



BRITISH
STEEL

LOW-CARBON ROADMAP

A pocket guide

BUILDING **SUSTAINABLE** FUTURES

BUILDING SUSTAINABLE FUTURES

In October 2021, we unveiled our ambitious Low-Carbon Roadmap. It will enable us to realise our goal for low-embedded carbon steel production, delivering a phased reduction in greenhouse gas (GHG) intensity by 2030, 2035 and achieving net-zero steel by 2050.

This pocket guide outlines the decarbonisation challenge faced by the steel industry, the targets we have set ourselves and our path to meet them.

As one of the first steel manufacturers to adopt a science-based target, we're embracing the challenge ahead with enthusiasm and are confident the steps we plan to take will realise a significant benefit to the UK's decarbonisation targets.

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THE CLIMATE CHALLENGE

Climate change is one of the greatest challenges facing humanity and has been declared an emergency by the UK Parliament.

Without action, we can expect to experience natural disasters with growing frequency, such as increasing global temperatures, droughts, sea level rises and mass extinctions.

Globally, between 7 and 9% of all man-made CO₂ emissions arise from steelmaking. From our analysis, more than 99% of GHGs from steelmaking are

from CO₂. That's why we're prioritising our efforts to address the climate challenge we all face.

Steel is an enabling material that provides the basis for others to decarbonise. Steel plays a key role in the transition to a zero carbon economy e.g. through green rail transport networks or low carbon power generation.

There are 2 principal ways of making steel. The route we currently use is the Basic Oxygen Steelmaking (BOS) route where oxygen is blasted through liquid iron to make steel. The alternative Electric Arc Furnace (EAF) route melts scrap steel using electricity.

As the world's most recycled material, steel made from the blast furnace route can be easily recycled through the BOS or EAF route later in its life. In this way a symbiosis between the world's 2 leading steelmaking routes exists.

We recognise there is a growing focus on carbon intensity throughout the supply chain as well as the product life cycle. We know customers and end-users are

looking for finished products with low-embedded carbon. Consequently, our decarbonisation strategy plays an integral part in meeting these needs.

Currently, the carbon intensity of steel beams produced via the EAF route is around a fifth of that of steel beams made through the BOS route.

However, the solution isn't as simple as moving production from BOS to EAF.

Building new EAF capacity takes time, so without additional global EAF capacity available now, moving steel currently sourced from the BOS route to an EAF route will not reduce global GHG emissions in the short term.

That short-term behaviour simply displaces an equal amount of material in the other direction i.e. from EAF to BOS.

The current ratio between EAF (29%) and BOS (71%) for steel manufacture is unable to change in the short term due to the costs and lead times associated with installing new steelmaking capacity.

At British Steel, we encourage supply chain behaviour that rewards long-term vision and targets and we see value in the supply chain working with the BOS route to decarbonise in-line with science-based targets.

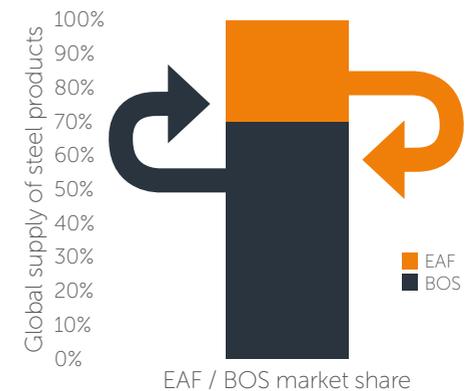
STEEL IN NUMBERS

34,500

PEOPLE EMPLOYED DIRECTLY IN THE UK STEEL INDUSTRY



Regional vs global thinking



LEGAL REQUIREMENTS AND FRAMEWORK

The UK has set itself an ambitious 78% reduction target on emissions by 2035 from 1990 levels, and it has also set itself a net zero target by 2050, which is aligned with the Paris Agreement.

But it's not just UK national targets where we see the focus for GHG reductions, it's also reflected in customer and non-governmental targets.

The Science Based Targets initiative (SBTi), which is backed by the UN Global Compact and significant Non-Governmental Organisations (NGOs) such as the Worldwide Fund for Nature, has a growing membership that includes some of our customers like Network Rail.

Steel organisations such as SteelZero also recognise the SBTi as a way to demonstrate a company's commitment to reducing GHG emissions, and we know many of our customers are already committed to their own SteelZero targets. We're working hard to ensure our activities and plans meet all legislative requirements and criteria of climate groups like SteelZero.

Non-government bodies, including some of our customers, are adopting science-based targets, which are also aligned to the Paris Agreement. This means the UK national targets (and the wider European targets) and the science-based targets are all closely aligned to the Paris Agreement and its commitment to limit global temperature rise.

We will also be adopting a science-based target and are proud to be one of the first steel manufacturers to do so. This approach will validate our carbon intensity reductions as we strive to reduce our GHG emissions.

Our Low-Carbon Roadmap will significantly reduce our CO₂ intensity by 2030 and 2035 and deliver net-zero steel by 2050. It also meets the carbon emissions reductions expected by the Committee for Climate Change sixth carbon budget.

UK TARGETS

78%
UK REDUCTION IN
EMISSIONS BY **2035**
COMPARED TO 1990
LEVELS

NET ZERO
UK TO ACHIEVE NET
ZERO BY **2050**

“ We're working towards one of the most significant carbon reduction projects across the UK. It's vitally important we play our part now for the benefit of future generations. ”

Ben Cunliffe, Commercial Director, Construction

OUR FOCUS

We are aligning our ambition with the SBTi methodology, aiming to reduce our scope 1 and 2 carbon intensity by more than 80% by 2035.

Typically, GHGs are split into 3 distinct categories called scopes:

Scope 1 covers direct emissions from processing; for us this includes emissions

from our iron and steel making activities and also from our own on-site generated electricity and steam.

Scope 2 is indirect emissions. In our case, these mainly arise from purchased electricity.

Scope 3 covers indirect emissions that sit outside scopes 1 and 2. This includes items in the value chain like raw materials, company vehicles, transport, distribution

and business travel.

Because around 92% of all our GHG emissions are from scopes 1 and 2 and are largely within our control, this is where our primary focus should and will be.

How do we measure our CO₂ emissions?

For scope 1 emissions, we use our Emissions Trading Scheme data, which

has third party verification. This provides an important level of credibility.

We measure our scope 2 emissions using UK government GHG conversion factors combined with our invoiced imported electricity usage.

And for scope 3 emissions, we use the World Steel methodology, which is backed up by an international ISO standard.



WHAT WE'RE DOING



Our roadmap will deliver an 82% reduction by 2035 through a number of techniques and innovations.

These include the deployment of EAF steelmaking and Carbon Capture and Storage (CCS) on existing Blast Furnace production routes.

Working from the left in this diagram, process and material efficiency, which includes increased scrap usage and supporting the reuse and recycling of material, will account for around **23%** of our emission reduction.

Low carbon iron and steelmaking

coupled with new ways of working at our Scunthorpe site will account for a reduction of around **28%**.

CCS is strategically important for our Scunthorpe operations as the Humber region will be the first in the UK to have a CCS network. This will help reduce the CO₂ intensity from our ironmaking process by around **23%**.

And finally, the use of hydrogen and electricity grid decarbonisation will reduce our CO₂ intensity by around **8%**.

By 2035, we will not only meet the SBTi target for our site, we will beat it by a significant margin. All our targets are achievable but will need appropriate government policy and framework support to facilitate it.

WHAT WE'RE DOING NOW

We're already making big efforts towards decarbonisation. It's important to remember that while our Low-Carbon Roadmap looks to the future, it also focuses on the products we currently offer.

We supply a wide range of global markets including automotive, construction and rail. Over recent years, we've introduced a range of innovative solutions, including:

- **Zinoco® rail:** a coated rail product for use in corrosive environments like coastal track, wet tunnels and level crossings. Typically uncoated rail has a limited lifespan so needs replacing

STEEL IN NUMBERS

£2.4 BN

DIRECT CONTRIBUTION TO THE UK ECONOMY



- more often. Our Zinoco rail offers increased rail longevity and so reduces the frequency for new rail
- **Weathering steel structural sections:** product life is extended thanks to the steel's protective oxide layer. This makes it ideal for use in exposed locations like bridges, buildings and catenary gantries on railway lines
- **S460M structural sections:** our high-strength beams offer increased strength at lighter weights. This means the mass of steel that's needed for a similar application decreases, reducing the volume of steel we make so there are fewer GHG emissions associated with a particular application
- **Wire rod for high-tensile applications:** its high strength-to-weight ratio of our high-tensile wire rod not only reduces energy consumption in rope and cable production and installation, it also reduces cable and superstructure weight
- **Higher strength crane rail:** offers better durability in service with the potential to use lighter sections, reducing installation and transport costs and associated GHG emissions

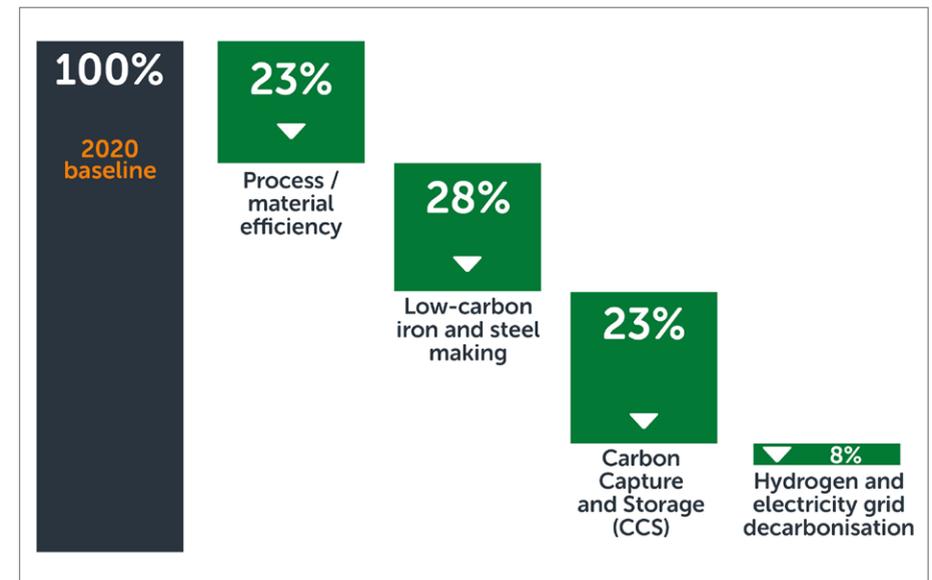
Our commitment to cut our environmental impact and continue developing product life-cycle solutions form a vital part of our company vision.

As one of the first steelmaking companies to adopt a science-based target, both our employees and customers can take confidence that our reductions are valid and in line with the Paris Agreement. We know from our own detailed analysis

that our Low-Carbon Roadmap is a sustainable, viable business model that we'll be moving through over the next 15 years.

To deliver the reductions identified in the diagram below, we'll be working closely with not only our own supply chain, but also other interested parties such as SteelZero, SBTi and our customers.

How we'll cut our CO₂ intensity by 2035



ZERO CARBON HUMBER

We're one of 12 leading companies across the Humber who make up the Zero Carbon Humber (ZCH) Partnership.

The ZCH Partnership aims to create the world's first net-zero industrial cluster by 2040 through low-carbon hydrogen, carbon capture and

negative emissions, known as carbon removal technology.

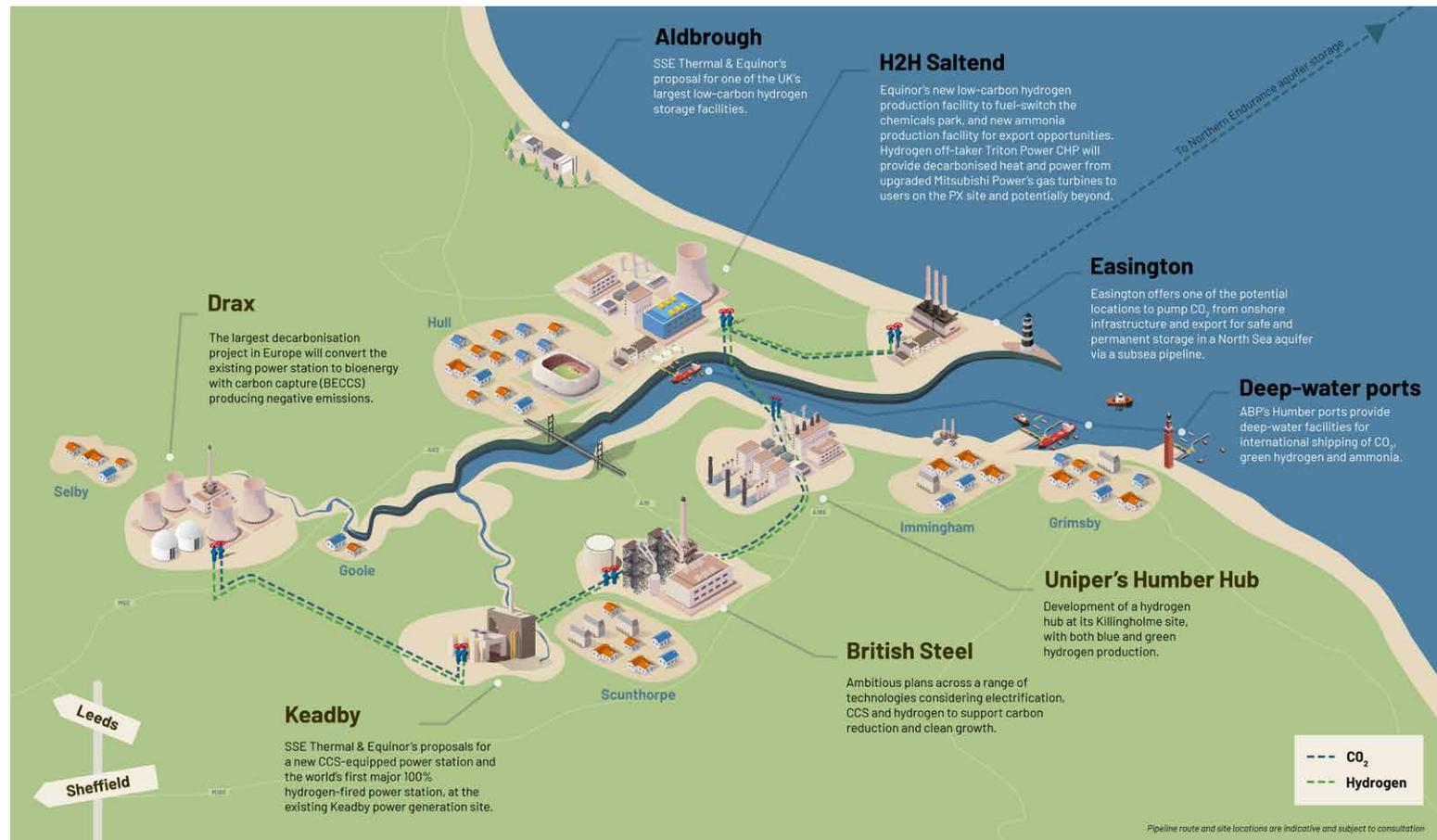
The scheme is enabled by shared

infrastructure that includes a pipeline network to carry hydrogen to industrial customers and carbon dioxide from power generation and industrial emitters to permanent storage in an offshore aquifer below the seabed in the UK's Southern North Sea.

As well as British Steel, the ZCH Partnership includes Associated British Ports, Centrica Storage Ltd, Drax Group, Equinor, Mitsubishi Power, National Grid Ventures, px Group, SSE Thermal, Saltend Cogeneration Company Limited, Uniper and the University of Sheffield's Advanced Manufacturing Research Centre (AMRC).

Following a successful bid to the department for Business, Energy & Industrial Strategy (BEIS) by a collaboration between ZCH, Net Zero Teesside and Northern Endurance Partnership, the East Coast Cluster was selected as one of the UK's first carbon capture, usage and storage clusters.

The project aims to remove nearly 50% of all UK industrial cluster CO₂ emissions.



SUMMARY

Our Low-Carbon Roadmap is ambitious but realistic. With the appropriate government policies and frameworks in place, we will be able to achieve our 2050 net zero vision.

- Our 2021-2035 focus is on substantial phased reductions in our scope 1 and 2 emissions
- We will deliver net-zero steel by 2050
- Our activities will be validated by a science-based target
- Our hybrid model, together with the Humber CCS network, leaves us in an ideal position to move forward with increased scrap and ore-based

STEEL IN NUMBERS

43,000

FURTHER JOBS
SUPPORTED IN
THE SUPPLY CHAIN
AND LOCAL
COMMUNITIES



metallic substitutes

- We will continue to engage and work with the UK government, the decarbonisation sector and society at large

The steel industry is essential for modern life and will play a central role in the world's climate challenge. For instance steel is essential for the manufacture of wind turbines, tidal energy technologies, solar harvesting, hydrogen production facilities and networks.

And it should not be forgotten that the UK steel industry makes a significant contribution to the UK economy – around £2.4 billion every year – securing employment for 34,500 people directly and a further 43,000 indirectly.

As an infinitely recyclable material, steel offers unique attributes for global decarbonisation and the transition to circular economies. We know, backed up with supporting policies and frameworks, we can achieve our ambitious emission reductions. Our roadmap will lead to a transformation of our business over the next 15 years to a low-carbon steelmaking producer of the future.

GLOSSARY

BOS: Basic Oxygen Steelmaking involves making steel through oxidation by injecting oxygen through a lance above a molten mixture of liquid iron and scrap steel

EAF: an Electric Arc Furnace melts steel scrap using the heat generated by a high power electric arc. During the melting process, elements are added to achieve the correct chemistry and oxygen is blown into the furnace to purify the steel

Greenhouse gas: Greenhouse gases (GHGs) are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself and by clouds. This property causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary GHGs in the Earth's atmosphere.

Moreover, there are a number of entirely human-made GHGs in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Beside CO₂, N₂O and CH₄, the Kyoto Protocol deals with the GHGs sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs)

Module D: an Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products

Paris Agreement: the Paris Agreement is an international agreement within the United Nations Framework our manufacturing operations, energy efficiency and environmental performance



It's really exciting to embark on this strategy.
It's aggressive, but with the right support and
frameworks in place, it's entirely achievable.



Lee Adcock, Environment & Sustainability Director

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