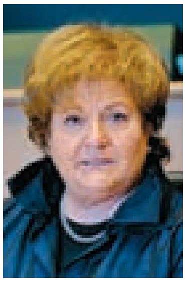
MAKING THE GRADE

A PARLIAMENT MAGAZINE SPECIAL SUPPLEMENT ON A STEEL ROADMAP FOR A LOW-CARBON EUROPE 2050

EUROFER
The European Steel Association

THE PARLIAMENT MAGAZINE
POLITICS, POLICY AND PEOPLE



Amalia Sartori is chair of parliament's industry, research and energy committee

Making the grade

The steel industry's value for the EU is twofold. The first is symbolic, because it was the spark that lit the touch paper for European integration in 1951; the second is economic, as it represents the backbone of our manufacturing industry, the driving force behind Europe's economic wellbeing.

The last few years have put the whole diverse European steel sector to the test. The industry directly employs around 350,000 people, but has lost 65,000 since the beginning of the crisis. Today, it still makes a significant contribution to the EU's GDP, but the repercussions it has had to cope with mean that it is now essential that we return the total turnover of this sector to pre-crisis levels.

The new strategy for the re-launch of the industrial policy, which we are currently working on in parliament, is setting a fundamental target that the other economic policies presented by the EU must also aim towards: by 2020, 20 per cent of the GDP must come from manufacturing. And this strategy needs to include the steel industry. The increasing weight that other third party production is gaining on the international market needs to be the warning that forces us to turn things around.

The increased understanding of the importance of industry to the revival of the European economy should lead to action being taken more quickly, focused on supporting initiatives that have already been launched and are yet to be promoted to improve our energy as well as our commercial policies. In June 2013, the commission adopted the action plan for the steel industry, with a view to making sure this sector is competitive, innovative and sustainable. The plan includes various measures aimed at re-establishing the importance of the whole industry. These include the creation of a clear, foreseeable framework of standards for investments and an energy strategy that reduces the costs that energy-intensive companies have to sustain.

In the international world we live in, we cannot exclude the idea of a policy of commercial agreements and free trade that establishes equally advantageous conditions and takes into account the need for reciprocity that is becoming increasingly urgent in the world of industry. Innovation must be the driving force behind the revival of the economy. We need to offer as much support as possible to research and development to make the most of the existing potential for knowhow that our industries possess and are keen to promote. Investment in the revival of this fundamental sector will also help to create a green industry, based on the fact that steel is the most common material right at the start of the production chain, and is 100 per cent recyclable. Consideration of the scrap market, also in the action plan, will be an additional factor in the efforts to improve sustainability already made by steel companies, as well as a useful, significant way of cutting costs.

In this context, it is important that EU environmental and climate policy considers the limits that overly ambitious targets might impose on industry, with the risk of putting us at a disadvantage in relation to other countries. Without the manufacturing industry, it is very hard to start again. The EU needs a real 'industrial compact', based on reforms and initiatives designed to revive investment and support the growth process that economic and fiscal initiatives are keen to encourage.

CONTENTS

EDITORIAL TEAM

General editorial enquiries
Tel: +32 (0)2 741 8221
Email: newsdesk@dods.eu

Managing Editor
Brian Johnson
Tel: +32 (0)2 741 8221
Email: brian.johnson@dods.eu

Deputy Editor
Desmond Hinton-Beales
Tel: +32 (0)2 741 8220
Email: des.hinton-beales@dods.eu

Journalist
Kayleigh Lewis
Tel: +32 (0)2 741 8228
Email: Kayleigh.Lewis@dods.eu

Commissioning Editor
Rajnish Singh
Tel: +32 (0)2 741 8225
Email: rajnish.singh@dods.eu

7th Floor, Rue du Trône 60, Brussels 1050

EDITORIAL BOARD
Romana Jordan Cizelj
Eija-Riitta Korhola
Jan Olbrycht
Alojz Peterle
Struan Stevenson
Inese Vaidere

PRODUCTION

Head of production
John Levers
Tel: +44 (0)20 7593 5705
Design
Matt Titley
Max Dubiel

ADVERTISING AND SPONSORSHIP SALES
Sales Director
Grant Hewston
Tel: +44 (0)20 7593 5547
Email: grant.hewston@theparliament.com

Sales Manager
Sandra Fernandez
Tel: +44 (0)20 7593 5545
Email: sandra.fernandez@dods.eu

Sales
Monica Barbosa
Tel: +44 (0)20 7593 5544
Email: monica.barbosa@dods.eu

Billy Davis
Tel: +44 (0)20 7593 5546
Email: billy.davis@dods.eu

Cristina Sanchez
Tel: +44 (0)20 7593 5573
Email: cristina.sanchez@dods.eu

Andrew Waddell
Tel: +44 (0)20 7593 5548
Email: andrew.waddell@dods.eu

Nick Rougier
Tel: +44 (0)20 7593 5551
Email: nick.rougier@dods.eu

Alexsandra Stanisavljevic
Tel: +44 (0)208 955 5554
Email: Alexsandra.stanisavljevic@dods.eu

Dominic Paine
Tel: +32 02 741 8203
Email: dominic.paine@dods.eu

Subscriptions
Tel: +44 (0)208 955 7007
Email: dodssubs@alliance-media.co.uk

www.theparliament.com

Annual subscription price: €120

PUBLISHER & MANAGING DIRECTOR
Martin Beck

DODS PARLIAMENTARY COMMUNICATIONS PARTNERSHIP
Emilie Robert
Tel: +44 (0)20 7593 5558
Email: emilie.robert@dods.eu

About Steel

European steel is resource efficient and indispensable for European manufacturing

The steel industry in Europe generates employment, wealth and sustainable development. The European steel industry employs 350,000 highly skilled people at over 500 production and processing sites located in 24 EU member states. Several million more jobs are directly and indirectly dependent on steel in the value chain and service sectors. The industry produces on average 170 million tonnes (Mt) of crude steel per year. In 2009, the steel sector generated a turnover of approximately €170bn, 1.4 per cent of the EU's GDP.

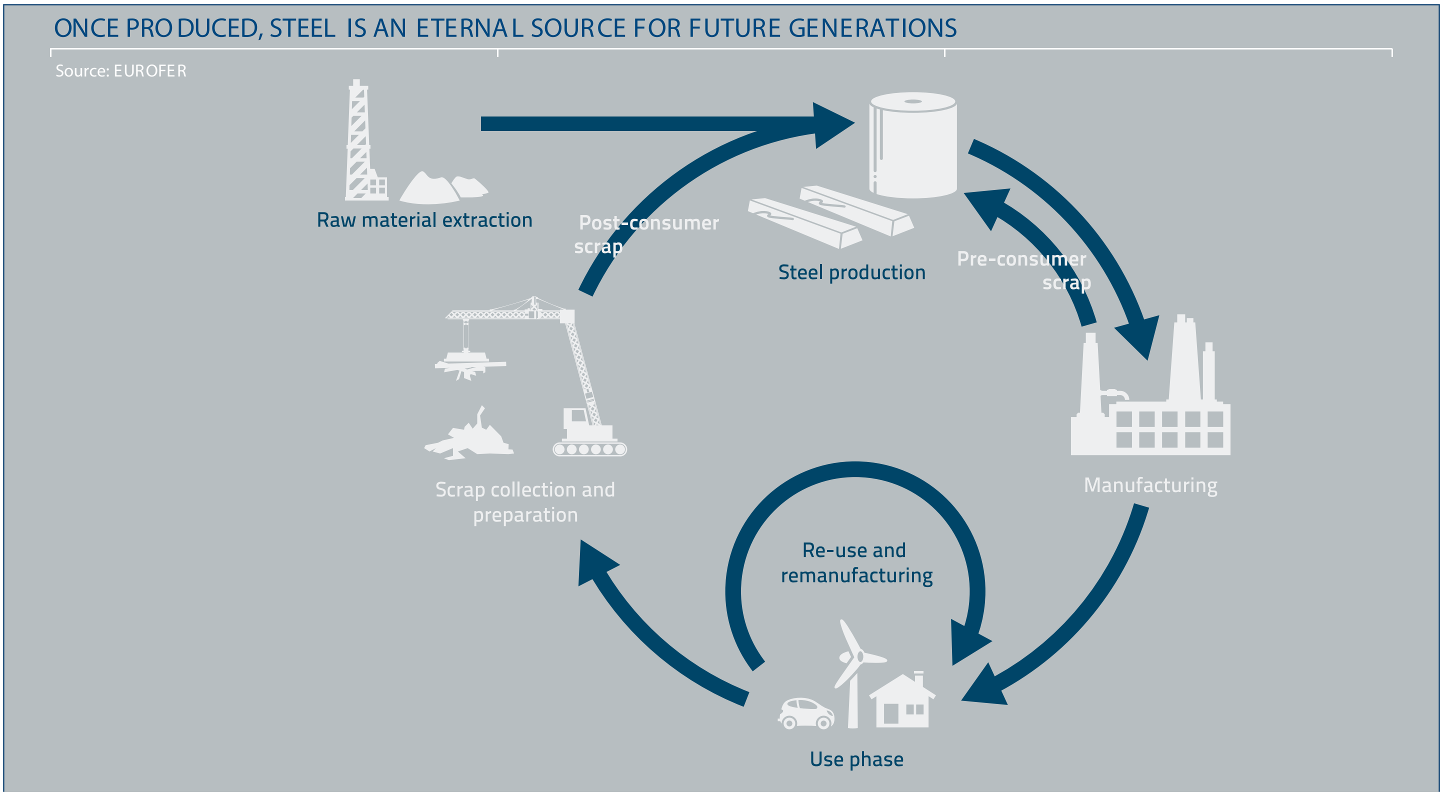
Steel is by far the most frequently used industrial base material. The transition towards a competitive low carbon economy relies heavily on an innovative and globally competitive steel industry in Europe. The European steel industry is closely integrated with diverse manufacturing sectors. New technologies benefit from the strong steel R&D network in Europe. Innovative steel solutions provide the foundation for innovation, durability, CO2 reductions and energy savings in applications as varied and vital as automotive, construction, machinery, brown and white goods, low carbon and renewable energies.

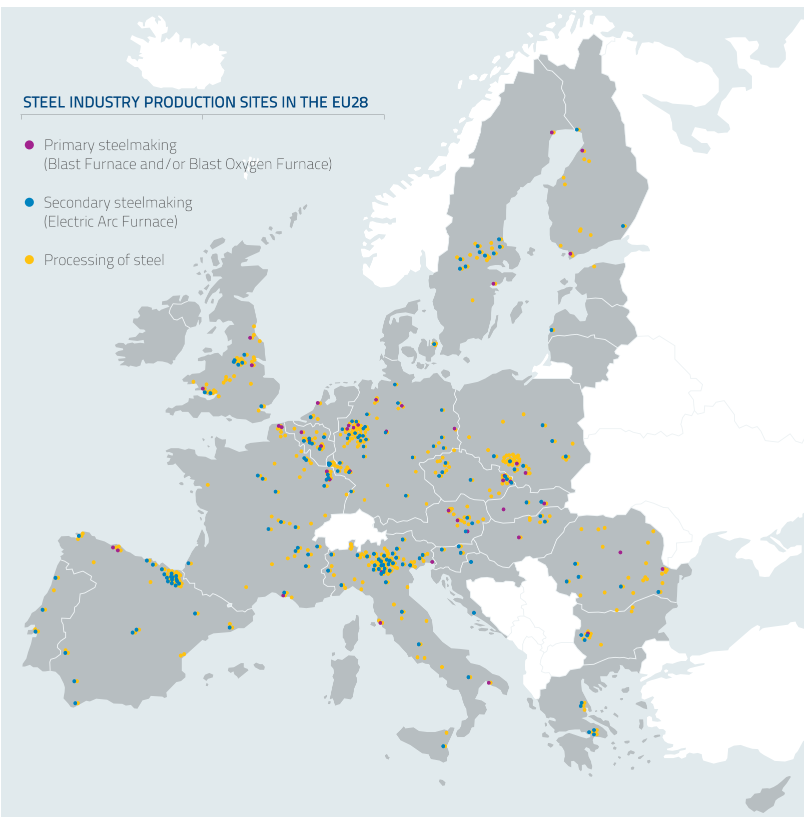
The European steel industry is known for being among the most energy and resource efficient worldwide. By-products from steelmaking such as process gases and slags are used as efficiently as possible to save natural resources. Process gases, for instance, are recovered for heat and electricity production. As an alternative to landfill, most slags are used in the cement and construction sectors. In 2010, CO2 savings from the use of process gases totalled about 42 Mt. The recycling of slag led to about 19 Mt CO2 savings.

As it is 100 per cent recyclable, steel contributes significantly to the long-term conservation of fundamental resources for future generations. About 50 per cent of total EU steel production originates from recycling of steel scrap in electric arc furnaces or in basic oxygen furnaces. Using steel scrap in place of virgin iron ore saves energy and reduces CO2 emissions in steel making.

"In 2009, the steel sector generated a turnover of approximately €170bn, 1.4 per cent of the EU's GDP"

→





The fact that steel products have long lifecycles is one of the reasons why on a global scale there is insufficient recycled material to satisfy the growing steel demand. This is why steel production ever more relies on virgin material made from iron ore introduced into the supply chain. Primary and secondary steel productions are complementary routes and will continue to be so. In order for the EU to meet its sustainability objectives, it is essential to ensure enough iron and steel scrap is available within Europe at the right quality and at competitive prices. However, to date, the EU is a net exporter of steel scrap (by 16 Mt in 2012).

EU steel makers operate in a highly competitive global market. The industry's trade intensity with third countries is above 30 per cent. The EU28 is the second largest steel importing region in the world, but also the second largest exporter. Imports in 2012 reached 21.4 Mt, the biggest import sources being Russia, Ukraine, China, Turkey and South Korea. EU steel exports for the same year totalled 31.7 Mt, the biggest markets being Turkey, the US, Algeria, Switzerland, Russia and India.

EU steel makers have remained competitive in terms of overall costs and in terms of quality, through a continuous process of investments and restructuring, and this despite energy prices and raw materials, labour and regulatory costs that are among the highest worldwide. ★

The roadmap's key findings

Meeting the commission's objectives for the low carbon roadmap is technically and economically unfeasible for Europe's steel industry

EUROFER's Steel Roadmap for a Low Carbon Europe 2050 responds to the Roadmap for moving to a low-carbon economy in 2050 published by the European commission in 2011. The commission's roadmap postulates a reduction of 88-92 per cent of absolute greenhouse gas emissions for the EU industry until 2050 compared to 2005, in addition to the reductions already achieved by these sectors between 1990 and 2005 of about 20 per cent for industry and seven per cent for power. Available at www.eurofer.eu in full length, the EUROFER steel roadmap integrates the results of several studies which have looked into actual future abatement potential of the steel sector.

Irrespective of source and point of view, the conclusions of the steel roadmap are quite unambiguous: For the time being there are no economically feasible steelmaking technologies with the potential to meet the CO2 reduction targets of the commission roadmap.

After having reduced its absolute CO2 emissions by 25 per cent between 1990 and 2010, and by 15 per cent per tonne of steel produced, available cost-effective mitigation technologies could decrease the sector's CO2 emissions at best by a further 15 per cent per tonne of steel by 2050.

In order to achieve radical CO2 reductions this would require yet unproven technologies and a functioning infrastructure for carbon capture and storage (CCS). Such a scenario could lead to a reduction of CO2 emissions of up to 60 per cent in 2050, still falling short of the commission's 88-92 per cent aspirational objective for industry. Should competing regions not be submitted to such constraints, the uptake of 'breakthrough' technologies by the EU steel industry will not be affordable.

Mid-term targets for the emissions trading scheme (ETS) are out of reach of the European steel industry, too. The commission's roadmap mentions 43-48 per cent reduction by 2030 based on 2005 levels. The 1.74 per cent reduction pathway of the ETS, which results in CO2 reductions of 37.6 per cent by 2030 compared to 2005 levels and 70.9 per cent until 2050 would also not be met.

If the steel industry is to continue producing in Europe and to decarbonise while retaining its global competitiveness, further substantial research into carbon-lean technologies and massive investments are necessary. Legislators will have to create the right framework conditions for this.

With available cost-effective mitigation technologies the EU steel industry could decrease its CO2 emissions only by a further 15 per cent per tonne of steel produced by 2050 compared to 2010.

Steel production processes in Europe have reached a high level of optimisation. Technological development has enabled increased control and efficiency of all the steel production phases. How to improve energy efficiency and reduce CO2

"With available cost-effective mitigation technologies the EU steel industry could decrease its CO2 emissions only by a further 15 per cent per tonne of steel produced by 2050 compared to 2010"

> *"CO2 emissions from steel production can be reduced by 15 per cent in an economical way"*

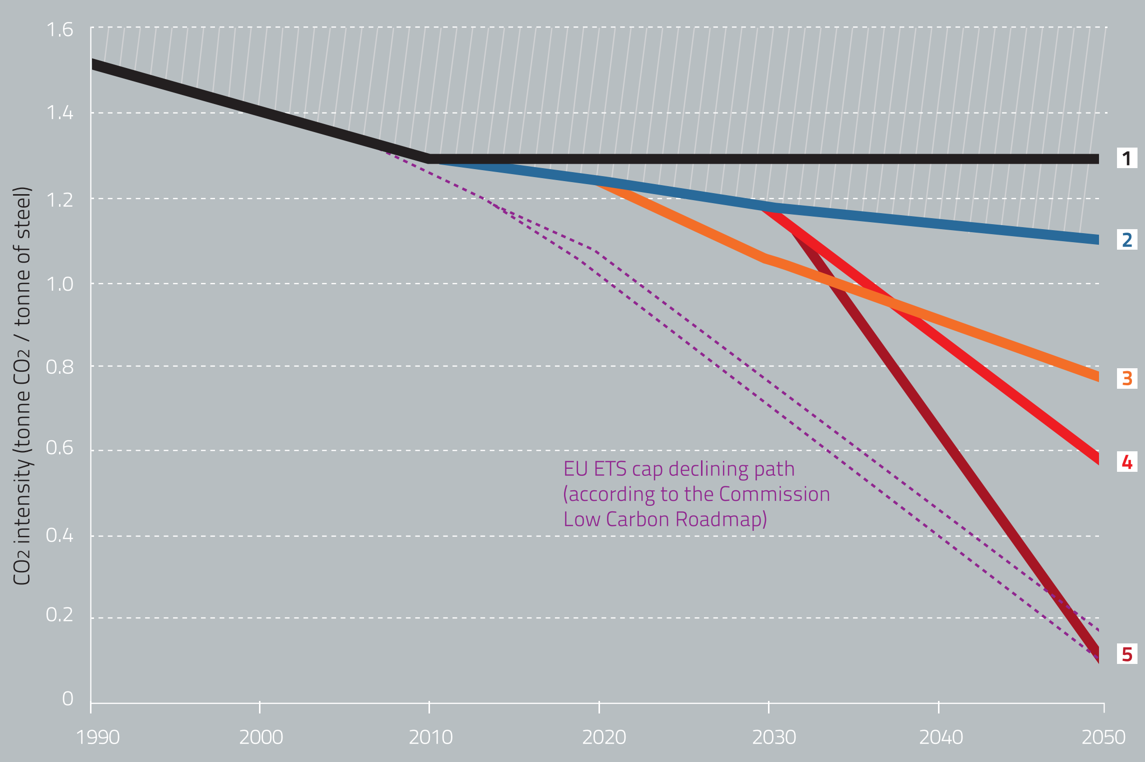
emissions even further has been the subject of a number of scientific studies and programmes in recent years.

The ULCOS programme, set up in 2004, has made a major contribution to the issue. The initiative, which includes major European steel producers, is supported by the European commission. It has evaluated the technical CO2 reduction potential of over 80 existing and potential technologies, out of which it identified four technologies with a long-term emissions reductions potential of more than 50 per cent: blast furnace with top gas recycling (BF-TGR), bath smelting, direct reduction, and electrolysis. These technologies are now being investigated further in an R&D programme including pilot and demonstration plants. The BF-TGR as well as the bath smelting technology have reached pilot plant phase. With the exception of electrolysis all breakthrough technologies rely on the development of CCS to unfold their full abatement potential.

In 2012, the EU's Joint Research Centre (JRC) published a study called 'Prospective Scenarios on Energy Efficiency and CO2 Emissions in the EU Iron and Steel Industry'. The study concludes that the application of best available techniques and innovative technologies would lead, from 2010 to 2030, to a maximum CO2 emission abatement of 14 per cent to 21 per cent. The analysis looks into the steel sector's CO2 savings and energy efficiency potential up to the year 2030 from a cost efficiency perspective. It suggests that the carbon price would have a limited impact on deployment of new technologies: even with a carbon price as high as €200 the overall abatement would reach 19 per cent only. Assumptions of the study include the deployment of innovative technologies like blast furnace top gas recycling and CCS from 2020. A follow-up analysis by the JRC using the same model but less conservative decision making criteria on new investments shows that reduction in CO2 emissions could amount to around 18 per cent and 65 per cent respectively. The BF-TGR concept, which would retrofit

CO_2 INTENSITY PATHWAY SCENARIOS FOR THE EU STEEL INDUSTRY UP TO 2050

Source: BCG-VDEh, EUROFER



existing blast furnaces with top-gas recycling installations and separate CO2 from the blast furnace gas, plays a central role in the follow-up analysis, too.

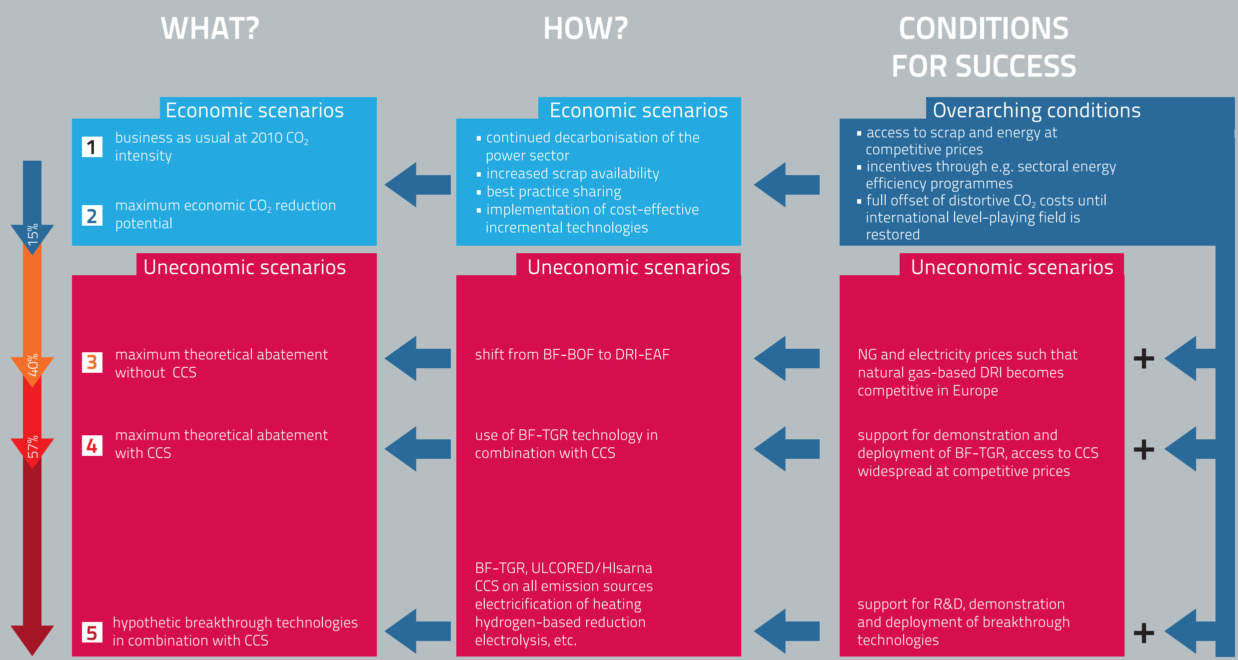
Also in 2012, EUROFER contracted The Boston Consulting Group (BCG) to assess from a techno-economic perspective the EU steel industry's options to decrease its CO2 emissions up to 2050. BCG teamed up with the German steel institute VDEh for this project.

The BCG/VDEh study follows a holistic approach in determining the CO2 mitigation potential of the EU steel industry, taking into consideration both the emissions from steel production and the effects of the use of steel in innovative applications. It assesses the technical potential of existing or projected technologies as well as the economic viability of the retained options. The study also looks into CO2 savings related to the use of steel in applications for which steel cannot be replaced by any other material.

CO2 emissions from EU steel production fell by over 25 per cent between 1990 and 2010, from 298 million tonnes (Mt) in 1990 to 223 Mt in 2010 (direct and indirect emissions calculated down to the hot rolling process). This decrease is mainly due to a partial shift from production using virgin ores to production by recycling scrap through the electric arc furnace route (accompanied by a contraction in production volume), efficiency gains, and, the decrease of CO2 emissions from electricity generation. Specific CO2 emissions decreased by about 15 per cent from 1.508 to 1.293 tonnes CO2/tonne of steel over the same period.

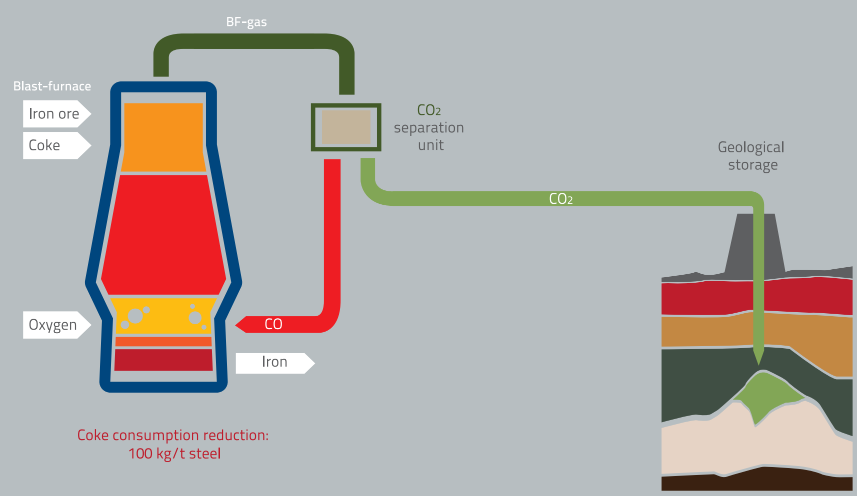
As for the 2050 horizon, the BCG/VDEh study projects – based on proprietary modelling – that the EU steel market will grow by 0.8 per cent annually, leading to EU crude steel production of 236 Mt in 2050. The amount of scrap available within the EU is projected to grow by 0.9 per cent annually, increasing from 96 Mt in 2010 to 136 Mt in 2050.

Under these assumptions the BCG/VDEh study assessed the EU steel industry's mitigation pathways via several abatement scenarios. The economic scenario involves the implementation →



Emission reduction potentials are expressed in specific CO_2 emissions relatively to 2010
CCS: Carbon Capture and Storage
BF-BOF: Blast Furnace-Basic Oxygen Furnace
BF-TGR: Blast Furnace with Top Gas Recycling technology
DRI: Direct Reduction of Iron
EAF: Electric Arc Furnace
NG: natural gas

PRINCIPLE OF THE ULCOS-BF PROCESS



of cost-effective incremental technologies and best practice sharing throughout the sector. It also takes into account the projected increase in scrap availability resulting in a growing share of secondary steelmaking from 40 per cent up to 44 per cent in 2050 as well as the effect of the decrease of the CO2 intensity of the power sector. This would lead to an absolute CO2 emissions reduction of 13 per cent, from 298 Mt CO2 in 1990 down to 258 Mt CO2 in 2050. Specific CO2 emissions would decrease from 1.508 tonnes CO2 per tonne of steel in 1990 down to 1.093 tonnes CO2 per tonne of steel, which represents a decrease of 27.5 per cent compared to 1990. For the 2030 horizon this translates into a decrease in specific CO2 emissions by 10 per cent between 2010 and 2030.

In the uneconomic direct reduction scenario, the expected overall CO2 abatement in the steel sector would amount to about 40 per cent between 1990 and 2050. The scenario represents a partial shift from steelmaking in blast furnaces to a process consisting of direct reduction of iron with subsequent steelmaking in electric arc furnaces. This implies huge investments, including the replacement of existing, optimised blast furnaces by other installations with higher operating costs. Also, the route relies on natural gas and electricity which are both excessively expensive in Europe. The BCG/VDEh study estimates CO2 abatement costs pertaining to the shift from the existing route towards the direct reduced iron-electric arc furnace route (DRI-EAF) as ranging from €260 per tonne of CO2 to €710 per tonne of CO2. Even under favourable natural gas and electricity prices, this technology change would be impossible without adequate support policies.

In the CCS scenario, implying fully functioning carbon capture and storage, all iron-ore based steelmaking technologies would have the same CO2 intensity of about 0.7 tonnes of CO2 per tonne of steel. Thus, the retrofit of existing blast furnaces with top gas recycling technology appears to be the most sensible option. Such a scenario, involving full deployment of CCS, would lead to a reduction of absolute CO2 emissions of ca. 60 per cent in 2050 compared to 1990, still falling short of the EU's 80 per cent aspirational objective. To date, economic viability and general applicability of CCS in Europe looks unlikely. Public resistance in a growing number of member states is strong. Recent research for the ULCOS top gas recycling technology suggests minimum additional costs for CCS of €50 per tonne of CO2 for capture only, without transport and storage.

Bringing the steel sector's emissions further down would need the deployment of technologies like HIsarna (smelting reduction) or ULCORED (direct reduction) – both connected to CCS – or hydrogen-based reduction, should they prove technically feasible. Under a fully decarbonised electricity scenario, electrolysis could also be envisaged as a potential solution.

From today's perspective the objective proposed in the commission low carbon roadmap is technically and economically unachievable for the steel industry. ★

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: 2011-2013 Demonstrator: 2020 Deployment: > 2030
Direct reduction (ULCORED)	5% without CCS 80% with CCS	Laboratory: done Pilot: 2013 Demonstrator: 2020 Deployment: > 2030
Electrolysis (ULCOWIN)	30% with today's electricity generation mix 98% with CO_2 free electricity generation	Laboratory: ongoing Pilot: 2020 Demonstrator: 2030 Deployment: > 2040

Mitigating circumstances

Steel can make a significant contribution to climate protection in Europe as a CO2 mitigation enabler

Steel's contribution to climate protection in applications far outweighs the CO2 footprint of steel production, according to a study by the Boston Consulting Group (BCG). Steel's CO2 balance is positive when manufacture and usage are taken into account equally. And if the material's outstanding recycling properties are included, too, it seems evident that life-cycle assessment is the best way to appreciate the real environmental footprint of a material.

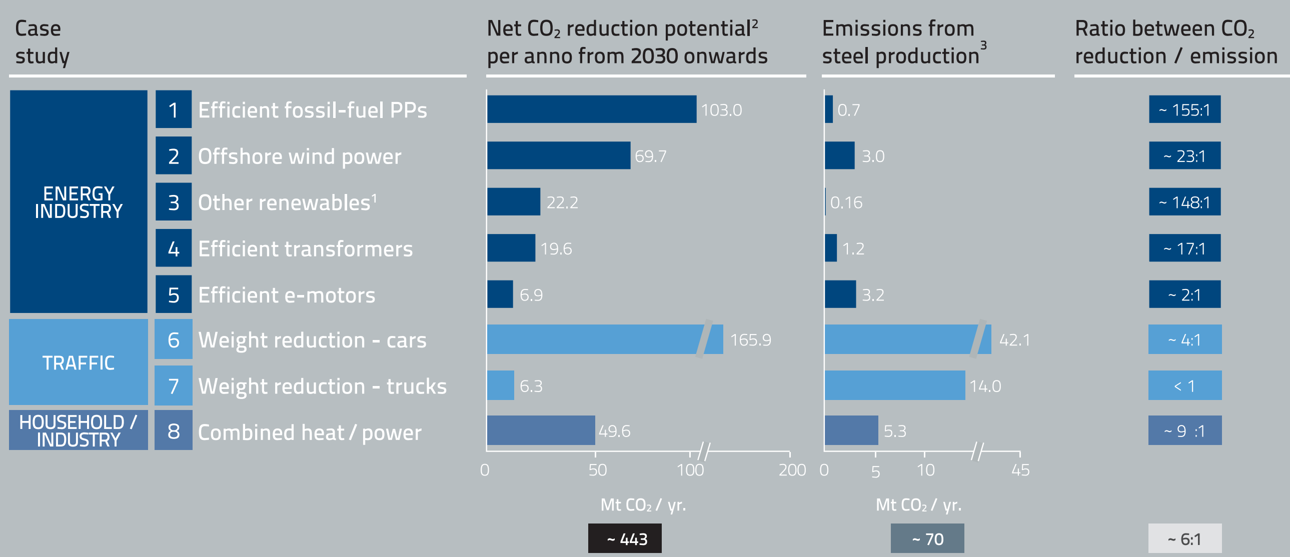
The current EU climate policy, however, regulates CO2 at the stack. This so-called tailpipe approach focuses on emissions stemming from the production of materials only. It overlooks their contribution in applications essential for climate protection. This approach is problematic. It risks relocation of the steel production facilities outside Europe while the product is a key material for meeting the climate targets Europe has set itself.

The BCG study applies a holistic approach in determining CO2 mitigation potential of the EU steel industry. It takes into account both the emissions from steel production and the effects of the use of steel in innovative applications. The result: steel can save six times as much CO2 in climate relevant applications than is emitted in the production of the material.

The study is conservative in establishing this: it concentrates on CO2 mitigation potential that is directly influenced by steel. It looks into CO2 savings related to the use of steel in applications for which steel cannot be replaced by any →

CASE STUDIES FOR EU27 RESULT IN CO_2 SAVINGS

Source: BCG/VDEh



Source: Steel Institute VDEh; Project team analysis
Note: PP = power plant
[1] Bioenergy. [2] Net reduction refers to reduction attributable to steel. [3] Refers to the emissions related to the amount of steel needed for the specific application.

other material. Applications with a complex mix of materials and possible reciprocal effects were excluded from the analysis. The selection focused on applications with a CO2 abatement potential within the EU of at least five million tonnes (Mt) annually. The analysis covers the period from 2010 to 2030, for which the expansion of the applications under scrutiny can be forecast with a sufficient level of confidence. It does not go beyond 2030 because of the lack of reliable forecasts.

The BCG analysis relies on external data collected and published by renowned research institutes. General forecasts regarding the development of CO2 emissions until 2030 are based on scenarios modeled in various scientific analyses.

According to BCG case studies on eight CO2 savings applications for which steel cannot be replaced by any other material, the yearly savings for the EU of these applications alone would be at least 443 Mt CO2 in 2030. This is more than six times as much as the 70 Mt CO2 released by producing the steel grades under consideration. The abatement should also be compared to the average yearly emissions from steel production in the EU over the period 2010-2030, which are estimated at approximately 220 Mt CO2. Steel's climate balance is positive.

Additional significant emission reductions could be established if the scope of the analysis was extended to other steel uses. It can be concluded that the application of innovative grades of steel, developed and produced in Europe, will result in an amount of CO2 mitigation which is at least double that of the CO2 emitted by the whole sector itself. In this respect, steel can be justifiably classed as a CO2 mitigator.

"Life-cycle analysis proves steel's CO2 balance is positive"

Three examples will show in detail both steel's potential as a CO2 mitigation enabler and BCG's approach and methodology in establishing this: Efficient fossil fuel-fired power plants, offshore wind power and weight-reduction in cars.

With about 103 Mt CO2 emissions saved annually up to 2030 and only 0.7 Mt CO2 yearly emissions pertaining to the production of the steel needed for the application, efficient fossil-fuel power plants form the case study that shows the best reduction/emission ratio of the eight cases looked into. The ratio is 155:1. Innovative steels are used in many critical parts of such facilities, such as steam and turbo generators, boilers, electronics and in numerous structural elements. New, heat resistant steels, for example, are a prerequisite for raising the temperatures and the pressures of the steam driving the generators, thus increasing energy efficiency.

Wind power is an example that underlines the conservative approach of the study in defining steel's mitigation potential. Generally, steel is the most applied, key material for wind power generation. This goes for the towers of the windmills as well as for the pods or the gear units. In addition, specially alloyed electrical steels are used in the generators that transform the wind power into electricity. Yet, in onshore wind farms steel might be replaced by alternative materials in certain places. The towers might also be made of wood or of concrete or be realised as hybrid constructions containing steel and concrete parts.

Therefore, the authors concentrated on offshore windmills because here steel really is without alternative. Offshore wind power is expected to grow rapidly in Europe in the coming years. In many European regions there is already a lack of space for additional inland plants. Landscape preservation has to be taken into account as well as resistance of local residents to new installation. Offshore wind farms do not have these disadvantages and, because of stronger and steadier winds at sea, they offer a significantly higher number of full load hours than inland plants. CO2 savings from this, which are attributable to steel, amount to 70 Mt per year up to 2030. Annual CO2 emissions from producing the steel applied amount to three Mt.

Weight reduction in cars is responsible for the highest absolute emissions savings among the applications analysed in the report. It amounts to about 166 Mt annually, while emissions from producing the steel employed are about 42 Mt. Steel is by far the most important material used in vehicle production. About two thirds of a modern car is made of steel. The BCG analysis focuses on car components that can only be made of steel, such as axles or chassis parts. Reducing weight in vehicles means less fuel consumption and, therefore, fewer CO2 emissions. The steel industry has developed special high-strength steels that can take up to 40 per cent 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. Modern high-strength steels have been the most successful lightweight materials used in car production over the past 10 years. Furthermore, steel is the best automotive material in terms of design flexibility, cost effectiveness, low emissions during manufacture and recyclability. ★

Making a commitment

The steel industry is committed to unlocking its mitigation potential

The EU steel industry is committed to unlocking the far-reaching energy and CO2 saving potential in Europe. The transition towards a competitive low carbon Europe requires the spread of new technologies and large investments in new infrastructure. Because of steel's contribution both to carbon-lean solutions and to the EU's economic wealth, a competitive low carbon Europe relies heavily on an economically healthy, modern, innovative and globally competitive European steel industry. A longterm European policy must clearly express this as a starting point and adopt it as a guiding principle for the development and implementation of the relevant measures and policy instruments. ★

> *"A competitive low carbon Europe relies heavily on an economically healthy, modern, innovative and globally competitive European steel industry"*

In this context, the EU steel industry is committing to:

- Deliver further measureable cost-efficient improvements in carbon and energy efficiency
- Implement incremental technologies - mainly process optimisation and retrofits
- Continue investing in R&D for mitigation of direct and indirect emissions from the sector
- Reinforce horizontal cooperation in best-practice sharing, energy efficiency, R&D, demonstration and pilot plant projects in relevant existing or new platforms
- Apply innovative technologies if economic viability is met
- Continue to work on the development of innovative steel grades for CO2 mitigation and carbon-lean steel applications, together with our customers
- Actively participate in finding global solutions to mitigate CO2 emissions in the steel sector. This includes development of international standards on CO2 measurement and performance assessment, further refine the work initiated with this Steel Roadmap and find a real dialogue with policymakers and other stakeholders

Policy recommendations for a low-carbon and competitive Europe 2050

Future policies have to retain the competitiveness of the steel industry

1. Climate change requires a global response. This can only be achieved through the enforcement of a comprehensive international agreement providing equal treatment for the production of globally traded goods such as steel, with an effective monitoring and verification system. EU climate targets should be dependent upon comparable reduction efforts by other major economies

2. Climate policies need to differentiate between sectors which can meet the overall target (e.g. the power sector) and those which cannot (steel). Emission reduction pathways for the steel industry should be built 'bottom-up' which means they need to be based on abatement levels which are technically and economically feasible, irrespective of the overall cap

3. Best performers in sectors should incur no direct or indirect burdens resulting from climate policies. In the context of cap and trade, best performers need 100 per cent of their allowances for free (no correction factor should apply) and their indirect CO2 costs must be fully and consistently offset through an EU mechanism at least until international distortions to competition are removed

4. EU energy policies must be aimed at securing globally competitive energy prices for industry. This means, among other things, deploying renewable energy in a truly cost-effective way and investigating the sustainable extraction of new forms of energy. To the same purpose, exemptions from energy taxes, network and renewables tariffs and levies have to be continued and made general

Adequate support for new technologies is required to bring about drastic CO2 emission reductions in the steel industry

5. EU and member states need to provide the fundamentals required for the implementation of the strategic technology path of the steel industry: A high level of support for R&D, demonstration and deployment of new technologies, including infrastructure investments, installation, operation and access to CCS, as well as an adequate legal framework

6. To this end public funds should be provided consistent with the level of support needed and cover all stages from research to deployment at industrial scale of the technologies and infrastructure. Funding could for instance come from the earmarking of the revenues from the EU ETS

7. In parallel, an appropriate set of incentives should be put in place to promote the sequestration of CO2 into products

8. The recovery of industrial waste energy (waste gases, heat and pressure) should be promoted through incentives similar to those available for renewable energy generation

Future policies must recognise the positive role steel will play

9. Climate policies should encourage and not hamper the production of steel as steel will play a key-role in the decarbonisation of the EU. If steel is not produced in Europe, many industrial supply chains are at risk of relocation

10. Policies should follow an integrated approach so as to capitalise on the benefits of innovative steel grades and steel applications in CO2 mitigation, for example evaluating a sector's emissions over several complete life cycles of its products and along the value adding chains it is part of. This not only entails increased use of design for recycling, recyclability and life cycle evaluations, but also the monitoring of market developments in steel scrap in order to identify any adverse conditions in recycling markets, and analysing pressures on scrap flows to less emission-efficient regions

A coherent and predictable policy framework

11. The efficiency of existing policies should be examined openly and transparently through realistic impact assessments for each sector

12. EU climate policy should be designed in a way it has the potential to convince third countries to enter in a global climate agreement. This would require among others achievable targets for industry

13. EU energy and climate policies should constitute a coherent package. Overlapping policies should be avoided. The 2020 CO2, renewables and energy efficiency targets overlap, causing confusion and hampering investment

14. EU institutions should refrain from constantly interfering in the agreed climate policy framework and targets ★