EUROFER
The European Steel Association

LOW CARBON ROADMAP

PATHWAYS TO A CO2-NEUTRAL EUROPEAN STEEL INDUSTRY

FINAL

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OVERVIEW

Making a success of the European steel industry's low-carbon transformation

The European steel industry is the most advanced of its kind in the world. As it is, Europe leads the way in environmental and climate performance. CO_2 emissions and energy use in European steel production have been halved since 1960, and the sector has the ambition to further achieve cuts of between 80-95% by 2050, compared to 1990 levels.

This transition will require significant investment in new technological development and deployment, in energy infrastructure, consumption and type, and will require access to high quality materials, such as iron ore and scrap.

EUROFER has established a clear set of pathway scenarios that will deliver this essential change for the sector, ensuring that Europe will remain on track to fulfil its Paris Climate Accords requirements, whilst also making European steel fit for a clean, low-carbon future.

KEY MESSAGES

This roadmap sets out several of the key elements that will make the transition to a low or carbon-neutral European steel industry possible

- The European steel industry could achieve carbon emissions cuts of between 80-95% by 2050, under the right conditions, through new technological pathways
- Total costs of production will rise by 35-100% per tonne of steel by 2050 as a result of the costs of using new technologies and more energy
- Additional energy requirements will be about 400TWh of CO_2-free electricity in 2050 – about seven times what the sector purchases currently.

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INTRODUCTION

With advanced technologies, and under the right circumstances, the EU steel industry could achieve a revolutionary transformation in the way it makes steel and in its environmental impact

The whole European steel industry is being driven to reduce its direct and indirect CO2 emissions – and could achieve CO2 emissions cuts of 80-95% in 2050 compared to 1990 levels. However, this change is not an instantaneous shift: it is an iterative process that will require adjustments and a managed transition between phases.

The overall transformation would be enabled by hydrogen-based steelmaking, by adapting of fossil fuel-based steelmaking through process integration, and through the capture and use of waste carbon for the production of chemicals and increased recycling of steel scrap and steel by-products.

Steel innovation: technological pathways

There are two main technological pathways for CO2 reduction in the steel sector. These are Smart Carbon Usage (SCU) and Carbon Direct Avoidance (CDA).

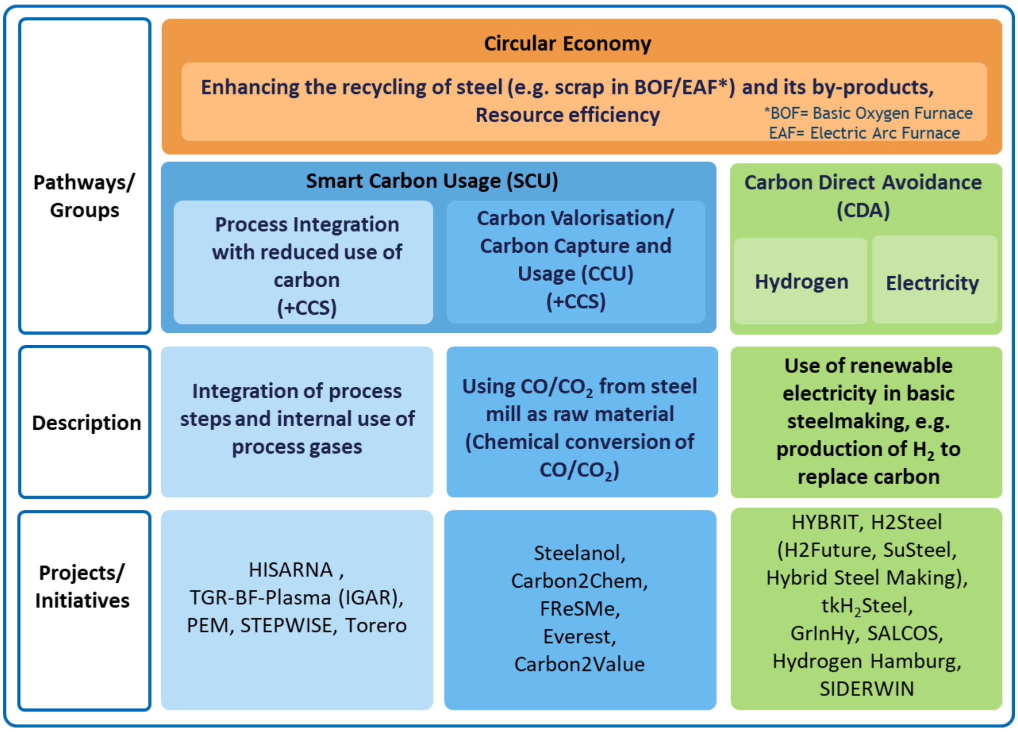

Figure 1: *The EU steel industry's strategic technological pathways. This identifies both the main pathways to be pursued and a sample of some of the proposed or ongoing projects in each pathway.*

These pathways, shown in **Figure 1**, seek to substantially reduce the use of the carbon compared to the current means of steel production or to avoid carbon emissions entirely. There are overarching circular economy projects, such as enhancing recycling of steel and its by-products and the further improvement of resource efficiency. Within each pathway are groups of technological approaches.

Smart Carbon Usage (SCU) includes:

- Process integration, which looks at modifications of existing ironmaking/steelmaking processes based on fossil fuels that would help reduce the use of carbon in, and thus the CO_2 emissions of, a state-of-the-art EU plant.
- Carbon Valorisation or Carbon Capture and Usage, which includes all the options for using the Hydrogen, CO and CO_2 in steel plant gases or fumes as raw materials for the production of, or integration into, valuable products.

Carbon Direct Avoidance (CDA) includes:

- Hydrogen-based metallurgy, which uses hydrogen to replace carbon as the main reduction agent for the iron ore reduction stage. This hydrogen could be produced using renewable energy.
- Electricity-based metallurgy, which uses electricity instead of carbon as reduction agent for the iron ore reduction, with greater focus on renewable energy.

Necessary conditions

Various conditions must be satisfied while the steel industry is transitioning to becoming a low-CO_2 sector

The necessary conditions need to be in place to make this transformation happen. In particular, all the necessary ingredients for steel making need to be available in both quality and quantity. These include suitable raw materials, such as iron ore and scrap. It also means having access to sufficient low-CO_2 energy sources, such as electricity and hydrogen, which must be available at commercially viable rates. The energy infrastructure that goes with it is also indispensable, as even cutting-edge, technologically advanced steelmaking facilities would be stranded without access to clean energy.

During the transition, Carbon Capture and Storage (CCS) technology may also be needed in order to support progress along the potential CO_2 reduction pathway.

Finally – both during the transition and once the move to the low or carbon-neutral future of the sector has successfully been completed – there must be regulatory framework that ensures that the EU steel industry remains competitive compared to its global competitors. Most global competitors do not face anything close to the environmental standards or climate constraints of EU players – and as such, do not bear the costs. A suitable regulatory framework would serve to address this fatal and conceived handicap, both now and in the future.

Scenarios for transformation

Depending on the reality of the circumstances, a range of potential outcomes are possible

While the sector has the ambition to reach up to 95% CO_2 reductions compared to 1990 levels, there are a range of intermediate states, depending on a range of circumstances, some of which are beyond the immediate control of the sector. These factors include financing availability, energy access and energy infrastructure investment, actual rates of technological development and deployment, as well as real (as opposed to projected) future demand for steel and political or social developments. Nevertheless, for ease of comparison, for the purpose of these scenarios, EU steel demand is projected to rise from 166 million tonnes today to around 200 million tonnes in 2050.

Nevertheless, we can identify six principle scenarios.

- **Scenario 1: Business as Usual**
  No technological development takes places; no new processes come on stream; the production mix remains the same and projected demand is met using existing installed capacity. CO_2 intensity per tonne of steel produced remains the same.
  In this scenario, emissions would be 10% lower compared to 1990 levels. This scenario is not realistic because it does not account for any developments – it is here for comparison purposes only and does not feature in the research study highlighted below.
- **Scenario 2: Ongoing retrofit**
  Existing facilities are retrofitted with technology to further limit carbon emissions but the fundamental processes do not change, though low-carbon electricity is assumed to be available.
  In this scenario, a 15% reduction in emissions could be achieved by 2050, compared to 1990 levels.
- **Scenario 3: Current projects with low-CO_2 energy (electricity and gas)**
  All projects currently underway are scaled up to their full potential at industrial level, using new technologies and processes that are currently under development. However, only low-CO_2 energy is available, rather than fully CO_2-free sources. This hinges on the assumption of a 'closed loop' in 2050 for all carbon capture and usage products, i.e. that the embedded emissions in their products will not be emitted into the atmosphere at a later stage.
  In this scenario, up to 75% less CO_2 could be emitted in 2050, compared to 1990 levels.
- **Scenario 4: Alternative pathway with low-CO_2 energy (electricity and gas)**
  A mix of the lowest emissions SCU and CDA technologies is deployed in combination with scrap-based EAF. However, only low-CO_2 energy is available, rather than fully CO_2-free sources.
  In this 'alternative pathways' scenario, CO_2 reductions of 80% by 2050 compared to 1990 levels could be achieved.
- **Scenario 5: Current projects with CO_2-free energy (electricity and gas)**
  To achieve deeper decarbonisation, the remaining emissions in core stream and downstream emissions are targeted. Decarbonised energy production, including zero emissions electricity and gas, instead of natural gas for use in the steel sector, are assumed to be available.
  In this scenario, emission reduction of up to 85% could be achieved by 2050, compared to 1990 levels.
- **Scenario 6: Alternative pathways with CO_2-free energy (electricity and gas)**
  The remaining emissions in core stream and downstream emissions are targeted.
  In this 'alternative pathways' scenario, CO_2 reductions of up to 95% by 2050 compared to 1990 levels could be achieved.

Energy access and cost

The European steel industry's energy requirements will rise significantly

Reliable, affordable and clean energy access will remain key, with the 80-95% reductions only possible is CO_2-free electricity and hydrogen are available. However, an essential piece of the puzzle is the additional costs that these sources will entail. The projected investment needs are very high, and both the capital and operating costs of using them will lead to significant increases in production outlays.

The total annual costs of steel production in 2050, including both capital and operating expenditure (CAPEX; OPEX) are estimated to be between €80-120 billion. However, the individual cost impact depends on production route and is significantly higher for the primary steel production routes compared to the cost impact for the overall steel industry.

The average steel production costs of all *primary* steel making routes could increase by 35 -100% between 2015 to 2050 compared to the production costs of the retrofitted Blast Furnace/Blast Oxygen Furnace route (BF/BOF). These figures are account for the expectation that the price for electricity and hydrogen production will fall between now and 2050 compared to current prices.

The quantities of energy hat the European steel sector is likely to need will also rise sharply. The sector will need, annually, about 400 TWh of CO2-free electricity from the grid by 2050. This 400 TWh corresponds to more than seven times the steel industry's current electricity purchase from the grid. Of this, around 230 TWh would be used for the production of about 5.5 million tonnes of hydrogen.

Other key findings and techno-economic feasibility assessment

Transformation of the sector is feasible, but the costs are high and depend on external factors to be successful

An environmentally-friendly, innovative and competitive European steel sector plays a crucial role in contributing to the EU's long-term climate and energy ambition. At the same time, the European steel sector faces intense global competition.

Technical research has demonstrated that the European steel industry could reduce the CO2 emissions of its production by up to 95% by 2050 compared to 1990 levels, even considering a projected 5% rise in steel production between those two periods.

This research was carried out by Navigant[1]and the VDEh Steel Institute[2] with the contribution of other independent experts using 2017 data. With the development projects initiated by the steel companies in 2017 and later the potential for CO2 reductions is even higher. The study also underlines that such emission reductions cannot be made in isolation.

To arrive at these findings, Navigant and the VDEh Steel Institute performed a detailed techno-economic assessment of a broad range of mitigation options in line with the main low-carbon innovation projects within the EU steel industry. These included Smart Carbon Usage (SCU) technologies and Carbon Direct Avoidance (CDA) options. Their assessment also factored in incremental improvement options.

From the assessment carried out by these research groups it is clear that any successful, far-reaching transformation of the EU steel sector will require a number of radical changes from industry:

- Investment in the industrial implementation of cutting-edge, breakthrough technologies.
- Deep and consistent innovation in new approaches, including significant investment in their upscaling, over a relatively a short timeframe.
- A predictable and supportive regulatory framework is essential
- Intensified cross-sectoral cooperation will become ever more important as coordinating these external factors is key to making leap towards more CO2-lean scenarios.
- A substantially improved and enlarged energy system to ensure the supply of required energy sources at commercially viable rates to the steel industry. A complete

[1] Update of the Steel Roadmap for Low Carbon Europe 2050 - Part I: Technical Assessment of Steelmaking Routes. Final report, Steel Institute VDEh, 04/2019
[2] Update of the Steel Roadmap for Low Carbon Europe 2050 - Part II: Economic Assessment. Final report, Navigant, 05/2019

transformation of the broader energy system towards green electricity and hydrogen is indispensable.

Beyond these requirements, concerted effort and support will be needed to ensure the competitiveness of the European industry against severe foreign competitors who neither face the same strict climate or environmental standards and thus do not face anything like the same costs.

PATHWAYS TO A CO_2-NEUTRAL EUROPEAN STEEL INDUSTRY

Transitioning the European steel industry to its low-carbon future

With the right measures, CO2 reductions of up to 95% can be attained

It is not currently possible to determine with certainty which precise combination of technologies will be used in the future. This is because the eventual applicability of a certain technology is subject to regional conditions. Most notably, these include energy costs, energy and infrastructure availability, the extent of local industrialisation, local legal restrictions and the technological readiness level actually achieved by any given breakthrough technology.

However, based on their analysis of the different CO2 reduction options in the EU steel industry, Navigant and VDEh developed a set of potential scenarios – or 'pathways' – for steel production between now and 2050.

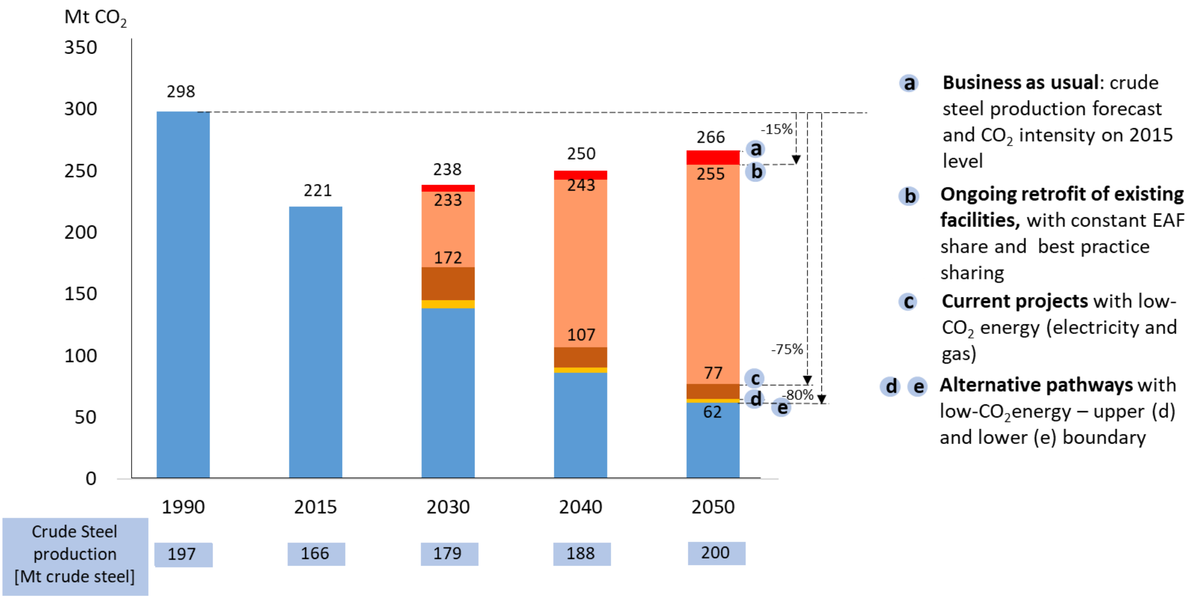

Figure 2: Various pathways for emissions reduction between 1990 and 2050.

Business as usual

This scenario assumes that no technological development takes places; no new processes come on stream; the production mix remains the same and projected demand is met using existing installed capacity. In this scenario, emissions would rise but it would still remain by 10% lower compared to 1990 levels, as shown with point (a) in ***Figure 2***. This scenario is not realistic because it does not account for existing developments – it is here for comparison purposes only and does not feature in the research study highlighted below.

'Ongoing retrofit' pathway

These include an 'ongoing retrofit' of existing facilities pathway, which keeps the current share of production technologies, namely Blast Furnaces/Basic Oxygen Furnaces and Scrap-Electric Arc Furnaces, constant until 2050. This leads only to a 15% emission reduction compared to 1990 levels – point (b) in ***Figure 2.***

As both the ongoing retrofit of existing facilities and the incremental options are far away from reaching the defined reduction targets the study considers a so called 'current projects' pathway which assumes that existing breakthrough projects around Smart Carbon Usage (SCU) and Carbon Direct Avoidance (CDA) under development reach their full production capabilities.

'Current projects' pathway with low-CO2 energy

This 'current projects' pathway implies broad diversity of production technologies in 2050. It further implies that there is no one solution to becoming low-CO_2 steelmaker, but instead there will be a variety of production technologies in the future. The initial setup of the 'current projects' pathway assumes a power grid mix of 80g CO2/kwh in 2050[3] and focuses on the core stream emissions[4]. This pathway would deliver a **74% reduction in CO2 emissions by 2050, compared to the 1990 emission baseline**, which corresponds to an absolute reduction of 221 million tonnes of CO2, as in point (c) in *Figure 2: Various pathways for emissions reduction between 1990 and 2050.**Figure** 2.*

This hinges on the assumption of a 'closed loop' in 2050 for all Carbon Capture and Usage (CCU) products, i.e. that the embedded emissions in their products will not be emitted into the atmosphere at a later stage. If this 'closed loop' assumption does not hold for the CCU products, the emission reduction will be significantly lower.

'Alternative pathways' with low-CO2 energy

The study also investigates 'alternative pathways', that employ only a combination of Scrap-EAF and the lowest emission technology from CDA and SCU respectively. With low-CO2 energy, these pathways could achieve CO2 reductions of up to 80% by 2050 compared to 1990 levels.

To achieve deeper decarbonisation, the remaining emissions needs to be reduced.

'Current projects' pathway with CO2-free energy

The remaining emissions in the core stream and downstream emissions would should be targeted to achieve higher emission reduction. The remaining emissions for the 'current project' pathway are presented in ***Figure 3***. The reduction of these emissions requires CO2-free energy. With green

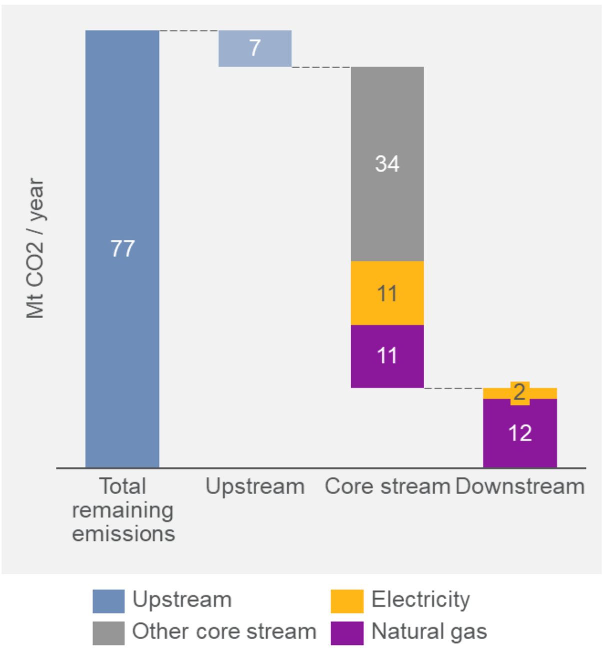

Figure 3: *Split[1] of remaining emissions of current projects pathway in upstream, core stream and downstream.*

This pathway, which uses green electricity and green gas applications, as opposed to natural gas, could result in emissions reductions of 86%.

[3] EU Reference Scenario 2016, Energy, Transport and GHG Emissions Trends 2015 (page 145) – publication of the EU Commission
[4] The emissions are split in upstream (pellet or HBI production), core stream (iron and liquid steel production) and downstream processes (casting and hot rolling).

electricity and green gas applications – displacing natural gas – the 'current project' pathway could, assuming a decarbonised energy system, achieve emission reductions of up to 86% by 2050 compared to 1990 levels, resulting in emissions of 41 million tonnes of CO2 in 2050, as shown with point (f) in ***Figure 4***

'Alternative pathways' with CO2-free energy

With alternative pathways used with green electricity and green gases, the emissions can be further reduced so that these pathways could achieve CO2 reductions of up to 95% by 2050 compared to 1990 levels, as shown in ***Figure*** 4.

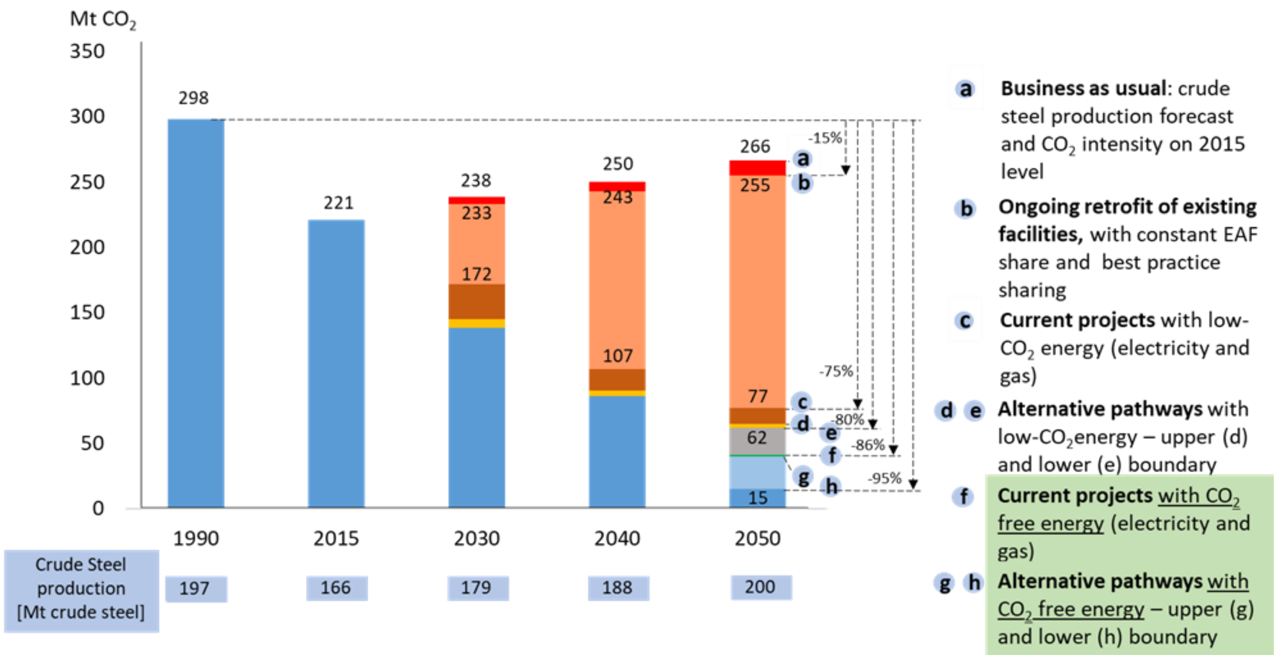

Figure 4: Various pathways for emissions reduction between 1990 and 2050 – including use of CO2-free energy.

Steel production growth projections for 2050

The CO2 emission reductions reported above were estimated based on **marginal production growth** up to an annual production of 200 million tonnes of crude steel in 2050, which represents a growth rate of about 0.5% growth per year compared to 2010 production levels, as shown in ***Figure 5***.

The projected evolution of steel production structure is illustrated in ***Figure 6***. This gives projected steel production overlaid on a supposed technology mix for the 'current project' pathway. However, this increase in EU crude steel production may be significantly less than forecast if the present spike in imports of semi- and finished products turns out to be a sustained long-term trend, rather than a short-term aberration.

Were EU steel production to continues to stagnate, remaining at the 2015 level (166 million tonnes of crude steel), the emissions reduction level could in fact be higher than if production growth were to continue to rise until 2050, as estimated in this study.

In this stagnation scenario the 'current projects' pathway could result in emissions of 64 million tonnes of CO2 in 2050. This represents a reduction of up to 79% versus 1990 levels. This scenario could occur if EU imports of semi-finished and finished steel products were to further increase, displacing production of crude steel in the EU. This is to say, if 'carbon leakage' occurs, total emissions will be lower in Europe, though they will be higher abroad, and potentially much higher if those regions have not advanced down the decarbonisation track as far as EU steel producers have.

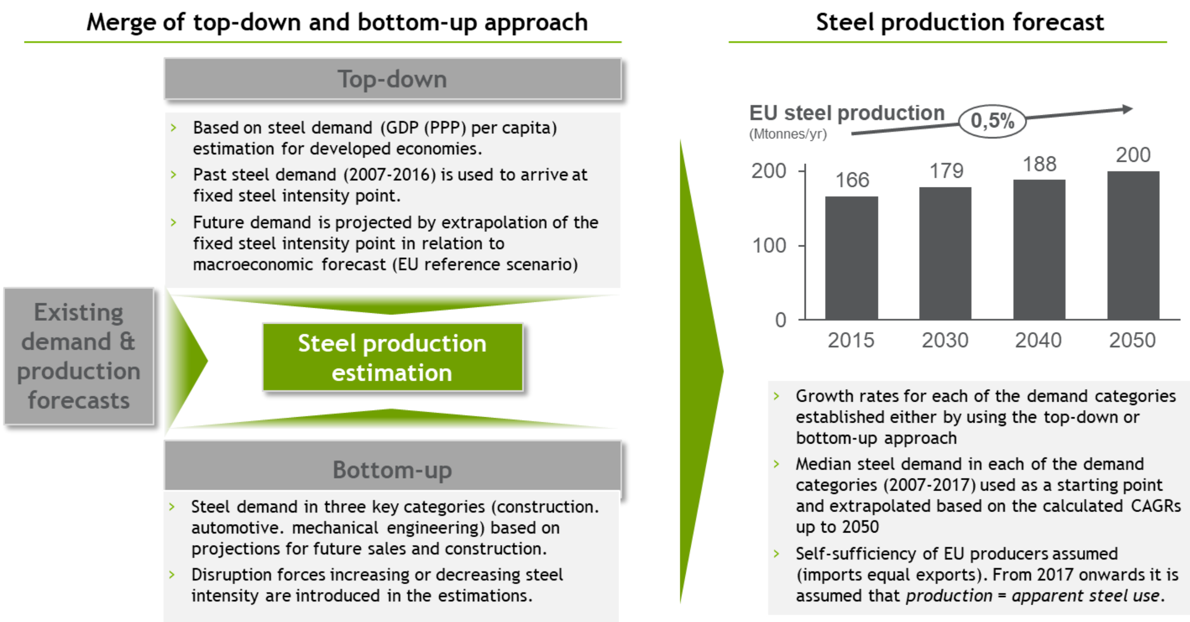

***Figure 5**: Forecasts for steel production up until 2050. This chart explains the various factors that determine growth projections.*

Growth per year is projected to be about 0.5%, but this is predicated on imports not rising further. If import levels continue to rise, this may displace EU steel production, though the net climate effect would likely be larger because of the 'carbon leakage' phenomenon

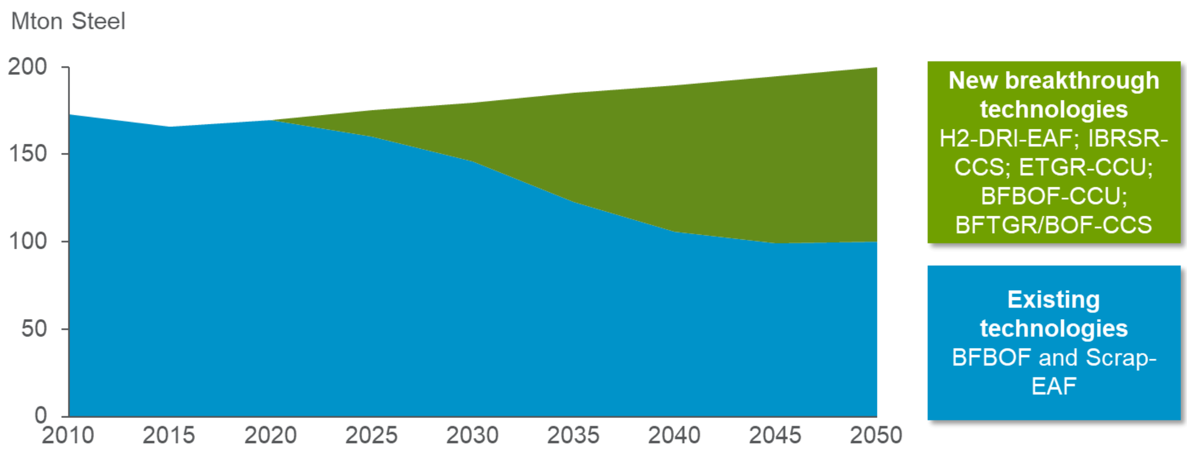

***Figure 6**: Assumed production structure for the 'current projects' scenario given projected growth of steel production by 5% compared to 1990 or 20% compared to 2010 levels. This particular scenario sees new breakthrough technologies take a significant share of production.*

Scrap and its role in emissions reduction

Scrap is crucial for the reduction of CO2 emissions

Scrap plays an important role in the EU steel strategy for the reduction of CO_2 emissions. It is used in multiple steel production routes. However, the overall availability of scrap is limited. Its availability towards 2050 was modelled by differentiating three sources of scrap: home scrap, prompt scrap and obsolete scrap. The calculation method and results of the scrap availability model are displayed in ***Figure 7***.

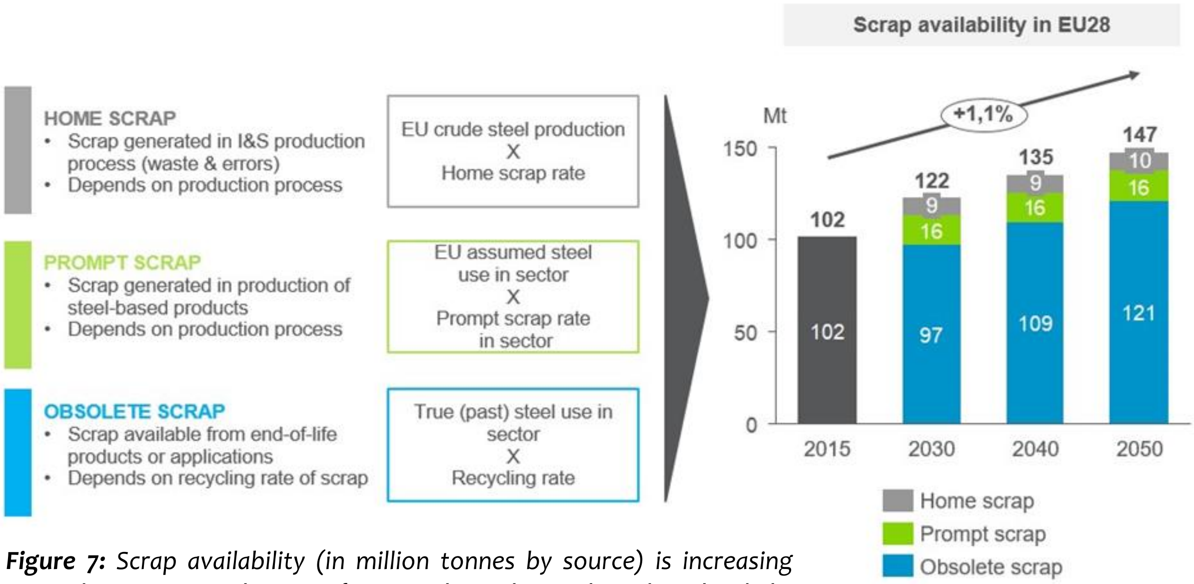

Figure 7: *Scrap availability (in million tonnes by source) is increasing towards 2050. Note: the scrap forecast shown here is based on the slight production growth forecast of +0.5% per year up until 2050.*

Inputs into steelmaking and carbon storage

Energy, raw materials and carbon storage are all important factors

Achieving deep decarbonisation requires a number of prerequisites to be met – mainly the availability of input materials and feedstock.

Energy is a particularly vital input. A transformed, future EU steel sector will have substantial demand for energy. This is estimated to be around 400 TWh/year, consisting both of low-carbon electricity purchased from the grid for steel production processes (about 162 TWh/year) and the production of about 5.5 million tonnes of green hydrogen (about 234 TWh/year) will be created, ***Figure 8***. This will require measures that go beyond the steel sector.

This 400TWh is seven times the EU steel industry's current demand from the electricity grid; it is the equivalent of the annual electricity consumption of Germany.

Another issue includes the potentially limited availability of pellets, as well as underdeveloped markets – and thus a lack of suppliers – for key emissions reduction technologies. On this it will be imperative that the steel sector collaborates with pellet suppliers so that these barriers can be overcome. Scrap availability in sufficient quantity and quality is also essential in the decarbonisation pathways.

Carbon Capture and Storage (CCS) may play an important role, but may not be available throughout the EU. In some EU member states, there are significant hurdles or even prohibitions on the deployment of CCS. For the 'current projects' scenario, about 21 million tonnes/year would have be captured, transported and stored. Hence, without CCS only a 67% CO2 reduction would be possible, as opposed to the 74% cut set out in the 'current projects' pathway. Some 'alternative pathways' may require more CO2-free electricity and hydrogen and more CO2 storage capacity of up to 63 million tonnes/year.

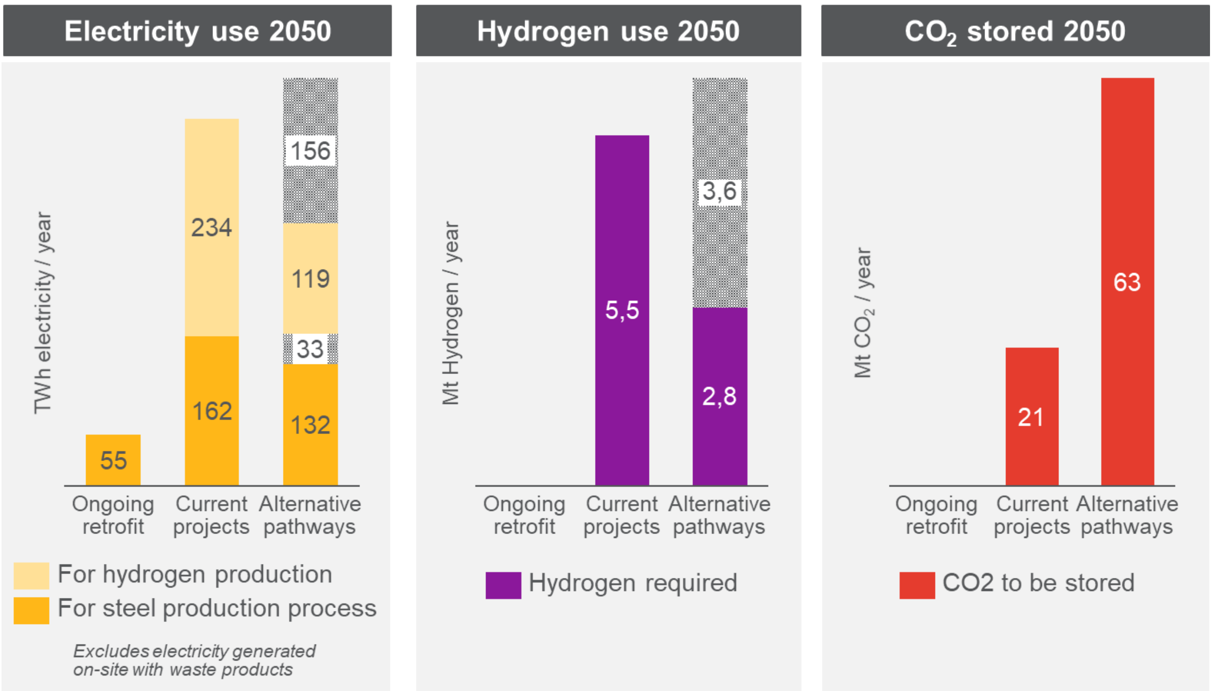

Figure 8: *Projected demand of the various pathways for power purchased from the grid, for hydrogen and for CO2 storage capacity in 2050.*

Investment requirements and ongoing costs

The deployment of significant investment resources will be necessary to bridge the gap between current conditions and the EU steel sector's potential transformation

The transformation of the EU steel sector will entail high investment costs and lead to a significant increase in production costs. The 'current projects' pathway described above implies significant additional investment costs for the steel sector.

Assuming the projected steel production growth holds true, the 'current projects' pathway requires approximately €52 billion of investment if the industry is to be changed overnight to the 2050 production setup, as seen in ***Figure 9***. These are the non-annualised CAPEX numbers required for the production structure in 2050, i.e. for retrofitting existing plants and new builds, taking into account the existing infrastructure. This is €18 billion, or 53%, more than the investment needed to retrofit the current steel making routes, which would cost €34 billion.

Note: cost figures cited here represent 2015 real values and do not include costs related to change of property, new energy infrastructure, additional permits, required innovation, demolition, scale- up costs and the like. Accordingly, the investment costs could be significantly higher if those additional cost elements are considered.

In the analysis of the operational costs of the steel sector, a low-cost and high cost range was created, based on Navigant's sector expertise and steel company inputs. This was in order to address the uncertainty in the future price evolution of input material and energy. For the 'current projects' pathway, with slight production growth up to 200 million tonnes of crude steel, the total production cost in 2050 ranges from €81 to 112 billion, which is a substantial increase compared to the total production cost of €74 – 91 billion for the 'ongoing retrofit' pathway. This corresponds to an increase of up to €20 billion per year, or up to 23 % compared to 'ongoing retrofit' pathway.

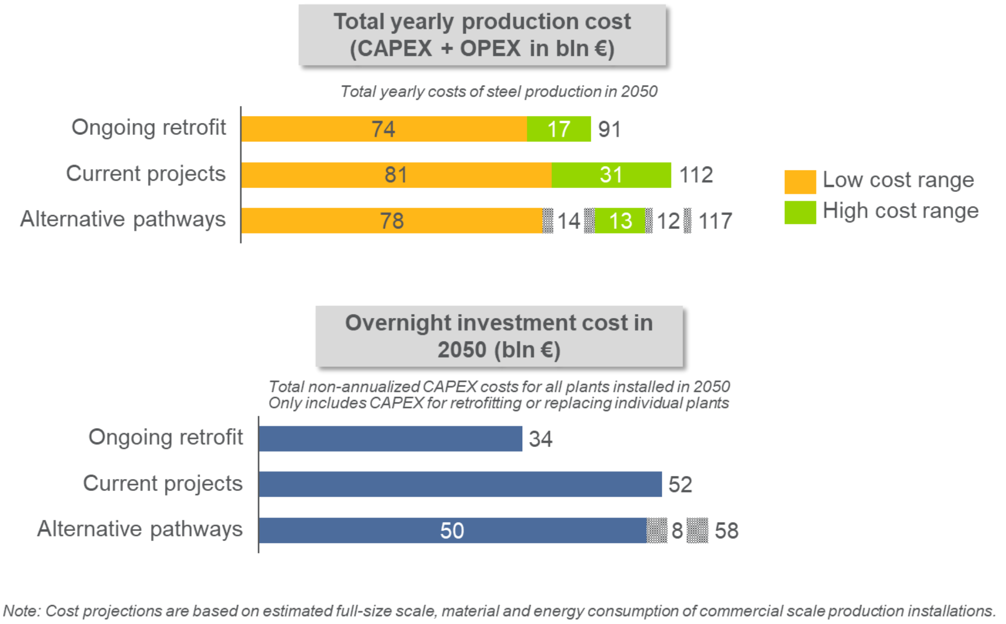

Figure 9: *Total yearly production cost and overnight investment cost in 2050 for the 'ongoing retrofit', 'current projects' and 'alternative pathways' pathways.*

These cost increases relate to the full portfolio of production technologies that are employed in the 'current projects' pathway. Scrap/EAF plays a major role here and the additional cost of scrap/EAF over BF/BOF retrofit are limited in 2050. The significant increase in the production costs of some alternative technologies will thus partly be 'compensated for' by the relatively low projected cost of scrap/EAF. The study found that the cost impact for individual routes of primary steelmaking will be significantly higher than the cost impact, on average, of the overall steel industry. Hence, the average steel production costs of all primary steel making routes could increase up to 100% from 2015 to 2050 compared to the production costs of the retrofitted Blast Furnace/Blast Oxygen Furnace route (BF/BOF), ***Figure 10***

Therefore, European primary steel producers will have an especially significant cost disadvantage compared to other regions which are not developing towards low-carbon in a similar way, or which benefit from access to subsidised electricity, hydrogen or Carbon Capture and Storage facilities.

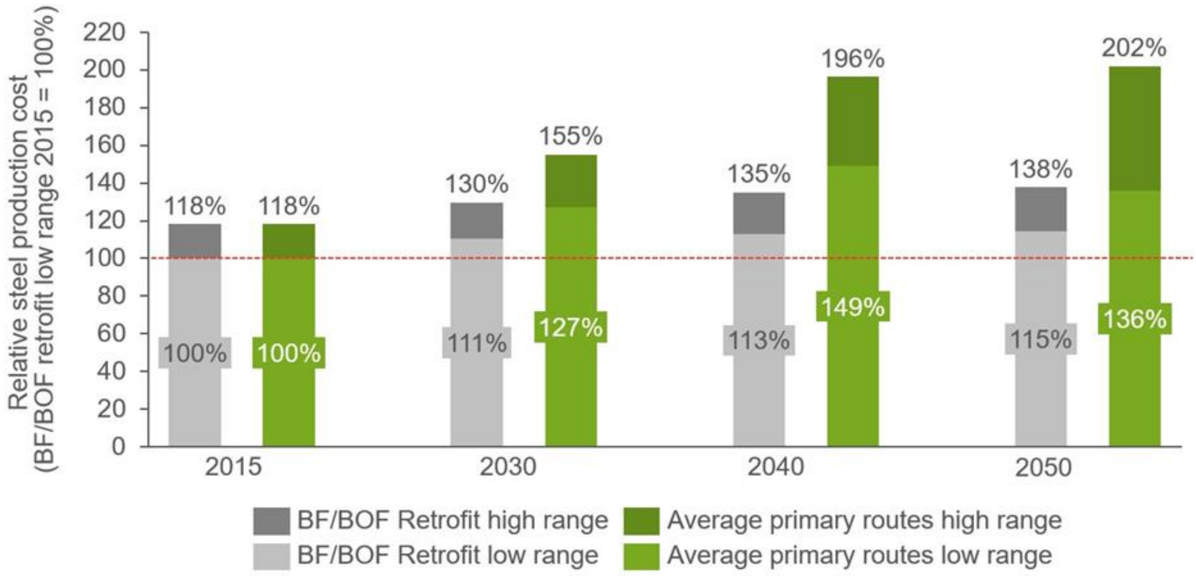

Figure 10: *Comparison of average steel production cost of baseline and primary routes in the 'current projects' pathway.*

Conclusions

Radical changes are a must for emissions reduction

To reach the emissions reduction targets, it is important to act now. Given the asset-intensity of the steel industry, the implementation of low-carbon technologies (including engineering, permitting, construction) is time intensive. Investment decisions taken today will only take effect in 10 or more years.

The steel sector is willing to undergo the required transformation, but this cannot be done in isolation. Instead, it should be done in cooperation with governments, the energy sector and other industries. The deep transformation of the steel sector requires concerted effort and support. The pathways investigated here illustrate that several radical changes are required for deep emissions reductions:

- Research into, and the development and upscaling of, low-carbon steel making technologies is required. This comes at high risks for individual companies.
- Significant investment for the roll-out of new technologies is required.
- Cross-sectoral cooperation with other sectors is essential. These sectors include chemicals, cement and power.
- The energy system needs to be transformed: readily available, large supplies of affordable CO2 neutral electricity, alongside significant volumes of green hydrogen at internationally competitive rates.
- Carbon Capture and Storage infrastructure, including for CO2 transport and storage, may have to be made available.

The transformation of the steel sector is being stalled by several key barriers that have to be addressed with absolute priority. The study proposes a mix of remedies that target the most important obstacles towards deep decarbonisation.

The use of the existing financial support options, such as Horizon Europe, Partnerships, Important Projects of Common European Interest, and the ETS Innovation Fund should be prioritised to the greatest possible extent. This would fast-track innovation in the sector. Subsequently, innovation de-risking mechanisms and funding for cross-sectoral decarbonisation should be used to complement the existing mechanisms and address the lack of innovation incentives and capital of sufficient size. Additionally, having a clear regulatory framework and a vision for the successful implementation of key emission reduction technologies is of utmost importance.

To roll-out emission reduction technologies, access to sufficient low-interest investment capital is also needed. Here, the use of support mechanisms, for example in the form of carbon contracts or other de-risking mechanisms, is advisable.

The competitiveness of a low-CO_2 steel sector must be sustained during both the innovation and implementation/roll-out stages. The principle threat is that of low-cost foreign competition, which might not be moving – or not moving as fast – towards low-carbon operation as European producers. To minimise the adverse effects of the global competition on EU decarbonisation efforts, adequate supportive policies should be developed.

EU measures are needed to secure a level playing field and the competitiveness of the EU steel sector

An EU regulatory framework that provides a level playing field for EU steel products with third countries' competitors in the EU and on global markets is essential for a successful transition to low-CO_2 steel production in the EU. The EU needs to introduce WTO-compliant measures that allow the EU steel industry to recover the full costs of its decarbonisation. Steel products sold on the EU market, whether produced in the EU or imported from third countries, must have a similar CO_2 cost constraints. Such a framework should also incentivise global competitors to follow the EU's decarbonisation path.

Taking a broader, societal perspective, beyond the steel sector's own emissions, steel products are highly effective mitigation enablers in many applications or products in other sectors. Based on a review of megatrends and steel application areas, examples of steel contributions have been derived. These examples include steel in low-carbon urban transport infrastructure, in lightweight car construction and for future low-carbon energy assets. Beyond these concrete examples, steel will be a key material in the development of the circular economy.

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ABOUT THE EUROPEAN STEEL ASSOCIATION (EUROFER)

The European Steel Association (EUROFER) AISBL is an international not-for-profit organisation under Belgian law, based in Brussels.

EUROFER was founded in 1976 and represents the entirety of steel production in the European Union. EUROFER members are steel companies and national steel federations throughout the EU. The major steel companies and national steel federations in Switzerland and Turkey are associate members.

EUROFER is recorded in the EU transparency register: 93038071152-83

ABOUT THE EUROPEAN STEEL INDUSTRY

The European steel industry is a world leader in innovation and environmental sustainability. It has a turnover of around €170 billion and directly employs 330,000 highly-skilled people, producing on average 170 million tonnes of steel per year. More than 500 steel production sites across 23 EU member states provide direct and indirect employment to millions more European citizens.

Closely integrated with Europe’s manufacturing and construction industries, steel is the backbone for development, growth and employment in Europe. Steel is one of the most versatile industrial material in the world. The thousands of different grades and types of steel developed by the industry make the modern world possible. Steel is 100% recyclable and therefore is a fundamental part of the circular economy.

As a basic engineering material, steel is also an essential factor in the development and deployment of innovative, CO_2-mitigating technologies, improving resource efficiency and fostering sustainable development in Europe. It is our objective to reduce direct CO_2 emissions from steelmaking in Europe by at least 80-95% by 2050 and meet our responsibility to protect the climate.