Steel, the Backbone of Sustainability in Europe

EUROFER
Sustainability Vision paper

EUROFER
The European Steel Association

Content

About EUROFER

The European Steel Association (EUROFER) represents almost 100% of EU steel production. Founded in 1976, EUROFER's headquarters is located in Brussels. It is the voice of the European steel industry to policy makers, civil society and relevant stakeholders.

EUROFER's members are steel companies and national steel federations based throughout the EU. The national steel federations and major steel companies of Switzerland and Turkey are also associate members.

Steel is durable

Renewable energy relies on steel

Steel is reusable

100% recyclable

Steel production results in by-products and residues that are efficiently used as alternative raw materials by other sectors

Steel versatility and superior design are basics factors for promoting reuse (upgrade), repair, remanufacturing and material recovery

Steel is one of the most versatile materials, being efficiently used in a very large number of applications

Steel is a permanent material and its anthropogenic stock will be a valuable future resource

Steel is a ubiquitous material and it plays a key role in EU society, ensuring safety, performance and social value

Steel made in Europe is the backbone of sustainability[1].

1 This concept is appropriately interpreted by the 'Tree of life' monument (ideated for the world expo 2015 in Milan, Italy), with the core structure made of 150 tonnes of steel. For the complex symbology that it represents and for being an emblem of the future and of innovation, the 'Tree of life' was chosen as cover image of the EUROFER Sustainability Vision.

4 The European Steel Industry Vision

Modern society would be impossible without steel. The European Steel Industry Vision is based on the decisive contribution of steel to European socio-economic growth and sustainable production, as well as the Circular Economy, which is expected to become even more important in the future.

In the short term, the sustainability of the European steel industry will depend upon meeting the formidable challenge of remaining economically viable against a background of excess global supply.

In the short, medium and long term, the European steel industry:

- is and will remain a responsible employer
- sees zero accidents as a top priority in EU steel production facilities
- is committed to remaining the most sustainable steel producing region of the world, both in CO_2 emissions and in other environmental impacts
- chooses to evaluate the environmental impact of its products through a life cycle approach
- is dedicated to increasing the recycling rate of different products, the recovery of alloying elements and of coatings and to avoid recycling inhibitors
- promotes transparency in cooperation with its supply chain and welcomes responsible sourcing certification schemes
- is dedicated to developing products which contribute to a sustainable society

Steel has significant social value and is by far one of the most important, multi-functional and adaptable materials.

It is essential for our transport systems and infrastructure; for our housing and manufacturing; for our agriculture; for our water and energy supply systems.

Steel will also underpin the development of the green economy. Renewable energy, resource- and energy-efficient buildings, low carbon and clean energy vehicles, as well as recycling facilities – all depend on different grades of steel.

All steel scrap collected is recycled: steel is the most recycled permanent material in the world.

In order to illustrate all the characteristics of steel as sustainable material and to trace how sustainability has been at the basis of the European Steel industry's activities, the EUROFER Vision Paper highlights the current contributions and the commitments for the future in regards to:

- European socio-economic growth
- Sustainable production
- Circular Economy
- Energy and CO_2
- Innovative steelmaking technologies
- Sustainable products

A final section is dedicated to the Key Figures of the current situation and the general future perspective of the European steel industry.

European Sustainable Development and Growth Strategy

Sustainable development is one of the most important objectives of the European Union and it is based on the need to fulfil the demands of the present generation without compromising the ability of future generations to meet their own needs[2]. It consequently aims at continuous improvement of the quality-of-life and well-being of both current and future European society.

"Sustainable development offers the European Union a positive long-term vision of a society that is more prosperous and more just, and which promises a cleaner, safer, healthier environment – a society which delivers a better quality-of-life for us, for our children, and for our grandchildren."

With this specific focus, the European Council adopted the first EU Sustainable Development Strategy (EU SDS) in 2001, combining short-term actions with a long-term perspective, recognising the importance of strengthening the interaction with partners outside the EU, hoping for a significant impact on global sustainable development. The strategy was updated in 2009. Measuring progress is an integral part of the EU SDS and it is EUROSTAT's task to report every two years on the EU set of Sustainable Development Indicators (SDIs). These SDIs cover socioeconomic development, sustainable consumption and production, social inclusion, demographic changes, public health, climate change and energy, sustainable transport, natural resources, global partnership and good governance.

The Europe 2020 Growth Strategy, adopted in 2010, focuses on smart, sustainable and inclusive growth with five main objectives: employment, research and innovation, climate change and energy, education, poverty and social inclusion (supported by seven flagship initiatives). The Europe 2020 Growth Strategy is complementary to the EU SDS which sets the general framework and the long terms objectives that Europe 2020 should implement, contributing to a better integration of the three dimensions of sustainable development in EU policies.

In September 2015, the United Nations Department of Economic and Social Affairs (UN DESA) announced the 2030 Agenda for sustainable development and 17 Sustainable Development Goals associated with 169 targets to end poverty, protect the planet and ensure prosperity for all. Goals and actions came into effect on 1 January 2016 and will guide decisions for the next fifteen years at global, regional and sub-regional level.

In line with this background - and with the ambition to provide all the necessary information needed to better describe the contribution of the EU steel industry to a sustainable future - EUROFER would like to demonstrate how sustainability has already been the basis for the EU steel industry's activities and how this is being advanced into a vision for the future.

2 Cf. Review of the EU Sustainable Development Strategy adopted by the European Council on 15/16 June 2006.
Sustainable development was defined for the first time in the World Commission on Environment and Development (WCED) report, better known as Brundtland report (named after Gro Harlem Brundtland, at that time chair of the WCED), and published in 1987 with the official title 'Our Common Future'.

6 Steel, contributing to socio-economic growth in Europe

The current situation

“ The EU steel sector operates world class production facilities. ”

Continued investment in R&D stands as the basis of its innovative strength. It is a solution provider for demanding client sectors, with a strong focus on value creation through operational excellence, product leadership and customer intimacy.

“ The steel Industry is an essential part of European economy and a major European employer. ”

Although the total number of jobs in the sector has fallen by about 25% since 2007, the present direct employment level is 328000 FTE (Full Time Employment). Together with several million directly and indirectly dependant jobs in its value chains, steel is a major player in the manufacturing industry. The European steel industry provides a living for millions of people in Europe; it is a vector for prosperity and a necessity as a strategic European industrial sector.

“ Modern steel production depends heavily on having a highly skilled workforce. ”

In fact, the steel industry relies on highly qualified employees who have the capacity to provide forward-looking solutions and face future challenges, such as the transition to a competitive low carbon economy.

The European steel industry is an equal opportunity employer. For instance, the proportion of women in the EU steel sector has increased over the past decade and is currently between 6% and 25%, depending on occupation and EU country.

“ The EU steel industry is the spearhead in its sector with regard to health and safety, supported by European and national legislation, setting the highest standards for industrial hygiene in workplaces worldwide. ”

These are complemented by company initiatives to anticipate and evaluate psychosocial risks in order to design appropriate policies. Exchanges of best practices to promote health & safety in workplaces are being discussed at EU level. The EU steel industry is engaged in an intense Social Dialogue at EU level.

The future perspective

"Steel demand in the EU is expected to increase."

The near-term outlook for the EU is improving. The latest forecasts for steel demand in the EU suggest that apparent steel consumption may increase from 146 million tonnes in 2014 to around 160 million tonnes in 2020.

Steel production is expected to grow around 0.8% per year between now and 2050, in order to meet the demand for steel in Europe. This expectation assumes that the steel industry will continue to play a vital role in Europe, although in 2020 the industry is unlikely to reach the pre-crisis production levels (the average crude steel production in the period 2002-2007, was 199.4 million tonnes per annum).

"Digital skills and learning technologies must be included in education and vocational training."

The European steel industry is committed to offering its employees the opportunity to advance in education and further develop their skills. Employee training thus refers to instruction provided to enhance skills, capabilities and knowledge. With the use of modern human resource management, the steel industry is, more than ever, striving to find the right professionals and to retain them over the long term.

A highly-skilled workforce, equipped with the right tools and knowledge will ensure increased sustainable production (e.g. more efficient use of materials), consequently contributing to the circular economy and sustainable society.

"Industry 4.0 will provide significantly higher complexity, abstraction and problem-solving requirements."

With high probability, the work in industry 4.0[3] will create, for all employees, significantly higher complexity, abstraction and problem-solving requirements. In addition, employees increasingly need to be organised, interdisciplined, self-directed, communicative and able to continuously update their skills and abilities. This kind of working programme provides opportunities for quality enhancement, more interesting work relationships, and increased personal responsibility.

"The proportion of women in the EU steel sector will increase."

Recruitment is increasingly focusing on highly qualified individuals and the share of women graduates being hired is also increasing. In fact, over the past few years, steel companies in different Member States have been promoting various initiatives to attract and recruit women.

"Zero accidents as top priority in EU steel facilities."

The reduction in the number of accidents with the aim of achieving accident-free steel production is one of the top priorities of European steel companies. Developments related to industry 4.0 will certainly help. The European steel industry is strongly committed to improving occupational safety and health. Its performance has been constantly improving over the years and will continue to do so.

3 Industry 4.0 defines the fourth industrial revolution which embraces a number of contemporary automation, data exchange and manufacturing technologies. It facilitates the vision and execution of 'Smart Factories' and draws together Ciber-Physical Systems, the Internet of Things and Internet of Services.

8 Sustainable production

The current situation

“The European steel industry strives for 100% environmentally sound production.”

This is based on the principle of an integrated pollution prevention and control (IPPC) approach and on the implementation of Best Available Techniques (BAT) – which are techniques that are technically and economically viable - both on process integrated measures and on “End of Pipe” abatement measures. However, since the release of the EU’s Industrial Emissions Directive in 2010 much of that IPPC principle seems to no longer be applied in policy making. Nevertheless, continuous improvement our environmental performance is assured via the full deployment of Environmental Management Systems (ISO 14001) for all steel production sites.

Responsible sourcing

The current situation

The European steel industry is 39% scrap-based using the EAF production route, and 61% virgin material-based using the BOF route. Nevertheless, scrap is recycled via both routes so the proportion of actual scrap-based steelmaking is over 50%. The bulk flows of raw materials are: scrap, iron ore, coking coal, alloying elements, coating materials. Next to these bulk flows many more excipients are needed to produce steel. Responsible sourcing issues are mostly associated with the upstream business, more specifically the mining of the raw materials and the smelting and refining of the alloying elements and coating materials. Most of those activities are conducted outside Europe and the steel industry has exerted its due diligence leverage in order to identify possible risks. Social responsibility issues are so far identified with tin and coal from conflict areas. However most of the issues are not associated with coal mining for coking coal, which represents about 2% of global coal production.

“EUROFER promotes transparency in the supply chain.”

The future perspective

“ The European steel industry is committed to remaining the most sustainable steel producing region of the world. ”

Specific environmental objectives in achieving this aim are:

- The further optimisation of water usage, taking any potential shortage and local conditions into account;
- Further relative decoupling of its use of resources as well as of its emissions, facilitate the use and valorisation of industrial by-products in the spirit of 'industrial symbiosis' (ensuring access to the market as it is the case for natural materials) in order to contribute to saving resources.
- Rationalisation and harmonisation of the air quality legislation across Europe, complete implementation of the Best Available Techniques to abate air emission

However, the evaluation of, and decision about, each environmental measure needs to be done via an integrated approach in the truest sense of the sustainability and the IPPC spirit (taking on board trade-offs, cross-media effects).

In addressing environmental issues it is important not to focus only on the impact of the production stage but to follow and apply complete Life Cycle Thinking. This holistic approach enables the identification of the life stage with the most important impact, and to optimise product design accordingly. An important aspect of measuring product environmental sustainability is to provide customers with high quality and representative Life Cycle Inventory (LCI) data. This data are essential in order to use Life Cycle Assessment (LCA) in a meaningful way, so as to improve product performance and promote a more circular cradle-to-cradle approach.

The European steel industry is actively involved in developing a common methodology for assessing product environmental performance with the European Commission and is committed to improving data provision to downstream users. To date, LCI data provided by European steelmakers to the World Steel Association (worldsteel) data collection represents significant coverage of European production (42% based on production volume). This contrasts with data providing by only one Chinese producer representing only 5% of all Chinese production. Increasing imports from China, displacing efficient European production, means that an overall increase of the environmental impact and emissions as a result of higher emissions embodied in imported steel.

The future perspective

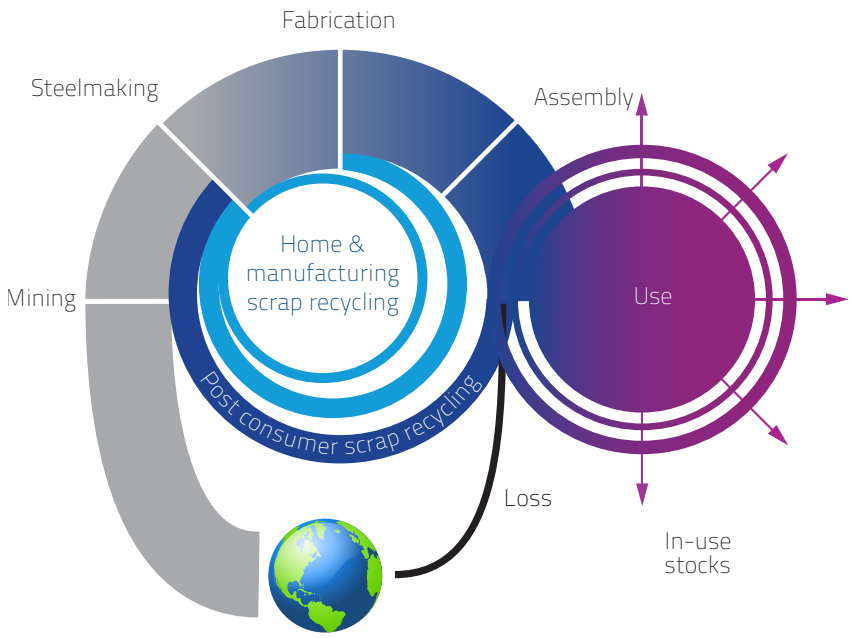
In order to responsibly source, a specific procurement policy should be in place for engaging our suppliers. The European steel industry has always promoted greater transparency in the supply chain: this is seen as one of the essential elements of due diligence. By consent, the steel industry considers early risk identification as an important instrument.

Producers in the EU source raw materials in a responsible and sustainable manner recognised through the establishment of a due diligence management system, in cooperation with our supply chain, in order to sustainably address risk management requirements.

“ EUROFER welcomes the development of responsible sourcing certification schemes. ”

For minerals originating from conflict affected and high-risks areas, EUROFER welcomes a self-certification scheme in which the industry works in cooperation with its supply chain. In this, the OECD guidelines for conflict minerals will be followed.

The current situation



Inspired by University of Cambridge

Current global steel demand exceeds the volume which can be made out of scrap. This is presented in the graph "Growing Consumption" (below). Steel products are produced, fabricated and assembled. Along this production value chain some scrap is already produced. In steelmaking this is called 'home scrap' and for manufacturing this is called 'manufacturing scrap'. These flows are of course immediately recycled by the industry. This is shown with the light blue recycle loops.

The products enter their use phase. Their lifetime depends on their end application. It can vary from a couple of months for a packaging can to over a century in construction applications. During its lifetime this steel is not available for recycling or reuse: but it is stored in the anthropogenic stock, serving its purpose to society. This is illustrated in the figure bellow by the big purple steel bubble. Due to the increasing amount of steel in society the 'bubble' currently is expanding. Once the steel reaches its 'end of life' it can be almost completely recovered and becomes available as post-consumer scrap. This is the dark blue recycle loop. Very little steel gets lost (black line).

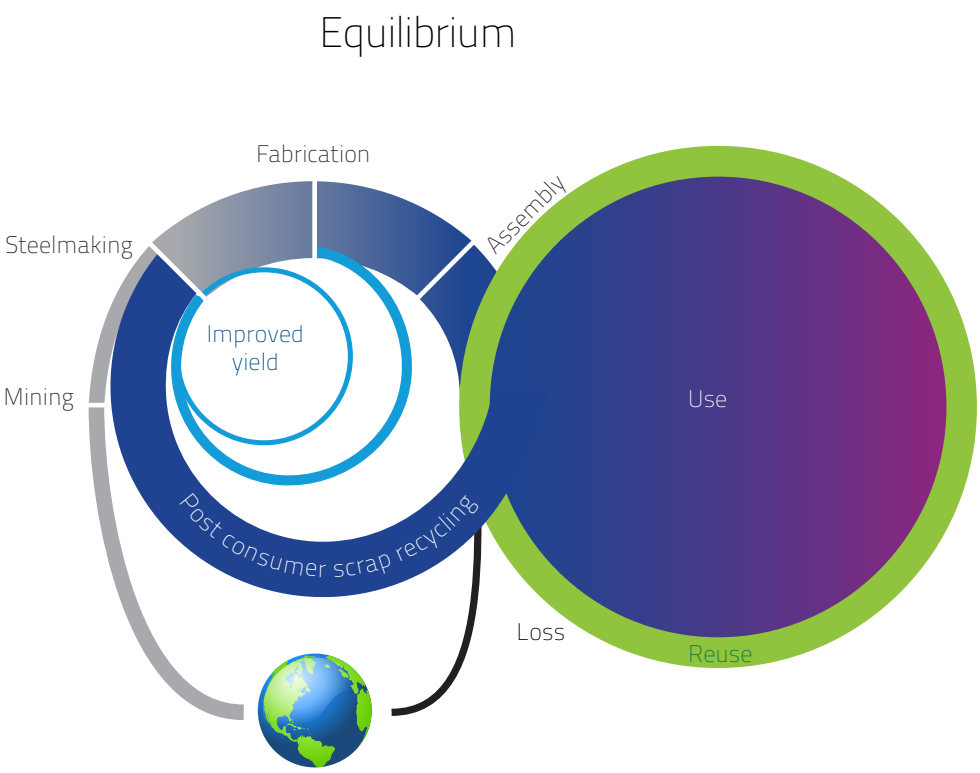
"Although currently 61% of European steel production is based on iron-ore, the fact that all scrap generated is re-melted and put into new products demonstrates the present circularity of the steel."

Circular Synergies: the Use of By-Products and Residues as Alternative Materials.

The by-products and residues generated during steel production make a valuable contribution to society, replacing natural resources that would otherwise be used by other industrial sectors. These practical synergies among industries can be demonstrated with convincing examples from well-established markets, such as:

- Blast Furnace slag: a suitable, and for some applications superior, substitute for clinker in cement production. Its use results in a significant reduction of the CO_2 emissions related to the production of clinker.
- Basic Oxygen Furnace slag/Electric Arc Furnace slag: in road construction, replacing the use of natural aggregates.
- Chemical compounds: sulphuric acid, sulphur, ammonium sulphate, benzene toluene xylene (BTX), tar, emulsions, and many other that are valuable raw materials for the chemicals industry.
- Process-gases: gases produced during steel production such as Blast Furnace gas, Basic Oxygen Furnace gas, and coke oven gas are used in power stations and transformed into electricity with as little flaring losses as possible.

The future perspective



Inspired by University of Cambridge

At some point in time, global steel demand will be in balance with the scrap supply. This is the "equilibrium" graph. The necessity of producing steel from virgin raw materials is being reduced, so eventually just the loss of steel will need to be compensated for. Due to yield improvement in production and manufacturing, pre-consumer scrap flows have decreased significantly. Thanks to innovation the reuse of steel has increased, shown by the green ring. The amount of steel in society has increased. Therefore, the post-consumer scrap supply will increase as well (dark blue loop) and will be sufficient to satisfy steel demand via the scrap production route. By this point in time the steel industry will be less dependent on virgin raw materials that nevertheless will still be necessary in order to compensate for material losses from use in society.

It is hard to predict when this moment will occur. It depends heavily on future global steel demand. Given the needs of developing countries steel consumption will continue to increase for the time being. Assuming steel demand will increase to more than 2 billion tonnes worldwide, equilibrium will not be reached before the second half of the 21st century.

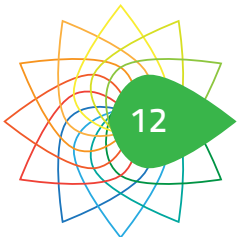
"The European steel industry is ideally placed to make use of all scrap material arising locally, thanks to the significant stock of the material in EU society."

Currently, more than 50% of steel produced in EU (EAF and BF) comes from scrap. This contrasts with only 10-15% in China, which instead has to rely more on the use of virgin resources.

Due to overlapping legislation regarding the recycling of some residues or the use of by-products, the realisation of the full potential of the industrial synergies that would foster better recycling and use of these materials remains a challenge.

"The final objective of steel production management is to make the entire production process completely circular, fostering circular synergies with other industries."

However, due to missing markets or conflicts and inconsistencies in legislation, for instance, some filter cakes and waste water sludges, or other valuable residues, have to be landfilled instead of being recycled.



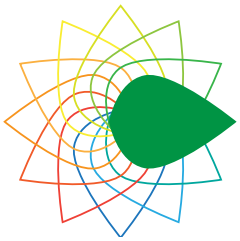
Energy and CO_2

The current situation

The European steel industry is one of the most efficient steel industries in the world. European steelmakers have reduced energy consumption and CO_2 emissions per tonne of steel by 50% since 1960 and are now close to the technically feasible minimum.

“Therefore only very limited further improvements in energy and CO_2 efficiency are possible, and mostly in downstream processes.”

When steel is produced out of iron-ore the use of coal and coke as reducing agents unavoidably results in CO_2 emissions. However, once ‘hot metal’ iron is produced in a blast furnace and transformed into steel in an oxygen converter, chemical energy is embedded in the material and is not lost. The recycling of this steel in an electric arc furnace or steel converter at its end of life therefore requires significantly less energy. The present balance between oxygen and EAF steelmaking is the result of scrap availability, present requirements and product portfolio.



Innovative steelmaking technologies

The reduction of greenhouse emissions (necessary to mitigate Climate Change) is the focus of several programmes launched in different regions of the world. The most ambitious of these is the European ‘ULCOS’ programme.

“The strength of European innovation.”

Launched in 2004, ULCOS brought together a consortium of 48 organisations (including 10 steel and mining companies) with the objective of delivering cuts in CO_2 emission of more than 50% per tonne of steel. The first phase (ULCOS I) ran until 2011 and included four routes: three rely on the use of the carbon in coal, coke or natural gas (and thus also on Carbon Capture and Storage –CCS) and a fourth process uses electricity directly (thus no direct carbon). A second phase (ULCOS II) should eventually lead to the development of all these processes on a commercial scale.

The four routes are: ULCOS BF (Blast Furnace with Top Gas Recycling), HIsarna (Bath smelting), ULCORED (Direct reduction), ULCOWIN (Electrolysis).

The future perspective

Although only minor improvements to energy efficiency and CO_2 efficiency are possible using existing technology, the European steel industry will continue in its efforts to deploy those incremental developments.

The European steel industry has taken the lead in the development of Ultra-Low CO_2 Steelmaking (ULCOS) technologies, although at this stage they are not yet economically viable. Reductions in CO_2 emissions of over 50% could be realised if these technologies could be economically combined with carbon capture storage/utilisation.

"Further contributions by the steel industry will be through products that support renewable and low carbon energy solutions, including those used in the construction, transport and energy sectors."

Scrap-based steel-making will continue to depend on market conditions and product requirements. However, as long as demand is higher than scrap availability, primary steel making will remain necessary.

"ULCOS is the largest and most ambitious programme contributing to future energy savings and reduction of CO_2 emissions"

Abatement potentials of the ULCOS Technologies

Technology	Expected potentials for direct CO_2 mitigation effects	Soonest expectations (from a purely technical perspective)
Top gas Recycling Blast furnace (ULCOS-BF)	15% without CCS 60% with CCS	Laboratory: done Pilot: done Demonstrator: tbc Deployment: > 2020 onwards
Bath smelting (Hisarna)	20% without CCS 80 % with CCS	Laboratory: done Pilot: done Demonstrator: 2020 Deployment: > 2030
Direct reduction (ULCORED)	5% without CCS 80% with CCS	Laboratory: done Pilot: done Demonstrator: 2020 Deployment: > 2030
Electrolysis (ULCOWIN)	30% with today's electricity generation mix 98% with Co2 free electricity generation	Laboratory: ongoing Pilot: 2020 Demonstrator: 2030 Deployment: > 2040

cf. 'A Steel Roadmap for A Low Carbon Europe 2050', EUROFER

14 Sustainable products

“Steel is versatile and is the material of choice for a variety of sustainability applications.”

The European steel industry continues to develop new steels for these sustainable uses.

Steel using sectors have their own specific issues requiring a tailormade approach for each. The following are the most important features of the most relevant of these sectors:

Construction

“Steel is the material of choice for sustainable, energy- and resource-efficient construction.”

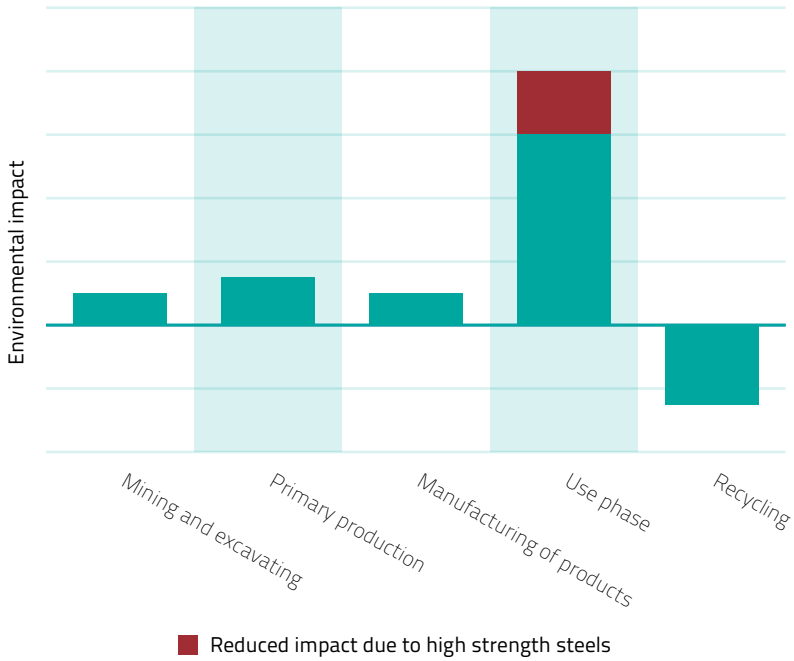
Steel performs many functions within a building: panels and steel sandwich elements are, for example, used in roofing, walls and facades. The high strength to volume ratio of steel allows building elements to minimise their overall footprint whilst maximising thermal performance. For example, light steel framed houses enable external walls to achieve a higher thermal performance compared with brick and block walls of the same thickness. Beams and reinforcement bars made of steel are indispensable for structural frameworks. Efficient use of structural steel can reduce the mass of the building and foundations and thereby save valuable resources. Steel can be used for stairs, escalators and elevators that make a building accessible.

Due to the ability to create large open spaces, buildings designed in steel are often more adaptable to changing societal needs, meaning buildings can often be refurbished rather than demolished. Once at the end of life, steel can be readily reused or recycled back into new steel without the loss of its properties.

Automotive

"The best way to evaluate vehicle environmental impacts is through a life cycle assessment (LCA)"

The European steel industry has developed high-strength multiphase steels that make vehicles lighter and therefore more fuel-efficient. Modern cars have around a 60% steel body and engine component set. 18% of European steel production goes into automotive applications. Steel producers and car manufacturers cooperate closely to develop innovative steel solutions to increase safety and to reduce a vehicle's carbon footprint via weight reduction.



However, the automotive sector is a significant source of greenhouse gas emissions. Tailpipe emissions of light duty vehicles alone are estimated to account for 10% of global CO_2 emissions. Regulators around the world are addressing this challenge by setting progressive automotive greenhouse gas emission limits, fuel economy standards or a combination of both. All current legislation focuses exclusively on 'tailpipe' or use-phase emissions. Tailpipe emissions take into account the greenhouse gas emissions caused solely by the combustion of fuel. Use-phase considers emissions from the entire fuel cycle - both production and consumption of fuel. For a typical gasoline-powered vehicle roughly 85% of greenhouse gas emissions come from the fuel cycle with the remaining 15% caused by vehicle production and disposal. The only way to correctly measure vehicles' impact on the climate and the environment is through a full life cycle assessment (LCA).

Regulating only tailpipe or use-phase emissions could lead to industry responses that actually make things worse. Consider the use of light-weight materials to reduce vehicle mass: it does decrease use-phase emissions, but since the production of light-weight materials (aluminium, magnesium and carbon fibre) is typically greenhouse gas intensive, the emissions during vehicle production are likely to increase significantly. If the increase in production emissions is greater than the decrease in use-phase emissions, vehicle light-weighting actually increases total emissions - an unintended consequence.

Only the vehicle's total life-cycle emissions accounted for the in net environmental impact of different designs can be compared. The regulation of automotive greenhouse gas emissions by taking into account all lifecycle stages using LCA provides a unique opportunity to align regulatory practice with the state of the art in environmental product policy and launch a new area of enlightened and more successful environmental legislation.

The steel industry has developed special high strength steels that can take up to 40% of the weight out of car components. Because of their increased strength these steel grades make it possible to use less material in a car part while still meeting all the functional and, in particular, safety requirements. Furthermore, steel is the best automotive material in terms of design flexibility, cost effectiveness, low emissions during manufacture and recyclability. Steel use is therefore particularly praised in the compact and midsize segments that account for about 75% of the cars produced in Europe.

See more at: http://www.worldautosteel.org/life-cycle-thinking/communication-to-policy-makers/#sthash.PAkC6uuv.dpuf

Energy, Metal Goods & Mechanical Engineering

"It would be almost impossible to produce, transform, transport or distribute energy without steel"

Whether it be fossil or renewable energy, it would be almost impossible to produce, transform, transport or distribute energy without steel. Wind turbines, for example, would not produce any electricity without steel - in fact they would not even be able to stand if it was not for their steel towers. The generator, the slew bearings, the blade extenders, the gearbox – in total there can be several hundred tonnes of steel contained in a single windmill.

And when energy is distributed, steel is again present in many different ways: in modern transformers, for example, which have degrees of efficiency of more than 99% thanks to high-quality electrical steels. Using transformers based on high efficiency Grain Oriented Electrical Steel (GOES) makes energy transmission possible, which is a key characteristic for the transportation of electricity. Motors and generators only can work with the contribution of non-Grain Oriented Electrical Steel. Therefore, electrical steel is essential material when it comes to electro-mobility and green energy.

Fossil fuels, such as oil or natural gas, are transported in pipelines made of steel, some of which are required to be made of special high-purity grades that withstand corrosion from the hydrogen sulphide contained in the fuels. With their special properties, these steels help to use reserves that were hitherto difficult to exploit. Ships carrying liquefied natural gas cooled to below 160 degrees centigrade use another speciality made by European steelmakers: low-temperature steels, designed to withstand extreme cold without becoming brittle or fragile.

Domestic Applications

"Steel is a daily presence in our lives"

Refrigerators, washing machines and ovens are a daily presence in our lives, as are cutlery, kitchen tools or cookware. Steel is ubiquitous here because of its hygienic properties as well as its durability and its aesthetic qualities. Stainless steel, for example has been inspiring designers for decades as a material for elegant tableware and premium cooking utensils. Because of its corrosion resistance, stainless steel is also a core material for many domestic appliances.

Colour coated quality steels are also very successful in a wide variety of domestic applications. Steel producers supply pre-painted steel sheet to appliance manufacturers and they can process it into casings, fronts or covers directly, without the need for further painting operations. This saves process steps, time and money while at the same time offering almost unlimited design options. Pre-painted steel comes not only in many different colours, but also with a wide variety of surface structures. New developments include anti-fingerprint or anti-graffiti coatings.

Although all this material is recyclable, even greater efforts are being made to make this material reusable. Through modular and demountable design it is becoming economically feasible to reuse the material, which saves significantly on energy and resources and maximises material circularity at end-of-life.

Packaging

“ Steel for packaging protects and preserves contents ”

Steel is the packaging material which best protects and preserves contents from air and light. It is 100% recyclable without any loss in quality and its magnetic properties make it the easiest and most economical packaging material to sort and recover. Routes for collection and recovery of steel cans are well established and the basis for recycling excellence. With a very high recycling rate (of more than 71%), there is not another packaging material in Europe more recycled than steel.

Recent innovations mean that steel is now lighter and more formable than ever before. It also has an ideal surface for high-quality print and decoration. This provides food and beverage producers with numerous possibilities for brand differentiation. Packaging steel producers are improving their material even further: the packaging steel of the future will allow further weight savings. The bodies of three piece food containers could, in future, be 20% lighter than today’s standard items, saving transport costs and emissions alike. The steel industry is cooperating with packaging producers as well as suppliers of manufacturing systems to bring this innovation to markets.

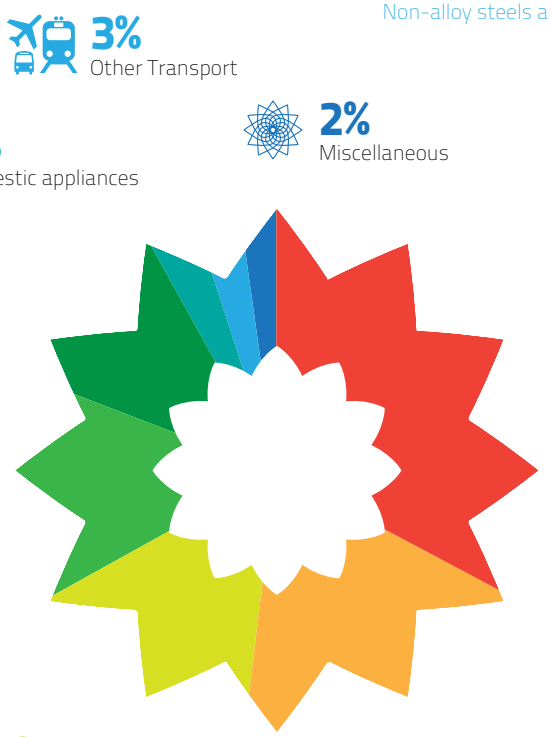
Current situation: Key figures

Steel is the most recycled metal in the world

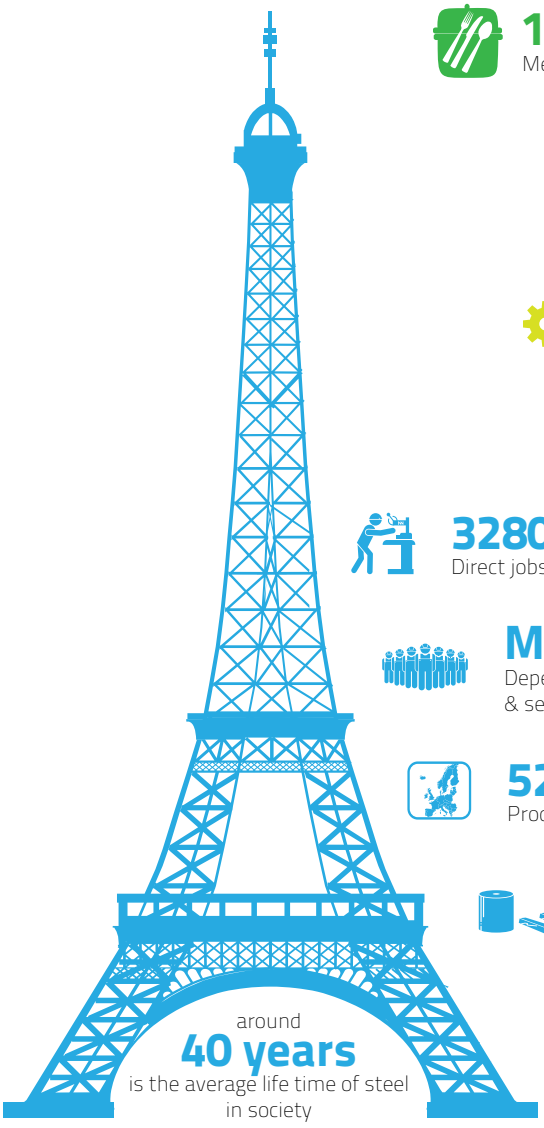
by volume

Sector shares in total steel consumption

Non-alloy steels and other alloy steels
Average 2010/2014



- **3%** Other Transport
- **2%** Miscellaneous
- **3%** Domestic appliances
- **11%** Tubes
- **33%** Construction
- **14%** Metalware
- **15%** Mechanical Engineering
- **19%** Automotive



around
40 years
is the average life time of steel in society

328000
Direct jobs

Millions
Dependant jobs in value chain & service sector

520
Production sites

170 million
Tonnes of steel produced each year

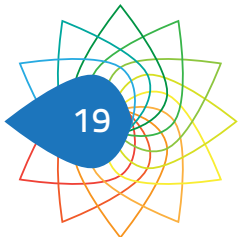
68%
Of all steel ever produced still serves its purpose in society

25%
Reduction in CO_2 emissions from EU Steelmaking since 1990

450 million
Tonnes of CO_2 savings per year by 2030 due to innovative steel applications

166 billion €
Turnover = **1.4 %** of the EU's GDP

The European steel industry: future perspectives



In the short term, the sustainability of the European steel industry will depend upon meeting the formidable challenge of remaining economically viable against a backdrop of excess global supply.

The massive increase of aggressively priced imports - notably from China - which began in 2013 and continued in 2014 and 2015, remains a threat for the European steel industry in the near term. A more effective EU trade policy is essential to counter these unfair trade practices.

On top of the burden of trade dumping, the cost burden of unilateral environmental legislation and energy in Europe is very high.

“ The EU steel sector requires level playing field conditions in trade, environmental and energy policies ”

It urges the European Commission to streamline its industrial policy with other policy areas to sustain the competitiveness of industry.

“ Within the right regulatory environment the steel sector will be instrumental in delivering technologies and solutions to transform EU into a competitive, low-carbon economy ”

In order to sustain its competitive position in its home markets and abroad, the EU steel industry requires the assurance of a sufficient level of investment.

In the medium-term, with the aim of securing long-term viability, there is an imperative to implement changes to address the climate change issue, both in the steel supply chain and in the application of steel products. Breakthrough technologies are indispensable and Ultra Low Carbon CO_2 Steelmaking (ULCOS) is at the moment the largest and the most ambitious programme to contribute to energy savings and the reduction of greenhouse emissions. It is the most advanced programme and represents European innovation strength in action.

Also in the medium-term, the industry will have to address external cost efficiency (i.e., providing added value for customers and markets). For example, this can be achieved by providing products that can improve through-process yields, improve material efficiency and reduce waste across the supply chain, as well as extending the service life of products and maintaining product value at the end-of-life phase. This includes the concept of labelling or marking of products and Eco-design (products fit for disassembly and dismantling). These developments, along with the adoption of new business models that enable even greater levels of reuse and remanufacturing of steel components, will show how the industry can take a lead in meeting the aims of the Circular Economy.

“ Regarding energy efficiency, the European steel industry is one of the most efficient industries worldwide ”

Presently, only very limited improvements in the energy efficiency are possible; mostly in downstream processes. EUROFER calls upon European policy makers to ensure that the steel industry, which is at very high risk of carbon leakage due to its high exposure to international trade and carbon intensity, receives truly 100% free allocation and full offsetting of indirect costs at the level of 10% most efficient installations. It is therefore vital that the benchmarks used are technically and economically viable, based on real industry data, taking into account the whole amount of CO_2 from process gases occurring unavoidably during steel production, this without the application of arbitrary reduction factors to benchmarks or to free allocation.

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