs and investment costs if the definition of inside information may discourage employees to undertake actions that are in the best interest of the company, due to the risk that could fall under insider trading or market manipulation activities.

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[83] Regulation (EU) No 1227/2011 of the European Parliament and the Council on wholesale energy market integrity and transparency

7 Climate Change

This chapter starts with a brief introduction to the EU Emissions Trading Scheme (EU ETS), followed by a discussion on the different types of costs associated with it. Then methodology, data and results are presented in Section 7.3. Given the intertwined nature of investments, investment costs related *i.a.* to CO_2 abatement technologies are included in the costs calculated in Section 10 on environmental policy.

7.1.1 What is the EU ETS

The EU ETS is a cap-and-trade system first implemented in 2005, with the political and environmental goal of providing a cost-effective tool to reach the greenhouse gas (GHG) targets which the EU had committed to. The legislation setting up the ETS is Directive 2003/87/EC of the European Parliament and the Council Establishing a scheme for GHG emission allowance trading within the Community (hereinafter the ETS Directive) and its amendments.[84] The EU ETS was extended to the non-EU members of the European Economic Area, Lichtenstein, Norway and Iceland in 2007.

The EU ETS compliance is set at the installation level. More than 11,000 installations, including steel plants, are covered by the scheme. Each year, each installation must surrender a number of emission permits equal to its emissions during the past year. The compliance units are European Union Allowances (EUA), which represent one tonne of CO2-equivalent emissions. Other units that are good for compliance are Emissions Reduction Units (ERUs, from Joint Implementation projects) and Certified Emission Reductions (CERs, from Clean Development Mechanism projects). The total cap is equal to the total amount of EUAs made available each year through free allocation or auctioning. Underneath that cap, market participants, including covered installations, are free to trade. The total cap for installations covered by the EU ETS is set do decrease every year by 1.74%.

The EU ETS is now in its third phase. The characteristics of these different phases are discussed below. Given their different characteristics, they have different cost impact on the steel sector.

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[84] Amending acts were as follows: i) Directive 2004/101/EC of the European Parliament and of the Council; ii) Directive 2008/101/EC of the European Parliament and of the Council; iii) Regulation (EC) No 219/2009 of the European Parliament and of the Council; and iv) Directive 2009/29/EC of the European Parliament and of the Council. The latter act is the most relevant, as it introduces the so-called third phase of the ETS system.

7.1.2 Phase 1 (2005 – 2007)

During the first phase, which was a pilot phase, caps were set at the national level through the National Allocation Plans (NAPs), which had to be approved by the European Commission. A maximum of 5% of the allowances could be auctioned; the rest was allocated free of charge on the basis of estimates of historical emissions. Due to a lack of good quality data and no banking provisions between phases, this resulted in a sizable over-supply of EUAs, driving prices close to zero at the end of the phase.

Although being a pilot phase, Phase 1 resulted in significant outcomes. A price for carbon was established. It helped create the necessary infrastructure for future phases: at the installation level this included monitoring, reporting and verification (MRV); while in the marketplace National Registries, the Community Independent Transaction Log and carbon exchanges were founded.

7.1.3 Phase 2 (2008 – 2012)

In phase 2, allocations were granted on the basis of the reported emissions in the first phase. This process of grandfathering was considered fit to solve the problem of over-supply observed in Phase 1. However the economic crisis had a clear impact and substantially decreased emissions in Phase 2. The European Commission estimates that between 1.5 and 2 billion EUAs were carried over to Phase 3.[85] The amount of allowances that could be auctioned was also increased, to a maximum of 10% of the total.

7.1.4 Phase 3 (2012 – 2020)

The functioning of the ETS saw some significant changes at the start of the third phase. Auctioning was increased, and more than 40% of all allowances will be auctioned (including full auctioning for the power sector).

Energy intensive industries will receive part of their allocation for free, but will have to get the rest through auctions. Allocation to energy intensive industries is determined by using benchmarks,[86] established per product, according to Decision 2011/27/EU.[87] The

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[85] Report from the Commission, The state of the European carbon market in 2012, 14.11.2012, COM(2012)652.

[86] Benchmarks for the iron and steel industry are reported in Methodology for the free allocation of emission allowances in the EU ETS post 2012. Sector report for the iron and steel industry, Study commissioned by the European Commission to Ecofys (project leader); Fraunhofer Institute for Systems and Innovation Research; and Öko-Institut. Available at: http://ec.europa.eu/clima/policies/ets/cap/allocation/docs/bm_study-iron_and_steel_en.pdf.

average carbon-intensity of the 10% best performers represents the benchmark for allocating free emissions. Those installations that meet the benchmark receive more allowances for free than those installations that do not meet it. The latter are thereby incentivized to catch up to their best-performing peers. Free allocations are granted at the 80% level of the benchmark, a share which is set to decrease to 30% in 2020. However, this provision does not include sectors deemed to be exposed to the risk of carbon leakage, and which are listed in the carbon leakage Decision.[88] These installations received 100% of their benchmark free allowances. Steel making (NACE v.2 sector 24.10) and the casting of iron tubes (NACE v.2 sector 24.21) are included in the carbon leakage list.

BOF steel makers are also entitled to receive free allowances for the electricity generated through recycling of waste gases. Although free allocation of allowances for electricity production is prohibited, an exception is provided for waste gas electricity (Art 10A.1 of the ETS Directive). Allocation of allowances has been discounted by the energy content of natural gas, in order to ensure an even playing field between electricity producers. This decision has been contested by the industry federation before the Court of Justice of the European Union, which negated the *locus standi* and dismissed the case.[89]

As a result of the lessons learned in Phases 1 and 2, several important EU ETS functions have now been centralized. Member states registries were incorporated in the EU registry, and allocation is done at the EU level. Electric utilities now have to effectively buy all their allocations; measures have been included to compensate energy intensive industries, especially those exposed to international competition, such as art. 10A.6, which allows member states to compensate for the indirect costs of emissions passed through electricity prices.[90]

7.1.5 Scope of the study

This study analyses the cost impact of the EU ETS over the period 2005-2012. It does not contain a quantitative assessment of the impacts of Phase 3 for the steel industry. This report does include a quantitative analysis for Phases 1 and 2, and a qualitative discussion is undertaken for the 3rd phase based on regulatory changes. For Phase 3

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[87] Commission Decision determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council (2011/278/EU)

[88] Commission Decision determining, pursuant to Directive 2003/87/EC a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage (2010/2/EU)

[89] Order of The General Court (Seventh Chamber), 4 June 2012, In Case T‑381/11, Europäischer Wirtschaftsverband der Eisen- und Stahlindustrie (Eurofer) v. European Commission

[90] See Section 8.1.2.

there is also a quantitative scenario for one installation under a number of Phase scenarios for EUA prices.

7.2 Costs

This study identifies three types of costs: direct or compliance costs, indirect costs and administrative costs.

7.2.1 Compliance or direct costs

At the end of each year, installations surrender EUAs to match their CO_2 emissions in that year (in tonnes). Any shortage of allowances can be purchased through auctioning or in the secondary market.

Essentially, the cost of compliance is the difference between the amount of EUAs each installation needs to surrender and the number of allowances allocated, multiplied by the cost of the allowances purchased.

7.2.2 Indirect costs

Electric utilities face increased production costs through their ETS compliance cost. They pass on those costs to their respective customers via higher energy rates. Industrial consumers therefore face an extra cost because of the cost of CO_2 embedded in electricity prices. This is an additional cost, which they cannot pass on to the ultimate consumers if they are active in a globally competitive sector.

The pass-on rate of the CO2 cost for producing electricity is a number that is contested and may vary significantly between member states. In this report the pass-on rate is assumed to be one, but this is a conservative assumption and may overestimate actual indirect costs.

7.2.3 Administrative costs

 Two kinds of administrative costs arise under the EU ETS: one-off costs for the start-up of the process, and recurring Monitoring, Reporting and Verification (MRV) costs. The start-up costs are caused by the investments necessary for monitoring compliance. For illustrative purposes the infrastructure needed for the correct calculation of emissions would represent a one-off start-up cost.[91] MRV costs are the additional burdens placed

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[91] Detailed Information Obligations are spelled out in the Commission Regulation (EU) No 601/2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC. See Mapping Sheets of the Climate Change Policy Area in Annex I.

on installations for continued compliance with monitoring duties, for example the wages of the staff dealing with the administrative aspects, or the cost of hiring a verifier.

7.3 Quantification of Cumulative Costs

The ultimate objective of this study is to provide the cost of ETS per tonne of crude steel produced. The level of information is aggregated at the plant level.

The model for the cost of EU ETS is defined as:

Total ETS Cost (€/Tonne of steel) = Direct cost/Tonne (€/Tonne of steel)

+ Indirect cost (€/Tonne of steel)

+ Administrative costs (€/Tonne of steel)

Direct costs

Direct cost (€) = Emissions (Tonnes of CO2)

- Allocations (Tonnes of CO2)

* CO2Price (€/Tonne of CO2)

Where:

- *Emissions* are the verified emissions of the installation;

- *Allocations* are the EUAs freely allocated to each installation;

- CO_2 *Price* is the average yearly market-price of CO2.

The sources used for this calculation are:

- *Emissions*: National Allocation Plans (NAPs), National Registries and the EU Transaction Log;

- *Allocations*: NAPs, National Registries and the EU Transaction Log;

- CO_2 *Price*:

  o 2005: yearly average EUA spot prices, reported daily by the European Environment Agency;

  o 2006-2012: yearly averages of the daily settlement prices for Dec Future contracts for delivery in that year. The daily settlement prices were reported by the European Energy Exchange.

The CO_2 price used is a proxy and might (is likely that will) produce imperfect results. To fully understand carbon prices and, further below, the exact impact of the EU ETS, what would be needed would be a plant by plant analysis of transfers and trading strategies. This data is only made available by the EU Transaction Log (EU TL) with a five year time-lag.

Table 20: Average yearly prices per ton of CO2 (€)

Year	2005	2006	2007	2008	2009	2010	2011	2012
CO_2 Price	21.82	18.62	0.74	23.03	13.31	14.48	13.77	7.56

- _Total production_ (Tonnes of steel): this data is necessary for converting the price per installation into a price per tonne of steel. These figures are not available for each plant. For Plants 1and 4 the operators provided production figures for 2005 – 2012, Plant 2 has also provided figures, though only for 2010-2012. For other plants and/or years, the data used is a proxy: production capacity data from the World Steel Capacity Book. In order to ensure conservative assumptions, an 80% of total capacity approximation is used.[92]

Indirect costs

Indirect cost (€/Tonne of steel) = Electricity intensity (kWh/Tonne of steel)

* Carbon intensity of electricity (CO_2/Tonne of steel)

* BOF Discount factor (numeric multiplier)

_* CO_2 Price (€/Tonne of CO_2)_

Where:

- _Electricity intensity of steel production_: the amount of electricity used to produce one tonne of steel. This amount is plant and technology specific;[93]

- _Carbon intensity of electricity generation_ indicates the amount of tonnes of CO_2 emitted by utilities to generate one kWh;

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[92] According to capacity and production data, BOF plants were utilised at a rate between 86% and 90% between 2005 and 2008; utilisation rates dropped to about 56% in 2009, and came close to 80% for 2010 and 2011 (provisional data). Utilization rates in EAF plants were slightly lower, on average 1.5%, but followed similar trends.

[93] Only the electricity intensity of the crude steel production process is taken into account.

- *BOF Discount factor*: a discount factor of 0.2 included to account for the fact that BOF plants produce 80% of their own electricity consumption;

- *CO_2 Price* is the average yearly market-price of CO_2.

Sources:

- *Electricity intensity of production*; plants 1, 2 and 4 have reported their figures on electricity intensity. For the rest of the sample estimates from World Steel Dynamics are employed. A small correction was made for plant 3 to include the electricity consumption of its sinter plant. As this data is only available starting in 2010, the same figures are used for 2005-2010.

- *Carbon intensity of electricity generation:* the maximum regional carbon intensity of electricity is utilised, provided by the Commission's Guidelines on State aid measures.[94] Note that these figures are not national, as member states who are highly interconnected or have electricity prices with very low divergences are regarded as being part of a wider electricity market and so have the same maximum intensity of generation (for example Spain and Portugal).

  It must be noted that the figure used, which are the maximum regional carbon intensity are much higher for certain jurisdictions than the national average (e.g. for France it is a factor of 10)

  In order to check that the data is in the correct range, the average national carbon intensity was included in the analysis, determined as follows:

  o *Germany: data was acquired from BDE*W, the national industry association for energy and water sectors. Their national figures cover national carbon intensity of electricity generation up till 2007. These figures have been extended to the period 2008- 2012;

  o Spain and Italy: Enerdata, an independent research and consulting firm, provided a comprehensive data series;

  o For all other member states another proxy is defined. The national emissions data for the 'public electricity and heat production sector' (source: UNFCCC) is divided by 'Total gross electricity generation' per country (source: EUROSTAT) till 2010, for 2011 and 2012 figures for 2010 are used.

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[94] Communication from the Commission: Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012 (2012/C 158/04)

- _CO_2 _Price_: the same data is utilised as in the previous section to estimate a yearly average price;

- _BOF Discount factor:_ a discount factor for BOF plants is included to account for differences in production processes between BOF and EAF plants. BOF plants produce roughly 80% of the power they consume.[95] Not including this discount factor in the model would imply that installations pay both the direct and indirect ETS price for electricity they generate. This is incorrect, as only the indirect costs of the electricity they buy from utilities is to be considered. The _BOF discount factor_ is established at 0.2.

Administrative costs

Administrative cost (€/Tonne of steel) = Start-up costs (€/Tonne of steel)

+ MRV costs (€/Tonne of steel)

Where:

- _Start-up costs_ are the costs for one-off investments to start compliance with the EU ETS Directive;

- _MRV costs_ are the recurring costs for an installation when it comes to monitoring, reporting and verification obligations within the EU ETS directive.

Source:

-   The only data available for these variables was provided by Eurofer. This data includes an aggregate assessment of: staff, procedures, sampling and analyses for monitoring and reporting purposes, verification costs and other administrative costs such as managing the registry, purchases and sales of emission permits and hedging activities (source: Eurofer). The Eurofer estimates result in an average administrative costs of around 0.1 € per ton of steel.

Plants

The following plants have been included in the sample. As recalled in Section 3, only the main features are described below, in order to prevent plant re-identification:

1.   Plant 1 is a BOF producer with capacity >5 MMT located in Western Europe;

2.   Plant 2 is a BOF producer with capacity >5 MMT located in Western Europe;

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[95] Cf. report for the Iron and Steel industry, (2009). Benchmark study, _supra_ note 86.

3. Plant 3 is a BOF producer with capacity <5 MMT located in Western Europe;

4. Plant 3 is a BOF producer with capacity <5 MMT located in Central Eastern Europe;

5. Plant 5 is an EAF producer with capacity >0.8 MMT located in Southern Europe;

6. Plant 5 is an EAF producer with capacity >0.8 MMT located in Southern Europe;

7. Plant 5 is an EAF producer with capacity <0.8 MMT located in Southern Europe;

8. Plant 5 is an EAF producer with capacity <0.8 MMT located in Central Eastern Europe

7.3.1 Results

Table 21 shows that, in general, these installations have been allocated enough free allowances to cover their emissions during Phases 1 and 2. Only Plants 2 and 7 experienced a shortage in Phase 1. It is recognised that there was no carry over from Phase 1 to Phase 2, but the total surplus of EUAs for Phase 1 and Phase 2 together for this sample was still more than 34 million EUAs. The total surplus banked from Phase 2 to Phase 3 was 31,478,185 EUAs.

The discrepancies in allowances and emissions in Phase 1 and 2 can be attributed to the lack of information on historical emission for Phase 1 allocation.

The percentages of total allocation that were oversupplied vary widely between plants, from 6 percent to nearly 90 percent. For Plant 4 this is partly due to national circumstances as steel producing installations in that country, on average, received free allowances that were 46% higher than total emissions. One can also point to a drop of 30% in yearly emissions between 2008 and 2009. This was caused by downscaling in production, to slightly more than 20% of total capacity in 2010. Production increased steadily over the next two years, to more than 40% of plant capacity in 2012.

<u>Direct Costs</u>

Table 21: Emissions and allocations (tonnes of CO_2)

	Plant 1 BOF	Plant 2 BOF	Plant 3 BOF	Plant 4 BOF	Plant 5 EAF	Plant 6 EAF	Plant 7 EAF	Plant 8 EAF
Phase 1								
Emissions	35,172,872	58,185,760	18,810,842	11,824,517	179,886	359,843	421,484	126,496
Allocations	36,734,937	54,957,843	18,919,890	14,324,206	193,599	527,859	411,762	180,009
Difference	*-1,562,065*	*3,227,917*	*-109,048*	*-3,925,783*	*-13,713*	*-168,016*	*9,722*	*-53,513*
Phase 2								
Emissions	52,500,037	90,728,684	11,635,144	14,324,206	504,280	443,783	645,864	135,134
Allocations	58,916,831	103,387,205	13,906,452	23,806,310	660,420	986,460	756,170	175,469
Difference	*-6,416,794*	*-12,658,521*	*-2,271,308*	*-9,482,104*	*-156,140*	*-542,677*	*-110,306*	*-40,335*
Surplus Phase 1 and Phase 2	*7,978,859*	*9,430,604*	*2,380,356*	*13,407,887*	*-169,853*	*-710,693*	*-100,584*	*-93,848*
Surplus at the start of Phase 3	**6,416,794**	**12,658,521**	**2,271,308**	**9,482,104**	**156,140**	**542,677**	**110,306**	**40,335**
Oversupply as a % of total emissions	*9.1%*	*6.3%*	*7.8%*	*51.3%*	*24.8%*	*88.4%*	*9.4%*	*35.9%*
Oversupply as a % of total allocations	*8.3%*	*6.0%*	*7.3%*	*33.9%*	*19.9%*	*46.9%*	*8.6%*	*26.4%*

Plant 6 also saw a significant and permanent decrease in emissions from 2008 to 2009 by around 30%. It could be assumed that this is due to lower production levels, but as no information on production levels was made available by the operators of Plant 6, this cannot be confirmed. Plant 2 faced a significant shortage in Phase 1, as emissions were more than 3 million tonnes higher that allocated allowances. However, in Phase 2 this deficit was turned into a surplus of nearly 13 million EUAs.

An important observation is that the operator of Plant 2 experienced a large surplus in Phase 2 due to the fact that that site faced a temporary closure in 2011, and practically ceased production. Consequently, the analysis for that plant was limited to the period 2005-2010. Table 22 shows the total direct costs per plant, which is a weighted average (by yearly EUA price) of the sum of yearly emissions minus allocations.

Table 22: Direct costs (€ mln)

BOF	Plant 1	Plant 2	Plant 3	Plant 4
Phase 1	-28.09	38.58	-0.09	-58.07
Phase 2	-88.18	-151.26	-37.33	-123.78
TOTAL	**-116.27**	**-122.67**	**-37.42**	**-181.85**
EAF	Plant 5	Plant 6	Plant 7	Plant 8
Phase 1	-0.16	-2.38	0.14	-0.76
Phase 2	-2.19	-7.68	-1.52	-0.28
TOTAL	**-2.34**	**-10.06**	**-1.37**	**-10.04**

In these tables, a negative number indicates that the installation is unlike to have faced direct costs during the first two phases of the EU ETS. The values are however only indicative.

Two other points have to be made.

- No mandate was given to either examine the possible benefits from ETS and/or trading and compliance strategies used by firms. The valuation of the observed surplus depends on whether any EUAs were sold and if so when. It is difficult to obtain any insights into the strategies used by the various operators.

- Little data on transfers is available, as mentioned before: the EU TL releases this information with a 5-year time lag.

Finally the results show a large divergence between BOF and EAF installations. The four BOF plants in this sample have accumulated significantly larger numbers of EUAs over this period. Table 23 below shows the direct cost per tonne of production per plant.

Table 23: Direct costs per tonne produced (€/tonne)

BOF	Plant 1	Plant 2	Plant 3	Plant 4
Phase 1	-1.504	1.410	-0.011	-10.219
Phase 2	-3.163	-3.249	-6.667	-22.075
TOTAL	**-2.497**	**-1.524**	**-2.673**	**-16.108**
EAF	**Plant 5**	**Plant 6**	**Plant 7**	**Plant 8**
Phase 1	-0.054	-1.241	0.080	-0.660
Phase 2	-0.455	-2.399	-0.506	-0.146
TOTAL	**-0.305**	**-1.965**	**-0.286**	**-0.339**

This table shows that there were no direct costs from ETS compliance in Phases 1 and 2 for the plants in the sample. Comparing Table 23 to the previous one, Table 22, the variance between the plants in the sample is significantly smaller once we account for differences in production levels between the plants. There is however one clear outlier, plant 4. As mentioned above, this installation saw a large downscaling of production during Phase 2, and was also oversupplied during Phase 1.

Indirect Costs

As mentioned above, indirect costs are caused by utilities passing their ETS related costs on through increased electricity rates.

Table 24: Indirect cost per ton of steel (€/tonne), using maximum regional carbon intensity

BOF	Plant 1	Plant 2	Plant 3	Plant 4
Phase 1	0.396	0.396	0.231	0.363
Phase 2	0.417	0.417	0.306	0.381
TOTAL	**0.409**	**0.409**	**0.261**	**0.374**
EAF	**Plant 5**	**Plant 6**	**Plant 7**	**Plant 8**
Phase 1	4.036	3.521	3.756	6.342
Phase 2	4.242	3.701	3.947	6.666
TOTAL	**4.165**	**3.633**	**3.876**	**6.544**

Table 25: Indirect cost per ton of steel (€/tonne), using average national carbon intensity

BOF	Plant 1	Plant 2	Plant 3	Plant 4
Phase 1	0.045	0.298	0.179	0.446
Phase 2	0.045	0.329	0.229	0.455
TOTAL	**0.045**	**0.317**	**0.199**	**0.451**
EAF	Plant 5	Plant 6	Plant 7	Plant 8
Phase 1	2.893	2.799	2.489	3.660
Phase 2	2.636	1.901	1.979	3.310
TOTAL	**2.732**	**2.238**	**2.170**	**3.441**

During the remainder of this chapter, maximum regional carbon intensity is consistently used. These figures show a fundamental difference in cost structures between the two technologies. The indirect costs for BOF plants (which are less electro-intensive and rely on utilities for 20% of their electricity needs) are relatively low, with figures between 0.23 and 0.42 Euros per tonne.

EAF installations use electricity as their primary energy input and indirect costs have a far greater impact on their operations. The additional cost per tonne of steel is between 3.5 and nearly 7 Euros.

It must be noted that there is no great variability between the costs in the two phases, due to proxies being used for total production and electricity intensity of production for nearly all plants and periods. As mentioned above, plants 1, 2 and 4 did provide this information for 2010 to 2012.

As mentioned above, a pass-on rate of one is assumed for all installations, even though pass-on rates may vary significantly between member states. This conservative assumption could result in an overestimation of the actual indirect costs.

Administrative Costs

Table 26: Administrative cost per tonne of steel (€/tonne)

	Plant 1-4 *BOF*	*Plant 5-8* *EAF*
Total	0.13	0.10

Administrative costs, as estimated by Eurofer, are not significant per tonne, but could become a significant amount depending on the total production.

Total Costs

Table 27: Total costs of the EU ETS Scheme (€/tonne)

	Plant 1 BOF	Plant 2 BOF	Plant 3 BOF	Plant 4 BOF	Plant 5 EAF	Plant 6 EAF	Plant 7 EAF	Plant 8 EAF
Phase 1								
Direct costs	-1.504	1.410	-0.011	-10.219	-0.054	-1.241	0.080	-0.660
Indirect costs	0.396	0.396	0.231	0.363	4.036	3.521	3.756	6.342
Admin costs	0.130	0.130	0.130	0.130	0.100	0.100	0.100	0.100
TOTAL COSTS	**-0.977**	**1.937**	**0.350**	**-9.727**	**4.082**	**2.380**	**3.936**	**5.782**
Phase 2								
Direct costs	-3.163	-3.249	-6.667	-22.075	-0.455	-2.399	-0.506	-0.146
Indirect costs	0.417	0.417	0.306	0.381	4.242	3.701	3.947	6.666
Admin costs	0.130	0.130	0.130	0.130	0.100	0.100	0.100	0.100
TOTAL COSTS	**-2.616**	**-2.702**	**-6.231**	**-21.564**	**3.886**	**1.401**	**3.541**	**6.620**
Phase 1 and 2								
Direct costs	-2.497	-1.524	-2.673	-16.108	-0.305	-1.965	-0.286	-0.339
Indirect costs	0.409	0.409	0.261	0.374	4.165	3.633	3.876	6.544
Admin costs	0.130	0.130	0.130	0.130	0.100	0.100	0.100	0.100
TOTAL COSTS	**-1.958**	**-0.985**	**-2.283**	**-15.603**	**3.960**	**1.768**	**3.689**	**6.306**

Table 27, on the previous page, shows the impact of the EU ETS per tonne of steel. Note that 'Phase 1 and 2' results represent a weighted average on the basis of production.

Four observations can be drawn from the table above:

1) <u>There is a significant difference in costs between Phases 1 and 2.</u> The data indicates that the direct costs decreased from Phase 1 to Phase 2 <u>for 7 out of 8 plants in the sample</u>. However, that can probably be attributed, at least in part, to the low EUA price of 0.74€/Ton in 2007. This drove down substantially the average costs for Phase 1.

2) <u>The choice of technology plays a dominant role.</u> Indirect costs were high enough for EAF plants to more than compensate for their over-allocation of EUAs. For all four EAF plants in our sample, the high indirect costs wiped out the surplus of EUAs from allocation. Indirect costs do present a significant burden for EAF plants.

3) <u>On the other hand,</u> BOF plants are not likely to have faced ETS related costs during these two Phases. The accumulated surplus of allocations, together with lower indirect cost due to using coke as primary energy input, led to an estimated negative cost of EU ETS per tonne of product. While there is no data to verify this, it is likely that the economic downturn played an important role.

Large differences exist between plants within the same technology. For instance, the over-allocation Plant 4 received were slightly more than half that plant's emissions, compared with 6-9% for the other three BOF plants. Among the EAF plants, plant 8 incurred significantly higher indirect costs due to both lower electricity efficiency of production and higher levels of carbon intensity of electricity used.

<u>Phase 3</u>

In Phase 3, auctioning plays a stronger role with more than 40% of all allowances being auctioned. There are three different treatments:

- *The power sector* will essentially need to buy all its EUAs via auctions, increasing their directs costs;

- *The industrial sectors* will start bearing direct costs. They will still receive free allocation on their products benchmarks and 80% of its allowances will be free in 2013. However, that percentage will decrease to 30% in 2020; *Product benchmarks* have been established, at the level of the carbon-intensity of production of the 10% best performers. Installations that meet the benchmark receive 100% of the benchmark-based free allowances,[96] and are rewarded for their carbon-efficiency.

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[96] Which, as explained above, discounts the energy content of waste gases for the energy content of natural gas.

*Less-than-best performer*s receive a lower amount of free allocations and are thereby incentivized to catch up to their best-performing peers.

- Industrial installation, in sectors deemed exposed to significant risk of *carbon leakage,* receive a higher share of free allowances. In Phase 3 they receive 100% of ben*chmarked allocations* compared to 80% for the non-leakage exposed ones. The risk of leakage is *determined by the increase in productions cos*t caused by the ETS <u>and</u> the trade intensity of the sector with countries outside the EU. This means that industries facing both higher costs due to the EU ETS and international competition are compensated for their loss of competitiveness.

Each of these three cases has implications for the steel industry. This sector not only faces increased indirect costs due to higher direct costs for utilities, but also a drop in free allowances for many installations. Only those that reach the benchmark for carbon-efficiency will receive all their allocations for free. The others will need to supplement with EUAs banked from Phase 2 or EUAs bought at auctions or in secondary markets, resulting in higher direct costs.

Two measures, however imperfect, are in place to compensate energy intensive industries for indirect costs. First, as mentioned above, free allocations are made available for sectors that comply with the conditions for 'significant risk for carbon leakage'. As of now, this "Leakage List" includes the 'manufacturing of basic iron and steel'. However, the outcome of the review due in 2014 will decide the composition of the Leakage List going forward.

Secondly, member states can use state aid to compensate energy-intensive industries, though state-aid provisions and guidelines need to be observed in this case.[97]

In addition, two other issues are worth mentioning:

- The EU ETS scheme itself is under review. The current discussion on a structural reform to strengthen the scheme could still include changes that may affect the treatment of industries, such as steel

- Around the globe, various cap-and-trade systems are emerging. EU installations will no longer be the only ones facing ETS costs and competitive disadvantages. The Californian scheme is up and running, several Chinese pilot projects will kick-off this year and Australia's carbon pricing mechanism is in operation.

Though compensation mechanisms are discussed in other sections of the study, a brief discussion of the measures in Australia and California follows:

The EU ETS has two mechanisms for compensating industries for loss of competitiveness: the leakage list discussed above and the possibility for member states to financially compensate their industries for indirect CO_2 costs.

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[97] See Section 8.1.2.

The Californian scheme includes several compensation measures:

- Energy-intensive industries can opt to have the allocation/cap determined on the basis of their energy consumption, instead of their production output;

- Sectors are labelled as low, medium or high risk of leakage and receive 30 – 100% of their allowances for free, depending on how they are categorized;

- The proceeds of certain auctions of emission permits by private utilities are earmarked to compensate the customers that face higher electricity rates.

Compensation under the Australian pricing mechanism focuses on 'emissions-intensive trade-exposed' activities, granting them free carbon permits and other assistance, based on their total emissions and indirect costs. Certain sectors also receive public investment and research grants to aid them in their transition to a low-carbon economy.

Box 1 A Case Study for Phase 3

One plant was selected and a number of scenarios were run to try and understand the impact of P3 on the European steel industry. A number of assumptions were necessary in due to lack of complete data series:

- Constant electricity intensity of steel production for 2012-2020

- Constant carbon intensity of electricity generation for 2012-2020

- Constant 100% pass-on rate for indirect costs

These three assumptions result in an indirect cost that depends only on the price of EUAs.

- Three price levels for EUAs were used: 10, 15 and 30 Euros per tonne of CO_2.

- Production and emission forecasts for this particular plant were provided by the operators and cannot be externally validated.

The operator also forwarded estimates for future free allocation, which is a function of production levels between 2005 and 2008. These figures have not, as yet, been published by the Commission.

- Carbon intensity of steel production (tonne of CO_2/tonne of steel) for 2013-2020 was assumed to stay unchanged and equal to the average carbon intensity in Phase 2.

- Two levels of production were used for the simulations.

1. The level of production that was used in the benchmarking exercise, which translates into about a 94% capacity.

2. A slightly lower production level (at 88% of capacity), provided by the operators as average yearly output for 2013-2020.

- Administrative costs were kept constant at 0.13 Euros per tonne of steel.

- The steel sector is assumed to stay on the leakage list

Due to benchmarking, only the most carbon efficient plants receive enough allowances to cover their emissions. For this plant, producing at 94% capacity (benchmark level), leads to free allocation of 80% of necessary EUAs, the additional 20% needs to be bought.

It must be also recognized that the costs were calculated as average cost per ton of steel but that the marginal impact for steel production will play a significant role in the decision to add new capacity or expand production. In this case the marginal costs would represent the price of EUAs multiplied by the carbon intensity of the marginal tonne of steel.

The scenarios indicate that cost of Phase 3 of ETS varies significantly based on different assumptions. At the bottom end of the scale, at a price of 10 Euros per EUA and low production levels, the ETS cost is estimated at 4.16 Euros per tonne of steel. If the price of EUAs would increase to 30 Euros, everything else is kept constant; the cost would rise to 12.21 Euros per tonne of steel. The highest potential ETS cost of 15.78 Euros per tonne steel assumes both a carbon price of 30 Euros per tonne and high production levels.

However, these scenarios are based on a significant number of assumptions that need to be taken into account when relying on them for making any decisions. Also, the free banked allocation from P2, whatever that may be, was not accounted for, and it this could also be a significant factor in understanding the impact of ETS on the steel industry in P3.

All in all, a forecast of the impact of EU ETS in P3 and beyond, including the very important marginal cost of a tonne of steel, remains based on very imprecise and in some cases extrapolated data which we cannot verify and in which we do not have a high level of confidence.

As per our mandate, the costs associated with the EU ETS in Phases 1 and 2 have been described and quantified. All sites in the sample experienced over-allocations, but EAF installations faced sufficiently high indirect costs to wipe out the potential benefits of their surpluses, discounting any compensation measures in place.

Plant specific characteristics, for example energy efficiency or historic production, and national circumstances (such as the electricity production mix and NAPs) seem to have a large impact on EU ETS-related costs. National compensation schemes were not taken into account in this study, as it was not part of the mandate.

Phase 3 will be very different. The change in allocation method will result in direct costs for energy intensive industries. However, as things stand currently the market is expected to be long to 2020.[98]

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[98] Commission Report on the European Carbon Market, *supra* note 85.

One thing that can be said is that the results for P1 and P2 cannot be assumed to be a good representation for the impact of ETS on the steel industry in P3. The ETS has changed in 2012, but it is also expected that it will further change leading to 2020.

8 Competition Policy

As stated in Section 3 above, this report addresses the cumulative cost of EU legislation on the steel sector. Competition policy is one of the eight policy areas in scope of the report. However, strictly speaking, competition policy creates no, or very little, regulatory costs for steel makers. Rather, it is one of the factors which shape the competitive environment in which the European steel industry operates. This section is not to assess EU competition policy as such, which is by nature a horizontal policy, nor the purposes it serves or the benefits it delivers. Nor should any part of this section be interpreted as an assessment of e.g. the state aid regime or the rules on abuse of dominant position. The focus of the report is sectoral, and hence the consultants only discuss the impacts of part of competition law and policies on the steel industry.

This section proceeds as follows. Section 8.1 discusses the state aid regime with regards to steel makers; Section 8.2 discusses antitrust law and policies. A general description of competition policies and their application on the steel industry is provided; then a qualitative assessment of any barriers to meeting the simplification and smart regulation objectives and of the coherence of the legislation is carried out.

8.1 State aid and the steel industry

8.1.1 The regime of state aid in the EU

The legal regime of state aid in the EU aims at avoiding distortions of competition and trade among member states, due to direct or indirect government interventions, thus ensuring a level playing field among EU market players. The basic principles are laid down in art. 107 TFEU. The first paragraph of this article provides a definition of state aid incompatible with the EU internal market. In particular, aid measures granted by member states which are able to distort competition and trade in the EU by favouring certain undertakings or the production of certain goods are generally prohibited. The second paragraph provides *de jure* derogations to the general principle of incompatibility, thus allowing i) aid granted to consumers and having a social character; ii) aid aimed at restoring damage caused by natural disasters; and iii) aid granted to the economy of certain areas of the Federal Republic of Germany affected by the division of Germany, in so far as such aid is required in order to compensate for the economic disadvantages caused by this division. Finally, the third paragraph introduces cases of discretionary derogation, when the aid purpose consists in i) fostering the economic development of relatively poor areas; ii) enabling the execution of an important project of common European interest; iii) facilitating the development of certain economic activities; or iv) promoting culture and heritage. Based on art. 108 TFEU, to ensure that the general prohibition is respected and exemptions are applied equally across the EU, the Commission is responsible for monitoring the national state aid systems existing, and is entitled to ask member states to abolish or revise aid measures which are deemed not to be compatible with the good

functioning of the internal market. The member states have to inform the Commission of any plans to grant new aid or modify existing one, thus rendering the monitoring activity more reliable.

State aid which is not targeted at proven market failure distorts the markets and there is a little guarantee that it will improve the industry's capability to compete worldwide on its own merits. This is why state aid policy looks at the design of the aid in order to prevent overcompensation, not to hamper incentives, and to minimise distortions of competition.

Procedural rules are laid down in Council Regulation (EC) No 659/1999 - implemented by Commission Regulation (EC) No 794/2004 - which sets the obligations of member states to notify aid measures and to provide annual reports, as well as the powers of the Commission to carry out investigations and make decisions.

While state interventions conferring an advantage to selected recipients are to undergo an assessment by the Commission, general measures, i.e. not selective and applying to all companies regardless of size, location, and sector, are not considered state aid *stricto sensu*. Specific aid measures can be implemented only after the approval of the Commission, which is also entitled to recover unlawful aid. All the interested parties have the right to comment on Commission decisions; and to submit complaints reporting any aid allegedly incompatible with the TFEU or any misuse of aid. With small exceptions (e.g. for agricultural products), DG Competition is responsible to perform state aid control on most of economic sectors.

Council Regulation (EC) No 994/1998 enables the Commission to adopt both group and *de minimis* exemptions by means of a regulation. General block exemptions can apply to aid favouring small and medium-sized enterprises (SMEs), research and development (R&D) activities, environmental protection, employment and training, or complying with national maps for the granting of regional aid. Commission Regulation (EC) No 800/2008 (the so-called General Block Exemption Regulation or GBER) provides automatic approval (without notification) under the conditions therein specified for a wide range of aid measures (26 categories, including i.a. aid to SMEs, R&D aid to SMEs, aid for employment, training aid, regional aid, environmental aid, innovation aid, R&D aid for large companies, aid in the form of risk capital, and aid for enterprises newly created by female entrepreneurs). *De minimis* exemptions are regulated by Commission Regulation (EC) No 1998/2006 which exempts aid measures not exceeding € 200,000 over three fiscal years and loan guarantees for debt not exceeding € 1.5 million. To avoid abuses, this kind of exemption cannot be applied to "non-transparent" aid, i.e. when the total budget cannot be calculated accurately in advance; or to aid granted to firms at risk of failure.

Based on art. 107(3), several horizontal non-binding guidelines are set to define the Commission position towards certain categories of aid. Regional aid measures, aiming at promoting the economic development of certain disadvantaged areas within the EU, are currently covered by Guidelines on national regional aid for 2007-2013 (2006/C 54/08). The Community framework for state aid for R&D and innovation (2006/C 323/01) governs

aid direct to strengthen the scientific and technological base of the EU industry. Horizontal environmental aid measures are covered by Community guidelines on state aid for environmental protection (2008/C 82/01) and by Guidelines on certain state aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012 (2012/C 158/04). Community guidelines on state aid for rescuing - i.e. providing temporary and reversible assistance to firms that are working out a restructuring or liquidation plan - and restructuring - i.e. providing assistance to firms implementing a restructuring or liquidation plan - firms in difficulty (2004/C 244/02)[99] are another horizontal tool set on the basis of art. 107(3). Finally, also risk capital investment in SMEs which may have insufficient access to capital markets, in particular at their earlier growth stages, is governed by two *ad hoc* communications of the Commission (2006/C 194/02, amended by 2010/C 329/05).

8.1.2 State aid rules for the steel industry

<u>Historical background on the ECSC Treaty</u>

Until 23 July 2002, the steel industry was governed by the Treaty establishing the European Coal and Steel Community (ECSC). As a general provision, the ECSC prohibited all subsidies or state assistance as incompatible with the common market for coal and steel (art. 4). Nonetheless, the Commission Decision No 3855/91/ECSC authorized particular categories of aid measures, such as R&D aid, environmental protection aid, social aid to encourage closure of plants, and some exemptions regarding regional investment aid.

In compliance with the ECSC Treaty, the Commission Decision No 2496/96/ECSC (the last Steel Aid Code)[100] established new Community rules for direct and indirect state aid to the steel industry, to be applied until the expiry of this Treaty. The decision confirmed the possibility to grant R&D aid as well as aid for environmental protection, consistently with provisions applied by the Commission in other industries not covered by the ECSC Treaty. Furthermore, very detailed rules were set with regard to aid for closures, aiming at reducing overcapacity in the steel industry (based on a lesson learned from the crisis affecting the steel industry in the 80s). Any plans to grant or revise aid or to transfer state resources to steel industry were required to be notified to the Commission, which was then entitled to check the compatibility with the functioning of the internal market, thus rejecting and recovering unlawful aid measures. It is worth stressing that, despite the state aid rules, the ECSC was entitled to directly grant loans as well as to guarantee loans contracted by companies with third parties (art. 54 ECSC Treaty).

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[99] The application of these guidelines has been extended by Communications 2009/C 156/02 and 2012/C 296/02 until new rules will be enacted following the ongoing discussions on the EU state aid regime modernization.

[100] With the first (1981) and the second (1982) Steel Aid Code, the Commission governed state aid to the steel industry, by authorizing subsidies on the condition that production capacity would be reduced (CPS, 2011).

State aid rules after the expiry of the ECSC Treaty

The ECSC Treaty expired on 23 July 2002; from then on, sectors previously covered by that Treaty were subject to the provisions governing the EC – and the EU (TFEU) - Treaty and to all the procedural rules and other secondary legislation. As explained by the Communication from the Commission concerning certain aspects of the treatment of competition cases resulting from the expiry of the ECSC Treaty (2002/C 152/03), state aid control in the steel industry did not undergo significant changes. In a nutshell, regional and Rescue and Restructuring (R&R) aid measures are forbidden, while environmental, R&D, *de minimis*, training, and employment aid measures are permitted.

Unlike art. 4 ECSC Treaty, art. 107 TFEU requires intra-EU cross-border trade to be affected for the aid to be unlawful, but this requirement is very likely to be fulfilled in the steel industry due to the intense intra-EU trade.[101] Furthermore, aid granted to the industry under schemes authorised by the Commission are not subject anymore to the prior notification requirement established by the Steel Aid Code.

State aid prohibited

As from 24 July 2002 and up to 31 December 2009, the multi-sectorial framework on regional aid for large investment projects (2002/C 70/04) provided a general prohibition for regional aid to the steel industry (including large individual aid grants made to SMEs). This prohibition has been confirmed by Guidelines on national regional aid for 2007-2013. The aim is to avoid investment aid in an industry considered to be in overcapacity or in structural decline, thus preventing subsidy races. In addition, until 31 December 2009, also R&R aid for firms in difficulty in the steel sector were deemed incompatible with the internal market (2002/C 70/05), thus providing strong incentives to steel makers to cut costs and increase their competitiveness.[102] Accordingly, Guidelines on state aid for rescuing and restructuring firms in difficulty (2004/C 244/02) – whose application period has been recently extended[103] - do not apply to the steel sector, so that steel makers are currently not entitled to receive R&R aid. The rationale behind this exclusion is that, in view of the past experience and taking into account the features of the steel industry, R&R aid is considered to have the most distortive effects on competition in the sector.

Indeed, the relatively high amount of aid granted to steel makers during 1980s and 1990s in Western Europe and during the early 2000s in new member states[104] led to today's

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[101] Communication from the Commission concerning certain aspects of the treatment of competition cases resulting from the expiry of the ECSC Treaty (2002/C 152/03), section 2.3.

[102] Communication from the Commission, R&R aid and closure aid for the steel sector (2002/C 70/05), chapter 1.

[103] See Note 99.

[104] State aid for restructuring the steel industry in the new member states were granted on the basis of several European Agreements and of special protocols to the Accession Treaties. These aid measures aimed at achieving long-term viability - under normal market condition - of steel companies in new member states, provided that aid intensity were as limited as possible, that the restructuring programme

restrictions on regional investment and R&R aid. However, this situation is now confined to the past, and, in the case of Western European producers, almost twenty years have elapsed from the end of the restructuring process. In these years, the steel industry faced comparable competitive conditions to any other manufacturing sectors. Yet, the prohibition of regional and R&R aid persists.

Over the last decades, the progressive downsizing of state aid to steel makers was rooted in the acknowledgment that the viability of the industry required a reduction of overcapacity[105] (Lienemeyer, 2005). Nevertheless, in 2010 the total capacity installed in the EU was equal to 242 million tonnes of crude steel,[106] while in 2007 the production reached a peak of 210 million tonnes,[107] thus leading to a capacity utilisation rate of about 87%. Considering that a capacity utilization of about 85% is deemed close to full capacity utilization (Ecorys, 2008), in 2007 overcapacity was not an issue in the EU. This statement is further supported by the evidence that the EU demand for finished steel product reached a peak of 201 million tonnes in that year,[108] thus being able to absorb 83% of the installed European capacity. Furthermore, it is worth stressing that between 2010 and 2013, about 20 million tonnes of production capacity have been permanently cut, and additional 14 million tonnes have been temporarily shut down.[109]

State aid permitted

Closure aid for the steel industry was permitted until 31 December 2009 in accordance with the Commission Communication (2002/C 70/05), provided that production capacity was cut. After that, steel makers can no longer access to this aid.

Under the existing state aid regime, the steel sector – like any other sector - may benefit from state support measures that contribute to the EU 2020 objectives, e.g. R&D and innovation, training and employment aid, SME aid, aid to increase environmental protection. For instance, the steel sector has benefited in the past from exemptions from national environmental and energy taxes, from state aid for energy efficiency measures, and from aid to go beyond EU environmental standards.

In particular, based on rules established by Community guidelines on state aid for environmental protection (2008/C 82/01), steel makers have the same right granted to all sectors governed by the TFEU as for access to aid measures aiming at promoting

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were as short as possible – usually within a 5-year grace period, subject to prolongation-, and that inefficient production capacity were reduced. All restructuring programmes, which have led to successful outcomes, have expired (Lienemeyer, 2005).

[105] The overcapacity issue was officially acknowledged for the first time in the so-called Davignon plan in 1977.

[106] Steel Business Briefing &EuroStrategy Consultants, 2010.

[107] World Steel, 2012.

[108] World Steel, 2012.

[109] Data provided by industriAll – European Trade Union (May 2013).

environmental protection - without adversely affecting trade between member states to an extent contrary to the EU common interest – which comprise among others:

- Aid for undertakings which go beyond community standards or which increase the level of environmental protection in the absence of community standards;

- Aid for early adaptation to future community standards;

- Aid for energy saving;

- Aid for renewable energy sources;

- Aid for cogeneration;

- Aid for the relocation of undertakings;

- Aid involved in tradable permit schemes;

- Aid in the form of reductions of or exemptions from environmental taxes.

This approach fits well with the objectives of the EU state aid policy aiming at less but better targeted aid measures. In particular, the possibility to grant relatively high amounts of aid for research, development and innovation activities in the steel industry should contribute to the increase of competitiveness of the EU economy as a whole. Furthermore, the possibility to grant environmental aid allows balancing the requirements of environmental protection with competition rules, thus promoting sustainable development. Training aid can help steel makers to introduce their labour force to innovative production techniques.

State aid to compensate for increases in electricity price due to ETS

The ETS Directive (Directive 2003/87/EC as subsequently amended)[110] allows for special and temporary aid measures: i) aid to compensate for increases in electricity prices resulting from the inclusion of the costs of ETS allowances; ii) investment aid to highly efficient power plants; iii) optional transitional free allowances in the electricity sector in some member states; and iv) the exclusion of certain small installations from the EU ETS. Detailed rules on state aid permissible under the ETS directive were laid down in the Commission Guidelines on certain state aid measures in the context of the greenhouse gas emission allowance trading scheme post 2012 (2012/C 158/04), generally applicable to costs incurred by undertakings as from 1st of January 2013.

The first section of the Commission Guidelines, governing aid to companies in sectors deemed to be exposed to a significant risk of carbon leakage due to EU ETS allowance costs passed on in electricity prices, the so-called "indirect ETS costs", applies *i.a.* to the steel

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[110] Directive 2003/87/EC has been amended by Directive 2004/101/EC, Directive 2008/101/EC, and Directive 2009/29/EC, the so-called "ETS third phase directive", through which the provisions on special and temporary aid were added.

industry.[111] The Commission aims at achieving three objectives: i) minimising the risk of carbon leakage; ii) preserving the EU ETS price signal to spur cost-efficient decarbonisation; iii) minimising competition distortions in the internal market. As a result, aid measures can be granted, but do not fully compensate for the costs of ETS allowances in electricity prices, being based on efficient benchmarks,[112] and as the admissible amounts decline over time.[113] These two features are deemed pivotal to avoid aid dependency and preserving both long-term incentives to internalize environmental externalities and short-term incentives to switch to less polluting production technologies.

Despite the Commission guidelines are crafted to address the risk of carbon leakage and to minimise distortions in the internal market, state aid to compensate "indirect ETS costs" may have unintended consequences in terms of an even playing field. In the context of the current sovereign-debt crisis (and of the related austerity measures), national finances may have no room for compensation, thereby putting at risk the objective of fighting carbon leakage and, based on which countries will be able to compensate for those costs, distorting competition among EU producers located in different member states. Indeed, electricity is a crucial input for steel makers and, in particular, for those adopting the EAF technology; hence, these producers will be harmed to a larger extent by EU ETS allowance costs passed on in electricity prices. In 2011, more than 45% of the total EU crude steel production by EAFs was concentrated in Italy (25%), Spain (15%), Greece (3%), and Portugal (2%),[114] which are among the member states most affected by the crisis and by the budget tightening.[115] In case these countries were not able to fund state aid measures to compensate indirect costs of ETS, their production of steel in EAFs would experience a competitive disadvantage *vis-à-vis* other EU and third country steel makers.[116] This is even a more serious issue if it is considered that EAF outputs are usually of a lower quality (due to tramp metals contained in scrap), which makes it the industry segment most affected by price competition dynamics originating in low cost third countries.

8.1.3 State aid granted to the steel industry between 2002 and 2012 in the EU

In the EU, the majority of national state aid is granted under framework schemes, i.e. either under schemes approved by the Commission or under schemes exempted from the notification obligation in compliance with GBER. In 2011, state aid granted under the

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[111] For example, to manufacturers of basic iron and steel and of ferro-alloys, including seamless steel pipes

[112] Special formulas to calculate the annual aid amount are provided in sub-section 3.1 (2012/C 158/04).

[113] "The aid intensity must not exceed 85% of the eligible costs incurred in 2013, 2014 and 2015, 80 % of the eligible costs incurred in 2016, 2017 and 2018 and 75 % of the eligible costs incurred in 2019 and 2020" *(*2012/C 158/04, sub-section 3.1).

[114] See Figure 32 above.

[115] Sovereign-debt rating by Standard & Poor: Greece (B-); Italy (BBB+); Portugal (BB); Spain (BBB-) (data available at http://www.standardandpoors.com/ratings/sovereigns/ratings-list/en/us/?sub Sector Code=39, last accessed on 22 May 2013).

[116] Indirect ETS costs amount to about 3 €/tonne of wire rod, that is about 20% of the total cumulative costs estimated in this study.

block exemption and through notified schemes represented around 88% of total aid granted.[117] In general, framework schemes target aid to broad horizontal EU objectives, e.g. R&D, innovation, transition to a low carbon economy, environmental protection, employment, training, regional development.

According to the State Aid Scoreboard, between 2002 and 2011, in the EU non-crisis state aid measures (excluding aid to railways) reached about € 753 bln (see Table 28). In particular, € 411 bln (around 55% of the total) were channelled towards the manufacturing sector. Over the same period, state aid granted to the steel industry equalled € 1 bln, i.e. 0.7% of the total aid earmarked for specific sectors (€ 141 bln).

Table 28 State aid granted in the EU between 2002 and 2011 (€ mln at constant 2011 prices)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total State Aid	89,365	79,196	72,045	67,458	92,627	66,719	73,918	75,832	71,326	64,295
Aid to manufacturing sectors	27,793	32,674	39,978	40,427	45,653	40,940	49,294	49,905	47,642	36,926
State aid earmarked for specific sectors	32,121	28,503	17,778	11,319	10,057	8,296	9,530	9,367	8,734	5,473
State aid earmarked to the steel sector	88	107	95	149	156	208	145	112	15	17

Source: Authors' elaboration on Scoreboard - Data on State Aid Expenditure[118] and on Report - State Aid Scoreboard[119].

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[117] Report from the Commission, State Aid Scoreboard - Report on State Aid Granted by the EU Member States, COM(2012) 778 final.

[118] Data for Total State Aid (2002-2011) are drawn from Scoreboard – Data on State aid Expenditure (Non-crisis state aid by sector and objective, in million Euro -1992-2011- http://ec.europa.eu/competition/state_aid/studies_reports/ws2_1.xls, last accessed 22 May 2013). Data for aid to manufacturing sectors (2006-2011) are drawn from Scoreboard – Data on State aid Expenditure (State aid by sector, in million Euro and as a percentage of total aid -2006-2011 - http://ec.europa.eu/competition/state_aid/ studies_reports/ws2_10.xls, last accessed 22 May 2013). Data for state aid earmarked for specific sectors are drawn from Scoreboard – Data on State aid Expenditure (Sectoral aid by Member State, in million Euro - 1992 – 2011 -, http://ec.europa.eu/competition/ state_aid/studies_reports/ws4_11.xls, last accessed on 22 May 2013).

[119] Data for state aid earmarked for the steel sector (2002-2011) and aid to manufacturing sectors (2002-2005) are based on: State Aid Scoreboard - spring 2003 update - COM(2003) 225 final; State Aid Scoreboard - spring 2004 update - COM(2004) 256 final; State Aid Scoreboard- spring 2005 update - COM(2005) 147 final; State Aid Scoreboard - autumn 2005 update - COM(2005) 624 final; State Aid Scoreboard - autumn 2006 update - COM(2006) 761 final; State Aid Scoreboard - autumn 2007 update - COM(2007) 791 final; State Aid Scoreboard - autumn 2008 update - COM(2008) 751 final; State Aid Scoreboard - autumn 2009 update - Facts and figures on State aid in the EU Member States SEC(2009) 1638; State Aid Scoreboard - autumn 2010 update - Facts and figures on State aid in the Member States SEC(2010) 1462 final; Commission Staff Working Paper - autumn 2011 update - SEC(2011) 1487 final; Commission Staff Working Paper - autumn 2012 update - SEC(2012) 443 final.

<u>Aid under scrutiny by the Commission</u>

Based on the Commission online tool "Search Competition Cases",[120] it is possible to list state aid cases under scrutiny by the Commission during the period 2002-2012. When setting as search parameters i) state aid; ii) a decision date between 1 January 2002 and 31 December 2012; and iii) the NACE rev.2 code 24.1,[121] 37 cases are selected. After an in-depth screening process, 4 of these cases have been discarded, as they concerned mining facilities (which are not part of this study). Furthermore, an additional case - selected by including NACE rev.2 codes 24.2, 24.3, and 24.52[122] - has been included, as it concerns a steel making facility. Therefore, over the period 2002-2012, 34 state aid measures addressed to the steel and iron sector were registered by the Commission (see Table 29), comprising 26 *ad hoc* cases (i.e. not granted on the basis of an already approved scheme), five individual applications of an existing scheme, and three scheme applications.[123] Focusing on the aid instrument, 16 cases provided companies with a direct grant, five with a debt write-off, two with a soft loan, two with a guarantee, and two with a tax rate reduction; the remaining seven resorted to a mix of instruments. While 19 cases were notified, 22 required an investigation procedure to assess compatibility with the internal market, leading to seven positive decisions – four of which only partial - and to nine negative decisions (in eight cases, the recovery of the aid was mandated); the remaining cases where closed before a formal decision was adopted (e.g. because of aid remittal). Nineteen measures were finally granted, having as primary objective mainly environmental protection (five out of 19) and restructuring of firms in difficulty (six out of 19) in new member states or in areas of the Federal Republic of Germany affected by the division of Germany.

Table 29 List of state aid notified to/registered by the Commission over the period 2002-2012

#	NACE	Case Number	Member State	Last Decision Date	Title
1	C24.1	C10/2001	Italy	30/01/02	R&D aid to Lucchini SPA, ECSC steel
2	C24.1	C20/2001	Spain	30/01/02	R&D aids to several ECSC undertakings granted by the Basque government
3	C24.1	C30/2001	Germany	30/01/02	GothaerFahrzeugtechnik GmbH
4	24.1	NN131/2000	Austria	12/03/02	Investment aid to BöhlerBlecheGmbh
5	C24.1	C19/2001	United Kingdom	03/04/02	Climate change levy - ECSC steel
6	C24.1	C77/2001	Germany	05/06/02	CR77/01 - Aid in favour of EisengussTorgelowGmbh - EGT, Mecklenburg-Vorpommern
7	C24.1	C12/2002	Italy	02/07/02	Acciaierie de Valbruna - Environment - ECSC steel

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[120] "Search Competition Cases" by the European Commission is available online at: http://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3 (last accessed on 25 April 2013).

[121] NACE rev.2 24.1 - Manufacture of basic iron and steel and of ferro-alloys.

[122] NACE rev.2 24.2 - Manufacture of tubes, pipes, hollow profiles and related fittings, of steel; 24.3 - Manufacture of other products of first processing of steel; 24.52 - Casting of steel.

[123] The Commission classifies five aid measures (C20/2001, C19/2001, C13/2001, N266/2006, SA.31349) as schemes. Nevertheless, after an in-depth screening process, N266/2006 has been deemed an individual application of an existing scheme and C13/2001 an *ad hoc* case.

8	C24.1	C9/2002	Italy	02/07/02	Duferdofin - Environment - ECSC steel
9	C24.1	C10/2002	Italy	17/07/02	ILVA - Environment - ECSC steel
10	C24.1	C27/2002	France	17/07/02	Aide à l'environnement en faveur de SOLLAC, acier CECA
11	C24.1	C8/2002	Italy	17/07/02	Acciaierie di Sicilia - Environment - ECSC steel
12	C24.1	NN13/2001	Germany	30/10/02	Investitionsbeihilfe der Firma Vallource und Mannesmann Tubes VUM
13	C24.1	N487/2002	Germany	13/11/02	NeueMaxhutteStahlwerke GmbH i.K. FreiwilligeSozialeLeistungen Bayern
14	C24.1	C8/2001	Italy	13/11/02	Aid to PertusolaSud S.P.A.
15	C24.1	C13/2001	Germany	01/10/03	CR13/01 - Aide en faveur de JahnkeStahlbau
16	C24.1	C25/2002	Belgium	15/10/03	Participationfinanciére de la RegionWallonnedans l'entreprise CARSID - Acier CECA
17	C24.1	C31/2000	Germany	10/12/03	CR31/2000 - Aid to NeueHarzerWerke GmbH Blankenburg, Sachsen-Anhalt
18	C24.1	C77/2003	Spain	30/06/04	Aid to Solmed (steel)
19	C24.1	N315/2004	Belgium	20/10/04	Participation à l'augmentation de capital d' O.C.A.S. NV
20	C24.1	C95/2001	Spain	20/10/04	CR95/01 - Siderurgica Anon
21	C24.1	N600/2004	Czech Republic	02/03/05	Approval of capacity reductions for VPFM
22	C24.1	N186/2005	Poland	20/07/05	Mittal Steel Poland - change of IBP
23	C24.1	N274/2005	Poland	13/09/05	Rescue aid to HutaCynkuMiasteczkoSlaskie S.A.
24	C24.1	C20/2004	Poland	27/06/06	CR20/04 - Huta Czestochowa
25	C24.1	N266/2006	The Netherlands	11/08/06	NijmeegscheIjzergieterij
26	C24.1	C45/2004	Czech Republic	08/11/06	Restructuring aid to the steel producer TrineckeZelezarny
27	C24.1	C25/2000	Italy	16/07/08	Environmental aid to Lucchini
28	C24.1	N670/2009	Latvia	15/12/09	State guarantee in favour of JSC "LiepajasMetalurgs"
29	C24.1	N450/2009	Germany	09/03/10	Top Gas Recycling (TGR) Project - Aid to Arcelor Mittal Eisenhuttenstadt GmbH
30	C24.52	N451/2009	Germany	14/04/10	Energy saving by strip casting technology for light steels of Salzgitter Flachstahl GmbH
31	C24.1	C48/2007	Poland	06/07/10	Restructuring of the Polish tube sector
32	C24.1	C76/2003	Belgium	30/11/10	Reduction d'une dette TVA de la société UMICORE S.A.
33	C24.1	C37/2004	Finland	20/04/11	Alleged aid to Componenta
34	C24.1 - C24.42	SA.31349	United Kingdom	04/04/12	Climate Change Levy reduction for metal recycling activities

Source: Authors' elaboration on "Search Competition Cases" (data extracted on 25 April 2013).

For the sake of completeness, it is worth noticing that steel makers have also benefited of non-sector specific state aid, such as that granted to energy intensive industries and to pollutant production process emitting CO2 and NOx. Over the period 2002-2012, according to the "Search Competition Cases" engine, nine measures targeted on energy intensive producers, five on NOx emitters, and 19 on CO_2 emitters were under scrutiny by the Commission. None of them was an *ad hoc* or individual application case direct to steel makers, the majority being scheme applicable to all the relevant production processes.

8.2 Antitrust law and the steel sector

8.2.1 Antitrust law in the EU: agreements/concerted practices, abuse of dominant positions, and merger control

Antitrust law in the EU is based on the provisions included in two articles of the TFEU, and on the Merger Control Regulation:

- Art.101 TFEU covering agreements, concerted practices, and decisions by associations of undertakings;

- Art.102 TFEU covering abuses of dominant position.

The enforcement of these articles is governed by Council regulation (EC) No 1/2003, which entered into force on 1st May 2004. This regulation, *inter alia*, provides procedural rules and defines powers of the Commission, of national courts, and of national competition authorities, especially obliging national bodies to apply articles 101 and 102 whenever they deal with cases which may affect trade between member states.

In addition, merger control in the EU is governed by Council regulation (EC) No 139/2004 which applies to mergers and acquisitions with a community dimension (based on turnover thresholds) and aims at avoiding that concentrations between undertakings hamper effective competition in the internal market or in a substantial part of it. Prior notification of concentrations above the thresholds is required and the Commission is in charge to assess the compatibility of the notified cases with the good functioning of the common market. Concentrations below the thresholds are dealt with by national competition authorities.

As explained before, since the expiry of the ECSC Treaty, the steel sector has been covered by the rules included in the TFEU. Accordingly, as from 23 July 2002, EU steel makers are subject to the same provisions on antitrust applied to all other undertakings and no special rules exist for this industry. The transition from the previous to the current regime was guided by the Communication from the Commission concerning certain aspects of the treatment of competition cases resulting from the expiry of the ECSC Treaty (2002/C 152/03). Whereas under the ECSC Treaty national competition authorities and national courts had no power on competition cases in the steel industry, they currently apply both EU law and national competition law on this sector. Furthermore, steel makers are not anymore obliged to notify price lists and conditions of sale to the Commission. Nonetheless, authorisation for agreements/concerted practices granted under the ECSC regime ceased with the expiry of the ECSC Treaty, thus the Commission is potentially entitled to re-assess those agreements and practices.[124] Moreover, while joint ventures

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[124] In the Communication 2002/C 152/03, the Commission informed undertakings not to intend to start proceedings under art. 81 TEC (the new art. 101 TFEU) on agreements previously authorized, except for factual or legal developments which affect their future implementation.

were generally covered by rules on concentrations under the ECSC Treaty, they are now assessed according to Regulation No 139/2004 only if "full functioning undertakings", otherwise art. 101 TFEU is applied. Finally, as explained, the application of the merger regulation is based on turnover thresholds; hence, some mergers might also fall outside the Commission's jurisdiction.

8.2.2 Agreements, abuses of dominant position, and notified mergers in the steel industry between 2002 and 2012 in the EU

When setting as search parameters i) antitrust/cartels; ii) a decision date between 1 January 2002 and 31 December 2012; and iii) the NACE rev.2 code 24.1, 24.2, 24.3, 24.52, the "Search Competition Cases" engine selects only one case, i.e. the so-called "pre-stressing[125] steel cartel" (COMP/38344).

The "pre-stressing steel cartel" involved 36 legal entities belonging to 17 steel makers. On 30 June 2010 (then amending this decision on 30 September 2010 and on 4 April 2011), the Commission fined those producers a total of € 270 million to have participated in a cartel (infringement of art. 101 TFEU), engaging in price-fixing, quota-fixing, client allocation, and the exchange of commercially sensitive information over the period January 1984 – September 2002 and across all EU-15 member states (except for UK, Ireland, and Greece) and Norway. With reference to the steel industry, no other antitrust decision was published by the Commission.

The "Search Competition Cases" engine sorts 37 cases, when adopting as parameters i) mergers; ii) a decision date between 1 January 2002 and 31 December 2012; and iii) the NACE rev.2 code 24.1. Nineteen more cases are sorted when making a new search based on NACE rev.2 codes 24.2, 24.3, and 24.52. Over the period 2002-2012, not one of the 56 selected mergers was deemed incompatible with the common market (see Table 30), only in four cases applicants withdrew the notification, and only in two cases remedies were requested from the parties.

Table 30 List of merger notified to the Commission over the period 2002-2012

#	NACE	Case Number	Notification date	Title
1	C24.30	M.2688	19/02/02	ODS / IHC HOLLAND / METALIX JV
2	C24.30	M.2900	10/07/02	OUTOKUMPU OYJ / AVESTAPOLARIT OYJ
3	C24.10 - C24.4	M.3134	02/06/03	ARCELOR / UMICORE / DUOLOGY JV
4	C24.20	M.3582	25/10/04	MANNESMANN / FUCHS
5	C24.20 - C33.20	M.3682	14/01/05	INTEK / GIM
6	C24.10 - C24.34	M.3745	04/03/05	SEVERSTAL / LUCCHINI
7	C24.30	M.3747	29/03/05	RAUTARUUKKI / WÄRTSILÄ / SKF / JV

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[125] "Pre-stressing steel consists of long, curled steel wires used with concrete on construction sites to make foundations, balconies or bridges and also is used in underground engineering and bridge-building" (C339/7, Official Journal of the European Union, 19 November 2011).

8	C24.10	M.3808	02/05/05	MITTAL / HUTA STALI CZESTOCHOWA
9	C24.30	M.3900	25/07/05	CVC / WAVIN
10	C24.10	M.3952	23/08/05	SYSTEM CAPITAL MANAGEMENT - METINVEST / LEMAN COMMODITIES
11	C24.10	M.4137	07/04/06	MITTAL / ARCELOR
12	C24.10	M.4231	16/05/06	ARCELOR / MITSUI / AMSA JV
13	C24.10	M.4211	24/05/06	SCHMOLZ + BICKENBACH / UGITECH
14	C24.10	M.4259	06/06/06	ARCELOR / SEVERSTAL
15	C24.10	M.4273	08/06/06	SUNGREBE / ARCELOR / SEVERSTAL
16	C24.10	M.4225	22/06/06	CELSA / FUNDIA
17	C24.20	M.4331	09/08/06	ARCELOR / BAMESA / BAMESA OTEL
18	C24.30	M.4291	14/08/06	VOESTALPINE / PROFILAFROID / SAP
19	C24.10	M.4382	01/09/06	TPG / ALERIS
20	C24.30 - C25.93	M.4384	04/10/06	HOMBERGH / DE PUNDERT / PIB / OVAKO
21	C24.10	M.4421	13/10/06	OJSC NOVOLIPETSK STEEL / DUFERCO / JV
22	C24.10	M.4408	20/11/06	TATA / CORUS
23	C24.10	M.4515	21/12/06	CSN / CORUS
24	C24.52	M.4524	23/01/07	NEMAK / HYDRO CASTINGS
25	C24.10	M.4499	20/02/07	HOLDING GONVARRI / ASSC / ASSC SLOVAKIA
26	C24.52	M.4500	28/02/07	NEMAK / TK ALUMINUM "A"
27	C24.20	M.4628	21/05/07	SALZGITTER / VALLOUREC
28	C24.30	M.4749	08/08/07	PSB / OVAKO
29	C24.52	M.4840	24/08/07	FIAT / TEKSID ALUMINIUM
30	B06 - C24.10	M.4890	16/10/07	ARCELOR / FERNGAS
31	C24.10	M.5000	03/12/07	METINVEST / TRAMETAL / SPARTAN
32	C24.10	M.4945	21/01/08	ARCELOR / OFZ
33	C24.52	M.4992	04/02/08	ARCELORMITTAL / GALVEX
34	C24.10	M.5072	04/03/08	AMSSC / BE GROUP / JV
35	C24.10	M.5101	01/04/08	OJSC NOVOLIPETSK STEEL / NOVEXCO / NOVEX TRADING
36	C24.10	M.5120	04/04/08	ARCELORMITTAL / GONVARRI / SSC BRAZIL
37	C24.10	M.5122	29/04/08	ARCELORMITTAL / BORUSAN
38	C24.10	M.5179	29/05/08	ERAMET / TINFOS
39	C24.10	M.5211	19/06/08	OUTOKUMPU / SOGEPAR
40	C24.10	M.5259	13/08/08	MITSUI / BAMESA CELIK / BAMI / JV
41	C24.10	M.5251	17/09/08	SYSTEM CAPITAL MANAGEMENT-ENERGEES / METINVEST
42	C24.30	M.5545	02/06/09	ARCELORMITTAL / NOBLE EUROPEAN HOLDING
43	C24.10	M.5582	31/07/09	GONVARRI / SEVERSTAL / JV
44	C24.10	M.5643	23/10/09	ARCELORMITTAL / MIGLANI / JV
45	C23.5 - C24.10	M.5771	14/01/10	CSN / CIMPOR
46	C24.10	M.5955	11/08/10	METINVEST BV / IISW
47	C24.20 - C24.30	M.5921	18/08/10	TRITON / OVAKO NON-WIRE BUSINESS
48	C19.1-C20.1-C24.10	M.6123	18/04/11	ARCELORMITTAL BREMEN / KOKEREI PROSPER / ARSOL AROMATICS
49	C24.10	M.6177	20/04/11	OJSC NOVOLIPETSK STEEL / STEEL INVEST & FINANCE

50	C24.10	M.6246	28/04/11	OJSC NOVOLIPETSK STEEL / STEEL INVEST & FINANCE
51	C23.51 - C24.10 - C24.3 - C24.52	M.6265	14/06/11	CSN / AG CEMENTOS BALBOA / CORRUGADOS AZPEITIA / CORRUGADOS LASAO / STAHLWERK THURINGEN
52	C24.10 - C24.34	M.6276	15/07/11	AIF VII EURO HOLDINGS / ASCOMETAL
53	C24.10	M.6471	10/04/12	OUTOKUMPU / INOXUM
54	C24.30	M.6624	25/06/12	BEKAERT / SOUTHERN STEEL BERHAD / BEKAERT SOUTHERN WIRE
55	C24.10	M.6628	30/07/12	TRINECKE ZELEZARNY / ZDB DRATOVNA
56	C24.30 - C25	M.6737	06/11/12	RUUKKI / CAPMAN / FORTACO

Source: Authors' elaboration on "Search Competition Cases" (data extracted on 25 April 2013)

8.2.3 Long-term contracts for electricity

The steel industry is energy intensive and electricity plays a pivotal role as an input, in particular for producers adopting the EAF technology. An appropriate strategy for energy portfolio management aimed at securing the supply of the required electricity at competitive and stable prices over a sufficiently long time horizon is, in the stakeholders view, an important factor for the viability of steel making. In order to soften the impact of the volatility of electricity prices, steel makers have three options for their energy strategy:

- Signing long-term contracts with electricity suppliers;

- Investing in productive capacity of electric power;

- Trading in the energy derivatives market.

The second option can be very costly in terms of capital investments; while the third option is currently limited because of the shallow liquidity of electricity markets. As for signing long-term contracts, EU competition law may be one of the factors limiting the feasibility of the first option, as far as electricity suppliers holding a dominant position in a relevant market are concerned.

Long-term contracts are not *per se* forbidden by EU competition law. Nevertheless, when concluded by a dominant undertaking, these contracts might be forbidden under art. 102 TFEU if they have the effect of foreclosing the relevant downstream market for the supply of electricity, acting as a strategic barrier to entry and/or expansion. Indeed, this anticompetitive effect depends on the market scope, the duration, and the nature of those supply contracts. On the contrary, when non-dominant electricity suppliers conclude long-term contracts, they can be presumed compliant with competition law, unless there is a cumulative effect resulting from similar behaviour by multiple suppliers (to be assessed under art. 101 TFEU).

A limitation on long-term contracts entered into by dominant suppliers exists to prevent the foreclosure of the electricity market. Market foreclosure is to be prevented to the benefit of all consumers, including the industrial consumers which would themselves enter into a long-term contract. Indeed, once the market is foreclosed, the monopolist is free from competitive constraints and can impose higher prices. Notwithstanding the rationale of this prohibition, the limitation for European steel makers, as well as any other energy

intensive industries, to the freedom to enter into long-term contracts with certain clauses and under certain market configurations is a competitive constraint, which is absent in some other world regions. Acknowledged the rationale of this limitation, and according to the methodology of this report, the analysis that follows addresses only the impacts of this legal framework on steel makers, rather than on the whole economy.

The first case on long-term energy contracts concerns the Belgian gas market for large industrial customers, the so-called Distrigaz case.[126] In 2004, Distrigaz and its connected undertakings controlled between 70 and 80% of the relevant market of high-calorific gas for large industrial customers; hence it was considered as holding a dominant position. In this market configuration, the concern of the European Commission was that "the effect of these long-term contracts could be to foreclose the market to alternative suppliers and therefore hinder the development of competition following liberalisation of the gas sector."[127] Two practices were particularly sources of concern, i.e. the foreclosure of the market and resale restrictions. The latter were unilaterally removed by Distrigaz before receiving the Statement of Objections, and removal was subsequently confirmed through remedies; the former was resolved through a series of remedies accepted by the Commission. In a nutshell, Distrigaz committed to: i) ensure that each year on average 70% of the customers in the relevant market return to the market; ii) not to conclude contracts longer than 5 years with industrial customers; iii) to amend existing contracts longer than 5 years with industrial customers, including a free opt-out clause for the customer.

Long-term electricity contracts were later dealt with in the so-called EDF case.[128] EDF is the incumbent operator in the French market for the supply of electricity to large industrial and commercial customers. By investigating the supply contracts concluded by EDF with some French industrial customers, the Commission identified a potential abuse of dominant position (under art. 102 TFEU). In particular, contracts bound a significant part of the relevant market, were long-term, and included *de jure* (exclusivity clauses) or *de facto* (through a set of clauses, such as take-or-pay schemes) exclusivity, thus foreclosing competition and preventing newcomers to enter or expand in the market for the supply of electricity to large industrial customers. Furthermore, resale restrictions were added to the contracts with a detrimental effect on the development of the wholesale electricity market.

In reply to the Commission's objections, EDF offered commitments: i) to give other competitors a chance to conclude a contract with EDF's industrial customers; ii) to avoid a cream-skimming strategy by the incumbent, i.e. to secure more profitable large industrial customers; iii) to allow customers to purchase energy from two suppliers at the same moment. *Inter alia*, EDF committed itself to limit the duration of contracts without opt-out options for customers to 5 years. EDF also offered to delete resale restriction clauses

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[126] Case COMP/B-1/37966 – Distrigaz, 11.10.2007

[127] Case COMP/B-1/37966 – Distrigaz, 11.10.2007, § 5.

[128] Case COMP/39.386 – Long-term contracts France, 17.03.2010

and to provide support to customers who intend to resell the purchased electricity in the wholesale market. Finally, the Commission accepted and made legally binding the commitments submitted by EDF.

The EDF case shows the importance of a case-by-case evaluation of long-term contracts, concluded by dominant electricity suppliers, based on the assessment of the scope, nature and duration of the contract, as well as the underlying market structure. In light of this case, it can be presumed that energy suppliers – even dominant – are generally allowed to conclude long-term contracts up to 5 years and even longer, provided that these contracts include free opt-outs for customers (at least every five years).

The question shifts then from competition law to business strategy, i.e. whether electricity producers have any incentive to offer long-term contracts subject to the above mentioned commitments. Long-term contracts for energy intensive industries present a counterfactual dilemma which the consultants have not been able to solve, that is whether in the absence of competition policies limitations electricity producer would offer long-term contracts. Or, on the contrary, in the current regulatory and market framework for electricity generation and sale, long-term contracts, which used to be the rule in the regulated days, are *de facto* impossible because electricity producers cannot, or do not want to, bear themselves the market and regulatory risks.

Contracts, be they long-term or short-term, are an instrument through which parties allocates risks and rewards. How risks and rewards are allocated has an impact on the value of the contracts for both parties. If the clauses required making a contract compliant with competition law changes this allocation, this may change the incentives of the parties to enter into such a contract. If some of the commitments prescribed by the "EDF case" lower the economic value of such contracts, this is going to impact on the decision of electricity producers to enter into long-term agreements. For example, unilateral opt-outs are hardly juicy options for producers, as one of the main benefit of long-term deals that is stability, is enjoyed by customers, but not by the producers themselves. At the same, the prohibition of resale restrictions, which could prevent arbitrage, may make it more difficult for the incumbent generator to carry out price discrimination.[129] Hence, Competition policies may be facing a trade-off between preventing market foreclosure and forcing contractual parties into adding certain clauses which lower the value of the contract for one of the two parties. Protecting customers, be they professionals or consumers, comes at a

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[129] Price discrimination is indeed what industrial customers want: as they are bulk base load consumers, they would like to get consequently lower prices. However, in the absence of resale restrictions, large industrial customers may, e.g. in times of low product demand or high (peak) electricity price, resell electricity, thus competing with the electricity producer. Thereby, without the possibility of introducing a binding re-sale prohibition, the producer might increase the price of electricity sold to industrial customers in order to make the option to resell electricity in the wholesale market less attractive. Or, at one extreme, the producer may charge all consumers the same price, to avoid arbitrage. Price discrimination is a "strange animal" in competition economics. On one side, it increases the monopolist's profits; on the other, it can also increase social welfare.

cost, and this cost may result in higher electricity prices or less favourable contractual conditions.[130]

Long-term contracts are clearly an issue for steel makers. On one side, these contracts are possible under current EU law, under the conditions set out in the EDF and Distrigaz cases, albeit only a case-by-case assessment is possible. Indeed, the Commission acknowledged that "[d]ownstream bilateral supply agreements provide an opportunity to energy intensive industries to obtain more predictable prices" while at the same time they "risk foreclosing the downstream market". To better explain as these two competing interests may be balanced, in 2007 the Commission announced, in order "to reduce uncertainty in the market", that it would "provide guidance in an appropriate form on the compliance of downstream bilateral long-term supply agreements with EC competition law."[131] Most probably, guidelines could provide energy intensive industries and electricity producers with a more solid legal basis to decide whether entering, or not, into long-term electricity contracts. Indeed, they would clear out the dilemma whether electricity producers resist long term contracts on their own business considerations, or because of a cautious approach towards a competition-sensitive issue. This is especially important in this moment, considering that these two cases concerned countries with a strong concentration of energy markets; and that the additional grid interconnections among formerly separated national electricity markets may result in a different assessment of the geographic dimension of the relevant market (e.g. along the supra-national markets considered by the Guidelines on compensation for indirect ETS costs).

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[130] See *i.a.* Van den Bergh, R.K. (1997) 'Wer schützt die europäischen Verbraucher vor dem Brüsseler Verbraucherschutz? Zu den möglichen adversen Effekten der europäischen Richtlinien zum Schutze des Verbrauchers', in C. Ott and H.-B. Schäfer (eds.) *Effiziente Verhaltenssteuerung un Kooperation im Zivilrecht* (Tübingen; Mohr Siebeck).

9 *Energy Policy*

This chapter first compares electricity and gas prices across the world and within Europe. Then the impact of selected EU legislation on the energy prices paid by steelmakers is discussed.

The focus of this chapter is on energy prices paid by steelmakers; household prices are not reported. While natural gas prices are relevant for steelmakers as well, this chapter will mainly focus on electricity prices and the impact of EU legislation on them. The reason is that the consulted stakeholders from the steel industry generally indicated that this was the area were the impact of EU legislation was most salient.

In this Section, electricity costs are expressed in €/MWh In the cumulative cost assessment, costs are expressed in €/tonne of finished product. Given electricity intensity of the prototypical plants in Western and Central Eastern Europe, for each additional €/MWh, European producers incur in the following additional costs expressed in €/tonne (see Table 31).

Table 31 Effect of price marginal increases

Plant	Electricity: effect of an additional €/MWh
Western European BOF – flat products (HRC)	0.28 €/tonne
Central Eastern European BOF – flat products (HRC)	0.31 €/tonne
Western European BOF – flat products (CRC)	0.43 €/tonne
Central Eastern European BOF – flat products (CRC)	0.47 €/tonne
Western European EAF – long products (WR)	0.64 €/tonne
Central Eastern European EAF – long products (WR)	0.70 €/tone

9.1 Comparison of electricity prices

This section first explains the fundamentals of electricity price formation. Then, it presents the average price of electricity paid by the industry in the EU and compares it to the prices

paid by the industrial consumers in the U.S., Canada, Japan, and Turkey.[132] The section then takes a closer look at the EU, making an intra-EU comparison of electricity prices for industrial consumers among the countries where the plants belonging to the selected sample are located.[133]

9.1.1 Fundamentals of electricity price formation

Notably, the cost of generating electricity varies depending on which generation technology is used. As the short-run marginal costs of fossil-fuel fired power plants often set the electricity price in liberalised electricity markets,[134] the cost of fossil fuels (generally coal or gas) plays a key role in the price formation. As a consequence, the price of energy commodities has a significant impact on the cost of electricity. Irrespective of country-specific energy policies and market structures, regional differences in the price of energy commodities thus lead to significant electricity price differentials across the world.[135]

The most relevant commodity prices are coal, natural gas and oil. Oil is no longer directly relevant for electricity price formation in most developed countries as oil-fired generation capacities are generally only used in emergency situations. However, as natural gas prices are frequently (though decreasingly) indexed to the oil-price, this oil-gas price linkage means that the oil price is still relevant.

Figure 51 shows natural gas price developments from 1993 to 2012, in comparison with the oil price. From the 1990s to 2007/2008, prices for US, EU, and Japanese natural gas were increasing almost in parallel, and also in line with the oil price. As prices are reported in nominal US dollars, the general increasing trend is partly due to inflation. As a result of the unexpected shale gas revolution in the US, US natural gas prices have since fallen to 1990 levels. Recall that these figures are in nominal terms, so in real terms US gas prices are

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[132] In the competitiveness analysis, the energy prices of other countries such as China, Russia and Ukraine are also considered. However, this comparison was only possible through WSD data, and not with the international surveys of electricity costs.

[133] These countries are: Portugal, Spain, Italy, France, the United Kingdom, Germany, Poland and Hungary.

[134] In the energy-only market model, sources of power generation are dispatched according to their short-run marginal costs. The most expensive generation unit needed to meet demand determines the market clearing price. All dispatched generation units except the marginal power plant earn infra-marginal rents, allowing producers to cover fixed costs and invest in new generation capacity. In most European power markets, either coal or natural gas are generally the most expensive unit most of the time. At times when other forms of generation with low short-run marginal costs (e.g. nuclear, hydro and especially solar and wind) are able to meet demand, electricity prices are significantly lower and may even be negative (see also: Box 2).

[135] Commodity and electricity prices are not directly linked in countries with regulated or (cross-)subsidised electricity prices. However, even in those situations the price of the commodities is non neglible as it determines the extent to which subsidies (or other forms of government intervention) are needed. The higher the cost of electricity generation, the less sustainable are support policies, especially in situations when public budgets are constrained and ageing generation fleets require reinvestments. Also, steel producers sometimes dispose of their own generation facilities, where electricity is produced out of waste gases.

even lower than 20 years ago. US have also decoupled from the oil price. In Europe, by contrast, gas prices have been three to four times as high as in the US as of 2009, and are not yet fully decoupled from the oil prices. Japanese LNG import prices are even higher than in Europe and still linked to the oil price.

Figure 51 Natural gas and oil prices, 1993-2012
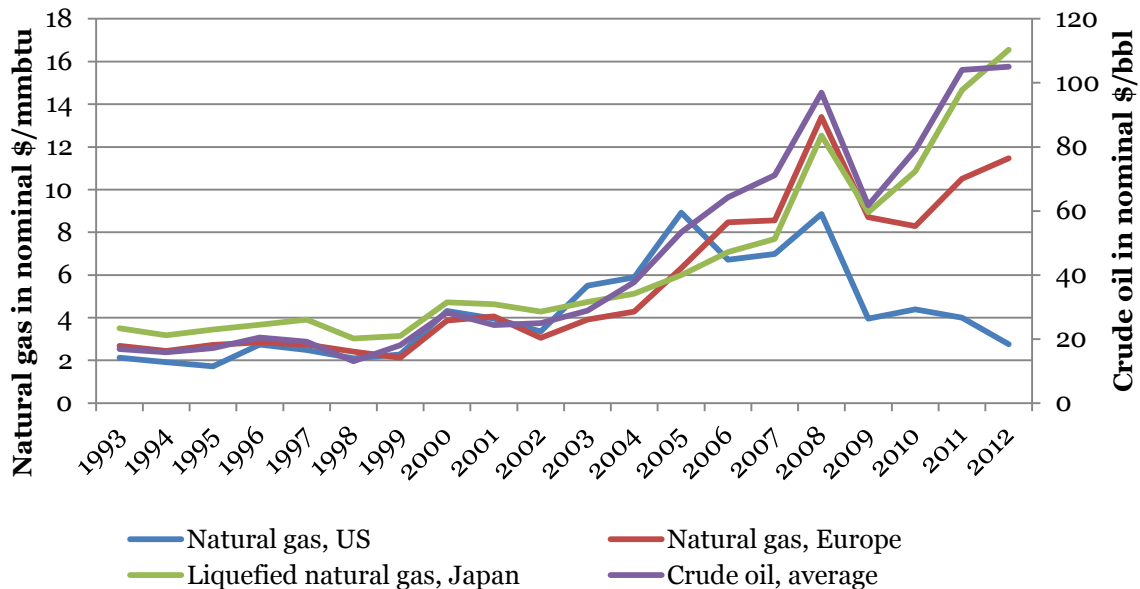
Source: World Bank Commodity Price Data (Pink Sheet)

Figure 52 provides an overview of coal price developments from 1993 to 2012. As CO_2 prices are currently either non-existent (most of the world) or very low (EU),[136] coal is a currently a highly competitive source of power generation in many parts of the world, despite its significant carbon footprint. An exception is the US where the low gas prices, in connection with environmental regulation, imply that natural gas is increasingly replacing coal in power generation. US coal producers are forced to export their coal to other markets, putting downward pressure on the price of coal in other parts of the world. This development is particularly visible in Europe, where spread between coal and gas prices, and low CO_2 prices, are increasingly pushing natural gas-fired power plants out of the merit order.[137]

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[136] See Section 7.

[137] Natural gas is about half as carbon intensive as coal.

Figure 52 Coal Prices, 1993-2012

Source: World Bank Commodity Price Data (Pink Sheet)
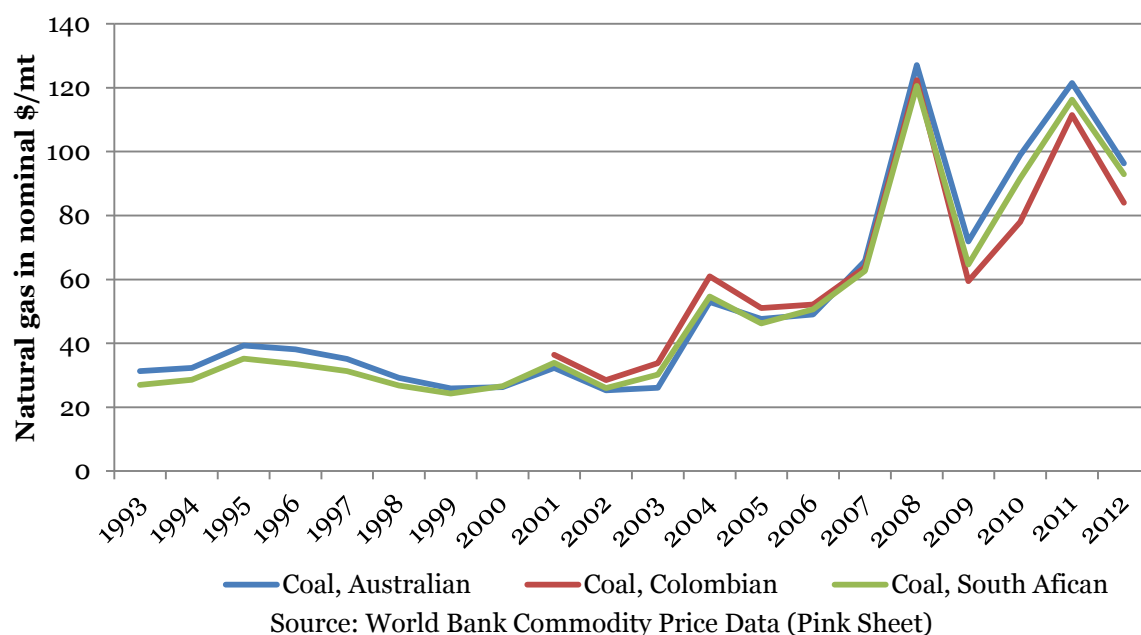
9.1.2 International comparison of industrial electricity prices

On a worldwide scale, industrial electricity price vary greatly. The price differences are due to many elements. Among them there are the type of technology used for power generation; costs of fuels, or in the case of renewables, the local climate; network costs, and also the regulatory framework concerning fiscal, environmental and energy issues. It is important to note that electricity prices are still subject to subsidies and/or price regulations in many parts of the world, especially, but not only, outside of the OECD.

Making an international comparison of electricity prices paid by the steel industry is challenging as electricity prices, especially for large industrial consumers are not very transparent. Public sources have been thus complemented with the information provided by steel operators and subsequently verified. Indeed, international comparison of very large industrial consumers require access to the prices actually paid by the operators, as international statistics usually focus on lower consumption bands. Furthermore, a proper comparison requires the understanding of the amount of taxes actually by paid by specific consumers in each jurisdiction, information which is extremely difficult to retrieve from secondary sources.[138]

For the international comparison, the source is the International Energy Agency's Energy Prices and taxes publication series. However, the publication only reports industrial energy price for low consumption levels (i.e. below 20,000 MWh per year), while steel producers consume more than 150,000 MWh per year. The prices can thus only serve as very rough indication of the prevailing price differences.

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[138] Finally, it should be noted that so far data concerning Turkey, Brazil, Russia and Ukraine could not be retrieved.

Figure 53 illustrates the evolution of end-user electricity prices paid by the industry in key OECD countries over the last nine years.[139] The figure shows that since 2008, the prices of electricity paid by the industrial users operating in North American countries have been decreasing significantly. Inversely, electricity prices in other key OECD countries have been rising in the same period of time. These differences are commonly attributed to decrease in gas prices following the shale gas 'revolution' discussed above. No significant decoupling of price between US and Europe took place before 2008.

Figure 53: Indices of real energy prices for industry (2005 = 100)
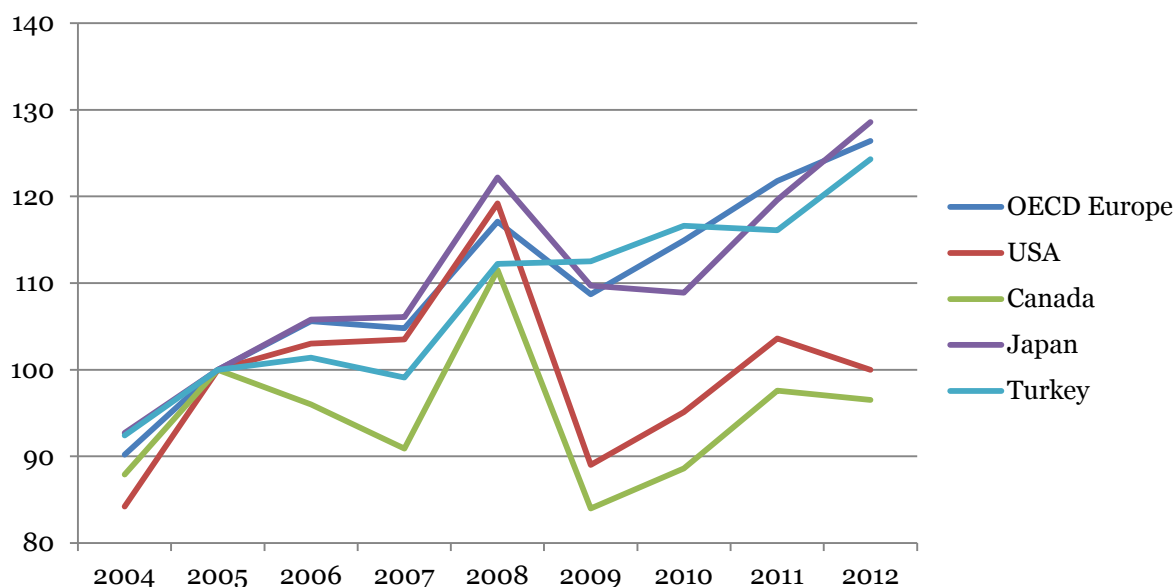
Source: International Energy Agency, 2013

In 2011, the average end-user price of electricity for industrial consumers[140] in the U.S., including taxes, was of € 49.6 per MWh.[141] Thanks to the extraction of its domestic energy sources, the US are a major producer of fossil fuels. In 2011, the following sources of energy were responsible for the electricity production in the U.S.: (i) conventional thermal (67%)[142], (ii) nuclear (19%), (iii) hydro (8%) and (iv) 5% other RES[143]. The impact of shale gas is reflected in the growing role of gas as a fuel for electricity generation. Additionally, energy taxation in the U.S. is very limited. The rates of the taxes applied on electricity consumption varied between 2 and 6% depending on the state.[144]

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[139] For a comparison of the cost of electricity in steel production with non-OECD countries, see Sections 1.2.2 and 1.3.2 above.

[140] Band ID: 2,000 MWh < Consumption < 20,000 MWh.

[141] International Energy Agency, Energy Prices and taxes, Quarterly Statistics, first quarter 2012.

[142] Of which coal was responsible for 42%, and natural gas for 25% of power generation.

[143] EIA data.

[144] International Energy Agency, Energy Prices and taxes, Quarterly Statistics, first quarter 2012

In China, the prices of energy are regulated by the central government. By controlling the prices of energy, the Chinese authorities can limit the effects of volatility and inflation, *de facto* assuring the competitiveness of their industry.[145] In 2011, the average price of electricity for industrial consumers[146] in China was of € 80.10 per MWh.[147] Coal remained the main fuel used for power generation in China followed by hydro, new RES and nuclear.[148] It is not clear how much these tariffs are compensated by public subsidies.[149]

In 2011, the average price of electricity for industrial consumers[150] in the EU-27, including taxes, was of € 120.4 per MWh[151]. This is actually much higher than what reported by Western and Central Eastern European BOF steel producers. In 2011, the following sources of energy were responsible for the EU's electricity production: (i) 55% conventional thermal, (ii) 28% nuclear, (iii) 11%hydro, and (iv) 6% other RES.[152] As the EU is a big importer of fossil fuels, 52% of its energy need was covered by imports.[153]

9.1.3 Intra-EU comparison of industrial electricity prices

The prices of electricity vary not only throughout the world, but also among EU member states. As mentioned above, understanding what steel producers actually pay for their electricity consumption is difficult. To start with, Eurostat data were relied upon.

Unfortunately Eurostat data for industrial consumers with an annual consumption superior to 150,000 MWh (i.e. the range relevant for steel makers) is only available for five of the eight countries under scrutiny (Spain, Italy, Hungary, Poland and the UK). For Germany, France and Portugal electricity prices for industrial consumers with an annual consumption ranging from 70,000 to 150,000 MWh are hence reported. Electricity prices before taxes are more suit for comparison for two main reasons. First, the extent to which steelmakers actually have to pay taxes on their energy consumption is limited compared to other sectors. Second, since the impact of the EU on the level of energy taxation in the case of energy products and electricity use for metallurgical process is negligible (see Section 9.3.5), it falls outside the scope of this study. Consultants are aware of the limitations of Eurostat data

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[145] Toff J. Edwars, China's Power Sector Restructuring and Electricity Price Reforms, [in] Asia Paper 6.2, Brussels Institute of Contemporary China Studies.

[146] Band ID: 2,000 MWh < Consumption < 20,000 MWh.

[147] OECD Economic Surveys: China, OECD, 2013.

[148] Unconventional Gas: Potential Energy Market Impacts, JRC Scientific and Policy Report, European Commission, 2012

[149] See Section 11.1.2 below.

[150] Band ID: 2,000 MWh < Consumption < 20,000 MWh.

[151] Based on Eurostat data.

[152] Eurostat data.

[153] Eurostat data.

Figure 54 shows Eurostat prices of electricity for large industrial consumers excluding taxes for 2012.[154] With 52 €/MWh and 56 €/MWh, Spain and France have relatively lower industrial electricity prices; UK prices are the highest among the eight countries under study, reaching 98 €/MWh.

Figure 54 Prices of electricity for large industrial consumers excluding taxes - 2012 (€/MWh)[155]

■ Price (in €/MWh)
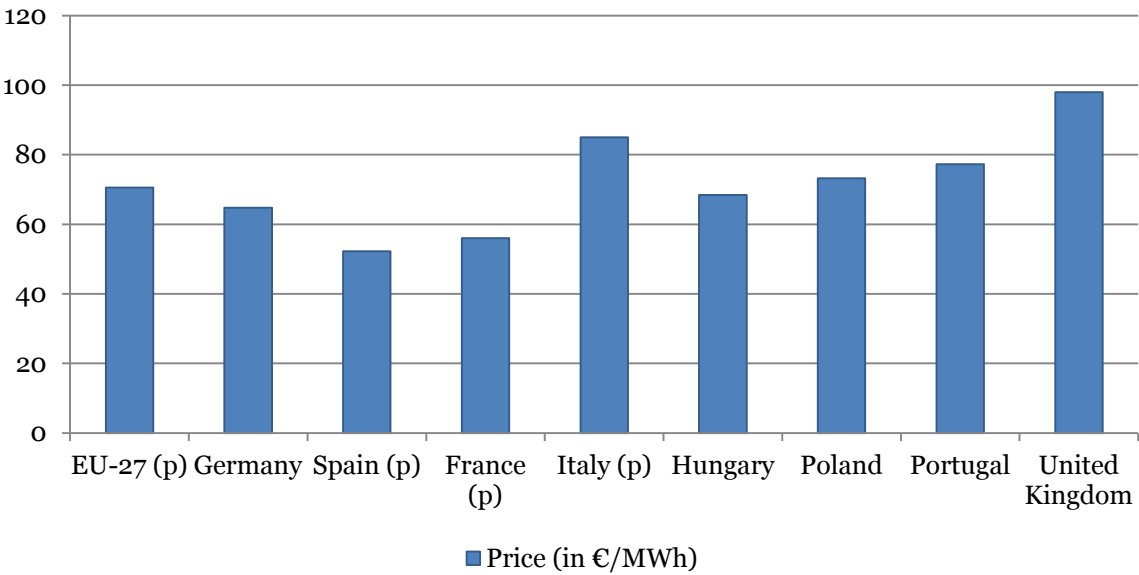
Source: Eurostat, 2012

Figure 55 below reports the price of energy including costs and levies but excluding taxes as reported throughout the interviews. Plants A and B are Western European BOF plants; plant C is a Central Eastern European BOF plant. For one plant, the price reported is in line with Eurostat prices; for the other two plants, prices are lower, by 8 and 10 €/MWh, i.e. about 15%.

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[154] Note that, according to Eurostat methodology, transmission and other tariffs are included in the prices of electricity before taxation.

[155] (p): provisional

Figure 55 Prices of electricity for steel operators - (€/MWh)[156]
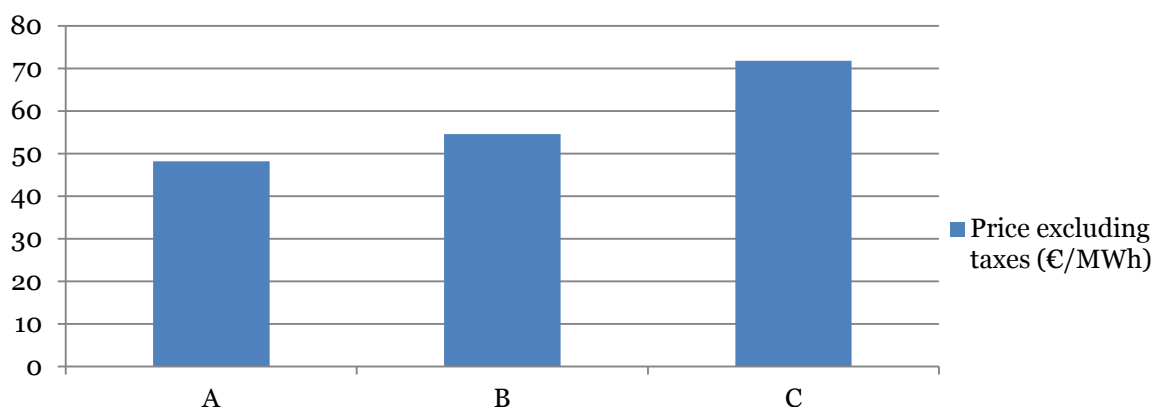
Source: interviews with operators; author's validation

To give a better idea where these differences come from, we now break down industrial electricity prices into three components (i) the cost of electricity transmission, (ii) the costs of the national RES support schemes and (iii) the level of taxation. The impacts of the carbon price on electricity prices, which are another relevant factor for the industrial customers' price structure, are discussed in the Section 7.

The cost of the transmission tariffs:

Figure 56 provides an overview of the evolution of tariffs for electricity transmission in selected member states.[157] Distribution tariffs can be ignored as steelmakers are usually directly connected to the high-voltage grid. As shown in the bar graph, there is no overarching increasing or decreasing trend in the level of transmission tariffs. The level of these tariffs varies significantly from one country to another. In 2012, the member states with the lowest tariffs are France and Poland[158] (both 5.73 €/MWh). Inversely, the tariffs imposed by Spain (8.64 €/MWh) and Italy (8.57 €/MWh) are the highest among the selected countries. The tariff for electricity transmission represents 16.2% of the final price of electricity without taxes charged to large industrial consumers based in Spain, and this is the highest among the selected member states. The impact of the tariff for electricity transmission on the final electricity price for large industrial consumers was the smallest in Poland, amounting to 7.8%, of the pre-tax price.

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[156] (p): provisional

[157] Considering transmission tariffs as a cost of regulation is debatable. Transmission tariffs are fixed by energy regulators; still, transmission costs would exist (and would be charged to final customers at least to a certain extent) even absent the regulation. Furthermore, all electrical systems in the world must bear, and thus pass on to customers, electricity costs, regardless of the regulatory framework. However, how these costs are shared among different classes of electricity customers depends on the regulatory framework.

[158] These prices do not include other regulatory charges not directly related to TSO activities. In Poland, these include stranded costs i.e. cost resulting from compensation paid to energy producers for dissolving long term energy sales contracts concluded in the past with a single buyer company. The long term contracts obliged energy producers to modernize their production units, adjusting them to environmental standards. Those costs are recovered by a transitory charge in the tariff (ENTSO-E 2012).

**Figure 56 Transmission tariffs in selected EU member states - 2009-2012
(2011-€/MWh)**
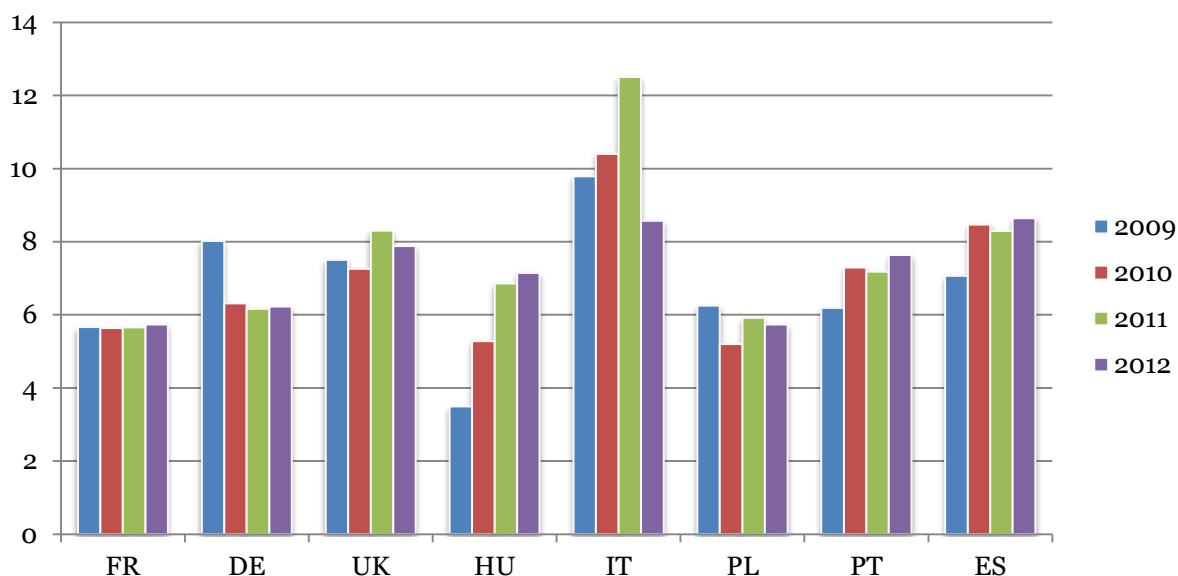
Data reported from plant operators are on average aligned with data from ENTSO-E. However, in two cases transmission costs were significantly lower (between -23% and -46%), probably reflecting the fact that the largest consumers face a digressive transmission tariff, and in the remaining case the transmission costs reported by the operator was significantly higher. This is most probably due to the inclusion of other regulatory costs in the transmission tariffs.

Other regulatory charges, not directly related to TSO activities, might influence the final cost of electricity. While in most of the member states selected for this study these costs have a limited impact on the final price of energy (e.g. 0.50 €/MWh in Germany), their impact is greater in Poland (2.67 €/MWh) and most importantly in Portugal (16.09 €/MWh).[159]

Costs of the RES Support Schemes

Information on the cost of RES support paid by industrial customers is very scarce in the public domain. However, based on primary and secondary sources, it has been possible to estimate costs for RES support in 6 out of the 8 countries in scope of this report; these countries represent 69% of crude steel production in the EU 27 in 2012.[160] Figure 57

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[159] In Poland these costs are mainly due compensations paid to energy producers for dissolving long term energy sales contracts concluded in the past with a single buyer company. These long-term contracts forced energy producers to upgrade their production units. Those costs are recovered by a transitory charge in the tariff. In Portugal these additional costs are mainly generated by energy deviation and the costs of the islands tariff convergence. For more details consult ENTSO-E (2012).

[160] Missing data for HU and PT.

reports the costs of RES support schemes for large industrial consumers consuming 150,000 MWh per year in selected EU member states. Steel makers consume more, and in some case significantly more, electricity; hence, the data does not reflect the actual costs for steel makers due to RES support schemes. With the exception of Italy, the figure is based on an industry source, and may thus be interpreted as an upper bound estimate. As shown by the figure, these costs are significantly different across member states.

Figure 57 Costs of RES Support Schemes for 150,000MWh users - calculated, 2011 (€/MWh)
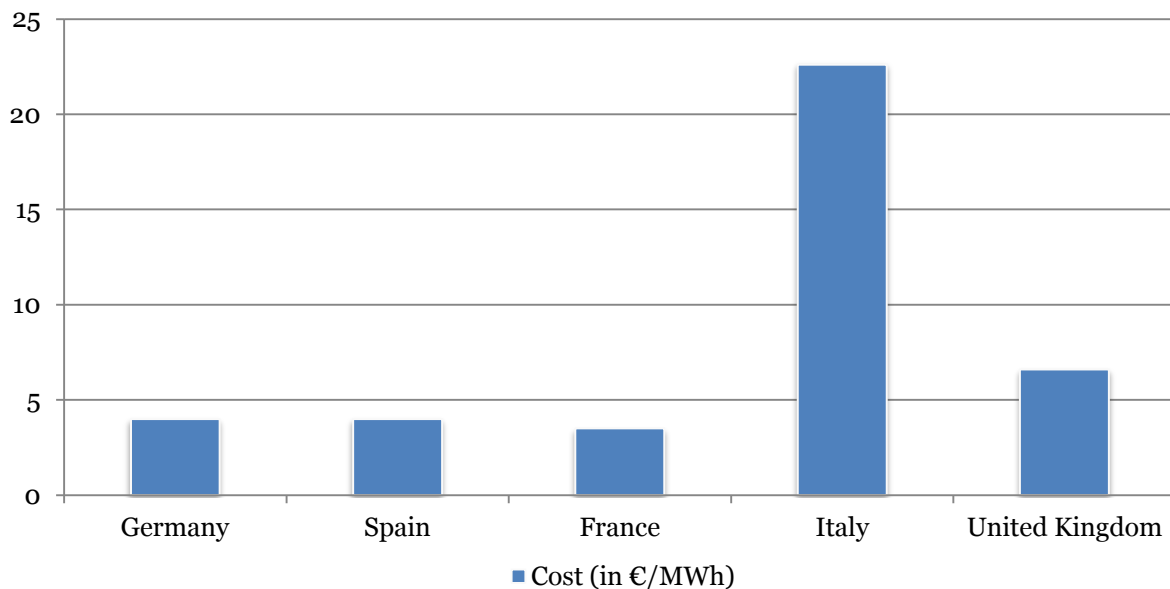
Source: Industry (Bhagwat, 2012), Luiso (for Italy)

At higher levels of consumption (i.e. 680,000 MWh/year), thus closer to the steel industry's actual consumption levels, the cost of RES support schemes is relatively lower, as shown in Table 32.[161] While the annual average for Italian consumers amounts to 5.9 €/MWh, in Germany it is merely 0.57 €/MWh; a difference of an order of magnitude. French figures are slightly higher than Germany's, but this is because the French figures also include other system charges and thus do not only measure direct RES support. As matter of fact, the share of RES support scheme costs in total electricity supply costs also varies – between 7.2% (Italy) and about 1% (Germany and France). Note that these figures do not take the merit order effect into account.

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[161] Luiso (2013) only provides comparative data for Italy, Germany, and France.

Table 32: RES support scheme cost comparison for 680,000MWh users (2012)

	Italy	Germany	France
Annual average (in (€/MWh)	5.9	0.57	0.8
Annual cost (in €)	4,030,197	390,576	550,000
Share of total electricity supply cost (in %)	7.2%	1%	1.4%

Note: In France the figure includes other system charge in addition to RES support scheme costs (about 52 %); in Italy the figures are system charges as well, but 90% are related to RES support. For the precise definition of the considered system charges, please consult the original source.
Source: Luiso (2013)

Costs for RES support schemes have not been reported from all the operators. For plant A, they are around 1 €/MWh. For plant B, the legal framework is unclear and it is not possible to understand the exact share of RES support paid by large industrial consumers, but triangulating several sources it is possible to infer a cost of about 5 €/MWh.[162] For plant C, the reported costs amount to about 9 €/MWh.

Besides RES levies, some member states also charge a levy for co-generation (CHP) support. CHP charges are a substantial issue in some countries, e.g. Belgium or Romania, while others do not impose such a charge or exempt industrial consumers.[163] However, they were not reported as a significant burden in the countries in scope of this exercise.

Taxation of electricity prices

Figure 58 illustrates the impact of taxes and levies on the final costs of electricity for industrial consumers.[164] However, the impact varies from sector to sector given the existence of several specific exemptions. In most of the member states selected for this study, taxes are responsible for a share of final prices paid by industrial consumers, which ranges from 1.7% (United Kingdom) to 11.9% (Italy). Yet, according to the data published by Eurostat, the share of taxes in the final price of electricity seems to be significantly higher in Germany (43.1%) than in the other member countries. It should be noted that Germany has high energy tax rates, but also rebates schemes for energy intensive and manufacturing industries, which are possibly not fully reflected in the Eurostat data.[165] In any case, the total price of electricity paid by Italian (96.5 €/MWh) and British (99.7

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[162] See also Deloite, 2013.

[163] For Belgium see Deloitte 2013. For Romania, this was confirmed through contacts with electricity industrial customers. For both countries, CHP charges can reasonably be estimated in the area of 1-5€/MWh. Industry stakeholders also reported that they expect an increase of these costs in the near future.

[164] VAT excluded.

[165] E.g. the energy tax rate in Germany is 20.5 €/MWh, including on electricity used for metallurgical purposes. Businesses enjoy a reduced tax rate of 15.37 €/MWh. However, for energy intensive industries which meet several conditions laid out in the law, including energy efficiency targets, up to 90% of the tax is rebated through lower social contributions (see art. 10 of the Stromsteuergesetz).

€/MWh) large industrial consumers is the highest among the countries compared in this study. However,

Figure 58 Prices of electricity for large industrial consumers[166] - 2012 (€/MWh)[167]
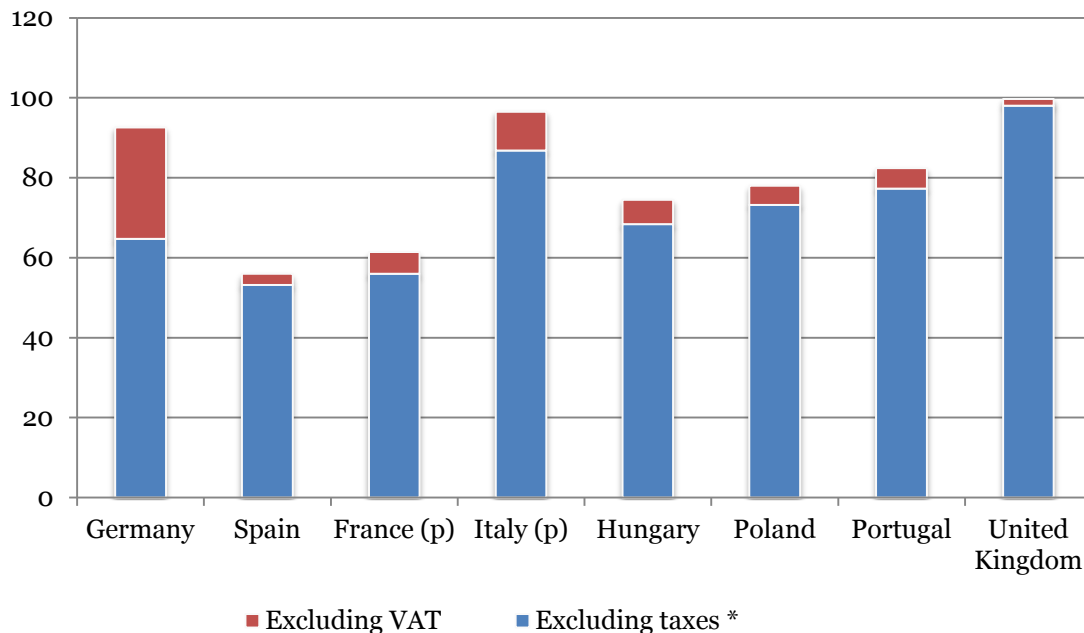
Source: Eurostat, 2013

From the interviews, it clearly appears that steel companies in some countries pay an electricity tax, but that the amount, if any, is not as high as reported in Eurostat data. Plant B reported an effective electricity tax rate of 2.4 €/MWh, while Plant C a tax rate of 4.78 €/MWh. However, as EU excise duty legislation does not apply to electricity use for metallurgical purposes, these rates depend only on national policies.

9.2 Comparison of natural gas prices for industry

Gas markets have evolved significantly in the last decade. The sophistication of the liquefaction technologies, the shale gas revolution in North America, and the development of LNG infrastructures changed dramatically the functioning of gas markets. As described in the Section on the Fundamentals of electricity price formation, the prices of gas in North America have decreased following the unexpected shale gas revolution. Yet, despite this, important volumes of gas are still being delivered under long-term contracts destined for identified buyers. Like any other energy commodity, natural gas end-user prices are

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[166] The Eurostat data for industrial consumers with an annual consumption superior to 150 0000 MWh [Band IG] is available for the following countries: Spain, Italy, Hungary, Poland and the UK. Due to the lack of a reliable alternative source, the prices for industrial consumers based in Germany, France and Portugal presented in the above figure originally belong to industrial consumers with an annual consumption ranging from 70 000 to 150 0000 MWh [Band IF].

[167] (p): provisional; * According to the methodology applied by Eurostat, transmissions tariffs are included in the prices of electricity before taxation.

shaped by many factors: the costs of its transportation from the producing region, the level of taxation, the nature of the contract (long-term vs. spot market) and the context in which the contract was agreed. These elements can help in understanding the differences in gas prices throughout the world and within the EU.

The table below shows the differences in the price paid by industrial consumers for gas consumption. Among the countries compared, the British industry has access to the lowest prices of gas at 30.9 €/MWh. However, gas is subject to heavier taxation in Germany than in the UK. It is worth noting that ex-tax, German industrial consumers benefit from the lowest prices. Inversely, among the compared countries, the final prices of gas are particularly high in Hungary 55.9 €/MWh, almost twice the UK price.

Table 33 Prices of gas for industrial users – 2012 (€/MWh)[168]

	Taxes Excluded	Taxes Included
Germany	24.0	33.3
Spain	29.3	36.6
France (provisional)	30.6	36.1
Italy (provisional)	33.6	36.9
Hungary	42.9	55.9
Poland	29.8	36.7
Portugal	34.7	42.8
United Kingdom	25.3	30.9

Source: Eurostat, 2013

9.3 Impact of EU regulation

9.3.1 Third Energy Market Package

The Electricity and Gas Directives from 2009[169] establish common rules for the internal market in electricity and gas, respectively. Together with a regulation establishing the Agency for the Cooperation of Energy Regulators (ACER),[170] and two regulations

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[168] The Eurostat data for industrial consumers with an annual consumption superior to 4 000 000 GJ [Band I6] is available for the following countries: Germany, Spain, Italy and Hungary. Due to the lack of a reliable alternative source, the prices for industrial consumers based in France, Poland, Portugal and in the UK are presented in the above figure originally belong to industrial consumers with an annual consumption between 1 000 000 and 4 000 000 GJ [Band I5].

[169] Directive 2009/72/EC of the European Parliament and of the Council concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC; andDirective 2009/73/EC of the European Parliament and of the Council concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC.

[170] Regulation (EC) No 713/2009 of the European Parliament and of the Council establishing an Agency for the Cooperation of Energy Regulators .

determining the conditions for access to the network for cross-border exchanges in electricity[171] and natural gas,[172] they constitute the Third Energy Market Package (hereinafter Third Package). The Third Package provides for the legislative framework of rules for generation, transmission, distribution, and wholesale and retail trade in electricity and gas. The internal market in electricity and gas aims to deliver choice for all consumers of the EU and create new business opportunities,[173] thereby achieving competitive prices and higher standards of service. Fostering cross-border trade shall achieve efficiency gains. In electricity this means, for instance, that more efficient generation capacities replace the less efficient ones, security of supply is increased, e.g. through the pooling of backup capacities, and a sustainable electricity system is built, *inter alia* through the integration of renewables.

As the steel industry is highly energy intensive, the liberalisation of energy markets, set to bring about competitive energy prices for Europe, is very relevant to the industry. Hence, the attention is turned to some of the main aspects of the market liberalisation agenda their implications for industries are discussed. As there are generally no direct costs for steel makers associated with the Third Package, the indirect effects resulting from its implementation are rather discussed. The focus is on electricity as this is the area where the consulted stakeholders from the steel industry felt that the impact of EU regulation was particularly salient.

Regulated prices

In 2011 electricity prices for non-household consumers were still regulated in 12 EU member states (ACER/CEER, 2012). In some countries, prices are regulated at levels below market costs (European Commission, 2012). As regulated end-user prices prevent suppliers from improving their services (e.g. developing pricing schemes that take the individual characteristics of different consumer groups into account) and also discourage new entrants that could challenge the incumbents, the Commission insists on phase-out timetables for those countries that still have regulated end-user prices.

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[171] Regulation (EC) No 714/2009 of the European Parliament and of the Council on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003.

[172] Regulation (EC) No 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005.

[173] In order to develop competition in the internal market in electricity, large non-household customers should be able to choose their suppliers and enter into contracts with several suppliers to secure their electricity requirements. Such customers should be protected against exclusivity clauses the effect of which is to exclude competing or complementary offers. (To be monitored by NRAs, cf. art. 37.1.(k)). Similarly for gas , in order to develop competition in the internal market in gas large non-household customers should be able to choose their suppliers and enter into contracts with several suppliers to secure their electricity requirements. Such customers should be protected against exclusivity clauses the effect of which is to exclude competing or complementary offers. (To be monitored by NRAs, cf. art. 41.1.(k)).

⇨ While the deregulation of energy prices is important to ensure the functioning of liberalised energy markets, in those countries where the steel industry used to benefit from favourable 'industrial tariffs', deregulation may lead to higher power prices for the steel industry.

Network codes

Network codes are probably the most underestimated tool in the Third Package – some stakeholders informally refer to them as the "Fourth Energy Package". Network codes that are of particular interest to the energy intensive industry include the balancing network code as well as the network code on forward markets, both expected to enter the legislative procedure in the first quarter of 2014. Improving the cross-border pooling of balancing resources should bring down balancing costs, and thereby help to limit the costs stemming from the integration of variable renewables into the electricity grid. A network code on forward markets could help the energy-intensive industry to hedge the risk of energy price increases and generally decrease uncertainty.[174]

⇨ Network codes are crucial to bring down energy system costs and are and finalising their development by 2014 as targeted should be in the interest of the electricity-intensive industry.

Trade

Trading electricity across borders brings social welfare benefits. By requiring the development of proper market rules in the form of the above mentioned network codes – in particular the network code on capacity allocation and congestion management expected to be adopted through delegated acts still in 2013– the Third Package allows cross-border trading to flourish in practice. According to a calculation performed by energy regulators, the existing electricity interconnectors do already bring significant welfare gains (see Figure 59, ACER/CEER 2012). For example, in 2011, the existing interconnection capacity between Germany and France, both under study in this report, brought social welfare benefits of some € 115 mln. If additional interconnector capacity of 100 MW had been available for trade on this border, social welfare would have increased by an additional € 4 mln. Particularly striking is the example of the border between France and Italy, also under study in the report, where an additional interconnector capacity of 100 MW would have increased social welfare by € 19 mln. It is important that the extra capacity in this context does not need to come from new physical transmission infrastructure (discussed below in the section on the Energy Infrastructure Package), but can instead be the result of more efficient capacity calculation methods that are being developed in the process of energy market integration.

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[174] Several stakeholders from energy-intensive industry have raised concerns of the current situation in which they find it difficult to ener into long-term electricity supply contracts (i.e. > 5 years); see Section 8.2.3.

⇨ Generally, cross-border trading can thus make a contribution to increasing the competiveness of EU energy prices, and therefore of the EU's energy intensive industry such as steel.

Figure 59: Simulation results: gross welfare benefits from cross0-border trade and incremental gain per border – 2011 (€ mln per year)[175]
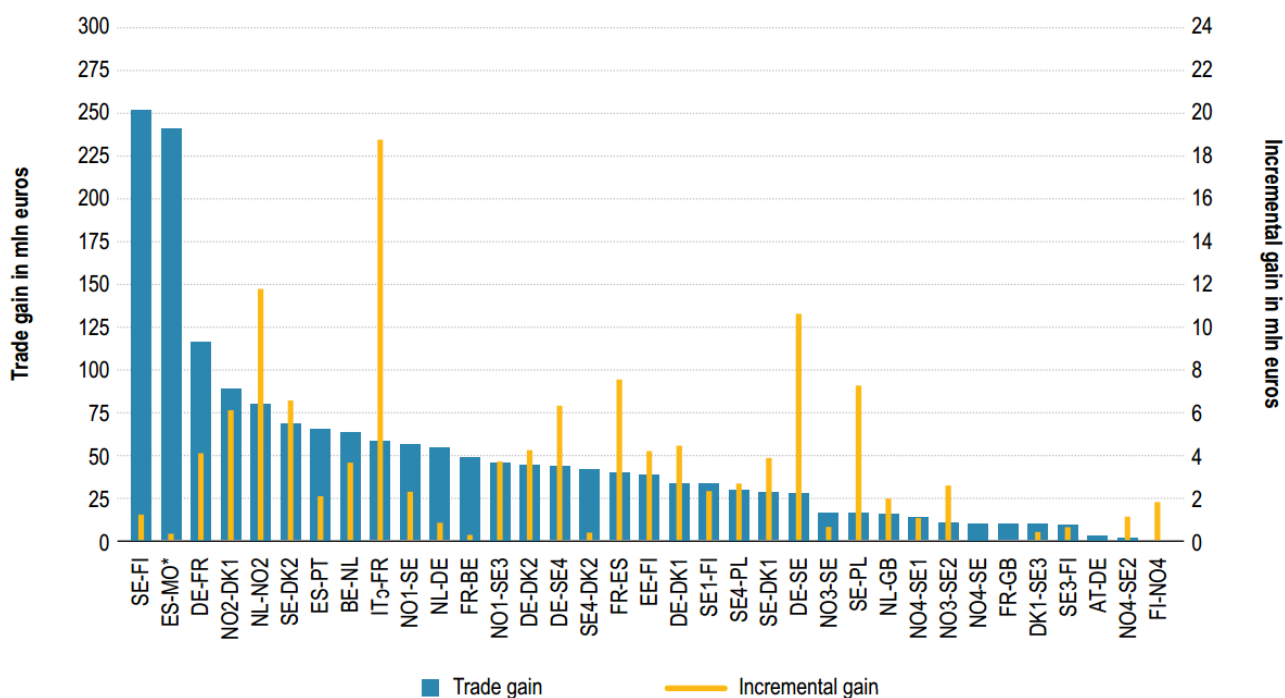
Source: ACER/CEER 2012

Market liquidity

Due to their high consumption levels, large industrial electricity consumers need liquid wholesale markets to be effectively free in choosing their suppliers. If markets are fragmented on the supply-side, industrial consumers may not have a choice but to procure electricity from the largest supplier, often the historical incumbent. Liquid markets are an important prerequisite for entering into long-term contracts, which may otherwise be problematic from a competition perspective as they would further decrease market liquidity. Market liquidity is also important to get a first idea of how much wholesale electricity prices say about the price paid by industry. In principle one would expect that in countries where a greater share of the total electricity consumption is traded at a power exchange end user prices better reflect the wholesale price.

Liquidity in EU electricity wholesale markets varies widely. Table 34 lists the liquidity of the eight countries under study as well as day-ahead base load power prices, both for 2011. In five out of the eight countries under scrutiny market liquidity was still less than or equal

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[175] For a detailed discussion of the methodology please consult the original source.

to 15%. Thus, while this data suggests that prices of electricity traded at power exchange gives some indication of what large consumers have to pay for electricity in Germany (40%), Spain, and Portugal (67%), in the other countries the volumes traded at power exchanges were probably too small. As a consequence, in the intra-European price comparison Eurostat data are relied upon. The relatively low levels of liquidity in a number of member states also suggests that large industrial electricity consumers may sometimes not really have a choice yet when it comes to choosing their electricity supplier.

⇨ The development of network codes and efforts to expand electricity infrastructures should further increase market liquidity in the future, but, especially when it comes to physical infrastructures, this is a time-consuming process. Yet, the success of these efforts is crucial to ensure that large industrial electricity consumers can reap the benefits of energy market liberalisation in practice. It should be noted that power exchanges increase the transparency of electricity price formation and large industrial consumers report to find it difficult to procure electricity below the prices traded at power exchanges.

Table 34 Trade volumes at power exchanges as a percentage of national demand and annual average day-ahead base load power prices (€/MWh)[176]

Country	Market liquidity 2011	Day-ahead price (EUR/MWh) 2011
France	13%	48.9
Germany	40%	51.1
Hungary	n.a.	55.8
Italy	58%	72.2
Poland	13%	52.2
Portugal	67%	45.5
Spain	67%	50.8
UK	15%	56.9

Source: ACER/CEER 2012, EC 2012

9.3.2 Renewables

Directive 2009/28/EC on the promotion of the use of energy from renewable sources[177] set mandatory targets for RES (Art. 3.1). Member states shall ensure that the share of energy from RES in gross final consumption of energy reaches the national overall targets. Member states are free to devise national renewable energy action plans, and to decide

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[176] Market liquidity is measured by a proxy indicator, dividing the total quantity of electricity day-ahead marketed on any power exchange of the corresponding market by the total quantity of power consumed on the corresponding territory.

[177] Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

how to fund them. National targets depend on the starting point and the economic situation. As the support for renewable electricity is either passed on through electricity prices or directly added to electricity bills, the costs of achieving the agreed objectives will ultimately be borne by end-users. However, as noted above, in many member states steel makers, as other energy intensive industries, only have to shoulder a relatively small burden of these costs, as the main share in most member states falls on households.

When assessing the costs of RES support schemes for industry, it is crucial to also look at the cost saving that materialise through the merit order effect that puts downward pressure on wholesale electricity prices (Pöyry 2010). As explained earlier, in liberalised electricity markets, the supply curve, also called 'merit order curve', is based on the cost of producing each additional unit, i.e. generally the fuel cost, from the range of available generation technologies. Wind generation, as the largest-scale example of RES-E capacity additions in recent years, has an additional unit cost close to zero (no fuel cost). When a large wind-based generation capacity is added to the system as a result of the RES support, the whole curve shifts to the right, thus reducing the unit price that utilities can charge and the associated rent they would get (Figure 60). This benefits the customers to the detriment of generators.[178]

Figure 60: Effects of wind power at different times of the day
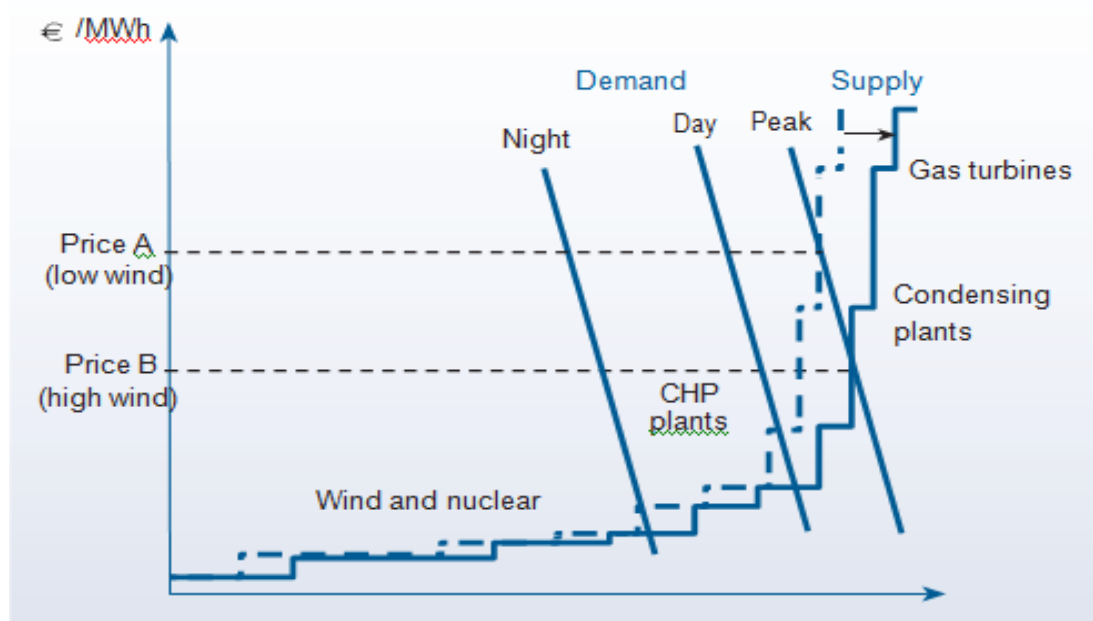
Source: Pöyry 2010, p.11

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[178] As discussed in the Section on Climate Change, the added EU ETS allowance price has the opposite effect on the merit order curve (Figure 27). When carbon prices are added on top of the marginal costs of each fossil fuel, the curve as a whole is shifted upwards and the market price increases for any given demand volume. The difference becomes windfall profits for the electricity producing sector and is covered by higher prices for the consumers.

Estimates of the rents or wealth transfers reveal significant volumes for the merit order effect from increased RES-E share, although depending on the electricity market structure of specific countries. Sensfuß et al. (2008) estimates the effect at €5 billion in 2006 for Germany, and compare this effect to the cost of incentives to RES of €5.6 billion. Thus, the consumers have paid only €0.6 billion of net costs, while the generators have absorbed €2.5 billion in reduced profits. Results for Ireland point to even bigger impacts: one study by Clifford and Clancy (2011) estimates a merit order effect of €75 million. This balances the €50 million in overall costs from the Irish variant of feed-in-tariffs (FiT) and thus the cost of RES support is not felt by electricity customers.

Depending on the extent to which steelmakers actually share RES support scheme costs and the level of the merit-order effect, the net costs of RES support schemes for steelmaker may thus either be rather small or even negative, meaning that RES support schemes may, somewhat counter intuitively, bring down electricity costs for steel makers in some circumstances (see for the example of Germany).

Box 2 RES support costs vs. merit order effect. The case of Germany.

Reusler and Nestle (2012) estimate the net effect of RES support schemes on the so called privileged electricity consumers (e.g. steel makers) in Germany, that do not have to share the full burden of the RES support schemes. The maximum amount these consumers contribute to RES support schemes is capped at 0.50 EUR/MWh. At the same time, the industry benefits from RES support schemes through the merit-order effect that puts downward pressure on electricity prices. The authors conclude that so far the privileged industry has received a net benefit from RES support in Germany. More precisely, in 2010 the merit-order effect decreased electricity prices by 5 EUR/MWh. According to estimates from the Germany Ministry of the Environment reported by Reusler and Nestle (2012), in 2011 the effect increased to 8.7 EUR/MWh. It should be noted that steelmakers may be affected by RES support scheme costs even if they are among the privileged electricity consumers, as some parts of the steel value chain may not be covered by the exemption.

⇨ The costs of support schemes in general and for steelmakers in particular depend on member states' implementation of the RES directive and the national context. It is important to emphasise that RES support schemes do not necessarily lead to higher costs for steelmakers, but may even lead to lower electricity supply costs due exemptions and the merit-order effect. There is, however, a risk that steelmakers will have to shoulder a greater burden of RES support scheme costs in the future if politicians give in to public opinion which tends to see exemptions for industry critically.

9.3.3 Energy Infrastructures

As mentioned in the section on the Third Package, expanding physical energy infrastructures of cross-border relevance is crucial to making the internal energy market work, as emphasised by the Commission Communication of the same name from November 2012:[179]

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[179] Communication from the Commission, Making the internal energy market work,COM(2012)663, 15.11.2012

Energy must be able to flow to where it is needed, without physical barriers at national borders. This implies *inter alia* addressing the effects of unplanned power flows ("loop flows") on cross-border market integration. Serious investment in energy networks is needed to enable certain areas of the EU to emerge from isolation5 and to achieve our Europe 2020 targets"

Regulation (EU) No 347/2013[180] provides guidelines for trans-European energy infrastructure. At the heart of the new regulation are the so-called Projects of Common Interest (PCIs), which will benefit from streamlined and faster permit-granting procedures, improved cost-allocation procedures and access to (very limited) EU funding through the "Connecting Europe" facility.

Originally, the main purpose of cross-border electricity interconnections was to contribute to security of supply. Interconnectors were built to allow for mutual support in case of supply disruptions, thereby ensuring the reliability of electricity supply. More recently, their role in fostering competition and other efficiency gains related to cross-border trading has received growing attention. Given the ambitious renewable-energy targets of the EU, a new motive for interconnectors is emerging: the integration of electricity from RES.

⇨ While expanding electricity infrastructures may lead to somewhat higher transmission tariffs, they generally decrease electricity system costs and increase social welfare. [181]While transmission tariffs have been rather stable in recent years (see Section 9.1.3), concerns about future increases are reportedly an issue for the industry.

9.3.4 Energy Efficiency

The Energy Efficiency Directive[182] includes some provisions that shall provide incentives for large enterprises to make investments in energy efficiency improvements and may be associated with some direct and indirect costs for steelmakers.

Direct costs

Art. 8.4 foresees energy audits, meaning that large enterprises (incl. steelmakers) must undergo an independent energy audit. The energy audit should be carried out by Dec. 2015 and at least every four years afterwards; a higher frequency is possible. Companies implementing an energy or environmental management system certified according to

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[180] Regulation (EU) No 347/2013 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009

[181] Due to distributional effects associated with transmission expansion, increased interconnection capacity may, while increasing overall social welfare, lead to higher prices for consumers located in the low price area.

[182] Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC-

European or International Standards would be exempted (provided equivalence). According to the accompanying impact assessments, an audit should cost a few hundred thousand Euros. Art. 13 stipulates that member states shall lay down rules of penalties in case on non-compliance with audit provisions – member states may decide the level of penalty (if any), there is thus not necessarily a regulatory cost associated with this provision. After 5 June 2014, Art. 14.5 requires that steelmakers, in case of refurbishment of industrial installations generating waste heat at a useful temperature level with a total thermal input >20MW, carry out a cost-benefit analysis assess the option of introducing co-generation in heating. There is an exception for CCS.

Indirect Costs

Art. 7 contains an obligation for energy companies to achieve end-use energy savings of 1.5% of the annual energy sales to final customers. The provision is valid from 2014 to 2020. Member states have the option to exclude iron and steel manufacturing, hence at the moment it is not possible to assess whether any indirect costs will materialise.

⇨ While there may be some (low) costs for steelmakers resulting from the energy efficiency directive (depending on the member states' implementation), in aggregate the provisions may well be beneficial for companies.

9.3.5 Energy Taxation

Energy taxation is generally determined at national level within EU bounds A Council Directive (2003/96/EC)[183] sets the Community framework for the taxation of energy products and electricity. According the consolidated version of the Directive[184] there are minimum excise duties on fuels, such as coal, coke or natural gas. More precisely, coal and coke for heating business use shall be subject to an excise of minimum 0.15 €/GJ of Gross Calorific Value. However, the Directive also contains an exemption for dual use of coke and coal (e.g. for use of coal and coke for chemical reduction and metallurgical processes), hence steel makers are not imposed any lower bound for energy taxes at EU level.

⇨ In addition, electricity for business use shall be subject to an excise of minimum 0.5 €/MWh, but, again, there is an exemption for electricity used principally for the purposes of chemical reduction and metallurgical processes. Importantly, Art. 17 provides member states the option to fully exempt energy-intensive industries. To what extent (if at all) steelmakers are affected by energy taxation depends on the member states. No energy taxes on fuels and electricity used for metallurgical processes can be attributed to the EU framework.[185]

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[183] Council Directive (2003/96/EC) restructuring the Community framework for the taxation of energy products and electricity

[184] As amended by Council Directive 2004/74/EC and 2004/75/EC.

[185] With the small exception of parts of the industry value chain which may be not considered as carrying out metallurgical processes.

10 Environmental Policy

10.1 Introduction

EU environmental policy is embedded in a number of legislative measures covering a wide range of aspects, from air quality to the management of solid waste and from water quality to the prevention of noise pollution. EU environmental policy exerts a major influence on the steel industry, with about ten main pieces of EU legislation having a more or less direct impact on the operations of steel makers. This Section reviews the impact of EU environmental legislation concerning (i) the prevention and control of industrial emissions; and (ii) the prevention and recycling of waste, as well as the influence of (iii) various other legislative and policy measures.

The analysis covers, with varying degree of detail, all the three categories of regulatory costs considered in this Study, namely: (i) compliance costs, i.e. the costs incurred for fulfilling the substantive obligations spelled out in EU legislation (e.g. the respect of certain emission limits); (ii) administrative costs, comprising the costs incurred to fulfil the administrative obligations stipulated in the legislation (e.g. the costs for obtaining an environmental permit); and (iii) indirect costs, which refer to the costs incurred by steelmakers as a result of environmental protection measures that affect other operators along the value chain.

This Section is structured as follows: (i) Section 10.2 reviews the main pieces of relevant legislation, with an assessment of the implications for the steel industry; (ii) Section 10.3 presents an estimate of compliance costs; (iii) Section 10.4 deals with administrative costs; (iv) Section 10.5 elaborates on indirect costs.

10.2 Review of relevant legislation

10.2.1 Prevention and control of industrial emissions

Overview

The **Industrial Emission Directive** (IED)[186] is currently the main piece of EU legislation in the area of industrial emissions. IED applies an integrated pollution prevention and control (IPPC) framework for industrial activities in the EU and accordingly it "lays down rules designed to prevent or, where that is not practicable, to reduce emissions into air, water and land and to prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole" (art. 1). The IED is the successor of the **IPPC Directive** of 1996 (IPPCD) which first introduced a set of

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[186] Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control).

common rules for the permitting and controlling of industrial installations.[187] However, the IED also recasts six other pieces of EU legislation concerning industrial emissions,[188] thereby providing for a comprehensive regulatory framework applicable to all industrial activities in the EU. The IED also applies to large combustion plants (LCP), i.e. thermal power plants with a total rated capacity of 50 MW or more. Agreed in late 2010, the IED entered into force on 6 January 2011 and was to be transposed into national legislation by Member States by 7 January 2013.[189] Upon transposition, IED provisions will become applicable from 7 January 2014 for existing industrial installations and from 1 January 2016 minimum requirements for LCPs will come into effect.

Key Provisions

The IED (as well as the previous IPPCD) is based on the principle that operators of industrial installations must obtain an ***integrated environmental permit*** from the competent Member State authorities. Permits are to specify the applicable Emission Limit Values (ELVs), based on the so called Best Available Techniques (BATs). The BATs and the associate emission levels applicable to the various lines of business covered by the Directive are to be specified in technical documents, the so called BAT Reference Documents (BREF), whose conclusions are formally adopted by the Commission through an Implementing Decision (the so called "BAT Conclusions").[190] The IED does provide for some ***flexibility*** in the implementation of emission limits and national authorities are allowed to set less strict ELVs under certain circumstances, notably when "the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits" (art. 15.4) as a result of the local environment, geographical location or technical characteristics of the installation.[191] However, the minimum ELV set directly in the Annexes to the IED cannot be derogated. In order to ensure effective implementation, the IED includes provisions regarding the ***monitoring of emission levels*** and the ***carrying out of environmental inspections***, to take place at least every one to three years, depending upon the level of risk. Furthermore, in the case of plant closures, the IED

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[187] Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC).

[188] The six recast Directives include (i) the three Titanium Dioxide Directives (78/176/EEC, 82/883/EEC and 92/112/EEC on waste from the titanium dioxide industry); (ii) the Volatile Organic Compounds (VOC) Solvents Directive (99/13/EC); (iii) the Waste Incineration Directive (2000/76/EC); and (iv) the Large Combustion Plants (LCP) Directive (2001/80/EC).

[189] The majority of Member States did not transpose (or only partially transposed) the directive by the deadline of 7 January 2013. For details, see
http://ec.europa.eu/environment/air/pollutants/stationary/ied/transposition.htm.

[190] The BATs are to be developed through "an exchange of information" involving all the stakeholders and coordinated by the European IPPC Bureau of the Institute for Prospective Technology Studies (IPTS) at the EU Joint Research Centre (JRC) in Seville (Spain).

[191] Additional, temporary elements of flexibility are provided for the LCPs, in particular through the application of Article 32 on Transitional National Plans and Article 33 concerning limited life derogations.

envisages the adoption of **remediation measures** in order to return the site to the *status quo ante*.

<u>Relevance for the Steel Industry</u>

The IED applies to all the installations of the steel industry, irrespective of the technology adopted (BOF or EAF), from the production or preparation of key inputs (production of coke, sintering) through the production of finished products,[192] as well as to the power plants included in integrated steel mills. All these facilities are (i) required to obtain a permit (or to renew the existing permit within specified deadlines) based on the emission limits associated with the BATs (the so called BATAELs); (ii) subject to monitoring and inspection requirements; and (iii) required to adopt the other measures specified in the IED (e.g. on the closure of sites).

The main reference documents for the emission levels applicable to the steel industry are the ***Iron and Steel Production BREF***, which covers the preparation of raw materials and the steel making process "proper" (sinter plants, pelletisation plants, coke ovens, blast furnaces, BOF/EAF mills, continuous casting)[193] and the ***Ferrous Metals Processing Industry BREF***, which covers downstream processes (hot and cold rolling, wire plants, coating, galvanization).[194] Other BREFs partly applicable to the steel industry include the BREF for LCP[195] and the BREF for some cross-industry activities, such as the storage and handling of materials and the cooling systems.

The BREF identify a series of BATs for the prevention or minimization of pollution applicable to the various stages of the steel production process. These BATs concern the introduction of certain ***technologies for pollution abatement*** (typically, in the form of end-of-pipe devices) and/or the ***modification of production processes*** (e.g. through a modification in the composition of inputs) and/or the adoption of ***enhanced process control methods*** of a general (e.g. the implementation of environmental

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[192] According to Annex I, the Directive is applicable to (i) production of coke, (ii) metal ore (including sulphide ore) roasting or sintering (iii) production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2,5 tonnes per hour, (iv) operation of hot-rolling mills with a capacity exceeding 20 tonnes of crude steel per hour, (v) application of protective fused metal coats with an input exceeding 2 tonnes of crude steel per hour, and (vi) surface treatment of metals using an electrolytic or chemical process where the volume of the treatment vats exceeds 30 m3.

[193] European Commission, Best *Available Techniques (BAT) Reference Document for Iron and Steel Production*, 2013. Adopted in 2012, this BREF replaces an earlier document developed in 2001 in the framework of IPPC Directive.

[194] European Commission, *Reference Document on Best Available Techniques in the Ferrous Metals Processing Industry*, December 2001. This BREF, developed with reference to the IPPC Directive, is currently under revision.

[195] European Commission, *Reference Document on Best Available Techniques for Large Combustion Plants*, July 2006. This BREF is also currently under revision, and the process started in early 2012. The LCP associated with steel plants are different from other LCP, as they typically ran on gases recovered from the steel production process. For this reason, the LCP BREF under revision is expected to devote a special section on LCP in the steel industry.

management systems) or specific nature (e.g. the adoption of measures to control fugitive emissions). Given the nature of the steel making process, the BATs largely focus on the prevention and control of air emissions, with special emphasis on the emissions of dust (particulate matter, PM), nitrogen oxides (NOx), sulphur oxides (SOx). However, in line with the integrated approach inspiring the IED, the BATs also concern water consumption and the treatment of effluent water, the minimization of waste generation, energy consumption and re-utilization, and noise control. The techniques listed and described in the BAT conclusions are neither prescriptive nor exhaustive and other techniques may be used that ensure at least an equivalent level of environmental protection. The emphasis placed on the various sources of pollution and environmental protection aspects varies across the stages of production, as shown in Table 35 below.

Table 35 Focus of BATs concerning the various stages of the production process

Installations/Steps in the production process	Air Emissions				Effluent water	Waste generation	Energy utilization	Noise control
	Dust	NOx	SOx	Other				
Sinter plant	✔	✔	✔	✔	✔	✔	✔	
Pelletisation plant	✔	✔	✔	✔	✔	✔	✔	
Coke oven plant	✔		✔		✔	✔	✔	
Blast furnace	✔	✔	✔		✔	✔	✔	
Basic oxygen furnace (BOF)	✔				✔	✔	✔	
Electric arc furnace (EAF)	✔			✔	✔	✔	✔	✔
Hot rolling mill	✔	✔	✔	✔	✔	✔		
Cold rolling mill	✔	✔	✔	✔	✔	✔		
Wire drawing mill				✔	✔	✔		
Hot dip coating line	✔	✔		✔	✔	✔		
Galvanizing line	✔			✔		✔		

10.2.2 Waste Prevention and Recycling

Overview

EU policy on waste is set out in the ***Thematic Strategy on Waste Prevention and Recycling***[196] and is embodied in various pieces of horizontal and product/waste-specific legislation. Legislation particularly relevant for this Study include: (i) the Landfill Directive;[197] (ii) the Waste Framework Directive;[198] (iii) the Scrap Metal Regulation;[199] (iv)

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[196] Communication from the Commission, Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste, COM(2005)666-

[197] Council Directive 1999/317EC of 26 April 1999 on the landfill of waste.

[198] Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives.

the Waste Shipment Regulation;[200] and (v) the End of Life Vehicles Directive.[201] Approved in 1999 and amended in 2003 and 2008, the ***Landfill Directive*** is intended to prevent or reduce the adverse effects of the landfill of waste on the environment. To this effect, the Directive defines the various categories of waste and sets the requirements for the establishment and operations of landfills. Approved in late 2008, the ***Waste Framework Directive*** (WFD) sets the basic concepts and definitions related to waste management and lays down basic waste management principles. It also sets recycling and recovery targets for certain waste materials, to be achieved by 2020. To this effect, the Directive requires Member States to adopt waste management plans and waste prevention programs. The WFD was to be transposed by Member States by 12 December 2012, but delays were experienced in several countries. Closely connected to the WFD is the ***Scrap Metal Regulation***, which, building upon provisions in the WFD (article 6), determines the criteria under which scrap metal ceases to be regarded as a waste. The ***Waste Shipment Regulation*** (WSR) seeks to prevent and control environmental and health hazards in relation to shipments of waste both within the EU and between the EU and third countries, strengthening the provisions of previous legislation dating back to the early 1990s. Approved at the end of 2006, the WSR entered into force on 12 July 2007. Finally, the ***End of Life Vehicles Directive*** (ELVD) aims at reducing the waste arising from end-of-life vehicles and covers various aspects along the life cycle of vehicles as well as aspects related to treatment operations (e.g. prevention of the use of certain heavy metals, collection of vehicles at suitable treatment facilities, etc.). Approved in 2000, the ELV was to be transposed by 21 April 2002.

Key Provisions

The ***Landfill Directive*** lays down the criteria for the permitting of landfill operations as well as the waste acceptance procedures and, in line with the polluter pays principle, requires that fees for landfilling adequately reflect investment and operating costs. The ***WFD*** includes a number of provisions concerning the measures to be put in place by Member States in order to achieve the recycling and recovery targets. Regarding operators, the WFD reiterates earlier provisions regarding the permitting of waste management operations and the registration of waste collectors, transporters and brokers and requires Member States to strengthen inspection mechanisms so as to ensure compliance. The ***Scrap Metal Regulation*** specifies the criteria under which scrap iron and steel may benefit from the so called "end-of-waste" status and sets the requirements that have to be fulfilled by operators (statement of conformity and quality management system). The ***WSR*** envisages a mechanism for the notification of shipments of waste and reiterates earlier bans on the export of waste outside the EFTA countries as well as on the export of hazardous waste to non-OECD countries. In order to ensure compliance, Member States

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[199] Council Regulation (EU) No 333/2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council.

[200] Regulation (EC) No 1013/2006 of the European Parliament and of the Council on shipments of waste.

[201] Directive 2000/53/EC of the European Parliament and of the Council on end-of life vehicles.

are required to perform inspections of establishments and spot checks of shipments. The **ELVD** sets targets for the re-use, recycling and other forms of recovery of end-of-life vehicles. To this effect, the Directive: (i) establishes requirements for waste prevention and for the collection of vehicles; (ii) sets environmental standards for treatment; and (iii) requires Member States to establish a system for the permitting of treatment facilities (with the possibility of derogation in certain cases).

Relevance for the Steel Industry

The piece of EU waste legislation having the most immediate impact on the steel industry is the **Scrap Metal Regulation**. In fact, by effectively removing iron and steel scrap from the list of materials regarded as waste, the Regulation frees operators from the substantive and administrative obligations applicable under the WFD. This, together with the provisions aimed at enhancing the re-use and recycling of end-of-life vehicles under the ELVD, is meant to increase the availability of a crucially important raw material for the steel industry. At the same time, the "end-of-waste" status granted to iron and steel scrap makes it possible to export scrap to third countries, which at times may have a negative effect on the availability of scrap in the EU market (see Section 10.5 below).

10.2.3 Other Environmental Policy Measures

Overview

Other pieces of environmental legislation listed in the TOR for the study include (i) the Air Quality Framework Directive;[202] (ii) the Water Framework Directive;[203] and (iii) the Roadmap to a Single European Transport Area (Transport Roadmap)[204]. Approved in 2008, the **Air Quality Framework Directive** merged four directives and one Council decision into a single measure, providing a coherent framework for the improvement of air quality in the EU. To this effect, the Directive sets standards and target dates for reducing concentrations of fine particles. Adopted in 2000, the **Water Framework Directive** also consolidates previous EU legislation on water, with the aim of achieving the 'good ecological and chemical status' of ground and surface waters. Adopted in early 2011, the **Transport Roadmap** is a strategic document proposing a series of initiatives aimed at building a competitive transport system, capable of increasing mobility, supporting growth and employment, and reducing environmental impacts of transport activities. With reference to environmental policy, of particular relevance for this Study is the proposal to cut shipping emissions that was the subject of a **Communication on maritime**

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[202] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

[203] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

[204] Commission White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, 28.3.2011, COM(2011)144.

emissions[205] and was translated into a ***Commission Proposal*** for amending the 1999 Directive on the sulphur content of marine fuels.[206]

Key Provisions

The ***Air Quality Framework Directive*** and the ***Water Framework Directive*** provide the general framework for environmental protection in the respective domains. They include a number of provisions concerning the measures to be put in place by Member States in order to achieve the intended objectives, including the development of national plans or strategies and the establishment of appropriate surveillance and enforcement mechanisms. In addition, as in the case of the Landfill Directive, the Water Framework Directive requires the full cost recovery for water services, in line with the polluter pays principle. The measures on shipping emissions envisaged by the ***Transport Roadmap and subsequent Commission initiatives*** are largely linked to the International Convention for the Prevention of Pollution from Ships (MARPOL),[207] that was amended in 2008 to introduce new international standards for marine diesel engines and their fuels and more stringent emission requirements for ships that operate in designated coastal areas where air quality problems are acute.[208] In particular, the Commission is proposing to cut maritime transport's CO_2 emissions ("overall, the EU CO2 emissions from maritime transport should be cut by 40% (if feasible 50%) by 2050 compared to 2005 levels", Transport Roadmap, page 8) and to reduce air pollution at sea, namely in terms of SO2 emissions.

Relevance for the Steel Industry

The ***Air Quality Framework Directive*** has limited direct relevance for the steel industry, as the key parameters for air quality are incorporated in the legislation on the prevention and control of industrial emissions. Similar considerations apply to the ***Water Framework Directive***, although in this case the relationship with the EU legislation on industrial emissions is more intricate.[209] As for the ***Transport Roadmap***, the measures

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[205] Communication from the Commission on the review of the implementation of Directive 1999/32/EC related to the Sulphur Content of Certain Liquid Fuels and on further pollutant emission reduction from maritime transport, 15.7.2011, COM(2011)441.

[206] Proposal for a Directive of the European Parliament and of the Council amending Directive 1999/32/EC as regards the sulphur content of marine fuels, 15.7.2011, COM(2011)439.

[207] For short presentation of the MARPOL, see http://www.imo.org/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx.

[208] For a summary presentation of the 2008 amendments to MARPOL see Environmental protection Agency, International Maritime Organization Adopts Program to Control Air Emissions from Oceangoing Vessels, October 2008.

[209] The coordination between the Water Framework Directive and the Industrial Emissions Directive is the subject of the project "Linking the Water Framework Directive and IPPC/IED Directive" managed by the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL). For more information, see http://impel.eu/projects/linking-the-water-framework-directive-and-ippcied-directive-phase-3.

envisaged for maritime transport could have a more significant, albeit indirect, influence on steel makers operating conditions, as the setting of more stringent limits to shipping emissions is expected to reverberate on shipping rates and, therefore, on the cost of imported raw materials.

10.3 Assessment of Compliance Costs

10.3.1 Introduction

Compliance costs refer to the costs incurred by steelmakers for fulfilling the substantive obligations spelled out in EU legislation in terms of prevention and control of air emissions, effluent waters, waste generation, etc. This Section provides an assessment of compliance costs for the steel industry over the 2003 – 2010 period. Three categories of compliance costs are considered, namely: (i) ***investment costs***, i.e. the resources invested in the retrofitting of plants (e.g. the installation of selective catalytic reduction equipment to reduce NOx emissions in sinter plants) and/or in the adoption of more environmentally-friendly technologies; (ii) ***financial costs***, represented by the opportunity cost of the capital invested or by the interest charges paid in case of borrowing; and (iii) ***operating costs***, which include the incremental expenses associated with environmental protection investments (e.g. for the maintenance of new equipment or facilities) and/or the implementation of other environmental protection measures (such as the incremental expenses associated with the use of higher quality raw materials, e.g. the use of more expensive low nitrogen content fuel or the replacement of coke breeze with anthracite).

10.3.2 Investment Costs

Introduction

In principle, the assessment of investment costs would require the identification of capital expenditures incurred by each steel maker (actually, by each steel making plant) in connection with specific pieces of EU environmental legislation. In practice, this would require the detailed review of investment plans of all EU steelmakers for the period under consideration, as well as an appreciation of the influence of EU legislation on investment and operational decisions. Such a detailed costing exercise is obviously impossible within the stringent time limits for this study and, even if enough time were allowed, it would in all likelihood be unfeasible because of confidentiality considerations. Useful elements were collected during interviews with selected steelmakers, but the limited number of these interviews and the considerable variation in operating conditions do not allow extrapolating the findings to the universe of the EU steel industry. Therefore, following the example of earlier studies,[210] in order to provide a comprehensive picture of compliance

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[210] See VITO, Sectoral Costs of Environmental Policy, December 2007

costs it is necessary to adopt a more aggregate approach, with recourse to industry statistics and other secondary sources.

There are two main sources of data on investments in environmental protection, namely: (i) the Enquiry on Investments in the Iron and Steel Industry ("Steel Survey"); and (ii) the survey of Environmental Protection Expenditure by environmental domains ("EPE Survey"). Both surveys have been implemented by national statistical offices with the coordination of Eurostat, but present significantly different features. In particular:

- The **Steel Survey** was carried out over the 2003 – 2008 period on the basis of an EU Regulation adopted following the expiry of the ECSC Treaty.[211] The survey focuses exclusively on investments implemented by the steel industry narrowly defined (i.e. defined as Group 27.1 of the NACE Rev. 1.1, which corresponds to the NACE Rev. 2 Group 24.1). The survey collected data on investments implemented at the various stages of the production process (from coking plants through coating installations), with an indication of investments on environmental protection;

- The **EPE Survey** is carried since the late 1990s, in the framework of the surveys on Structural Business Statistics (SBS).[212] The survey covers both investment and operating expenses incurred by enterprises, subdivided in different environmental domains (e.g. protection of ambient air and reduction of CO_2 emissions, waste management, etc.). Unlike the case of the Steel Survey, data from the EPE are available at the NACE "2-digit" level only, i.e. for the whole Manufacture of Basic Metals (NACE Rev. 1.1 Group 27 and NACE Rev. 2 Group 24).

The following points are worth noting:

- Given the different sector coverage, the Steel Survey and the EPE Survey yield different values for environmental protection investments, with EPE Survey values typically greater (sometimes much greater) than those for the Steel Survey. For the purpose of this exercise, ***Steel Survey data are used to develop a "lower bound" estimate***, while ***EPE Survey data are used to develop an "upper bound" estimate***;

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[211] Regulation (EC) No 48/2004 of the European Parliament and of the Council on the production of annual Community statistics on the steel industry for the reference years 2003-2009. The Regulation also required the collection of data on fuel and energy consumption, electricity use, iron scrap, and production capacity. For an overall presentation of the data collected in the framework of Regulation 48/2004, see http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Iron_and_steel_production_and_proc essing_statistics_-_NACE_Rev._1.1.

[212] The extension of SBS to encompass expenditure on environmental protection was stipulated by Council Regulation (EC, EURATOM) No 58/97 concerning structural business statistics, subsequently replaced by Regulation (EC) No 295/2008 of the European Parliament and of the Council concerning structural business statistics (recast). For an overview of data from the EPE Survey see http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Environmental_protection_expenditur e#Environmental_protection_expenditure_by_industry.

- Survey data refer to environmental protection investments in all the environmental domains, i.e. ambient air, waste prevention and treatment, noise reduction, etc. ***including investments aimed at reducing CO2 emissions***. Therefore, the analysis presented here complements the analysis of the ETS presented in Section 7 above;

- Survey data include all environmental protection investments, irrespective of their motivation, i.e. irrespective of whether they were undertaken: (i) independently by steel makers based on cost savings considerations (as it is the case for certain energy efficiency measures); (ii) in order to comply with EU legislation; or (iii) in order to comply with national legislation. As a result, ***survey data structurally overestimate the magnitude of compliance costs related to EU environmental legislation***. While it is often possible to qualitatively assess the relative influence of EU legislation, it is impossible to precisely separate costs linked to "spontaneous" investment decisions from "true" compliance costs and to apportion compliance costs between EU and national legislation. As a result, the magnitude of compliance costs linked to EU legislation was assessed under different hypothetical scenarios, following a sort of "sensitivity analysis" logic;

- In both surveys there are some gaps in the datasets, sometimes due to sheer lack of data, sometimes because of confidentiality considerations (which, in turn, are linked to the small number of steel makers in operation in some Member States). However, ***it was possible to estimate the missing values and to extrapolate the time series for a subset of seven Member States*** (Austria, Belgium, France, Germany, Italy, Spain and the United Kingdom), that account for almost three fourths (72-73%) of total EU steel output. [213] The values for these seven countries were ***subsequently extrapolated to the whole EU steel sector***, using data on physical output (crude steel).

Box 3 Data Validation

Data from the Steel and EPE Surveys were compared with other available information in order to verify their accuracy. In the case of Germany, EU largest steel producer, survey data were compared with figures on environmental protection investments for the period 2003 - 2009 kindly provided by the Stahlinstitut (VDEh).[214] VDEh data do differ from the Steel and EPE survey data, but – with the exception of only one year - they nonetheless fall between the lower and upper bounds retained for the analysis. In the case of Italy, the EU second largest steel producer, the accuracy of the data used in the analysis is suggested by the fact that the Steel Survey is carried out by ISTAT in close collaboration with Federacciai and, indeed, data from the

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[213] In some cases, gaps were filled through the use of national statistics. In other cases, values were estimated through extrapolation/interpolation, taking into account the proportion between the relevant variable (e.g. environmental protection investments) with some other related variable (e.g. total investments in the industry, as derived from SBS).

[214] Personal communication on 28 May 2013. VDEh data are presented in Annex 2.

Steel Survey figure prominently in Federacciai's publications.[215] Survey data were also cross checked for consistency with the information on investments retrieved during interviews with selected steelmakers. While there are some variations, the values of environmental investments made by the individual companies are usually compatible with survey data for the respective countries.[216] Overall, while some margins of uncertainty inevitably remain, the figures on environmental investments retrieved from the EUROSTAT appear to provide a reasonably accurate picture of the level of effort made by the steel industry in the area on environmental protection.

Main Trends in Environmental Protection Investments

Over the 2003 – 2010 period, the **total value of environmental protection investments made by the EU steel industry range between € 3.6 b in the Steel Survey** (lower bound estimate) **and € 5.8 billion in the EPE Survey** (upper bound estimate). "Lower bound" annual values range from a minimum of € 305 mln to a maximum of € 640 mln while "upper bound" figures range between € 540 mln and € 1,120 mln. Irrespective of the source used, **environmental protection investments account for 5-9% of total investments in the steel industry**. A summary presentation is provided in Figure 61 below.

Figure 61 Environmental protection investments – EU 27, 2003-2010 (€ mln)
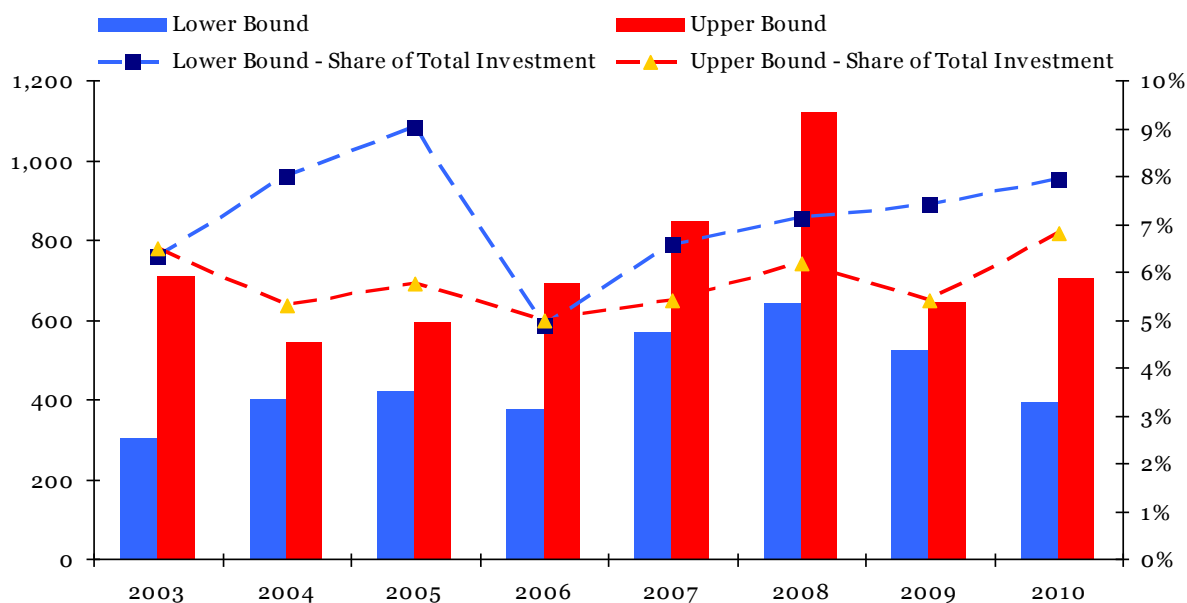
Source: Authors' elaborations and estimates on EUROSTAT and national statistics

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[215] Federacciai, Rapporto Ambientale 2011, presented at the 2012 annual meeting (see in particular pages 25 and 36).

[216] In practice, for each of the companies interviewed, the consistency check involved the comparison of two ratios, i.e. the company share of national environmental investments and the company share of national output expressed in tonnes of crude steel.

Regarding the nature of investments, according to data from the EPE Survey, the so called ***"end-of-pipe" measures account for the bulk of capital expenditure***, on average about 73%, while investments linked to cleaner technology, the so called "integrated technology" investments, still play a marginal role. However, integrated technology investments have progressively gained ground over time (27% in 2010, compared with 20% in 2003). In terms of environmental domains, ***the majority of investments concern the protection of ambient air, including the reduction of CO_2 emissions***, which on average account for about 54% of the total, compared with 18% for waste water management, 13% for waste management and 15% for other domains. A summary presentation is provided in Figure 62 and Figure 63 below.

Figure 62 Breakdown of environmental protection investments per typology of investment – Selected Countries, 2003-2010
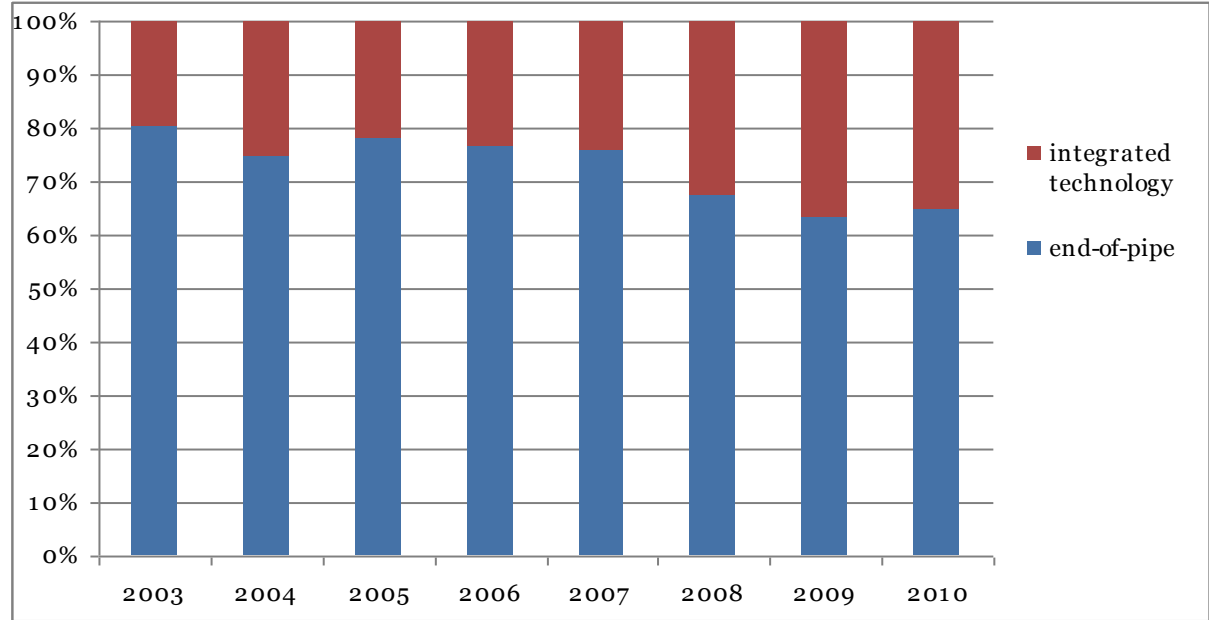
Source: Authors' elaborations on EUROSTAT data (EPE Survey)

Figure 63 Breakdown of environmental protection investments per environmental domain – Selected Countries, 2003-2010
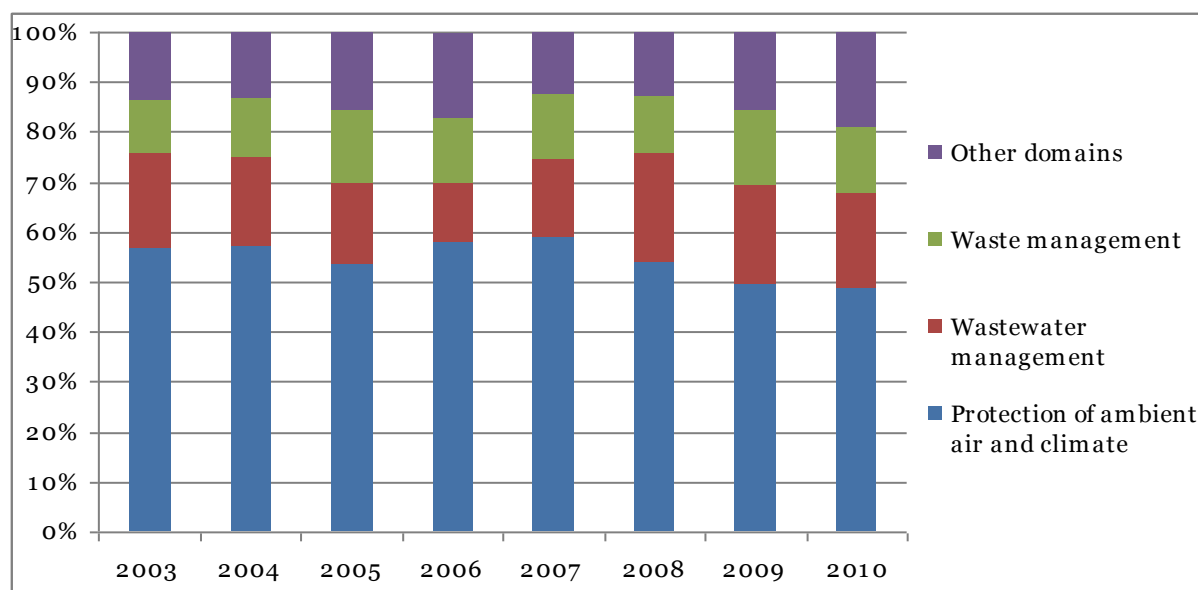
Source: Authors' elaborations on EUROSTAT data (EPE Survey)

Investment Costs per Unit of Output

In order to provide an idea of the impact of investments in environmental protection on steelmakers' operating conditions, data on total investments were transformed in annual values, considering an average life of the assets of 20 years, which is a fairly typical value in the steel making industry, and then expressed in terms of value per unit of output. In the "lower bound" scenario, annual investment costs (i.e. the value of the annual capital charges in the form of depreciation values) range from € 0.08/tonne to € 0.19/tonne, with a tendency to increase overtime. In the "upper bound" scenario, annual values are more than 50% higher, ranging between € 0.13/tonne and € 0.28/tonne. According to Steel Survey data, average values for the period range are aligned around € 0.07-0.08/tonne for Belgium, France and Germany, while significantly higher values (between € 020-0.23/tonne) are found in the case of Austria, Italy and Spain. However, annual figures provide only a partial indication of the impact of environmental investments on steelmakers' operations, as investments made in previous years continue to affect financial accounts until they are fully depreciated. Therefore, in order to provide a comprehensive view of the effects, annual values for the eight years analyzed were cumulated. The cumulated investment costs at the end of 2003 – 2010 period range between € 1.04/tonne in the "lower bound" scenario and € 1.68/tonne in the "upper bound" scenario. A summary presentation is provided in Figure 64 below.

Figure 64 Annual and cumulated investment costs - EU27, 2003-2010 (€/tonne)
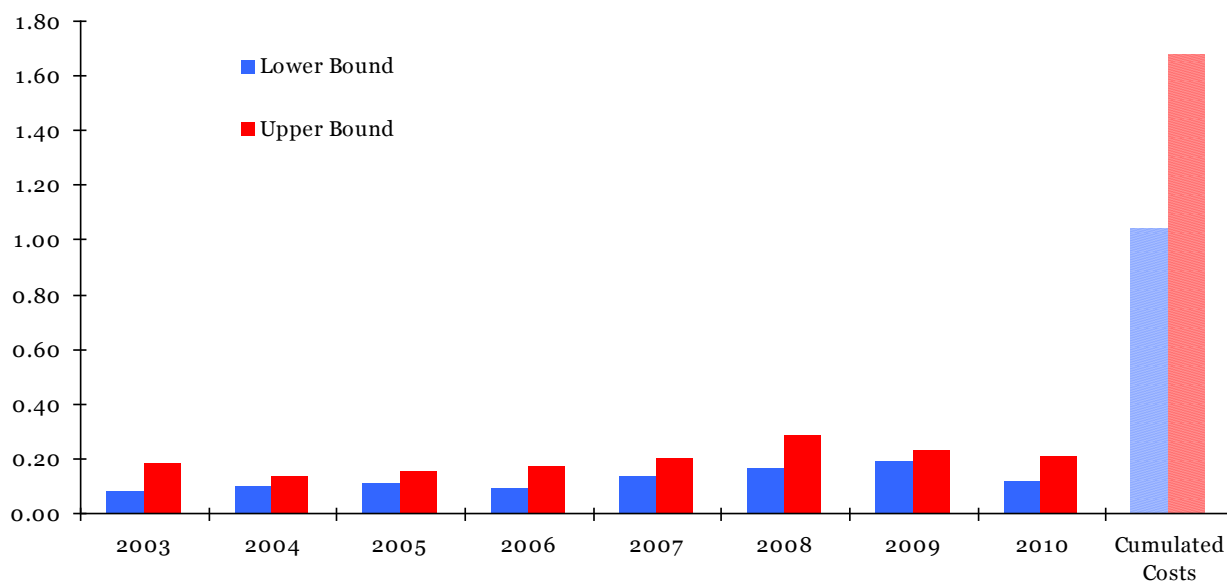
Source: Authors' elaborations and estimates on EUROSTAT and national statistics

10.3.3 Financial Costs

The financial costs incurred by steel makers in connection with environmental protection investments depend upon a variety of factors, such as the financing modalities adopted (i.e. the combination of debt and equity), the status and financial conditions of the investor (in the case of bank lending, large corporations are typically charged more favourable interest rates than SMEs) and the prevailing conditions in the relevant financial markets (which vary across countries and overtime). In the framework of this exercise, it is obviously impossible to take into account all the possible influencing factors and it is therefore necessary to resort to some "average" parameters. Therefore, **financial costs have been estimated assuming that environmental protection investments were entirely financed through bank loans, carrying an interest rate of 5% and with a maturity of 10 years**. While certainly an approximation, these parameters are aligned with available information regarding prevailing conditions in the EU financial markets in the years covered by our analysis.[217]

As in the case of investment costs, the financial costs linked to the environmental protection investments implemented in each of the eight years covered by the analysis

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[217] For instance, according to ECB data, over the 2003 – 2010 period, average lending rates in key steel producing countries ranged between 4% in Spain and France and 4.6% in Germany, with Italian borrowers paying 4.3%. Considering the less favourable credit conditions in other Member States (especially New Member States), a 5% interest rate appears as a reasonable assumption. ECB data refer to "loans other than revolving loans and overdrafts, convenience and extended credit card debt", with a maturity of over 1 year, worth more than € 1 million, and irrespective of the presence of a guarantee or collateral. Loans with longer durations (such as the 10 years envisaged in our exercise) were probably more expensive (no data are available), but this was in all likelihood offset by the presence of collateral, that steel makers do not seem to have problems in providing.

range were calculated per tonne of crude steel. Annual financial costs range from € 0.08/tonne to € 0.19/tonne in the "lower bound" scenario and from € 0.13/tonne and € 0.28/tonne in the "upper bound" scenario. The ***cumulated financial costs at the end of the period are estimated at € 0.71/tonne in the "lower bound" scenario and € 1.12/tonne in the "upper bound" scenario***. A summary presentation of results is provided in Figure 65 below.

Figure 65 Annual and cumulated financial costs - EU27, 2003-2010 (€/tonne)
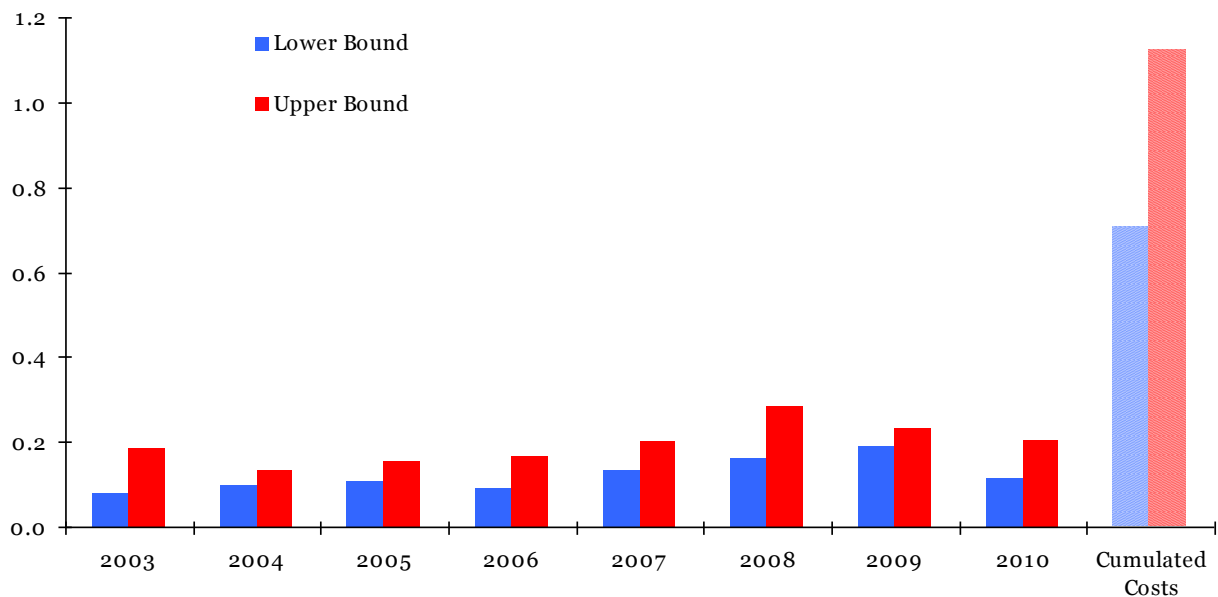
Source: Authors' elaborations and estimates on EUROSTAT and national statistics

10.3.4 Operating Costs

Available statistical sources are of limited value for estimating the operating costs linked to environmental protection measures. Data on environmental current expenditures are collected though the EPE survey, but the dataset presents some peculiarities that limit its usefulness for the purpose of the study. The same applies to data on environmental expenditures calculated by some steel companies that appear to be based on very broad definitions.[218]

Based on the above considerations, the operating costs (OPEX) of environmental protection interventions implemented by steel makers were estimated 'indirectly', as a share of investment costs (CAPEX). ***The ratio OPEX/CAPEX retained for the analysis is 15%*** and was estimated based on the three sources of information, namely (i) operational data for a sample of abatement/control technologies applicable to various stages of the steel making process, selected among the BATs included in the 2012 BREF; (ii) data on operating costs for some abatement/control technologies incorporated in the

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[218] For a discussion of these issues please refer to Annex 2.

GAINS model;[219] and (iii) information retrieved from selected steel makers during interviews. In the case of BATs, the ratio OPEX/CAPEX varies significantly, from little more than 2% to over 40%, but in the majority of cases the ratio is lower than 10%.[220] Lower OPEX/CAPEX ratios, typically in the 4% to 6% range, were found in the case of GAINS. However, this reflects the inclusion of only <u>fixed</u> operating and maintenance expenditures, which obviously understates the total value of operating expenses.[221] Higher OPEX/CAPEX ratios, typically in the 10% to 20% range, were found in the case of specific investments implemented over the last few years or currently under consideration by the steel makers interviewed.[222] More generally, interviewees indicated average OPEX/CAPEX ratios in the 10% to 20% as realistic values (see Box 4 below), which eventually led to retain the 15% midpoint value for our analysis.

Box 4 Excerpts from Interviews with Selected Steelmakers

"A 10% OPEX/CAPEX ratio is indeed a reasonable proportion, maybe on the lower side"

"Environmental OPEX are difficult to estimate, as they depend on the installation, but they can be assessed to represent 15-20% of CAPEX"

"In general, annual OPEX represent between 10% and 15% of CAPEX"

As in the case of other components of compliance costs, OPEX were expressed in terms of unit of output. Annual operating costs range from € 0.24/tonne to € 0.56/tonne in the "lower bound" scenario and from € 0.40/tonne to € 0.85/tonne in the "upper bound" scenario. In order to assess the overall impact on steel makers' operating conditions, operating costs also have to be cumulated over the period, as the operating costs related to investments made in a certain year continue to be incurred also in subsequent years. *The cumulated operating costs at the end of the period are estimated at € 3.12/tonne in the "lower bound" scenario and € 5.03/tonne in the "upper bound" scenario.* A summary presentation of results is provided in Figure 66 below.

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[219] The GAINS (Greenhouse gas - Air pollution Interactions and Synergies) model was developed by the International Institute for Applied Systems Analysis (IIASA) and is used to assess the impact of environmental policies. To this effect, the model incorporates cost data for a selection of control technologies applicable to various sectors, including the steel industry.

[220] For details, please refer to Annex 2.

[221] See Klimont Z. and others, Modelling Particulate Emissions in Europe - A Framework to Estimate Reduction Potential and Control Costs, Interim Report IR-02-076. Data refer only to control technologies for particulate matter.

[222] For details, please refer to Annex 2.

Figure 66 Annual and cumulated operating costs - EU27, 2003-2010 (€/tonne)
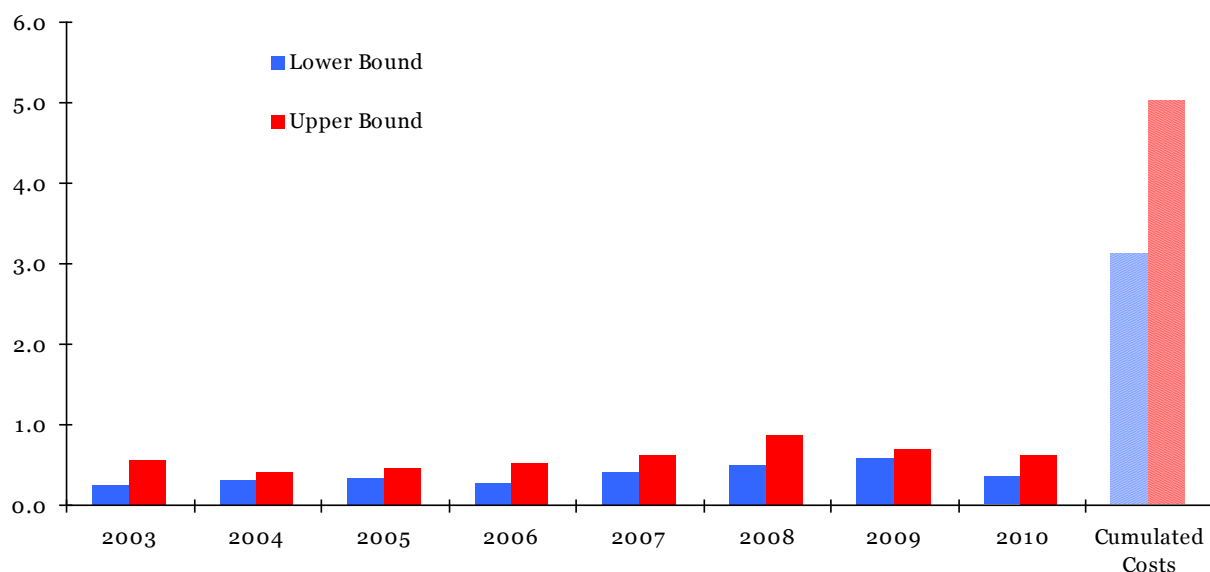
Source: Authors' elaborations and estimates on EUROSTAT and national statistics

10.3.5 Compliance Costs related to EU Legislation

The cumulated costs incurred by EU steelmakers for the implementation of environmental protection measures over the 2003 – 2010 period are summarized in Table 36 below.

Table 36 Summary of Cumulated Environment Protection Costs, 2003 – 2010 (€/tonne)

Item	Lower Bound Estimate	Upper Bound Estimate
Investment Costs	1.04	1.68
Financial Costs	0.71	1.12
Operating Costs	3.12	5.03
Total	**4.87**	**7.83**

It is impossible to precisely determine the share of environmental protection costs directly attributable to EU legislation as many factors are at play. On the one hand, there are clear signals that EU legislation has been a major driver of environmental protection investments in some countries. For instance, the higher than average (and raising overtime) investment costs incurred by Spanish steelmakers can be largely linked to the progressive implementation of the IPPC Directive, in a context where previous (national) legislation on air emissions was fairly lax.[223] On the other hand, some of the steelmakers

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[223] On this point, see the qualitative evidence presented in ifo Institute, Assessment *of different approaches to implementation of the IPPC Directive and their impacts on competitiveness*, December 2006.

interviewed indicated that, at least until the approval of the 2012 BAT Conclusions, the environmental protection standards implemented in their country were more stringent than EU rules, which implies that an unknown but presumably significant share of costs were linked to national legislation. Finally, the BATs adopted in 2001 include a number of control measures that also have generally positive effects on the operations of steel plants (e.g. through energy savings and/or lower use of certain materials), and therefore it reasonable to assume that the environmentally beneficial investments made over the 2002 – 2010 were not exclusively motivated by regulatory compliance considerations.

Based on the above, compliance costs linked to EU environmental legislation can only be assessed in an approximate manner. This was done by making reference to two scenarios. In the first scenario, EU legislation is assumed to play a key role, accounting for **80% of the costs** incurred by steelmakers. In the second scenario, commercial considerations (together, possibly, with national legislation) are assumed to play a comparatively greater role in driving environmentally beneficial activities, and therefore only **50% of the costs** are considered to be linked to EU environmental (and climate change) legislation. The results of this exercise are summarized in Table 37 below. In the case of the "lower bound" estimate, cumulated compliance costs over the 2002 – 2010 period are in the order of **€ 2.4-3.9/tonne**. The corresponding values for the "upper bound" estimate are **€ 3.9-6.3/tonne**,

Table 37 Summary of Cumulated Compliance Costs of EU Environmental Legislation (€/tonne)

	Lower Bound Estimate		Upper Bound Estimate	
	EU 50%	EU 80%	EU 50%	EU 80%
Investment Costs	0.52	0.84	0.83	1.34
Financial Costs	0.35	0.56	0.57	0.90
Operating Costs	1.56	2.52	2.50	4.02
Total	**2.44**	**3.92**	**3.90**	**6.26**

Available sources do not allow assessing with any degree of precision the impact of EU environmental legislation on steel producers using different technologies. However, there are indications that BOF producers were comparatively more affected than their EAF counterparts. Assuming that 70% of total environmental protection investments were carried out in integrated plants, the cumulated compliance costs for BOF producers can be 'guess estimated' to range between € 2.99/tonne (lower bound – EU 50% scenario) and € 7.70/tonne (upper bound – EU 80% scenario). The corresponding figures for EAF producers are more than 40% lower, ranging between €1.70/tonne and € 4.37/tonne.

Table 38 Guess Estimate of Cumulated Compliance Costs incurred by BOF and EAF Producers (€/tonne)

	Lower Bound Estimate		Upper Bound Estimate	
	EU 50%	EU 80%	EU 50%	EU 80%
BOF Producers	2.99	4.81	4.79	7.70
EAF Producers	1.70	2.73	2.72	4.37
Overall Average	**2.44**	**3.92**	**3.90**	**6.26**

The above results clearly show that the magnitude of compliance costs varies significantly depending upon the sources of data and the assumptions made about certain unobservable factors. In order to allow for a comparison with the cost estimates derived in other policy areas, average values have been calculated, taking the midpoint between the lower and upper bound scenarios and assuming that EU legislation accounts for 65% of the costs. Results were then extrapolated to 2012. The results of this exercise are summarized in Table 39 below.

Table 39 Estimate of Average Cumulated Compliance Costs (€/tonne)

	2003 – 2010 Period	Extrapolation to 2012
Investment Costs	0.88	1.13
Financial Costs	0.59	0.61
Operating Costs	2.65	3.39
Total	*4.13*	*5.13*
BOF Producers	5.07	6.14
EAF Producers	2.88	3.35

10.4 Assessment of Administrative Costs

10.4.1 Introduction

Administrative costs are a fairly common occurrence in the area of environmental policy, as many pieces of EU environmental legislation include provisions concerning the registration, the notification or the permitting of certain activities, and the supply of data or information for monitoring or policy making purposes. At the same time, the magnitude of these administrative costs is often limited, especially when compared with key economic variables of the steel industry, such as turnover or value added. Therefore, the analysis presented here only focuses on focuses on the two areas that based on the mapping of administrative obligations (see Annex 1), appear to be the main sources of administrative

costs for steel makers, namely: (i) the issuance/renewal of the Integrated Environmental Permits (IEP) for steel plants; and (ii) the carrying out of inspections for checking compliance with the conditions based on which the IEP was issued.

The following points are worth noting at the outset:

- Estimates of administrative costs show some variations across Member States, due to structural differences in the regulatory approach adopted by competent authorities at the national (sometimes, regional) levels as well as to widely different cost conditions. Therefore, any analysis at the EU level inevitably involve an element of approximation;

- In principle, the analysis of administrative costs should differentiate between costs that are genuinely attributable to EU environmental legislation and costs that in all likelihood would be incurred by enterprises in their normal course of business (the so called "business as usual" costs) and/or as a consequence of national legislation. However, at the level of abstraction of this exercise, such a distinction is very difficult to make and therefore all the administrative costs are attributed to EU legislation.

10.4.2 Estimate of Administrative Costs

Following standard practice, administrative costs incurred by steel makers were estimated taking into account: (i) the number of operators required to fulfil the administrative obligation (the "population"); (ii) the frequency of the relevant obligations (which can be annual, semi-annual, etc.); and (iii) the expenses incurred for the relevant cost items (e.g. personnel costs, fees, etc.). The parameters used in the analysis are presented in Box 5 below.[224] All the values refer to the situation prevailing in the mid – late 2000s.

Box 5 Administrative Costs Linked to IEP and Inspections - Key Parameters

Issuance/Renewal of IEP

Population: the issuance/renewal of IEP concerns the whole steel industry, is estimated to include <u>25 BOF plants and 150 EAF plants</u>.

Frequency: the validity of IEP varies across Member States. In Italy, the duration ranges from 5 years to 8 years, the latter in the case of enterprises with EMAS certification. In Austria, Romania and The Netherlands, the duration is 10 years and the same applies *de facto* to France. In Spain, Czech Republic and Slovakia, the duration is 8 years. In Germany, Sweden, Poland and the United Kingdom, the duration is indicated in each IEP, although in practice it appears to range between 6 and 10 years. In Belgium the duration is reportedly between 15 to 20 years. Considering the duration of IEP in the main EU steel producing countries as well as

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[224] The parameters were derived from various secondary sources. The main sources utilized include ifo Institute, *Assessment of different approaches to implementation of the IPPC Directive and their impacts on competitiveness*, December 2006; VITO, *Sectoral Costs of Environmental Policy*, December 2007; Confindustria, *Valutazione comparativa della disciplina di Autorizzazione Integrata Ambientale a livello europeo e nazionale: effetti sulla sviluppo industriale del paese*, gennaio 2013; and DEFRA*, Mid-term review of the United Kingdom's implementation of the Pollution Prevention and Control Regulations*, April 2007.

the expected frequency in the revision of the BAT Conclusions, a duration of 8 years was assumed. In practice, this means that over the 2003 – 2010 period analyzed, each steel plant had to renew its IEP.

Fees Payable to Competent Authorities: in Italy, fees for the issuance of IEP range from a minimum of € 5,000 for an EAF plant to more than € 150,000 for a BOF plant. In Germany, fees for EAF plants are in the order of € 19,000, while in Spain fees for EAF plants range from € 1,500 to € 5,000. No fees are reportedly charged in France. It is clear that in some MS fees constitute a non-negligible cost for steel makers. However, EU legislation is totally silent in this respect and the level of fees is entirely determined by national legislation. For this reason, fees payable to competent authorities are excluded from the calculation of administrative costs.

Personnel Costs: personnel costs for the preparation and follow up of IEP applications vary considerably, depending upon the national institutional setting and the organizational structure of applicants. Earlier studies have found values ranging from € 5,000 up to more than € 100,000, with an average value of € 40,000. The latter value was retained for the analysis.

Consulting Fees: the preparation of applications for IEP often require the involvement of consultants for the carrying out of studies. Again, values reported by firms vary considerably, from a few thousand Euros in the case of basic technical services to more than € 200,000 for full fledged environmental impact analyses, with an average of € 70,000. Considering the different complexity of authorization dossiers for EAF and BOF plants, for the purpose of this exercise two different values were retained, namely € 70,000 for EAF plants and € 150,000 for BOF plants.

Inspections for Compliance Checking

Population: inspections for compliance checking concern the whole steel industry. Data on the population are the same as those used for the issuance of IEP, i.e. 25 BOF plants and 150 EAF plants.

Frequency: the frequency of inspections for checking compliance with the conditions specified in IEP varies between one and four years, with some differences at the sub-national level (namely in Germany and Italy) and with a tendency to increase overtime. For the purpose of the exercise, 1 inspection/year was assumed in the case of BOF, while 1 inspection every two years were assumed in the case of EAF.

Personnel Costs: personnel costs incurred in the case of compliance inspections may vary significantly depending upon the circumstances in which inspections take place (i.e. whether there are problems or not). Considering an average duration of three days (plus a similar time for preparation and follow up) and the involvement of four technical employees (costing an average € 60,000/year), personnel costs can be estimated at some € 9,000 per inspection.

Based on the above parameters, administrative costs for an IEP issuance/renewal can be estimated at about € 110,000 for an EAF and € 190,000 for a BOF. Costs connected to inspections are estimated at some € 9,000 per inspection. **Total administrative costs incurred by the steel industry can be estimated at nearly € 25 mln**, of which little more than € 23 mln for the issuance/renewal of IEP and almost € 2 mln for compliance inspections. Although BOF producers face higher unit costs for the issuance/renewal of IEP, the more numerous EAF producers account for the largest share of cumulated costs, about two thirds of the total.

Table 40 Summary of Cumulated Administrative Costs Linked to IEP and Inspections (€ million)

Cost Items	BOF Producers	EAF Producers	Total
Issuance/Renewal of IEP	6.6	16.5	23.1
Compliance Inspections	1.4	0.3	1.7
Total	**8.0**	**16.8**	**24.8**

In order to facilitate the comparison with other costs related to environmental legislation, administrative burdens were annualized using the frequency parameter and expressed in terms of costs per tonne of crude steel output. As shown in Figure 47 below, ***administrative costs can be estimated at about € 0.011 per tonne/year for BOF producers and at € 0.037/tonne/year for EAF producers, while the overall annual average is about € 0.022/tonne***. Administrative costs related to the issuance/renewal of IEP account for three quarters of the cost per tonne (€ 0.008/tonne for BOF and € 0.028/tonne for EAF producers), while the cost of inspections is always below one Euro cent per tonne (€ 0.003/tonne for BOF plants and € 0.009/tonne for EAF plants). Overall, these are quite low values, with a limited impact on steelmakers' operations. Even assuming much less favourable parameters, i.e. higher unit costs and/or a higher frequency, administrative costs per unit of output are estimated to remain quite low. For instance, in the case of IEP, even assuming that permits have to be fully renewed every four years and that costs are five times greater than the values indicated above, the incidence of costs per unit of output would not exceed € 0.28/tonne for EAF plants and € 0.08/tonne for BOF plants.

Figure 67 Annual Average Administrative Costs of IEP and Inspections (€/tonne)
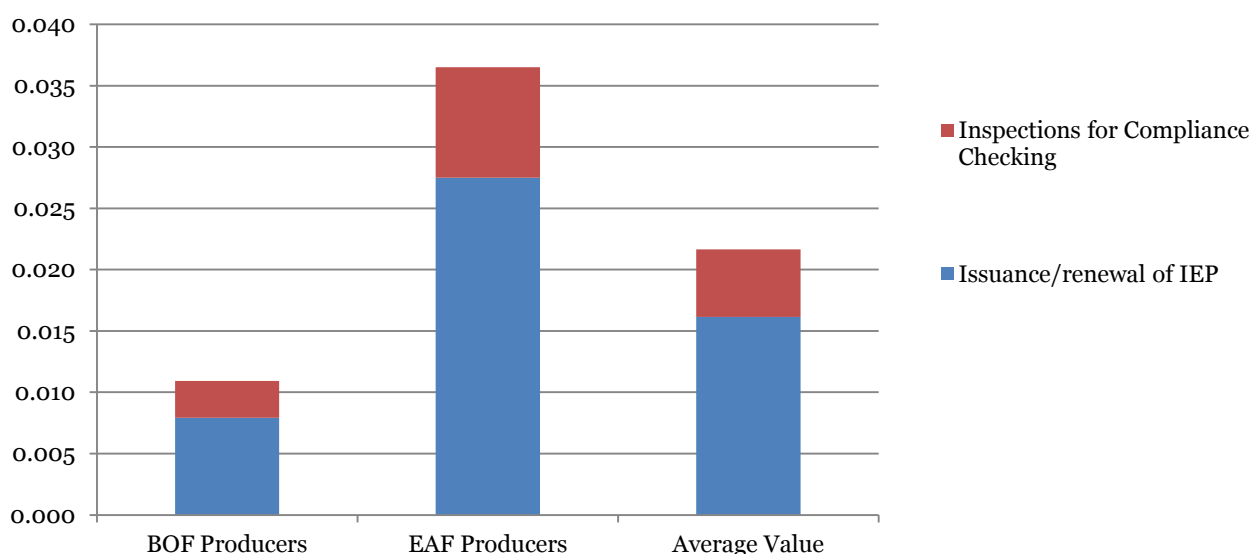
Source: Authors' elaborations on various data

10.5 Assessment of Indirect Costs

Indirect costs are defined as costs borne by steel makers as consequence of regulatory provisions not addressed to them but rather to their counterparts. In practice, indirect costs arise in the form of higher costs paid by steelmakers as a result of the influence exerted by EU environmental legislation on operators active at other stages of the value chain, typically suppliers of key inputs.

In the case of EU environmental legislation, three instances of indirect costs can be identified. The first has to do with ***the higher prices of electricity paid by steelmakers as a result of the compliance costs incurred by power plants in order to conform to emission limits stipulated in EU legislation*** (initially, under the LCP Directive and, subsequently, under the IED). The "passing on" of compliance costs from power producers to their clients was noted by earlier studies, especially in the case of energy-intensive industries, such as steel making.[225] The phenomenon was mentioned in discussions with steel makers and is privately confirmed by representatives of the power industry. However, the magnitude of these indirect costs is hard to gauge, due to lack of data.

The second instance of indirect costs is of a similar nature, as it relates to ***the proposed setting of more stringent limits to shipping emissions which, in turn, is expected to trigger an increase in shipping rates***. As the bulk of raw materials used by EU integrated steel makers are imported from distant sources, higher shipping rates would certainly affect steelmakers' cost structure, with an increase in operating costs and a deterioration of the competitive position of European producers vis-à-vis their international competitors having a more direct access to raw materials. However, this is subject to two qualifications. First, it should be noted that the proposal submitted by the Commission for amending the 1999 Directive on the sulphur content of marine fuels seeks to mitigate the negative consequences. In fact, the proposal envisages that lower emission limits could be achieved not only through the use of more expensive low sulphur fuels but also through the installation on ships of pollution abatement equipment, whose cost could be recouped over a relatively short period of time, presumably with a less dramatic impact on shipping rates.[226] Second, regarding the impact on international competitiveness, the anticipated higher shipping rates would also affect non-EU producers with easier access to raw materials and trying to sell their steel products in the EU market. While higher

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[225] See VITO, Sectoral Costs of Environmental Policy, December 2007 ("As the electricity market is not subject to open international competition, electricity suppliers can pass on any financial burden resulting from environmental regulation onto their customers. Hence, while the [LCP and IPPC] Directives may not cause a competitive distortion in the electricity market, they may very well lead to distortions in other, energy-intensive sectors, such as steel and base metals." page 88).

[226] On this point, see the analysis included in Commission Staff Working Paper, Impact Assessment Accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 1999/32/EC as regards the sulphur content of marine fuels, Brussels, 15.7.2011, SEC(2011) 918 final

shipping costs can be more easily absorbed by finished products than by raw materials, the negative impact on EU steelmakers' international competitiveness would be somewhat reduced. In any event, this source of indirect costs is still hypothetical and no information on its possible magnitude is currently available.

Finally, it is sometimes claimed that the compliance costs incurred by the operators of vehicles recycling facilities under the ELVD tend to encourage the export of old vehicles, with a ***negative impact on the supply of scrap material and, hence, on the price of scrap metal***. However in this case, the causation link is definitely much more tenuous than in the other cases mentioned above and the influence on prices (if any) is in all likelihood very small.

11 Trade Policy

As noticed in Section 4.4, the world steel industry is facing a more competitive environment compared to ten years ago. Moreover, the entry on the steel market of new production countries in addition to the historical centres such as Europe and US to Asia has shown the sector to be vulnerable on two sides: concerning the provision of raw materials (on which the EU is strongly dependent) and, given that, downstream sectors (i.e. automotive) have been showing a relative decline of demand. Safeguarding an undistorted level of competition both upstream and downstream among the main global players is an essential requirement for the EU steel industry to survive. Fair competition is ensured in particular through the implementation of WTO commitments, the negotiations of bilateral FTAs, actions against obstacles to trade introduced by third countries and the fight against dumping and government subsidies that artificially support the export performance of new global players.

After the Uruguay Round in 1994, the so-called '*zero-for-zero*' agreement was applied by abolishing import duties for almost all steel products. The *zero-for-zero* rule implies that the EU does not impose any tariff on most steel products[227]. For non-WTO members, the EU usually stipulates *ad-hoc* trade agreements on the specific trade conditions to apply. This was the case of Russia,[228] before it joined the WTO, and it is still the case for Kazakhstan.[229]

The main concerns of industry players regard (Eurofer, 2010) the rising importance of non-tariff barriers - i.e. domestic regulation, subsidies, export restrictions, safeguard mechanisms, local content requirements - that, especially in time of crisis, can take the form of protectionist measures. The industry stresses that the EU has a crucial role in safeguarding undistorted trade principles including by pursuing anti-dumping and anti-subsidy procedures where justified.

In this context, the paralysis of the Doha Round, forced the EU to take action bilaterally, not only by launching trade negotiations with the relevant partners. The Commission also

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[227] The application of the zero-for-zero agrrement howeverhas been signed up only by some developed countries while many others still impose tariffs on incoming steel products. Even if the scope of the report is to evaluate onlt the EU perspective, it is worth to notice that tariffs imposed somewhereelse (as safeguard measures that we will see later on) could have had an impcts on the export strategiy of European steel exporters.

[228] Before the accession of Russia, EU had stipulated an agreement on trade for certain products. Moreover, restrictions on imports and quantitative limits on certain steel products have been regulated in the past by Council Regulations (EC No 1342/2007 and EC No 1040/2010) and by a Council Decision (EC No2007/739/EC) on quantitative limits; these regulations have automatically expired when the Russian federation became part of the WTO.

[229] Council Regulation (EC) No 1340/2008 on trade in certain steel products between the European Community and the Republic of Kazakhstan.

monitors and deters any form of unfair trading practices on the global trade scene.[230] The Commission Market Access Database shows that there are currently two procedures in the steel market against trade barriers on steel products. The first includes public procurement in form of steel local content requirements applied by the USA, in particular at sub-federal level. More importantly, also in the context of the ongoing negotiations, in 2011 the Indian Government imposed export duties on iron ore and semi-finished steel products.[231] As the EU considers this as a key barrier, it is currently acting to gather more information on the nature of this measure. The export restrictions were raised by the Commission during the last bilateral Steel Contact Group meeting in December 2012 held with the Indian authorities. This issue is also part of the ongoing negotiations between the EU and India.

11.1.1 Trade Defence Instruments: their impact on the EU Economy

A major concern of the steel industry, not only at the EU level, is that competition with third countries is negatively affected by unfair trading practices, such as dumping and subsidies that artificially make third country steel products more competitive. The difficult recovery phase from the economic crisis is forcing the EU to better monitor the market, without moving towards a protectionist approach. Trade Defence Instruments (TDIs) are not instruments for ordinary protection, they are "targeted, contingent and [...] temporary".[232] Hence, they are not a comprehensive tool to ensure a fair playfield; furthermore, their (dynamic) effect over time is difficult to assess.

As pointed out during the interviews, (deep and comprehensive) trade agreements could indeed ensure a fairer environment through a bilateral bargain of the competitive conditions for companies that face the challenges of international trade. However, given the state of ongoing and future negotiations, in many cases and in particular with some commercial partners, TDIs are the only valid instruments to defend companies from unfair trading practices.

The EU legal framework makes three instruments available: anti-dumping duties (AD), anti-subsidy duties, and safeguards measures. They are all defined in EU binding acts. For anti-dumping measures, the EU Regulation[233] in compliance with the WTO Anti-dumping Agreement[234] applies. For subsidies, the anti-subsidy rules[235] and the Regulation on

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[230] Relevant partners are the ones raising so-called key barriers. A trade barriers is indeed categorized as "key barrier" when it is included in a special list of barriers raised by the main commercial partners (Conclusion of the Council of the European Union, December 2008).

[231] According to the Market Access Database, the Indian government re-established a 5% duty on fines (previously abolished following a stimulus package) and a 10% duty on lumps recently raised to 15%.

[232] Evaluation of the European Union's Trade Defence Instruments (2012)

[233] Council Regulation (EC) No 1225/2009 on protection against dumped imports from countries not members of the European Community. .

[234] Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994.

[235] Council regulation (EC) No 2026/97 on protection against subsidized imports from countries not members of the European Community.

protection against subsidized imports from non–EU Member States[236] provide the legal basis to start a complaint. Recently, the Commission adopted a proposal to modernise the regulation on protection against dumped and subsidised imports from third countries. Finally, safeguard measures, aiming at temporarily protecting the industry under extremely strict circumstances against sharp increase in imports, are regulated according to the status of the importing counterpart (WTO[237] and non-WTO members[238]).

Analyzing the impact on EU trade of the use of TDI against third countries may be challenging. By definition, anti-dumping measures are imposed against imports of a specific product originating in specific country (-ies) to restore an undistorted competitive environment for thatspecific product .This implies that even if the impact on the bilateral flows hit by dumping is not large, the effect on the specific product category is normally positive as it should temporary reduce dumped imports. Moreover TDIs can affect entry decisions of the firms and alter the probability of exit from the market since they ensure a provisional protection against unfair competitors. As noticed in some interviews, the effectiveness of TDIs is not only motivated by the possibility of restoring competitiveness, but also in terms of threat. If TDIs are used in a credible and thorough way, the commercial counterpart will have a higher incentive to abide by trade rules.

According to the Independent Evaluation Report published by DG Trade, there are at least three reasons that make the impact of TDIs difficult to evaluate. First, due to confidentiality reasons, the actual imports flows from the specific companies affected by the investigation is not available;[239] secondly, it is difficult to define counterfactual flows, which would be needed to measure the effect of the non–application of the duty in. Finally, at micro-level, the application of an AD duty creates uncertainty for those firms that usually deal with foreign markets by increasing the costs incurred: this scenario can both prevent some foreign firms to enter the EU market and deter their performance in terms of innovation or productivity, without necessarily affecting existing trade flows.

Anti-dumping and anti-subsidy measures

Since 2003, the EU carried out 31 investigations in the steel sector, involving most of its main commercial partners (Table 41). In particular, 24- concern only anti-dumping procedures, and three investigations are still ongoing against countries such as China, India and Russia. In general, according to WTO statistics, the EU imposed 125 AD duties (until the end of 2010), 44% of them are against China, while India, Russia and Thailand

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[236] Council Regulation (EC) No 597/2009 on protection against subsidised imports from countries not members of the European Community.

[237] Council Regulation (EC) No 260/2009 of 26 February 2009 on the common rules for imports.

[238] Council Regulation (EC) No 625/2009 of 7 July 2009 on common rules for imports from certain third countries.

[239] As it will also be shown in Table 43, trade flows can be proxied through the selections of HS codes, which however results in an overestimation

accounted for 6% each. Regarding anti-subsidies measures, the EU has carried out seven procedures, two of which are still ongoing against India.

Table 41 EU Cases on Anti-dumping and Anti-Subsidy in the steel international market, from 2003

	Product	Country Investigated	Measures
Anti-Dumping	Grain oriented flat-rolled products of silicon-electrical steel (GOES)	Russia, USA	Expired
	Stainless steel fasteners	Vietnam, Taiwan, Indonesia, Malaysia, Philippines, China, Thailand	Ad valorem duty until 2017 for China and Taiwan
	Steel wire ropes	Republic of Korea	No
	Seamless pipes and tubes (or iron or non-alloy steel)	Romania, Ukraine, Russia, Croatia	Ad valorem duty until 2017 for Russia and Ukraine
	Welded tubes and pipes of iron or non-alloy steel	Belarus, Russian Federation, Bosnia and Herzegovina, China	Ad valorem duty until 2013 for Belarus, China and Russia
	Steel fasteners (certain iron and steel…)	China	Measures in force
	Seamless steel pipes and tubes	-	Expired
	Seamless steel pipes and tubes	-	Expired
	Stainless steel big wire	-	Expired
	Steel wire ropes	-	Ad valorem duty until 2017 for Morocco, China, Republic of Korea, Republic of Moldova and Ukraine
	Steel wire ropes	Russia	*Ad valorem* duty (investigation ongoing)
	Galvanized steel	China	No

	Stainless steel cold-rolled flat products	China, Taiwan, Republic of Korea	No
	PSC wires and strands (certain pre-and post-stressing wires and wire strands of non-alloy steel)	China	Ad valorem duty until 2014
	Seamless pipes and tubes, of iron or steel (certain)	China	Ad valorem duty until 2014
	Stainless steel fasteners and parts thereof (certain)	India, Malaysia	Expired
	Stainless steel bars (certain)	India	No measure
	Stainless steel seamless pipes and tubes	China	Ad valorem duty until 2016
	Stainless steel fasteners	India	No measure
	Seamless pipes and tubes of iron or steel (certain)	Belarus	No measure
	Tube and pipe fittings of iron or steel (certain)	Turkey, Russian Federation	Ad valorem duty until 2018 for Russia and Turkey
	Organic coated steel	China	Measures in force
	Stainless steel wires (SSW)	India	No measure (Investigation ongoing)
	Stainless steel fittings	China, Taiwan	No measure (Investigation ongoing)
Anti-subsidy	Steel big wire	-	Expired
	Steel fine wire	-	Expired
	Stainless steel fasteners and parts thereof (certain)	India, Malaysia	Expired
	Stainless steel bars (certain)	India	Ad valorem duty until 2016 (Investigation ongoing)

	Stainless steel fasteners	India	Expired
	Organic coated steel products (certain)	China	Ad valorem duty until 2018
	Stainless steel wires (SSW)	India	No measure (Investigation ongoing)

Source: DG Trade

According to the current EU legislation, the EU can initiate an anti-dumping or anti-subsidy investigation on the basis of a properly substantiated complaint from the relevant EU industry or on an ex-officio basis

The Council Regulation 1225/2009 on protection against dumped imports, in compliance with the WTO Anti-dumping agreement,[240] allows the EU to set an *ad valorem duty* to counteract dumping, once there is sufficient evidence that a dumped price has been applied causing injury to the Union industry. There are additional elements to be proved, such as the link between the dumping and the injury, and the fact that the potential anti-dumping measure would not be against the interest of the Union.

The setting of the anti-dumping duty follows the "*lesser duty rule*" (LDR), according to which the duty applied to the importers does not always correspond to the dumping margin (defined as difference between the normal value of the good imported and the export prices applied) when the duty can cover the (lower) injury margin [241]suffered by the company. The injury margin is usually chosen to set the anti-dumping duty, so the methodology behind its calculation is crucial to offset the effect caused by dumped imports. The investigation period for AD cases usually lasts 15 months, (nine months after initiation at the latest) provisional measures can be imposed and then definitively collected at the end of the period, where the implementing regulation confirms or eventually modifies the conditions set in the provisional act. Definitive measures can be in force for five years, after which the measure may be reviewed and possibly prolonged.

The application of the LDR is considered a "WTO plus" (art. VI of GATT and Anti-Dumping Agreement) and is considered by some stakeholders the cause of a weaker trade defence, especially compared to the US. Higher AD duties are not only important *per* se, i.e. to counter specific dumping actions, but also because the existence of higher AD duties in other countries can divert imports flows towards the EU.

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[240] See http://www.wto.org/english/docs_e/legal_e/19-adp.pdf.

[241] To define the injury margin, the Commission has to verify the impact of the dumped imports on the Community market shares. In order to prove this, they have to see to what extent the dumped price undercuts the Community price. The analysis considers many other variables as output, profits, productivity, return of investment etc. (DG Trade, also see art. 3 of Regulation (EC) No 1225/2009.

In this respect, Figure 68 shows that from 1989 to 2009, EU average anti-dumping duties have been constantly lower than the ones applied by US and Canada. As noticed by Rovegno and Vandenbussche (2011), the US and Canadian duties show an increasing trend overtime compared to the more stable EU average of 30%. Moreover, the variability of the US average trend, due to a higher flexibility of adjusting the duty over time, creates uncertainty for every long-term internationalization strategy of foreign companies.

Figure 68 Average anti-dumping ad valorem duty levels by year of imposition[242]
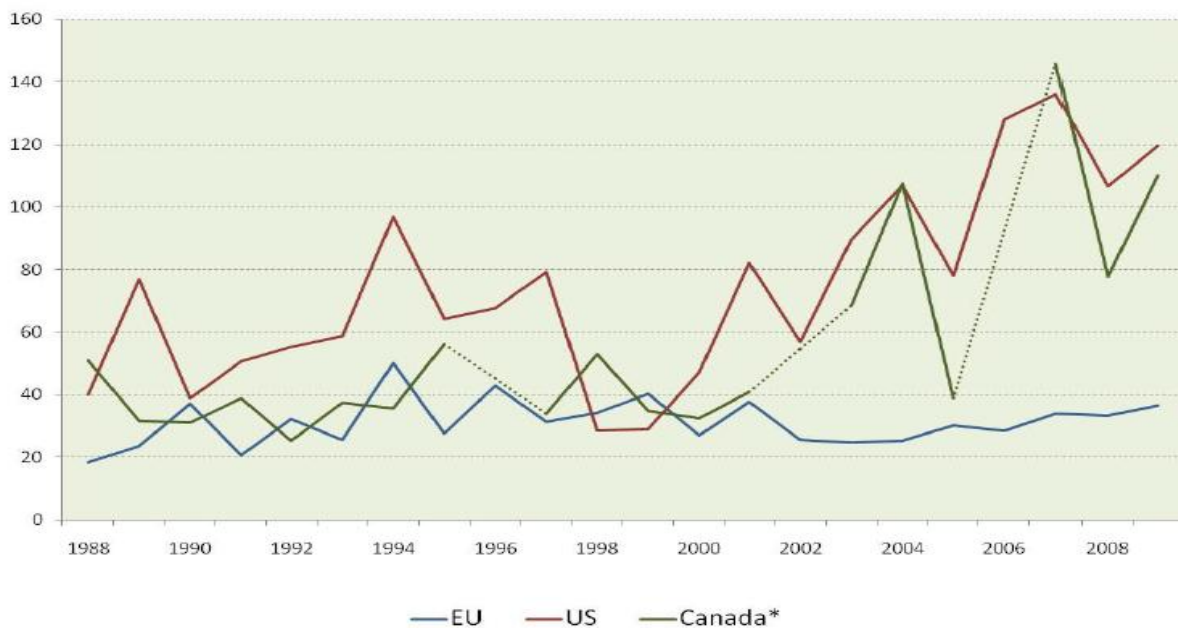
Source: Rovegno and Vandenbussche (2011) based on Global Antidumping Database (World Bank)

Disentangling the quantitative effect of the application of the LDR on the level of duties is not straightforward.   As shown by the Evaluation Report of EU Trade Defence Instruments,[243] the LDR indeed contributes to the lower and more stable trend of EU duties, but it is not the only cause. The lowering effect of the rule on the average EU duties has been estimated as equal to 9.3 percentage points, resulting in duties 28% lower than the ones computed without the application of the rule. However, even the removal of the LDR would not fill the gap existing between the EU and the US.

Table 42 quantifies the LDR effect across sectors and over time and compares the effect of the rule on steel industry with the respect to other sectors and the EU average. The LDR effect for iron and steel (HS code 72) is -37%; for articles of iron and steel (HS code 73) is -18%. This means that on average duties have been 37 percent lower than in the absence of the LDR, compared to the across sectors average of -26%. This effect has been particularly strong during 2000-2004, with around 17 percentage points of difference between the average dumping margin and the average final duty.

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[242] The dotted lines correspond to years when no antidumping duties were imposed.

[243] See http://trade.ec.europa.eu/doclib/docs/2012/march/tradoc_149236.pdf.

Table 42 EU Dumping margins, AD duties and effect of lesser duty rule by sector, (2000-2010)[244]

HS chapter and description	2000-2004		2005-2010		2000-2010		
	Avg def dumping margin	Avg definitive duty	Avg def dumping margin	Avg definitive duty	Avg def dumping margin	Avg definitive duty	LDR Effect
20 Vegetable, fruit, nut etc.			9.05	7.95	9.05	7.95	-12%
28 Inorganic chemicals, precious metals compuond, isotope	27.16	26.56	35.32	22.76	30.56	24.98	-18%
29 Organic cvhemicals	7.64	7.58	29.49	21.89	21.08	16.38	-22%
31 Fertilisers	34.68	9.3			34.68	9.3	-73%
39 Plastic s and articles thereof	31.03	27.14	12.75	12.75	18.08	16.95	-6%
41 Raw hides and skins and leather			69.8	58.9	69.8	58.9	-16%
44 Wood and articles of wood, wood charcoal	14.15	14.15	25.18	25.18	2028	20.28	0%
54 Manmade filaments	11.27	6.87	7.1	7.1	8.66	7.01	-19%
55 Manmade staple fibres	34.47	19.37			34.47	19.37	-44%
64 Footwear, gaiters amd the like			39.9	9.85	39.9	9.85	-75%
72 Iron and steel	**37.65**	**20.76**	**30.36**	**20.12**	**32.29**	**20.29**	**-37%**
73 Articles of iron and steel	**21.9**	**21.9**	**45.46**	**36.53**	**42.19**	**35.5**	**-18%**
76 Aluminium and articles thereof			33.21	17.86	33.21	17.86	-46%
81 Other base metals, cermets, articles thereof			64.62	29.3	64.62	29.3	-55%
83 Miscellaneous articles of base metals			27.1	27.1	27.1	27.1	0%
84 Nuclear reactors, boilers., machinert etc.			41.84	41.84	41.84	41.84	0%
85 Electrical, electronic equipment	28.34	27.58	47.33	27.84	35.94	27.69	-23%
87 Vehicles other than railway, tramway	15.8	15.8	32.57	16.87	31.04	16.77	-46%
90 Optical, photo, technical, medical, etc. apparatus			38.8	34	38.8	34	-12%
95 Toys, games, sports requisites			5.8	5.8	5.8	5.8	0%
Total average	**36.17**	**20.23**	**33.63**	**24.3**	**31.35**	**23.05**	**-26%**

Source: Evaluation of the European Union's Trade Defence Instruments (2012)

Table 43 reports the main anti-dumping measures in force in the steel industry. The aim of the Table is twofold: first, it gives a rough idea of the difference between the dumping and the injury margin; then, it attempts to compare AD-affected imports flows to overall imports flows. The limitations of this simple exercise are clear: i)the ad duty is company-specific and what we show is just a range of duties set for different companies; and ii) most importantly, due to confidentiality reasons it is difficult to have a clear understanding of the actual flows imported that have been hit by the investigation. However, imports flows have been estimated by estimating the flows of all the HS codes mentioned in each investigation. This leads to an overestimation, as also imports originating from companies not subject to the investigation are also included. Then, import flows are compared to total EU imports for that HS code from all over the world. With these caveats in minds, in four cases imports from countries subject to investigation represent more than 50% of EU imports for the specific product. Moreover, in these four cases, China is the main exporter involved.

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[244] The lesser duty effect is the difference between the final duty and the dumping margin in percent of the dumping margin.

Table 43 Anti-dumping Measures in force from 2003 [245]

	Product	Country	Year*	Dumping margin (%)**	Injury margin (%)	AD Duty (%)	Imported quantity year before (country)/tonnes	Imported quantity year before (extra EU)/tonnes	Share of sector imports (%)***
AD584	Organic Coated Steel	China	2011	48.9-68.1	13.7-44.7	0-26.1	464,582	915,598	50.74
AD529	PSC wire and strands	China	2008	26.8-49.8	0-31.1	0-31.1	48,381	96,490	50.14
AD490	Seamless Pipes and tubes	Romania	2005	11.7-17.8		11.7-17.8	85,927	548,780	15.66
		Ukraine		12.3-25.7		12.3-25.7	110,887		
		Russia		35.8		35.8	227,917		
		Croatia		29.8		29.8	25,470		
AD533	Seamless pipes and tubes	China	2008	73.1-64.8	15.1-24.2	17.7-39.2	449,182	811,825	55.33
AD482	Stainless steel fasteners	Vietnam	2004	7.7		7.7	2,769	50,180	5.52
		Taiwan		11.4-23.6		8.8-23.6	9,588		
		Indonesia		9.8-24.6		9.8-24.6	6,512		
		Malaysia		0		0	3,018		
		Philippines		0		0	5,196		
		China		12.2-27.4		11.4-27.4	4,823		
		Thailand		10.8-14.6		10.8-14.6	3,476		
AD565	Stainless steel seamless pipes and tubes	China	2010	62.6-83.7	48.3-71.9	48.3-71.9	21,548	56,530	38.12
AD525	Steel fasteners	China	2007	63.1-105.3	64.4-99	63.1-85	488,063	853,862	57.16
AD579	Tube and pipe fittings of iron or steel (certain)	Turkey	2011	2.9-16.7		2.9-16.7	2,360	25,297	16.27
		Russia		23.8		23.8	1,755		
AD523	Welded tubes and pipes of iron or non-alloy steel	Belarus	2007		38.1	38.1	28,191	411,935	43%
		Russia		22.7	16.8-20.5	10.1-20.5	34,148		
		China			90.6	90.6	110,922		

Source: Council Regulations, authors' calculations on data from COMEXT.

[245] Anti-circumvention investigations (AD384 and AD429 on Steel wire ropes) not considered. The duties mentioned pertain only to the definitive implementing regulation. Finally, where injury margins are not available (see AD490 and AD482, for instance), this is due to the fact that they are higher than dumping margins: according to the LDR, these are the ones used to define AD duties. (*)Year of the beginning of the investigation; (**) Percentage of CIF Union frontier price, duty unpaid; (***) Ratio between the sectoral imports from the country/countries under investigations and the total imports of that sector.

The procedure to impose an anti-subsidy measure is very similar to the one for anti-dumping duties. A market distortion may arise when importers, thanks to subsidies received, can set lower prices, thus acquiring new market shares to the detriment of the other companies. The EU may open an anti-subsidy investigation on the basis of a complaint from the EU industry concerned or also on an ex-officio basis in order to address these distortions.

Anti-dumping and anti-subsidies procedures present different difficulties, but can be initiated at the same time (see for instance the AD584 and AS587 on organic coated steel products against China discussed below). As in the case of anti-dumping procedures, the Commission, once having established the presence of a distortive subsidy creating an injury, can set a countervailing measure that can take the form of a percentage of price or a fixed amount (DG Trade, 2013). Table 44 below reports the two measures in force now against China (very recent) and India. Every measure can be imposed for five years, with an expiry review possible at the end of this period.

Table 44 Countervailing duties in force since 2003[246].

	Country	Product	Year*	Subsidy margin (%)**	Countervailing duty (%)
AS587	China	Organic Coated Steel	2011	23.8-44.7	13.7-26.1
AS556	India	Stainless steel bars	2008	26.8-49.8	0-31.1

The two legislative acts regulating the action against dumped and subsidised imports from non-member states are currently under review. In April 2013, a new proposal[247] has been made by the Commission to amend the two original regulations aiming at removing the lesser duty rule in case of structural distortions in the raw material market and in case of subsidisation; and also at improving the transparency about the imposition of provisional measures. Moreover, the Commission proposes to reimburse duties to importers paid during the period where an expiry review is conducted but which results in the termination of the measure. Stakeholders welcome the Commission proposal, especially as for the removal of the LDR in case of subsidies and structural distortions of the raw materials markets. However, they also point out that these principles need to be properly defined in order to be effective. For example, doubts persist, in the stakeholders' readings, concerning the definition of raw materials structural distortions.

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[246] (*)Year of the beginning of the investigation (**)Percentage of CIF Union frontier price, duty unpaid

[247] Proposal for a Regulation of the European Parliament and the Council amending Council Regulation (EC) No 1225/2009 on protection against dumped imports from countries not members of the European Community and Council Regulation (EC) No 597/2009 on protection against subsidized imports from countries not members of the European Community; COM(2013)192.

According to all the interviewees and our own analysis, costs of compliance with TDI regulation are not an issue. This is not to say that procedural costs are negligible, but that benefits of trade protection outweigh them. As trade complaints are not an obligation, but an opportunity, companies will undertake them only as far benefits outweigh costs in the case at hand. Furthermore, no interviewees considered the burdens as irritating or inappropriate.

A substantive part of the procedure is coordinated by trade association, that itself incurs in compliance costs. According to the Evaluation report, the estimated average costs of complaints for an association (across all sectors) is around € 60,000 (ranging from less than € 10,000 to more than € 200,000). On top of internal costs, this amount may also include external costs, e.g. the costs of external consultants or legal support. In particular for the steel industry, the total costs of carrying out a complaint are on average higher (around € 400,000) and can exceptionally reach € 1 million for unusual cases or those requiring special expertise. The report also shows that the costs of making a complaint in the EU are lower than the ones incurred by US and Canadian companies. Costs for complaining companies can also be significant. Indeed, the investigation requires the company to devote a team for collecting information and replying to the Commission's requests (e.g. by filling the questionnaires). This team are usually to be kept in stand-by also in-between investigations. Finally, it should be noted that the length of the procedure can represent an indirect costs for companies. From the start of the data collection to the imposition of provisional measures, companies may have to suffer alleged dumping for about 15 months.

Below, two case studies are discussed. The former are the "Organic Coated Steel" cases, with measures recently imposed against China. These cases were chosen as significant because they concern both anti-dumping and anti-subsidy measures. The latter is the case on "Seamless Pipes and Tubes", again against China, and is considered representative of the tube industry, which, especially in its seamless segment, is among the branches of the steel sectors most open to external trade. The decision to consider two cases against China is justified by the fact, as mentioned above, that when Chinese companies are involved, TDIs cover a larger share (up to more than 50%) of total EU imports for those products.

CASE 1: AD584/AS587 Organic Coated Steel

The case on dumped and subsidised imports of certain organic coated steel products from China has been recently concluded in March 2013.[248] It is a remarkable case as it found evidence of subsidised Chinese imports and the casual link between those imports and the injury suffered by the EU industry was established.

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[248] Council Implementing Regulation (EU) No 214/2013 of 11 March 2013 imposing a definitive anti-dumping duty and collecting definitively the provisional duty imposed on imports of certain organic coated steel products originating in the People's Republic of China

The complaint was received in 2010 from Eurofer representing 70% of European producers of organic coated steel.[249] The investigation period started in October 2010 and ended in September 2011. Products included in the investigation are certain organic coated steel products.[250] The complainant considers the procedure to have worked in a smooth way, and the Commission to have been supportive. The only comment – shared with the general assessment of the EU TDI system – is that provisional measures would better protect the affected sector if they could come at an earlier stage.

Figure 69 compares the imports of organic coated steel products from 2004 to 2012 from both China and the world. As we can see, during the investigation period (2010-2011) the imports increased forcefully compared to previous three years (which were strongly affected by the economic crisis).

Just before the starting of the investigation period, the EU production volume dropped from 4,447,780 tonnes in 2008 to 4,018,310 in 2011. In the meantime, the crisis had spurred a sharp decrease in 2009 (3,514,956 tonnes) and 2010 (3,992,209). During the same period, the production capacity remained quite stable while the capacity utilisation shrunk by 8 percentage points.[251] Sale decreased sharply from 2008 to 2009 (from 2,951,468 tonnes to 2,280,304), bouncing back to 2,592,540 tonnes during the investigation period.

Dumping margins were in the range of 48.9% and 68.1% while subsidy margins in the range of 23.8% and 44.7%. For both procedures, injury margins were calculated in the range of 13.7% and 58.3%. The definitive collection of the provisional duties confirmed that AD duties against the Chinese companies investigated goes from 0% to 26.1% while countervailing duties are now in the range between 13.7% and 44.7%. It is too early to judge the effectiveness of the double duties. However, interested parties are confident that this action will reduce Chinese imports, something that can already be inferred from the trade flows in 2012 (see Figure 69).

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[249] Art (1), Council Implementing Regulation No 241/2013.

[250] Art. 19. The list includes "...flat-rolled products of non-alloy and alloy steel (not including stainless steel) which are painted, varnished or coated with plastics on at least one side, excluding so-called 'sandwich panels' of a kind used for building applications and consisting of two outer metal sheets with a stabilising core of insulation material sandwiched between them, excluding those products with a final coating of zinc-dust (a zinc-rich paint, containing by weight 70 % or more of zinc), and excluding those products with a substrate with a metallic coating of chromium or tin...". The list was amended compared to the products covered by the Provisional Implementing Measure. See Council Regulation (EU) No 845/2012 of 18 September 2012 imposing a provisional anti-dumping duty on imports of certain organic coated steel products originating in the People's Republic of China.

[251] Art. 69 and 70, Regulation (EC) No 214/2013.

Figure 69 Imports of certain organic coated steel products from China and the World (hundred Kg)
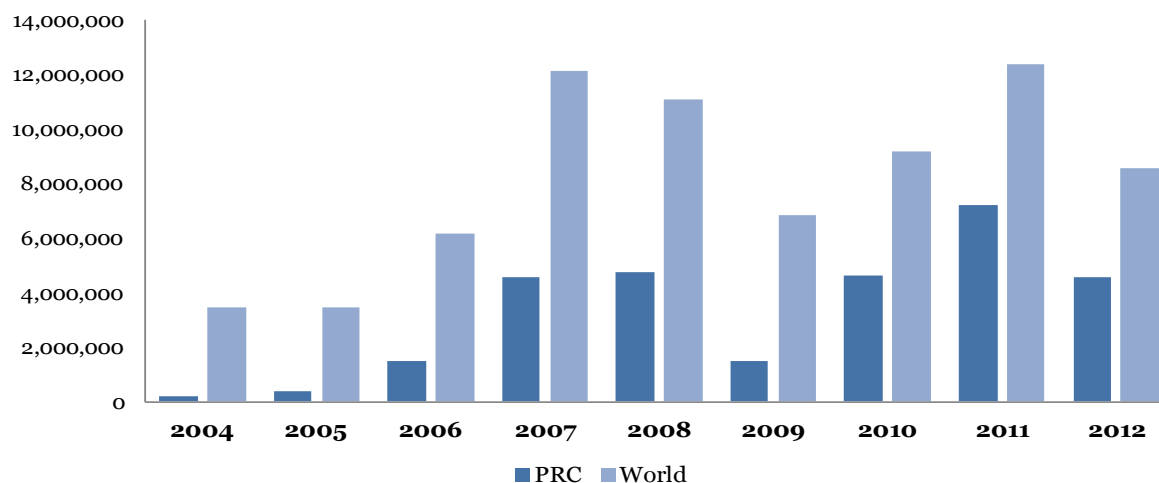
Source: COMEXT (2013)

CASE 2: AD533 Seamless tubes and pipes

As already recalled, the European segment of seamless tubes and pipes is more internationalized than other parts of the steel sector. As shown in Figure 70, since 2007 extra-EU exports of seamless pipes and tubes exceed intra-EU exports. The high exposure to international trade makes the sector more vulnerable to unfair practices, especially as the main commercial partner, that is China, suffers from overcapacity.

The case at hand started in July 2008 against a group of Chinese importing companies of certain seamless pipes and tubes[252] and was first settled in April 2009 by imposing provisional anti dumping-duties ranging from 17.7% to 39.2% (Regulation EC No 289/2009).

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[252] Regulation EC No 289/2009).

Figure 70 Exports and Imports of certain seamless tubes and pipes
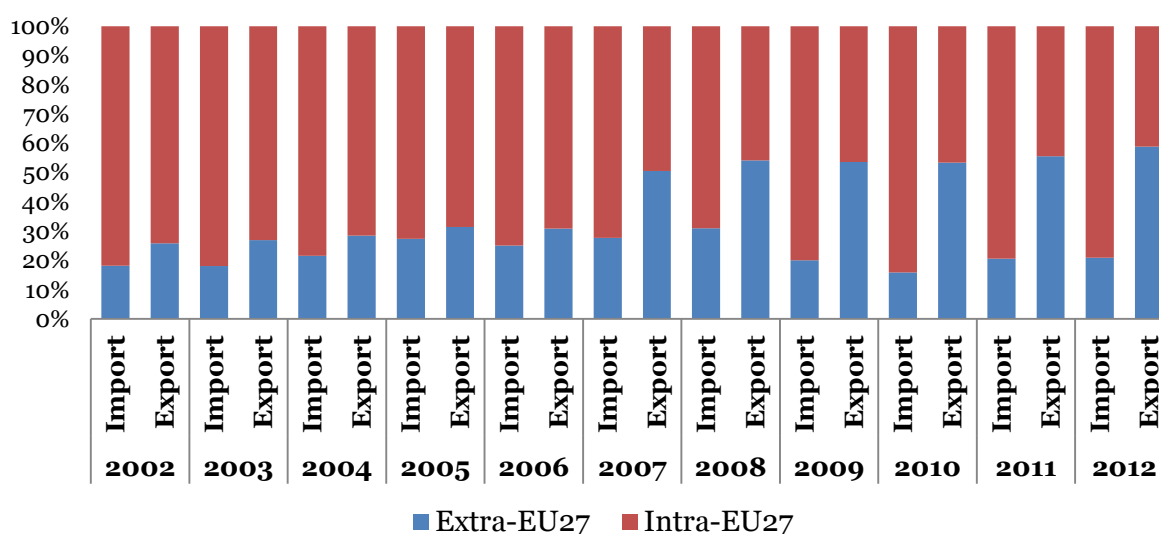
Source: COMEXT, 2013

The definitive collection of the duties has been finally imposed in September 2009 (Regulation EC No 926/2009). A peculiarity of this case is the use of the "threat of injury" concept. This means that EU companies are protected from the injury occurring after the closure of the investigation, rather than from that suffered during the investigation period. According to the data reported in the final Regulation, dumped imports of certain seamless pipes and tube increased sharply at the end of the investigation, taking advantage of a sudden increase in the EU consumption. The investigation concluded that an injury would have occurred in the absence of provisional measures (Art. 114). In this way, the existence of a threat of injury was proved and followed by the imposition of definitive AD duties. The affected companies, together with ESTA – the representative federation of the tube industry – was able to demonstrate that the injury was to be attributed to the imports from China, rather than to the current economic crisis.

The effects of the crisis become apparent when considering the decrease of market size. Indeed, the drop in absolute terms of Chinese imports after the investigation period (ranging from 470,413 tonnes to 306,866), nevertheless resulted in an increase of market share (from 14.9% to 17.8%).

Dumping margins both in the provisional and the definitive regulations were in the range of 64.8% and 73.1% while injury margins from 15.1% to 24.2 %, much lower than the dumping margins[253]. Final collected AD duties went from 17.7% 39.2%. The assessment of

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[253] The application of the lesser duty rule determined therefore a remarkable difference in the antidumping duties that were lower of 33 - 47 percentage points compared to the dumping margins equal to minus 46% - 73%, much higher than the average values in Table 43

the effectiveness of anti dumping measures in this case is clearly effective. After the definitive collection, imports from China did actually lower, and stakeholders tend to directly attribute the reduction to the TDIs imposed, rather than to the overall economic situation.

On safeguards measures

Safeguard measures can be imposed when the EU experiences a sharp increase of imports from non-EU countries that cause a severe injury the domestic market. The Imposition of safeguard measures is regulated by acts, distinguishing either WTO[254] or non-WTO countries.[255] The investigation period usually lasts nine months, and afterwards the EU can impose import or tariff quota for 200 days, and then for four years in case of definitive measures. The import quota is generally equal to the average level of imports over the last three representative years (EC 2013).[256]

Safeguard measures are protectionist restrictions that the EU has not been applying since 2005. In particular, in the steel sector there is a surveillance measure in place since 2002, that, should problems be detected, may result in the imposition of short-term import licensing.[257] According to the Regulation "[t]he situation on the steel market has worsened considerably in 2001 under the combined impact of a number of factors, chief among them being a marked downturn in the world economy". [258] The "steel market has also been unsettled by the uncertainty and hedging caused by the possibility of import restrictions on the US market following the US administration's 'Section 201' safeguard investigation".[259]

The situation is different for EU exporters, as safeguard measures are in place in several third countries, as emerged during the interviews. Currently, definitive measures are in force in Ukraine (imports quotas for seamless pipes); Indonesia (for iron or steel wires, steel wire ropes, iron wires zinc plated and wires of iron), Kazakhstan and Belarus (for stainless steel pipes), Russia (for steel pipes) and a new case is under discussion now in India (seamless tube).

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[254] Council Regulation (EC) No 260/2009 of 26 February 2009 on the common rule for imports.

[255] Council Regulation (EC) No 625/2009 of 7 July 2009 on common rules for imports from certain third countries.

[256] See http://trade.ec.europa.eu/doclib/docs/2013/april/tradoc_151031.pdf.

[257] WTO, Trade Policy Review on the European Union (2011).

[258] Art. 2, Council Regulation (EC) No. 260/2009.

[259] Art. 3, Council Regulation (EC) No. 260/2009

11.1.2 Chinese subsidies to the steel industry

> The government will work out supporting policies, provide favourable taxation terms, subsidized loans and scientific research funds to support large iron and steel projects which are based on newly-developed home-made production equipment.[260]

According to WTO rules, members have to notify their subsidies. China, which acceded the WTO in 2001, submitted a notification of subsidies in 2006 and 2011 with many countries complaining that it was neither complete nor up to date, as reported in our interviews. This led to the US to submit in 2011 a counter notification to the WTO, with all the subsidies of which they have become aware.[261] Secondary research and international trade defence mechanisms found evidences about Chinese subsidy practice for the steel industry.

China is more likely to provide subsidies in those sectors formally defined as "heavyweight" industries and therefore "key pillars" of the Chinese development policy.[262] The steel industry is one of those.

Haley and Haley (2012) consider that the Chinese steel industry has no discernible cost advantage compared to the EU. However, the subsidies that they calculate create a 30% cost differentials. Concerning cost advantages, data presented in Section 1 show that this is true of EAFs, where Chinese steel makers have a higher cost than European companies; however this is not true for BOFs, where Chinese producers have a cost advantage of about 10% compared to Central Eastern Europe, and of 15% compared to Western Europe.

<u>Main actors of the Chinese steel policy</u>

The Chinese steel policies are defined at central level by three governmental organs:

- National Development and Reform Commission (NDRC). NDRC is the successor of the state planning commission. Currently, its role consists in administrating and planning the macroeconomic and industrial development strategies. Representing the most powerful economic policy entity in China, its legal authority allows directly interventions on market processes to foster development. The NDRC drafted the Iron and Steel Industry Development Policies (ISIDP) a comprehensive document of objectives and plans about the Chinese steel sector;

- State-owned Assets Supervision and Administration Commission of the State Council (SASAC). This is a special commission under the State Council, It is responsible for the investments in state owned enterprises, acting as the public shareholder;[263]

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[260] Article 16"Iron and Steel Industry Development Policies" approved in 2005 by the Chinese state council http://www.asianlii.org/cn/legis/cen/laws/pfdoiasi501/

[261] See http://ia.ita.doc.gov/esel/files/china-counter-notification.pdf.

[262] See http://origin.www.uscc.gov/sites/default/files/transcripts/5.24-25.07HearingTranscript.pdf and http://www.cbsa-asfc.gc.ca/sima-lmsi/i-e/ad1371/ad1371-complaint-plainte-07-nc.pdf

[263] Nine of the top 10 Chinese Steel industries where managed by the SASAC in 2007 (see footnote 262 above).

- China Iron and Steel Association (CISA). This is no-profit organization linking the governmental institutions with the steel companies; among its duty, it manages the trade qualifications needed for market access.[264]

Also local governments strongly influence the steel companies. Indeed, steel companies are crucial to ensure employment level in the affected communities. In some cases, local interests may collide with the central macroeconomic policy, generating coordination problems and overcapacity.[265]

The companies are strongly linked with the states structures. The key positions in the top enterprises are hold by members of the Chinese Communist Party, and usually had held important positions in the bureaucracy. These managers are usually selected and monitored by SASAC, as a shareholder would.[266]

Chinese steel policies are currently trying to address two main challenges: fragmentation and value chain improvement. Given the political multilayered structure of China, the steel industry was initially developed at local level through local incentives or plans, and hence was fragmented. After the WTO accession, the NDRC has been promoting a policy of industry consolidation. At the same time, NRDC and CISA are providing incentives and direction for companies to engage in high added value production, hence moving the industry up in the value chain.[267]

Below, different kinds of Chinese subsidies to the steel industries are described, as reported in the Taube and in der Heiden (2008) and Haley and Haley (2012). They have been split between general subsidies, i.e. subsidies which Chinese steel companies may benefit from regardless of whether they produce for the internal or international markets; and specific export subsidies (or taxes).

General subsidies

The Chinese companies reportedly enjoy the following supports regardless of whether their products are for exports or imports:

- Input subsidies. Before China accession to the WTO, local governments used to grant free or under-priced resources to key enterprises, such as:

  o Land. In China the sale of land is not allowed, since the land is considered property of the state; only commercial exploitation or usage rights are legally

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[264] OfficialCisa Site http://www.mmi.gov.cn/

[265] Mark Taube and Peter Thomas in der HeidenThe State-Business Nexus in China's Steel Industry – Chinese Market Distortions in Domestic and International Perspective. (2008) Report prepared on behalf of Eurofer European Confederation of Iron and Steel Industries, Brussels.

[266] For example, the former CEO and President of Baosteel Industries XieQihua had been was formerly a Vice-Premier

[267] Taube and in der Heiden, *supra* note 265.

recognised. During the time of central planning, government agencies simply assigned parcels of land to certain steel plants to set up operations. Steel firms are still enjoying advantages through lower depreciation in the income statements;

o   Water and energy. Chinese prices for water and energy are directly managed by the government, with artificially low prices especially targeting "heavyweight" industries, such as iron and steel.[268] Table 45 below reports the amount of subsidies to the Chinese steel industry as calculated by Haley and Haley 2013 for different kinds of energy inputs.

Table 45 Energy subsidies to the Chinese steel Industry - 2002-2007 ($ mln, current price)

Period	Coking Coal	Thermal Coal	Electricity	Natural Gas	Total
2002	1,148	(604)	2	(31)	515
2003	964	(991)	2	(1)	(26)
2004	1,359	3,423	3	10	4,795
2005	3,933	1,772	304	92	6,101
2006	4,702	731	385	25	5,843
2007	1,774	5,878	215	(28)	7,839
TOTAL	**13,880**	**10,209**	**911**	**67**	**25,067**

Source: Haley and Haley (2013)

-   Unpaid dividends. Many of the SASAC-managed companies do not paid dividends to its major shareholder: the Chinese government;

-   Funds and grants. Chinese steel businesses enjoy a variety of available funds and tax brackets, e.g. local development reasons, "social security" concerns, or innovation investments;

-   Preferential lending policies. Subsidized loan facilities and preferential lending arrangements are available for state-owned production companies. Indeed, as reported by the IMF,[269] the banking sector, even though it is no longer fully in the hands of the central government, has still strong ties with it. Hence, commercial decisions on loans and rates tend to be based more on government planning than market considerations;

-   Capital Market Measures. SASAC-managed steel firms have an easier access to capital at lower costs. For example the biggest Chinese steel company Baosteel combined an equity issue with a declaration from the Chinese government to protect the value of

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[268] "Subsidies to Chinese Industry: State Capitalism, Business Strategy, and Trade Policy"Usha C.V. Haley and George T. Haley (2013)

[269] Podpiera, R., 2006, Progress in China's Banking Sector Reform: Has Bank BehaviorChanged?, IMF Working Paper WP/06/71, p.4, http://www.imf.org/external/pubs/ft/wp/2006/wp0671.pdf

the newly issued shares, 60% of which were bought by another SASAC-managed company. This operation triggered a leverage effect from international investors;

- Tax privileges. The Chinese tax system is based on a tax sharing model between central and local governments. The latter possesses a complete fiscal control over certain tax categories. Steel enterprises benefits from various local corporate tax privileges. Another important branch of tax allowance is the rebate for domestic equipment purchase i.e. if a steel Chinese firm buys equipment from a Chinese supplier, it is entitled to a tax rebate.

Table 46 below reports the amount of subsidies to a sample of steel companies as calculated by Taube and in der Heiden based on official documents and corporate statements.

Table 46 Subsidies on Chinese Steel Industries, 2002-2007

Typology	Sample	Amount ($ mln)
Funds and grants	Listed Corporations	264
Preferential Loans	TOP 15 Steelmakers	15,951
Privileged taxes (corporate taxes)	Listed Corporations	933
Privileged taxation (domestic purchases)	Listed Corporations	411

Note: Exchange Rate 8.265 CNY/US. Source: Taube and in der Heiden (2008)

Trade Subsidies

The Chinese government, through NDRC directives, uses a series of market-based instruments administrated by CISA to control the steel trade flows. The export of steel goods is managed by granting or imposing by VAT rebates, export taxes and export quotas. In general, Chinese trade measures promote exports of high end products, and discourage the exports of low end product or raw materials.

A topical example is the coke export management. In 2005 China employed an export tax of 5% on coke, which was raised to 15% in June 2007 and to 25% in January 2008; meanwhile the export quota was capped at 14 million tonnes per year, which is less than 5% of the total Chinese output.

An example of management through export rebates / taxes is provided in the three figures below. Figure 71 shows the exports of a low added value product: wire rods. Until April 2007, exports of wire rods enjoyed a VAT export rebate, and exports trebled between January 2006 and April 2007. Once this was withdrawn, and later substituted with an export tax, exports fell by two thirds in less than six months.

Figure 71 Chinese exports: wire rods (Jan 2006 = 100)
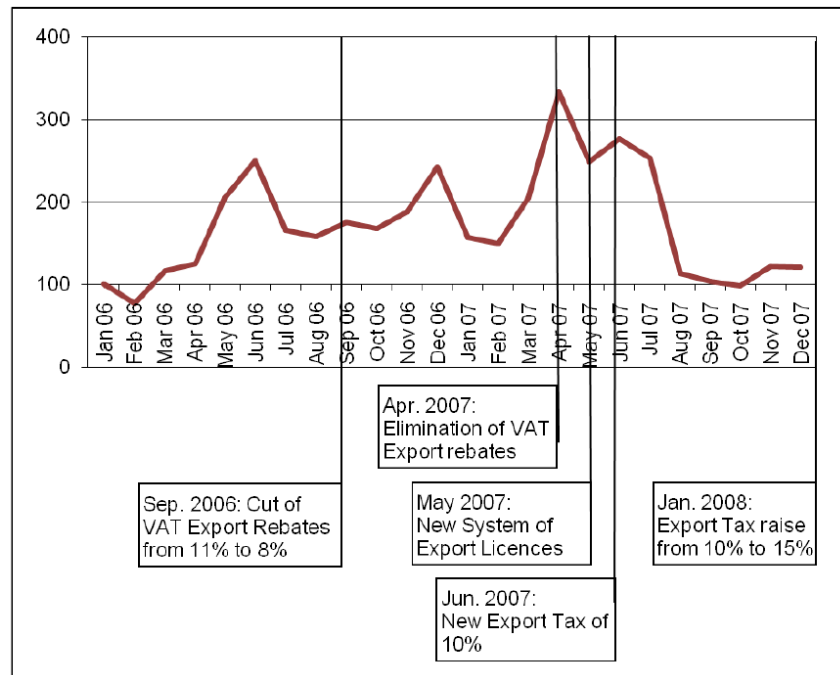
Source: Taube and in der Heiden (2008)

Figure 72 below shows the exports of a high added value product: large metallic coated sheets and strips. Here again, the lowering of the Vat export rebates resulted of a decrease of the index, from almost 600 to about 300.

Figure 72 Chinese exports: metallic coated sheet and strip width >600mm (Jan 2006 = 100)
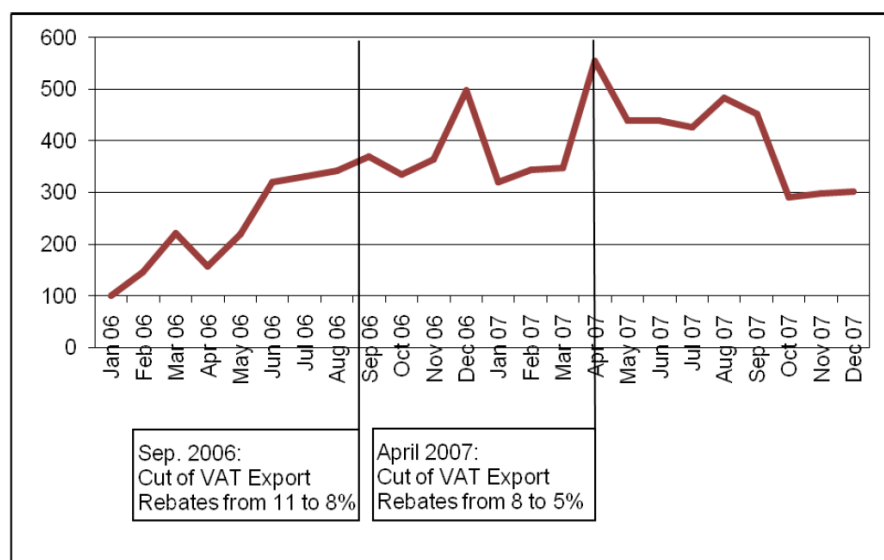
Source: Taube and in der Heiden (2008)

Finally, Figure 73 shows the exports of a high semi finished manufacturing. As for low added value finished products, the Chinese government u-turned its policies: from a VAT exports rebate of 11%, to an export tax of 25%. Quite naturally, exports disappeared, dropping from 1.5MMT in November 2006 to almost 0 at the beginning of 2008.

Figure 73 Chinese exports policies, exports volumes and price movements for billets
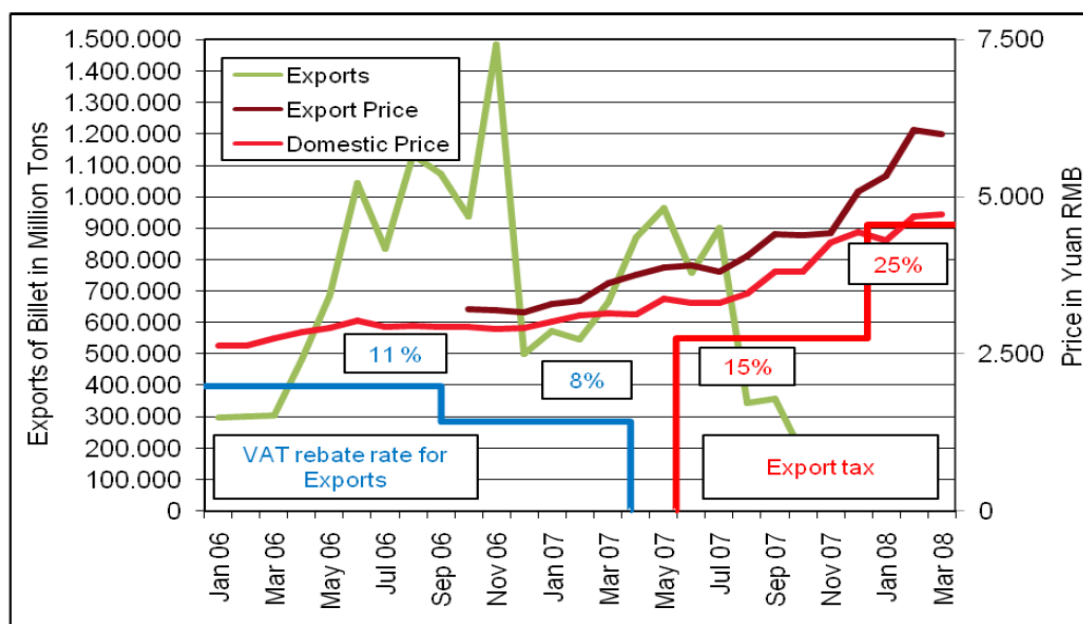
Source: Taube and in der Heiden (2008)

11.1.3 The Generalised Scheme of Preferences (GSP)

The legislative framework[270] that regulates Generalized Scheme of Preferences (GSP) will soon be replaced by a new regulation[271], which will enter into force in January 2014.[272]

GSP is applied to developing countries and grants preferential trade conditions to support growth and development. The countries are divided in three groups: i) Standard GSP (standard generalized preference); ii) GSP+ (special preferences for countries which are economically vulnerable and ratify and implement core conventions on labour and human rights, environment and good governance); and iii) Everything but Arms (duty free quota free exports with the exception of arms and ammunitions, for Least developed countries). The main aim of the reform is to focus preferences on the countries most in need of it. Countries that already enjoy special trade conditions due to bilateral trade agreements or, according to World Bank classification, that are categorized as high or upper middle income will no longer receive GSP preferences, since it is considered that they do not need GSP to be competitive on the EU market. This will create more opportunities for poorer economies, which will instead maintain preferences. The reformed scheme maintains the "graduation system": it excludes from GSP these sectors performing well albeit located in a

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[270] Council Regulation (EC) No 732/2008 of 22 July 2008 applying a scheme of generalised tariff preferences for the period from 1 January 2009 to 31 December 2011 and amending Regulations (EC) No 552/97, (EC) No 1933/2006 and Commission Regulations (EC) No 1100/2006 and (EC) No 964/2007

[271] Regulation (EU) No 978/2012 of the European parliament and of the Council of 25 October 2012 applying a scheme of generalized tariff preferences and repealing Council regulation (EC) No 735/2008.

[272] The Regulation will be rolled over by Council Regulation (EC) No 512/2011.

GSP country, based on the amount of exports, compared to exports from other GSP beneficiary countries.

As for the main trading partners of the EU steel industry, several countries will exit the GSP list, due to the existence of other market access arrangements – such as Algeria, Morocco, Egypt, Tunisia, Mexico and South Africa. Other countries due their income category will see their preferences deferred – such as Argentina, Brazil, and Kazakhstan –.

12 Product policy

12.1 Introduction

EU product policy pursues a dual objective. On the one hand, it aims at increasing the efficient use of resources and at preventing negative consequences for the health of consumers (e.g. in the case of chemicals) and/or for the environment (e.g. the generation of waste). This objective is stated inter alia in the Commission's Green Paper on Integrated Product Policy (IPP) adopted in 2001[273], which led to the EC Communication on IPP of June 2003.[274] On the other hand, product policy aims at ensuring that information on the characteristics of products is available to operators and users, so as to facilitate the uniform assessment of performance. This is particularly the case for product policy in the construction industry, where the theme of product performance is linked to that of competitiveness of industry.

This Section reviews the influence of EU product policy in *three "thematic areas"*, i.e. eco-labelling & eco-design, green public procurement, and life-cycle assessment methodologies, and for *two "product groups"*, i.e. chemical substances and construction products. The analysis focuses on the three 'usual' categories of regulatory costs, namely: (i) compliance costs, i.e. the costs incurred for fulfilling the substantive obligations spelled out in EU legislation; (ii) administrative costs, comprising the costs incurred to fulfil the administrative obligations stipulated in the legislation (e.g. the costs for the registration of certain products); and (iii) indirect costs, which include the costs incurred by steel makers as a result of legislative provisions affecting other entities (e.g. operators at other stages of the production chain). It is important to note that, compared with what done in other parts of this Report, in this Section the notions of compliance and indirect costs have been somewhat broadened, to encompass the (potential) costs that may be incurred by the steel industry as a result of changes in market developments (i.e. substitution of steel with other materials) that may result from EU legislative and policy measures.

This section is structured as follows: (i) Section 12.2 provides a review of the relevant legislation and policy documents, with an assessment of the implications for the steel industry; (ii) Section 12.3 analyzes compliance costs; (iii) Section 12.4 focuses on administrative costs; (iv) Section 12.5 deals with indirect costs.

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[273] European Commission, Green Paper on Integrated Product Policy, Brussels, 07.02.2001, COM(2001)68.

[274] Communication from the Commission, Integrated Product Policy - Building on Environmental Life-Cycle Thinking, 18.6.2003, COM(2003)302.

12.2 Review of Relevant Legislation

12.2.1 Eco-Labelling and Eco-Design

Overview

Ecolabels are voluntary environmental labelling systems, enabling consumers to recognize eco-friendly products. The EU Ecolabel system was set up in 1992: the general legal framework is provided by the **Ecolabel Regulation**[275] while the requirements that have to be met by specific products are spelled out in subsequent Commission Decisions. Key criteria for the award of the EU Ecolabel include: (i) the ecological impact of goods (with reference to climate change, nature and biodiversity, energy and resource consumption, generation of waste, pollution, emissions and the release of hazardous substances into the environment); (ii) the substitution of hazardous substances by safer substances; and (iii) the durability and reusability of products. A related piece of EU legislation is the **Energy Labelling Directive** of 2010,[276] which extends the scope of the energy labelling regime introduced in 2001 and establishes new efficiency classes for the most energy-efficient products. Eco-design aims at reducing environmental impacts of products by incorporating environmental considerations since the earliest stage of design. In the EU policy, so far the focus has been placed on improving product design with a view to reduce energy consumption. The framework is set by the **Eco-design Directive** of 2009,[277] which recast previous legislation on energy-using products[278] and expanded the application of eco-design to energy-related products. Implementing measures for specific products or product groups are presented in the three-year **Eco-design Working Plans**[279] and put into action with subsequent Commission Regulations.

Relevance for the Steel Industry

Being entirely voluntary, **eco-label systems** do not impose any specific obligation on operators and, therefore, they do not have any immediate impact on the steel industry. However, being aimed at orienting consumers' preferences, they may nonetheless exert a significant influence on market developments. This is particularly the case for the EU Eco-label system, which, under certain conditions, may be used in green public procurement

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[275] Regulation (EC) No 66/2010 of the European Parliament and of the Council on the EU Eco-label.

[276] Directive 2010/30/EU of the European Parliament and of the Council on the indication by labeling and standard product information of the consumption of energy and other resources by energy-related products.

[277] Directive 2009/125/EC of the European Parliament and of the Council establishing a Framework for the setting of eco-design requirements for energy-related products.

[278] Directive 2005/32/EC of the European Parliament and of the Council establishing a framework for the setting of eco-design requirements for energy-using products.

[279] Commission Staff Working Document, Establishment of the Working Plan 2012-2014 under the Ecodesign Directive, 7.12.2012, SWD(2012)434.

(see below)[280] and, therefore, has the potential of affecting a substantial share of the market. Therefore, in the case of the steel industry, eco-labelling legislation is relevant to the extent that it may influence the replacement of steel with other materials. A more direct impact on the steel industry <u>may</u> result from the ***eco-design legislation***. In fact, iron and steel furnaces are part of the product group 'Industrial and laboratory furnaces and ovens', which is covered by the Eco-design Working Plan for 2012 – 2014 and for which an implementing measure is expected to be adopted by end 2014. The applicability of the Eco-design Directive to industrial furnaces and kilns is currently challenged by the steel industry (as well as by several other industrial sectors, such as the cement industry, the glass industry, etc.) on grounds that the energy efficiency of these facilities cannot be assessed in isolation (as it is the case for, say, a classical bakery oven) but only as part of a whole production process. In addition, industrial furnaces and kilns are already subject to other EU legislation, either directly (the Industrial Emissions Directive) or indirectly (via the emission trading mechanism under the ETS Directive), and making them subject also to the Eco-design Directive would result in the possibility of conflicting provisions.[281] At the time of writing, the issue is still under discussion.

12.2.2 Green Public Procurement

<u>Overview</u>

The concept of green public procurement (GPP) refers to the development of criteria that minimize the negative externalities on the environment of public expenditure on goods and services. At the EU level, an early reference to GPP can be found in the ***Communication on Sustainable Europe*** of 2001, which encouraged Member States to make better use of public procurement to favour environmentally-friendly products and services.[282] The first operational indications on how to implement GPP were provided by an ***Interpretative Communication on public procurement rules***, also adopted in 2001, which explained the possibilities offered by current legislation of taking into account environmental considerations in public purchases.[283] This was followed by (i) the incorporation GPP-related aspects in the revision of the Public Procurement Directives

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[280] On the use of the EU Ecolabel in public procurement see http://ec.europa.eu/environment/ ecolabel/ecolabel-and-green-public-procurement.html as well as the fact sheet included in the GPP Toolkit (EC, Green Public Procurement and the European Ecolabel - Fact sheet, 2008).

[281] The position of the industry was illustrated in a letter to Commissioner Tajani on 9 April 2013 accompanied by a position paper supported by Eurofer and eleven other European industry associations ("Custom designed industrial kilns and furnaces are already sufficiently regulated – an eco-design regulation for these installations is not needed", April 2013.

[282] Communication from the Commission, A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development, 15.5.2001, COM(2001)264.

[283] Interpretative Communication of the Commission on the Community law applicable to public procurement and the possibilities for integrating social considerations into public procurement, 15.10.2001, COM(2001)566.

approved in 2004,[284] and (ii) the formulation of a comprehensive approach towards GPP in the Communication on 'Public procurement for a better environment' ('GPP Communication') adopted in 2008.[285] The **Public Procurement Directives** contain several references to GPP, including specific provisions on (i) the inclusion of environmental requirements in technical specifications (Article 23(3)b); (ii) the use of eco-labels (Article 23(6)); (iii) the setting of social and environmental conditions for the performance of contracts (Article 26); (iv) the requirement for economic operators to demonstrate they have met their environmental obligations (Article 27) and that they can perform a contract in accordance with environmental management measures (Articles 48(2)f and 50); and (v) the inclusion of environmental characteristics among the criteria that may be taken into consideration in the case of award procedures adopting the 'most economically advantageous' approach (Article 53). The **GPP Communication** seeks to foster a wider use of GPP by Member States through the identification of common 'GPP criteria', with special reference to a set of 'priority sectors' where GPP is deemed capable of yielding the greatest potential impact.

Relevance for the Steel Industry

As in the case of eco-labelling discussed above, the EU legislation on GPP does not impose any obligation on operators and therefore it exerts only an indirect impact on the steel industry, by influencing market developments. So far, this indirect impact has been relatively limited, due to two factors. First, **most of the priority sectors for which GPP criteria have been devised have a 'distant' relationship with the steel industry** and this is reflected in the nature of GPP criteria. There are instances when the linkage is stronger, namely in the case of the criterion 'use of environmental friendly materials' in the construction industry, but even in this case steel is only one of the many materials to be considered (and, in any event, a large share of steel used in construction is indeed the result of recycling and, therefore, can qualify as being environmental friendly). Second, **the uptake of GPP principles is still relatively modest across the EU**, with most public authorities making reference to only some of the GPP criteria, which obviously reduces the magnitude of whatever impacts may occur.[286] For instance, in the case of the construction industry, the 'use of environmental friendly materials' criterion was present in less than one third of a sample of public procurement contracts in 2009 – 2010 period. The situation may however change in the future, as the interaction between GPP and eco-labelling (as well as other pieces of EU legislation) is expected to become

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[284] Directive 2004/17/EC of the European Parliament and of the Council coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors; and Directive 2004/18/EC of the European Parliament and of the Council on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts.

[285] Communication from the Commission, Public procurement for a better environment, 16.7.2008, COM(2008)400.

[286] For a recent analysis of the utilization of GPP criteria see CEPS and College d'Europe, The Uptake of Green Public Procurement in the EU27, report submitted to DG Environment, 29 February 2012.

more pervasive. In particular, negative consequences may emerge in the case of steel products that incorporate substances subject to 'special attention' (such as those placed on the candidate list under REACH, see below), which may trigger substitution with other materials.

12.2.3 Life-Cycle Assessment Methodologies

Overview

Life-cycle Assessment (LCA) is a methodology to assess environmental impacts associated with the various stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling. Early LCA analyses focused on energy consumption, but the methodology was quickly extended to encompass air emissions, waste water and solid waste.[287] LCA is often mentioned in EU product policy. The carrying out of LCA analyses was already envisaged by the **Directive on Packaging and Packaging Waste** of 1994[288] while the already mentioned **Communication on IPP**[289] of 2003 qualified LCA as "the best framework for assessing the potential environmental impacts of products currently available" (page 10). More recently, recourse to LCA was also emphasized in the **Resource-efficient Europe Flagship Initiative**,[290] which recognizes the "need to consider the whole life-cycle of the way we use resources, including the value chain and the trade-offs between different priorities" (page 4). However, there are instances in which a less comprehensive approach to the assessment of environmental impacts is adopted. This is the case of the **Vehicles Emissions Regulations**, i.e. the regulation on CO_2 emissions from passenger cars of 2009[291] and its counterpart for vans of 2001[292], where emissions are considered only for the usage phase, adopting the so called 'tailpipe' approach. In other cases, EU policy relies on variants of the LCA approach that attribute different weights to various forms of end-of-life treatment of materials (e.g. recycling vs. recovery). This is the case, in particular, of the methodology proposed in the recent **Communication on the Single Market for**

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[287] For a review of early developments in LCA, see Boustead I, "LCA - How it Came About, The Beginning in the UK", *The International Journal of Life Cycle Assessment*, volume 1, issue 3, 1996. For a comprehensive review of LCA, see European Environment Agency, Life Cycle Assessment - A guide to approaches, experiences and information sources, Environmental Issues Series n° 6, August 1997.

[288] European Parliament and Council Directive 94/62/EC on packaging and packaging waste.

[289] Communication from the Commission, Integrated Product Policy - Building on Environmental Life-Cycle Thinking, 18.6.2003, COM(2003)302.

[290] Communication from the Commission, A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy, 26.1.2011, COM(2011)21.

[291] Regulation (EC) No 443/2009 of the European Parliament and of the Council setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles.

[292] Regulation (EU) No 510/2011 of the European Parliament and of the Council setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO_2 emissions from light-duty vehicles.

Green Products,[293] which attributes only partial credit to recycled materials as opposed to the full credit granted to energy recovery.

Relevance for the Steel Industry

The steel industry makes substantial use of recycled materials, namely in the form of scrap metal, and therefore the use LCA methodologies is generally seen with favour by steelmakers. Indeed, steel industry associations at the European and world level have been quite active in promoting the utilization of LCA.[294] However, there are still differences in the concrete application of LCA and the use of different methodological approaches may yield substantially different results for final products made of steel. To the extent that results of LCA exercises are expected to exert an influence on consumers' behaviour, the adoption of LCA methodologies that do not (fully) take into account the recyclability of steel may favour the utilization of alternative products, with a negative impact on steel sales.

12.2.4 Chemical Products

Overview

The production and use of chemical products ("substances") and their potential impacts on both human health and the environment is addressed by the ***Regulation on the Registration, Evaluation, Authorization and Restriction of Chemical Substances*** (REACH Regulation).[295] The purpose of the Regulation is "to ensure a high level of protection of human health and the environment, including the promotion of alternative methods for assessment of hazards of substances" (art. 1). This objective is to be attained through the better and earlier identification of the intrinsic properties of chemical substances. To this effect, the REACH Regulation introduces a system of registrations and authorizations for all the chemical substances and the objects containing chemical substances produced or otherwise supplied in the EU. Operational tasks related to the implementation of the REACH Regulation are entrusted to the European Chemicals Agency (ECHA), a decentralized EU agency. Approved at the end of 2006, the REACH Regulation entered into force on 1 June 2007 and its provisions are to be gradually phased-in over an eleven years period, until 2018.

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[293] Communication from the Commission, Building the Single Market for Green Products - Facilitating better information on the environmental performance of products and organisations, 9.4.2013, COM(2013)196.

[294] The World Steel Association has been particularly active on this front, with the development of methodological guidance materials. See in particular World Steel Association, Life Cycle Assessment Methodology report, 2011 as well as the position paper World Steel Association, Life cycle assessment in the steel industry, January 2010.

[295] Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

<u>Key Provisions</u>

The key principle of REACH is that ***the marketing of substances that have not been registered with ECHA is unlawful***, in line with the "no data, no market" principle (art. 5). Registration is the responsibility of producers and importers, which can act individually or collectively, through the mechanism of "joint submissions" (art.11). To simplify the registration process, all the manufacturers, importers and other entities dealing with the same substance are required to form the Substance Information Exchange Forums (SIEF). The ***registration process is to be implemented in stages***, depending upon the volume marketed in the EU. Substances with an annual tonnage in excess of 1,000 tons (the so called 'first tonnage band') were to be registered by the end of November 2010. The deadline for the registration of substances with a tonnage between 100 and 1,000 tons ('second tonnage band') was end May 2013, while substances traded in amounts between 1 and 100 tons ('third tonnage band') will have to be registered by May 2018. While the REACH Regulation applies to all chemical substances (estimated to be in excess of 140,000), ***special provisions are envisaged for the so called "Substances of Very High Concern"*** (SVHC), which are subject to a specific authorization mechanism, ***and for high risk substances***, whose placing on the market may be subject to restrictions. Another key feature of the REACH Regulation is the requirement to ***communicate information on substances up and down the supply chain***. This is aimed at ensuring that manufacturers, importers and the "downstream users" are aware of the information relating to health and safety of the products supplied.

<u>Relevance for the Steel Industry</u>

The REACH Regulation deploys its effects across all sectors and has a significant influence on the steel industry: steel makers are subject to registration requirements for certain products and to the obligation of providing information to downstream users while the utilization of several substances used in the steel making process maybe subject to authorization or restrictions. Regarding ***registration***, the key raw materials (mineral ores, ore concentrates, coal, coke, etc.) are exempted and the same applies to the bulk of the industry's output, which is mostly comprised of 'articles', i.e. objects whose shape, surface or design are more important than the chemical composition in determining the function and utilization. In practice, steel makers are required to register: (i) some intermediate products, namely sinter and some liquid or solid iron products when they have no particular shapes (e.g. pig iron, directly-reduced iron, hot-briquetted iron) and are manufactured from non-recovered sources, and (ii) by-products (such as coke oven by-products), to the extent that they are placed on the market (i.e. they have a non-waste status). The requirement to provide ***information to downstream users*** entails the development and dissemination of technical documentation to ensure the safe use of products. However, the classification of steel products as 'articles' in most cases results in lighter information requirements compared with what envisaged for substances. Potentially more far reaching effects are associated with the ***authorization and restriction mechanism***, as it may influence the availability of some key substances used

in the steel making process. In case a certain substance becomes unavailable, it is necessary to look for alternatives, which given the complex nature of the steel making process, usually entails a significant increase in costs. Potentially even more important, the authorization/restriction mechanism may influence market developments, as users of certain steel products may be induced (due to cost and/or quality considerations) to consider switching to alternative products.

12.2.5 Construction Products

<u>Overview</u>

EU initiatives in this area concern the performance of products used by the construction industry, including steel products, as well as the environmental performance of buildings. The main legislative measures and policy initiatives include: (i) the Strategy for the competitiveness of the construction sector;[296] (ii) the Directive on the energy performance of buildings;[297] and (iii) the Construction Products Regulation.[298] The ***Strategy for the competitiveness of the construction sector*** addresses the broad theme of the development of the construction industry. Adopted in mid 2012, the Strategy formulates a number of proposals for short and medium-long term measures aimed at increasing the contribution of the construction sector to Europe's sustainable growth. In this context, special emphasis is placed on the issues of improving resource efficiency and environmental performance. The achievement of higher levels of energy efficiency (the "nearly-zero energy building" concept) is the objective of the ***Directive on the energy performance of buildings***. A recast of previous legislation from the early 2002, the Directive lays down a comprehensive framework to achieve the target of 'nearly-zero energy buildings' by 2020. In particular, the Directive requires Member States (i) to develop a methodology for calculating the energy performance of buildings, (ii) to set minimum requirements for energy performance in order to achieve cost-optimal levels, and (iii) to establish a system for the energy performance certification of buildings. The theme of product performance is addressed by the ***Construction Products Regulation***, whose purpose is to create a set of "harmonised rules on how to express the performance of construction products in relation to their essential characteristics" (art. 1). To this effect, the Regulation provides a 'common technical language' on the performance of products that can be used by all parties involved and establishes a system for attesting the performance of products, in particular through the generalization of the use of the CE Mark.

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[296] Communication from the, Strategy for the sustainable competitiveness of the construction sector and its enterprises, 31.7.2012, COM(2012)433.

[297] Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings (recast).

[298] Regulation (EU) No 305/2011 of the European Parliament and of the Council laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

<u>Relevance for the Steel Industry</u>

The **Strategy for the construction sector** and the **Directive on the energy performance of buildings** have only a limited, indirect influence on the steel industry. For instance, the Strategy emphasizes the re-use, recycling and recovery of construction and demolition waste, including metal. However, the matter is extensively covered by other pieces of EU legislation (i.e. the Waste Framework Directive) and the Strategy only reiterates the objectives previously set. More directly relevant is the **Construction Products Regulation**, which is immediately applicable to operators and extends to steel products used in the construction industry. In particular, the Regulation introduces the mandatory CE-marking for all construction products starting from 1 July 2013 and from 1 July 2014 for fabricated structural steel works. At the same time, the Regulation entails a simplification of the pre-existing legal framework, with the elimination of inconsistencies and the harmonization of procedures, thereby reducing the administrative burden placed upon producers.[299]

12.3 Assessment of Compliance Costs

12.3.1 Introduction

Compliance costs refer to the expenses incurred by operators to fulfill the substantive obligations spelled out in the EU legislation. These costs typically take the form of incremental operating and/or investment costs. However, whenever the regulatory regime exerts an influence on market developments, operators may also face additional costs, in the form of reduced or missed business opportunities. In the case of EU product policy, compliance costs for steel makers originate primarily from the legislation regulating the production, use and commercialization of chemical products, i.e. the REACH Regulation. The concept of compliance costs is in principle applicable also to measures regulating construction products, although – as it will be shown below – in practice the magnitude of these costs appears to be negligible. Instead, no compliance costs are connected with EU actions in eco-labelling, green procurement and LCA, as the relevant legislative and policy documents do not impose any specific obligation upon the operators.

12.3.2 Compliance Costs Linked to the REACH Regulation

In the case of the REACH Regulation compliance costs refer to the **expenditures associated with the need to replace chemical substances whose utilization has not been authorized or is subject to restrictions**. Given the complex nature of the steel making process (especially in the case of integrated producers), the replacement of substances is generally an intricate matter, as usually there are no viable alternatives that can be bought 'off shelf'. In most cases, the replacement of substances implies significant changes in the production process, usually entailing an increase in operating

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[299] On this point, see Eurofer, Annual Report 2009, page 18.

costs and, at times, requiring some investments.[300] In other cases, substitution may be technically feasible and not too onerous, but may affect the properties of the final product, which may or may not be acceptable by customers.[301] The authorization mechanism established by the REACH Regulation is not yet fully operational and so far no authorization has been granted or denied. Similarly, the restrictions on the use of dangerous substances imposed under REACH do not seem to have affected any important substance used by the steel industry. However, ***the simple nomination of certain substances for future authorization*** (i.e. the placing of substances on the so called 'candidate list') ***is generating an 'announcement' effect, triggering the removal of certain substances from the market even before any decision is formally made***. The problem was already indentified by earlier studies[302] and is confirmed by steel industry representatives, who lately have been notified of the upcoming withdrawal of some substances (e.g. nickel salts used in the electro-deposition process for metallic coatings).[303]

According to industry representatives, ***the 'announcement' mechanism may also influence the behaviour of downstream users of steel products, with potential consequences on market developments***. This is particularly the case of steel products used for consumer products (e.g. tin cans), as downstream users are obviously very sensitive to anything even remotely linked to consumers' health and safety. In these cases, irrespective of the actual risk profile of the final steel products, the uncertainties associated with the authorization process and/or the inability to quickly find

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[300] For instance, one of the steel companies interviewed mentioned the case of the replacement of a certain pigment, which entailed an increase in operating costs in the order of € 2 million/year, plus an increase in the use of energy (with the new substance, more paint has to be applied, which requires more spraying).

[301] This is the case, for instance, of the replacement of certain substances in the production of some steel products used in the construction industry. Although the structural features of the products remain the same, additional precautions have to be adopted in storage, and this is resisted by customers in the construction industry, who tend to favor sturdier products.

[302] See CSES, Interim Evaluation: Functioning of the European chemical market after the introduction of REACH, 30 March 2012 and CSES, Interim Evaluation: Impact of the REACH Regulation on the innovativeness of the EU chemical industry, 14 June, 2012. The latter report, in particular, notes that "Premature de-selection of substances ("blacklisting") is also a major issue" (page vii) and that "A further result has been the "blacklisting" of substances used in sectors such as metals, construction chemicals, printing inks, or paints and coatings. Companies decide to remove substances or not to use them to avoid the extra costs of compliance related to use of those substances" (page 71).

[303] It should be noted that the 'announcement' effect associated with the 'candidate list' is not a novelty and indeed its possible role in accelerating the replacement of unwanted substances was extensively analyzed in the preparatory works for the REACH Regulation. See in particular Ökopol, Case study on "Announcement effect" in the market related to the candidate list of substances subject to authorisation, January 2007. Based on the analysis of other 'substance lists' used in various countries, the study concluded that "The candidate list will be appreciated as an EU-wide agreed list and implemented as a black list by many companies. This way substitution of identified SVHC will be promoted" (page 13).

suitable substitutes for substances placed on the 'candidate list' might trigger the substitution of steel with other materials, with potentially negative effects on sales.[304]

Overall, between one third and one half of the substances placed on the 'candidate list' are considered to be relevant to the steel industry (chromate compounds, cobalt salts, lead compounds, borates, RCF, coal tar pitch, etc.) and EU steelmakers are obviously concerned about the possible long term consequences of the REACH authorization mechanism. Some estimates provided by the industry, referred to a selection of substances and products, put at € 100 to 200 million/year the future potential loss due to problems linked to the need of replacing substances on the "candidate list". As these figures could not be independently verified during the study, further analysis would be necessary in order to verify any side-effects of the REACH regulation on steelmakers.

12.3.3 Compliance Costs Linked to the Construction Products Regulation

In the case of construction products, ***compliance costs refer to the expenses incurred (i) to ensure that the products display the required properties (the "essential characteristics"); and (ii) in documenting the performance of products***. Regarding the first aspect, the Construction Products Regulation does not seem to have had any material impact, as the 'essential characteristics' are specified in harmonized standards that have been gradually developed over more than a decade in the framework of the previous Construction Products Directive. The main innovation introduced by the Regulation concerns the mandatory use of the CE Mark to attest the certified performance of products. However, even the CE-marking is not a major novelty, as the system was already in use in most Member States under the previous Directive, with the only exception of Sweden, Finland, Ireland and the United Kingdom. This is particularly the case of the steel industry, where the use of the CE Mark is quite widespread for a variety of products, including those used in the construction sector.[305] Even in countries where the CE Mark was not mandatory, the system seems to have been used by leading producers on a voluntary basis.[306] Overall, ***the EU legislation on construction products does not seem to have resulted in significant incremental costs for the steel industry***.

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[304] This point was also noted by earlier studies, in particular in the above mentioned study from CSES on the innovativeness of the EU chemical industry ("there is a great deal of unease in the industry about the candidate list as we have been told repeatedly that [downstream users] and final customers often have very little understanding of what the candidate list actually means: the substances in question have not yet been evaluated but they are considered unsafe. So there are often "unwarranted" requests for their removal", page 71).

[305] The earliest reference to the CE-marking of steel products for construction located during the study dates back to the late 1990s, when Eurofer was announcing that, following to the completion of the relevant standardization work, "CE-marked steel products may be available in 2001" (see Eurofer, Annual Report 1999, Brussels, 2000, page 30).

[306] For instance, already in 2006 (i.e. five years before the approval of the Regulation) Corus UK was reporting to have "independent approval to CE-mark its hot-rolled structural steels" (see Corus Strip Products UK, CE marking for steel, 2006).

12.4 Assessment of Administrative Costs

12.4.1 Introduction

Administrative costs refer to the expenses incurred operators to fulfill the administrative requirements spelled out in legislation (e.g. the registration with a certain entity, the provision of information, etc.). Administrative costs may include a wide range of cost items, from the payment of registration fees to the cost of personnel handling the relevant administrative procedures. In the area of product policy, the main source of administrative costs is the REACH Regulation. In the case of the legislation on the construction products, administrative obligations (e.g. the issuance of the declarations of performance, which leads to the affixing of the CE Mark) are not easily separable from compliance costs, which – as indicated in the previous section – are regarded to be of limited importance. The other pieces of product legislation do not impose specific requirements upon operators and therefore do not give origin to administrative costs.

12.4.2 Administrative Costs Linked to the REACH Regulation

The analysis of administrative costs linked to the REACH Regulation focused on six main types of obligations, namely: (i) the registration of substances; (ii) the updating of registrations; (iii) the pre-registration of substances; (iv) the notification of SVHC in articles; (v) the requirement to provide information to downstream users; and (vi) the submission of documentation as part of the authorization/restriction process for dangerous substances. The analysis focuses primarily on the costs incurred since up to end 2012, although some indications are also provided regarding future costs. The information used in the analysis was largely obtained from industry sources (Eurofer and interviews with individual steel makers), with some additional elements derived from ECHA reports and earlier evaluations of REACH.[307] The key parameters used in the analysis are presented in Box 6 here below.

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[307] Reference is made in particular to ECHA, Registration Statistics, 5 April 2013; ECHA, Evaluation under REACH - Progress Report 2011, 2012; and CSES, Interim Evaluation: Functioning of the European chemical market after the introduction of REACH, 30 March 2012.

Box 6 Administrative Costs Linked to REACH - Key Parameters

Registration of Substances – First Tonnage Band

The registration of substances involves the submission of an application to ECHA, supported by technical documentation. In the case of the registration for the first tonnage band (i.e. up to end 2010), the steel industry took responsibility for 9 SIEF, whose activities were coordinated by three large companies acting as Lead Registrants (ArcelorMittal for iron and compounds, Corus for iron oxides, ThyssenKrupp for steel slags). However, steel companies also participated in a non leading position in the registration of other substances. Overall, the steel industry is estimated to have contributed to the registration of about 20 substances, with a total of some 200 – 250 dossiers submitted. According to Eurofer, the costs incurred by the three Lead Registrants were in the € 22 to 30 mln range, including ECHA registration fees, the cost for the functioning of SIEF, and the cost for background studies. These figures also include part of personnel costs, which however cannot be determined accurately, due to the large number of functional units involved in the process. Considering the likely underestimation of personnel and, more importantly, the costs incurred by steel makers participating in other SIEF not in a leading position, the total administrative costs incurred by the steel industry for the period up to end 2010 can be guess estimated at € 50 mln.

Registration of Substances – Second and Third Tonnage Bands

Costs for the second and third tonnage bands (i.e. over the 2011 – 2018 period) are expected to be much lower, due to the limited number of substances concerned. Still, the steel industry is taking responsibility for the registration of some imported substances for which the producers are unwilling to sustain the registration costs in view of the shrinking EU market. Overall, administrative costs are guess estimated at one tenth of the value recorded for the first registration period, i.e. € 5 mln, of which € 2 mln for the period 2011-2012 and € 3 mln for the 2013-2018 period.

Updating of Registrations

Registrations have to be periodically updated, to reflect new empirical evidence on the effects of substances. This involves the modifications of dossiers submitted at the time of the initial registration. Updating may also be requested by ECHA. The frequency of updating varies. For instance, the dossiers for iron substances are expected to be updated in 2013 for the first time since the initial registration in 2010. The same applies to the five dossiers for ferrous slag, which will have to be updated for the first time due to the availability of new study results. Previously, the dossiers for coke-oven products had to be updated significantly upon request from ECHA. The costs of updating includes two components, namely (i) a variable cost, linked to the expenditures incurred for the updating of specific dossiers, and (ii) a fixed cost, linked to the constant monitoring of developments for various substances, carried out by consortia of producers. Both variable and fixed costs vary, depending upon the nature of the updating and the more or less elaborate structure of consortia. Overall, the administrative costs of updating can be assumed to be in the order of € 1 mln/year. This implies a total cost of € 2 mln for the period up to 2012 and of € 6 mln for the 2013-2018 periods.

Pre-Registration of Substances

During the pre-registration phase, operators were required to submit applications with ECHA through a dedicated IT system. The number of applications received by ECHA was quite substantial, about 2.7 mln, i.e. 15 times larger than initially envisaged, as many operators tended to adopt a 'just in case' approach. Pre-registration was the first stage in the implementation of REACH and de facto coincided with the familiarization with the regulation. The parameters used for the analysis are as follows:

- **Population**: the number of pre-registrations made by the steel industry is not known. According to industry sources, it is possible that steelmakers have pre-registered a large number of substances as a precautionary measure. For instance, a single company is reported to have pre-registered no less than 800 substances. Another source mentions the case of a large manufacturer of basic metals pre-

registering around 50 substances. For the purpose of the exercise, <u>a total of 5,000 pre-registrations for the whole steel industry was assumed</u>;

- **Frequency**: pre-registration <u>occurred only once</u>, in the period between 1 June and 1 December 2008;

- **Costs**: pre-registration did not involve the payment of any fee to ECHA and the costs incurred by operators were essentially linked to the human resources devoted to the process. As pre-registration was the first step in the implementation of REACH, operators also had to spend time to understand the obligations under the Regulation, and to collect data. Based on the little information presented in earlier studies, <u>a cost of € 1,000 per pre-registration was assumed</u>.

Notification of SVHC in Articles

Notification is mandatory when 'articles' contain more than one tonne per year or when the concentration in articles is more than 0.1% weight by weight. Notification can be avoided if the producer or importer can demonstrate that there is no exposure to humans or the environment during normal and foreseeable conditions of use (including disposal). Notification affected only marginally the steel industry, as the presence of certain SVHC (e.g. chromium trioxide) was already well documented in registration dossiers, and limited effort was required. Overall, industry sources regard the administrative costs linked to the notification process as marginal and, therefore, <u>this item was not included in the analysis</u>.

Provision of Information to Downstream Users

The REACH Regulation requires operators supplying dangerous substances to provide information to downstream users in the form of Safety Data Sheets (SDS). However, this applies to only some steel makers, typically using the BOF route. Manufacturers of articles, the most common situation in the steel industry, are subject to lighter requirements, i.e. the provision of information to permit safe use and disposal, which is done through the so called Safety Information Sheets (SIS). In the case of some products (namely, stainless steel) the template SIS was developed by Eurofer, while individual steel makers took responsibility of developing SIS for other products. The parameters used for the analysis are as follows:

- **Population**: based on industry sources, the <u>number of substances requiring an SDS is estimated at 875</u>, assuming an average of 25 substances requiring an SDS for each of the 35 BOF plants in operations. The number of SIS is impossible to estimate with any degree of precision, due to a variety of factors (the number of products requiring a SIS varies across companies, the same – or very similar - SIS might have been used by companies belonging to the same group, etc.). For the purpose of the study, <u>a guess estimate of 3,700 SIS was retained</u>, assuming an average of 20 articles requiring a SIS for each of the 185 steel plants (BOF and EAF) in operation;

- **Costs**: little information is available of the costs of SDS/SIS. Earlier studies suggest the existence of significant variations: for instance, some companies had to invest in IT applications to help in the development of large numbers of SDS while others relied on external experts producing SDS for as little as € 200 apiece (plus translation costs, in the order of € 100 – 300 per language). For the purpose of this exercise, the unit cost of SDS was guesstimated at <u>€ 2,000</u> while SIS was assumed to cost <u>€ 1,000 apiece</u>.

Preparation of Dossiers Authorization and Restrictions

The authorization and restriction processes require on intensive interaction with the operators concerned, involving the submission of fairly complex dossiers (including a detailed analysis of the effects of substances, a socio-economic analysis, etc.). So far the number of authorization dossiers submitted by the steel industry is fairly small, seemingly less than ten. The cost for the preparation of dossiers is extremely variable, depending upon a number of factors (the intrinsic complexity of the matter, the number of companies having an interest in the substance, the level of familiarity of interested companies in working together, etc.) and is

usually spread over several years. Examples offered by industry representatives range from a minimum of € 100,000 for a very simple dossier submitted by a single company to an estimated € 3 mln (possibly more) in the case of a dossier involving a large number of companies (about 150), with an intermediate value of about € 300,000 for a moderately complex dossier developed by a fairly small groups of operators with good experience in working together. [308] Based on these parameters, the <u>administrative costs incurred by the steel industry for the period up to 2012 were grossly estimated at some € 5 mln</u>. This figure is likely to increase considerably in future years, as the attention will be gradually focused on the many other substances that are of potential interest for the steel industry but, given the extreme diversity of situations that could emerge, no estimate can be provided.

Based on the above parameters, ***total administrative costs incurred by the steel industry up to end 2012 in connection with the REACH Regulation can be estimated at about € 69.5 mln***. About three quarters of these costs refer to the registration process proper, with pre-registration and the updating of registrations cumulatively accounting for another 10%. The provision of information to downstream users and the preparation of authorization dossiers account for the remaining 15%. Data for BOF and EAF producers are available separately only for some cost items of limited importance, namely the cost of providing information to downstream users. However, available information suggests that BOF producers are significantly more affected by the REACH Regulation than their EAF counterparts. Overall, administrative costs for BOF plants can be roughly estimated at about € 50 mln, while the corresponding figure for EAF producers is € 19.5 mln.[309]

Table 47 Summary of Cumulated Administrative Costs Linked to the REACH Regulation (€ mln)

Cost Items	Costs Incurred up to end 2012	Expected Costs for the 2013 – 2018 Period
Registration of Substances	52.0	3.0
Updating of Registrations	2.0	6.0
Pre-registration of Substances	5.0	0.0
Provision of Information to Downstream Users	5.5	n.a. (presumably very low)
Preparation of Dossiers Authorization and Restrictions	5.0	n.a. (presumably quite substantial)
Total	**69.5**	**n.a.**

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[308] In principle, some of the costs incurred by consortia can be recouped by charging fees for the letters of access. However, this simply shifts (part of) the costs among the various players, without altering the overall cost borne by the industry.

[309] Based on the assumption that BOF producers account for 75% of the costs not related to the provision to downstream users.

Although the Regulation was approved at end 2006, administrative costs were mostly incurred over the five-year period spanning from 2008 through 2012, probably with a peak in 2010, in correspondence with the deadline for the registration of substances falling in the first tonnage band. Average annual costs for the period are in the order of € 14 mln per year. When compared with the average crude steel output for the period, *average annual administrative costs can be estimated at about € 0.08 per tonne*, with a higher value for BOF producers, about € 0.10/tonne, and a significantly lower figure for EAF, around € 0.05/tonne.

Figure 74 Annual Average Administrative Costs of REACH Regulation (€/tonne)
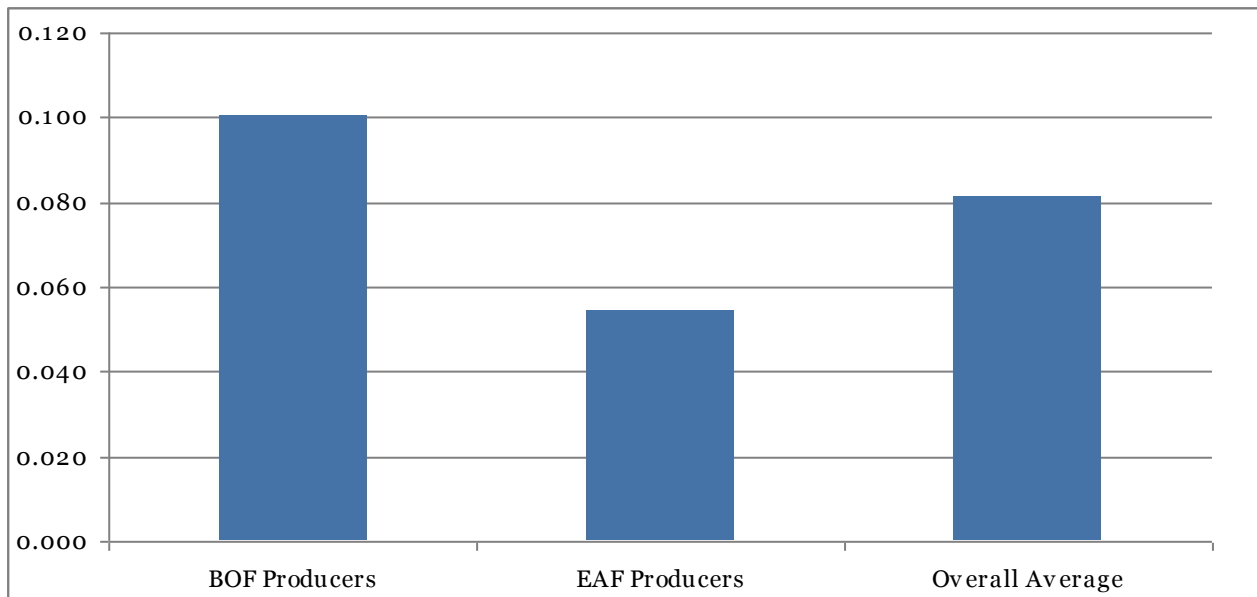
Source: Authors' elaborations on various data

The REACH Regulation is expected to continue generating administrative costs for the steel industry at least until 2018, when the registration process will be completed and the mechanism for authorizations and restrictions mechanism will be well under way. In future years the costs are expected to come predominantly from the preparation of dossiers for substances on the candidate list and of similar documentation related to the restriction process, with much lower costs linked to the registration of new substances and the updating of registrations submitted in previous years. *While no estimate of future administrative costs can be provided, the burden for the steel industry is expected to be quite substantial, possibly in the same order of magnitude recorded for the period up to 2012*.

12.5 Assessment of Indirect Costs

12.5.1 Introduction

Strictly speaking, indirect costs are defined as the costs borne by steel makers as consequence of regulatory provisions not addressed to them but rather to their

counterparts. In practice, indirect costs arise in the form of higher costs paid by steelmakers as a result of the influence exerted by EU legislation on operators active at other stages of the value chain, typically suppliers of key inputs. In the case of product policy, the notion of indirect costs can be broadened to encompass the negative side effects resulting from legislative provisions and policy orientations that may affect developments in the market for final products. Two instances of indirect costs can be identified, one linked to eco-labelling legislation, and one connected with the use of different LCA methodologies.

Indirect Costs Linked to Eco-labelling Legislation

Eco-labelling systems are intended to influence consumer preferences and the granting or denial of an eco-label may exert significant impact on market developments. This is particularly the case when eco-labels and are used in public procurement, which for certain products accounts for a large share of the final consumption. In the case of the steel industry, **_problems have emerged in connection with the presence of nickel in stainless steel_**. Nickel is known for having negative health effects: it is considered as potentially carcinogenic by inhalation, it is a skin sensitizer, etc. These undesirable effects, however, do not extend to nickel containing stainless steels (which account for about 70% of all stainless steel) and this is why stainless steel is so much used in food contact, medical devices, jewellery, etc. without any adverse effects observed. Yet, the presence of nickel may prevent the granting of the EU eco-label to products containing stainless steel. For instance, an issue emerged in the past regarding the eco-labelling of certain office equipment (PCs and laptops) due to the presence nickel in stainless steel. The problem was solved in 2010 with a decision European Union Ecolabel Board, but it is expected to resurface in the future. So far, the steel industry has only incurred in some operational costs to ensure that exemptions are asked for each eco-labelled product and that exemptions are effectively granted. However, if problems were to continue in the future, **_EU eco-labelling rules might result in a serious barrier to the use of stainless steel, with potentially serious consequences in terms of lost sales_**.

Indirect Costs Linked to Different LCA Methodologies

While the basic tenets of LCA have been progressively refined over time and can be regarded as well accepted, there are still significant differences in the way in which LCA is concretely applied to specific cases. In the case of the steel industry the main issue refers to the treatment reserved to scrap metal, which in an LCA perspective obviously constitutes one of the key advantages of steel over competing products. In this respect, issues have emerged with the methodology for the calculation of the Product Environmental Footprint (PEF) proposed in the recent Communication on the Single Market for Green Products.[310] In fact, the PEF methodology, somewhat at odds with the waste hierarchy stipulated in the

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[310] The methodology is presented in detail in an annex to above mentioned Communication. See Annex II: Product Environmental Footprint (PEF) Guide.

Waste Framework Directive, attributes only partial credit to recycled materials as opposed to the full credit granted to energy recovery. As the PEF methodology is expected to be applied for the development of benchmarks to assess the degree of environmental friendliness of a variety of products, the steel industry is concerned that ***the positive feature of steel may not be fully accounted for, with potential negative long term effects compared with competing products***.[311] However, it should be noted that the methodology is still in the testing phase and that the Commission has already indicated its willingness to consider alternative approaches. Therefore, ***the potential negative effects on future market developments are at this stage highly hypothetical and may well not materialize***.

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[311] The position of the steel industry is presented in the joint position paper Eurofer – Eurometaux – European Aluminium Association, Ferrous and non-ferrous metals comments on the PEF methodology, Brussels, 25th April 2013.

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Annex 1:

Interviews (in person, by phone or via e-mail)

Commission Services

CLIMA
COMP
EMPL
ENERGY
ENV
EUROSTAT
MARKT
RTD
TRADE

Stakeholders

Enrico Gibellieri (last president of the ECSC)
Eurofer
- general introductory meeting,
- climate change experts;
- energy experts,
- trade experts,
- environmental policy expert
- REACH expert
ESTA
ESTEP
Euroalliage
Eurometal
Federacciai (Italian national steel federation)
IIASA
IndustriAll
ISTAT
Wirtschaftsvereinigung Stahl - Stahlinstitut VDEh im Stahl-Zentrum
Wirtschaftsvereinigung Stahl (German national steel federation)
Worldsteel

Companies and Plant Operators

Company 1 (for trade policy)
Company 2 (for commodity markets)
Plants 3, 4 and 5 (for Environmental Policies, Climate Change, Energy, Trade)

Plant 6 (for Climate Change)
Company 7 (for REACH)

Annex 2

Background Information on Compliance Costs of Environmental Policy

Investment Costs – Basic Data from Surveys and Other Sources

Table A Environmental Protection Investments - Selected Countries, 2003-2010 – Steel Industry (€ million)

	2003	2004	2005	2006	2007	2008	2009	2010
Germany	35.0	48.5	50.4	67.7	62.8	66.0	70.5	58.1
Spain	68.6	78.5	70.7	73.6	98.1	80.9	64.5	55.5
France	17.0	29.0	19.3	16.3	28.8	31.4	32.2	25.7
Italy	70.5	76.0	121.3	86.3	149.4	217.0	159.2	111.4
United Kingdom	7.6	12.4	2.9	2.8	22.4	4.7	3.5	2.5
Austria	17.7	30.8	25.9	15.3	12.5	51.9	37.3	22.7
Belgium	2.6	12.1	15.3	9.4	34.2	16.7	13.1	11.7
Total	**219.1**	**287.3**	**305.8**	**271.3**	**408.3**	**468.6**	**380.2**	**287.6**

Source: EUROSTAT - Steel Survey and own estimates

Notes: with the exception of Italy (for which national data are available) data for the years 2009 and 2010 were estimated on the basis of the ratio of environmental investments to total investments in the steel industry according to SBS statistics. The same applies for the figure for Belgium in 2004.

**Table B Environmental Protection Investments - Selected Countries, 2003-2010 –
Manufacture of Basic Metals (€ million)**

	2003	2004	2005	2006	2007	2008	2009	2010
Germany	138.7	186.0	127.8	144.4	203.2	172.0	145.2	180.0
Spain	75.8	66.0	72.7	102.0	116.4	134.4	78.4	76.5
France	93.9	44.3	84.5	94.2	73.1	125.6	52.1	75.7
Italy	118.8	40.4	59.7	29.0	91.2	134.4	78.4	76.5
United Kingdom	17.6	20.0	15.5	27.4	28.7	178.5	39.5	27.0
Austria	40.4	24.3	45.3	62.9	53.7	55.8	51.2	43.4
Belgium	22.6	8.0	26.4	40.1	40.3	17.7	22.2	33.4
Total	**507.8**	**389.0**	**431.9**	**500.0**	**606.6**	**818.4**	**467.0**	**512.5**

Source: EUROSTAT - EPE Survey and own estimates

Notes: data for Italy in 2005 and Germany in 2006 and 2007 were estimated on the basis of the ratio of environmental investments to total investments in the metals industry according to SBS statistics. The figure for Germany in 2010 was guess estimated based on national data.

Table C Environmental Protection Investments - Germany, 2003-2010 (€ million)

	2003	2004	2005	2006	2007	2008	2009	2010
Steel Survey	35.0	48.5	50.4	67.7	62.8	66.0	70.5	58.1
EPE Survey	138.7	186.0	127.8	144.4	203.2	172.0	145.2	180.0
VDEh Data	93.0	117.0	120.0	169.0	142.0	137.0	82.0	n.a.

Source: EUROSTAT – EPE/Steel Surveys and own estimates; VDEh

Operating Costs – Considerations on Available Secondary Sources

Data on environmental current expenditures are collected through the EPE Survey. However, the EPE dataset presents some peculiarities that limit its usefulness for the purpose of the study. First, unlike the case of investments, data on current expenditures are collected by national statistical offices on a voluntary basis and, in principle, only every two years. As a result, time series show many more gaps than in the case of corresponding data on there are more gaps Second, the definition of current expenditures is very broad, including both operating costs 'proper' (defined in the survey as 'in-house' expenditure) and other expenditures whose linkage with environmental regulation is at least doubtful (e.g. the fees paid for waste collection and landfilling and effluent water treatment) or that are already covered in this study under different cost categories (e.g. the cost of studies for

the issuance of permits). Unfortunately, only for some countries and years data on the various categories of current expenditures are available separately. Third, possibly due to difficulties in the interpretation of the definition of environmentally-related expenditures, the time series show major variations over time and marked differences across countries.[312]

Similar considerations apply to the estimates of current expenditures provided by some steel makers which, in general, appear to be based on very broad definitions. In fact, in the case of some companies, it was possible to clarify that the estimates provided included both depreciation and financial charges, which in our case would result in a double counting of investment and financial costs that have been calculated separately. The inclusion of fees for ladfilling, waste water treatment and similar charges is also somewhat debatable, at least from the perspective of a study on the impact of EU legislation (fees are set at the national if not regional/local levels, and they reflect actual costs).

Operating Costs – Sample OPEX/CAPEX Ratios

Table D Ratios between CAPEX and OPEX for Selected Pollution Control/Prevention Technologies

Technology	CAPEX (€'000)	OPEX (€ '000)	OPEX/CAPEX	Comments
Advanced Electrostatic Precipitator	6,250	540	8.6%	Plant with a 4 MT capacity.
Bag Filter	9,300	697	7.5%	Plant with a 1.6 MT capacity
Cyclone	675	94	13.9%	Average value
Wet Desulphurization System	65,000	3,200	4.9%	Plant with a 4 MT capacity.
Regenerative Activated Carbon	73,000	3,720	5.1%	Plant with a 4 MT capacity.
Cast House De-dusting System	14,500	420	2.9%	Plant with a 3 MT capacity. Energy costs not considered
Fume Suppression	6,800	360	5.3%	Plant with a 3 MT capacity. Nitrogen cost not considered
Gas Recovery System	1,200	28	2.3%	Plant with a 2.8 MT capacity.
BOF Primary De-dusting System	32,000	3,000	9.4%	Plant with a 1 MT capacity.

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[312] For instance, the trend is particularly erratic in the case of the United Kingdom, with the value of current expenditures passing from € 485 million in 2001 to € 184 million in 2003 and to just € 89 million in 2004. Similar sharp movements are also found in the case of Italy, where expenditures record a five fold increase between 2002- 2004, when they averaged around € 50 million, and 2007, when they reached the value of € 262 million.

BOF Secondary De-dusting System	29,000	12,000	41.4%	Plant with a 1 MT capacity.
EAF Bag Filter & Adsorbent Material	500	n.a.	>15%	Plant with a 1 MT capacity.

Source: BREF for the Iron and Steel Industry, 2012

Notes: the selection of the above technologies was heavily influenced by the availability of the information required to compute the OPEX/CAPEX ratio, In fact, in a number of cases, the BREF does not provide any indication regarding the investment and/or operational expenditure of the proposed BAT. Some cost data are fairly old and may well be below current level, but - to the extent that price escalation has affected both investment and operating costs - this should not affect the ratio OPEX/CAPEX. The above technologies do not relate to downstream processes (hot and cold rolling, wire plants, coating, and galvanisation), which are covered by the Ferrous Metals Processing Industry BREF. This document is currently under revision and the current BREF, adopted back in 2001, was not used as it contains very little information regarding the economic parameters of proposed BATs.

Table E Ratios between CAPEX and OPEX for Some Pollution Control/Prevention Investments Implemented/Under Consideration by Selected Steelmakers

Investment	CAPEX (€'000)	OPEX (€ '000)	OPEX/CAPEX	Comments
Sinter Plant – Bag Filter	17,000	2,000	11.8%	
Sinter Plant – Bag Filter	20,000	3,000	15.0%	
Sinter Plant – Activated carbon	6,300	800	12.7%	Covering two sinter strands
Sinter Plant – Complete retrofitting	50,000	10,000	20.0%	Two sinter strands, with total 10 MT capacity
Coking Plant – Gas Desulphurization & Benzene Control	32,000	2,800	8.8%	Additional € 4 million/year OPEX if coke gas cannot be used, raising ratio to 21.2%
Blast Furnace – Water treatment (Pb, Zn)	3,000	100	3.3%	
BOF Shop – De-dusting (re-lading of hot metal)	17,000	200	1.2%	Not a priority intervention
Integrated Plant - Noise abatement	10,000	2,000	20.0%	
Integrated Plant – Prevention of Diffuse Dust Emissions	12,000	3,000	25.0%	

Source: Interviews with selected steelmakers