Net Zero Steel Pathway Methodology Project

Final Report Recommendations

28th July 2021

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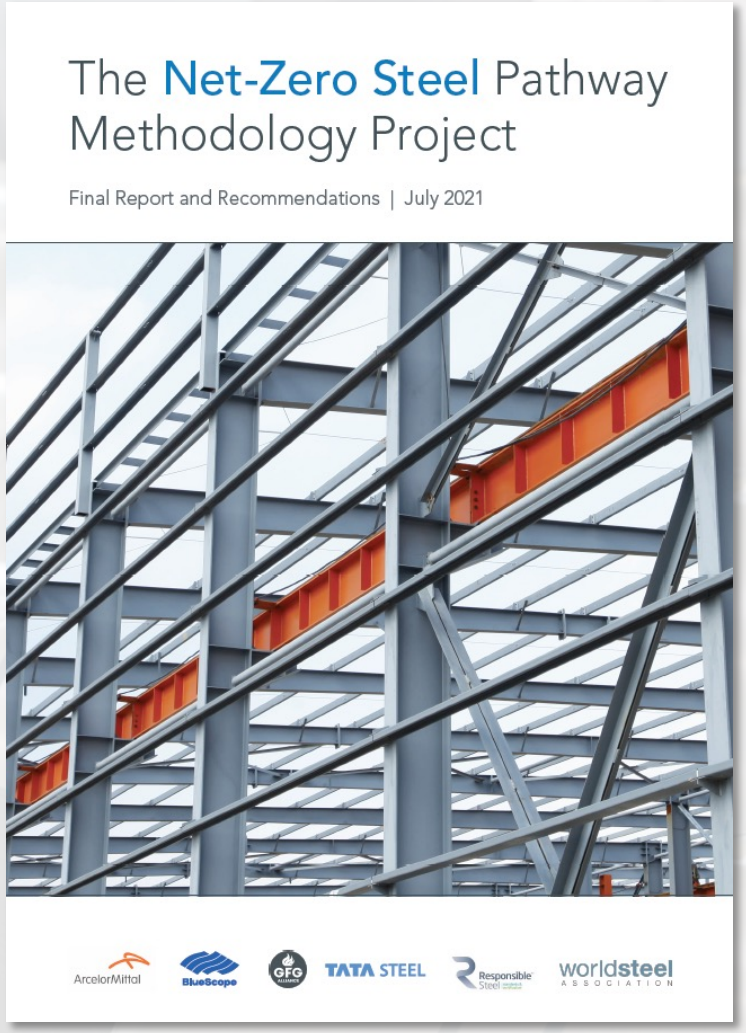
https://www.responsiblesteel.org/wp-content/uploads/2018/09/ResponsibleSteelAntitrustPolicy2018-09-20.pdf

Housekeeping

- The project report is available at: www.netzerosteelpathwayproject.com
- This webinar is being recorded, and the recording will also be made available from the project website
- After the presentations there will be a Q&A session: please type in any questions using the ‘Q&A’ function on Zoom at any point



Net Zero Steel Pathway Methodology Project

Net Zero Steel Pathway Methodology Project

Introduction

Matthew Wenban-Smith

Housekeeping

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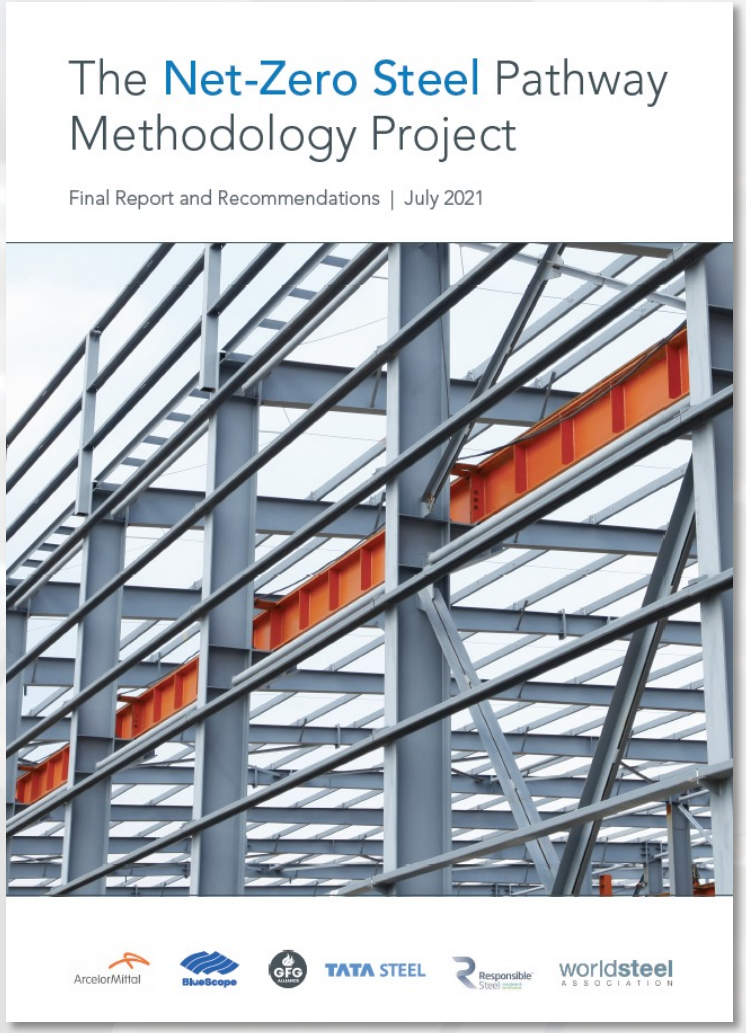
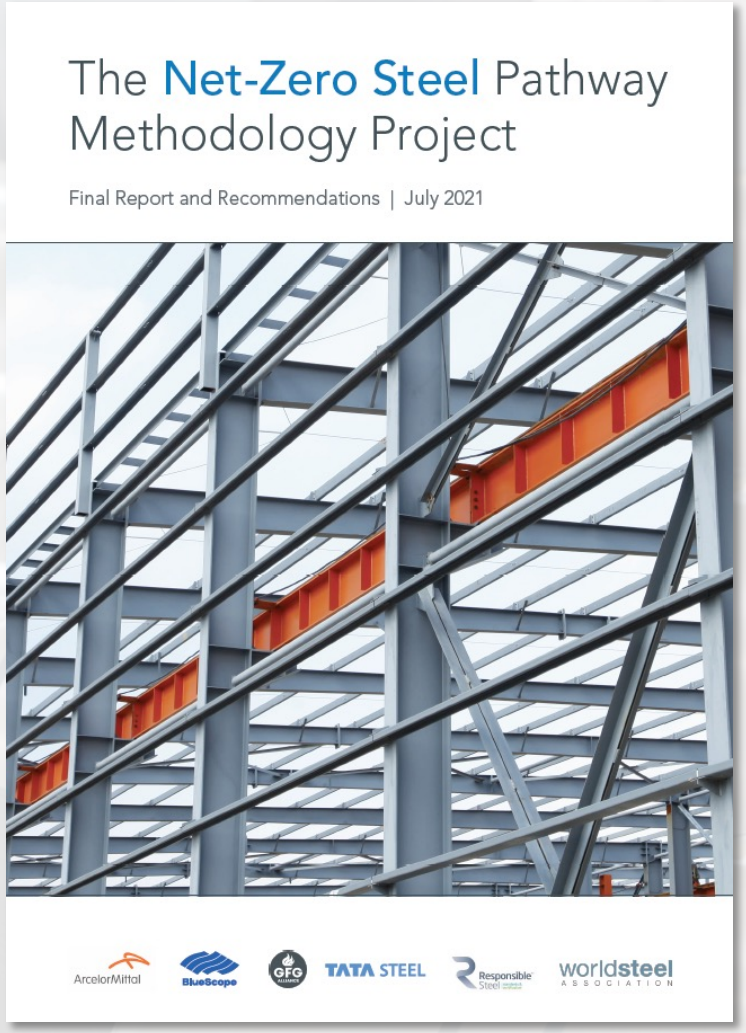


Net Zero Steel Pathway Methodology Project

Project background

Project aims:

- *To enable the steel sector to support the achievement of the Paris objectives through a credible, well informed sectoral decarbonisation approach*
- *To resolve challenges and define expectations for steelmakers wishing to make a realistic and credible commitment to the Paris Agreement, with a net zero or 'science-based target'*



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Project process and next steps

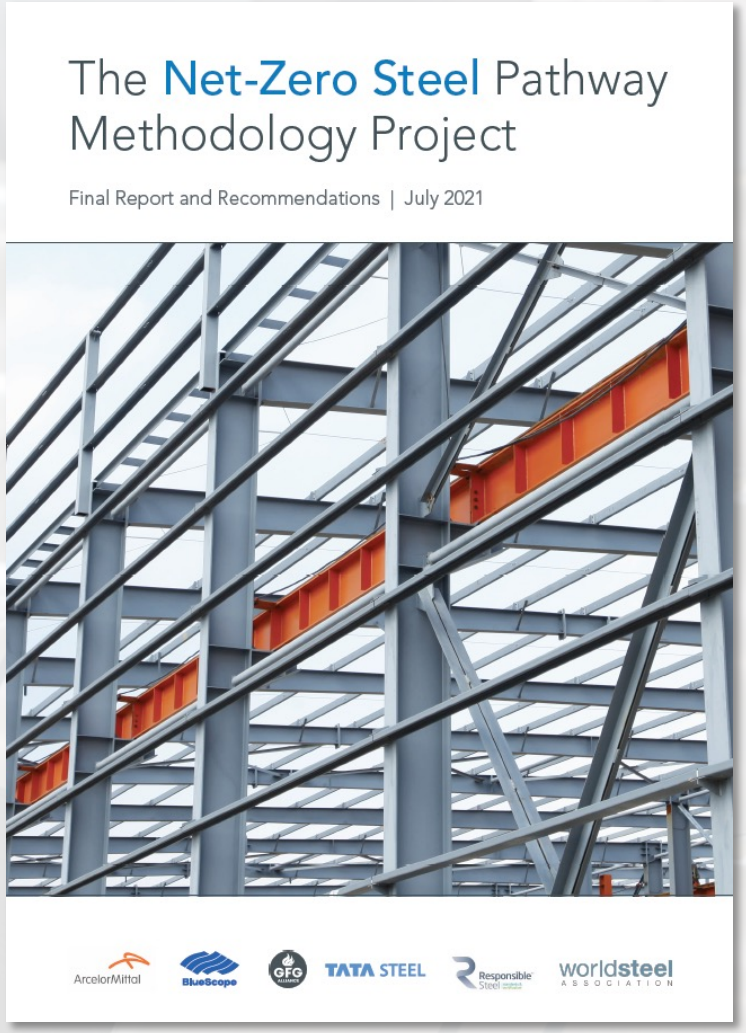
Project Steering Group: ArcelorMittal, BlueScope Steel, GFG Alliance, Tata Steel, worldsteel and ResponsibleSteel

Topic leads: Javier Bonaplata, Annie Heaton, Pete Hodgson, Ed Heath-Whyte, Tim Rodsted

Additional Technical Working Group participation of: Celsa Group, JSW, Liberty Steel Group, Nippon Steel, NLMK, Outokumpu, POSCO, Severstal, Tenaris, Ternium, voestalpine and Wirtschaftsvereinigung Stahl

Stakeholder Reference Group

Technical writer: Nick Avery

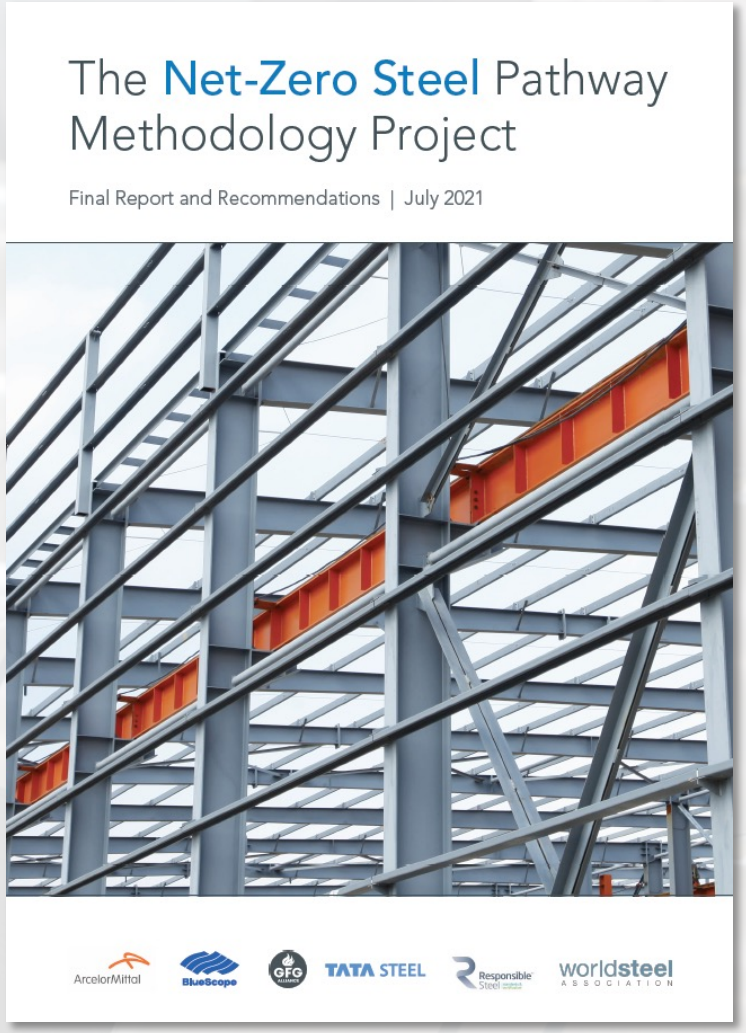


Net Zero Steel Pathway Methodology Project

Final report

1. Introduction
2. Steel industry GHG emissions: calculating budgets for primary and secondary steel production
3. Setting a consistent scope and system boundary
4. Accounting for the additional functionality of steel industry co-products
5. Policy context and pre-requisites for setting a company 2050 target
6. Compatibility with existing standards and accounting methods
7. Summary recommendations

Project report available at:
https://www.netzerosteelpathwayproject.com/



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Recommendation 1

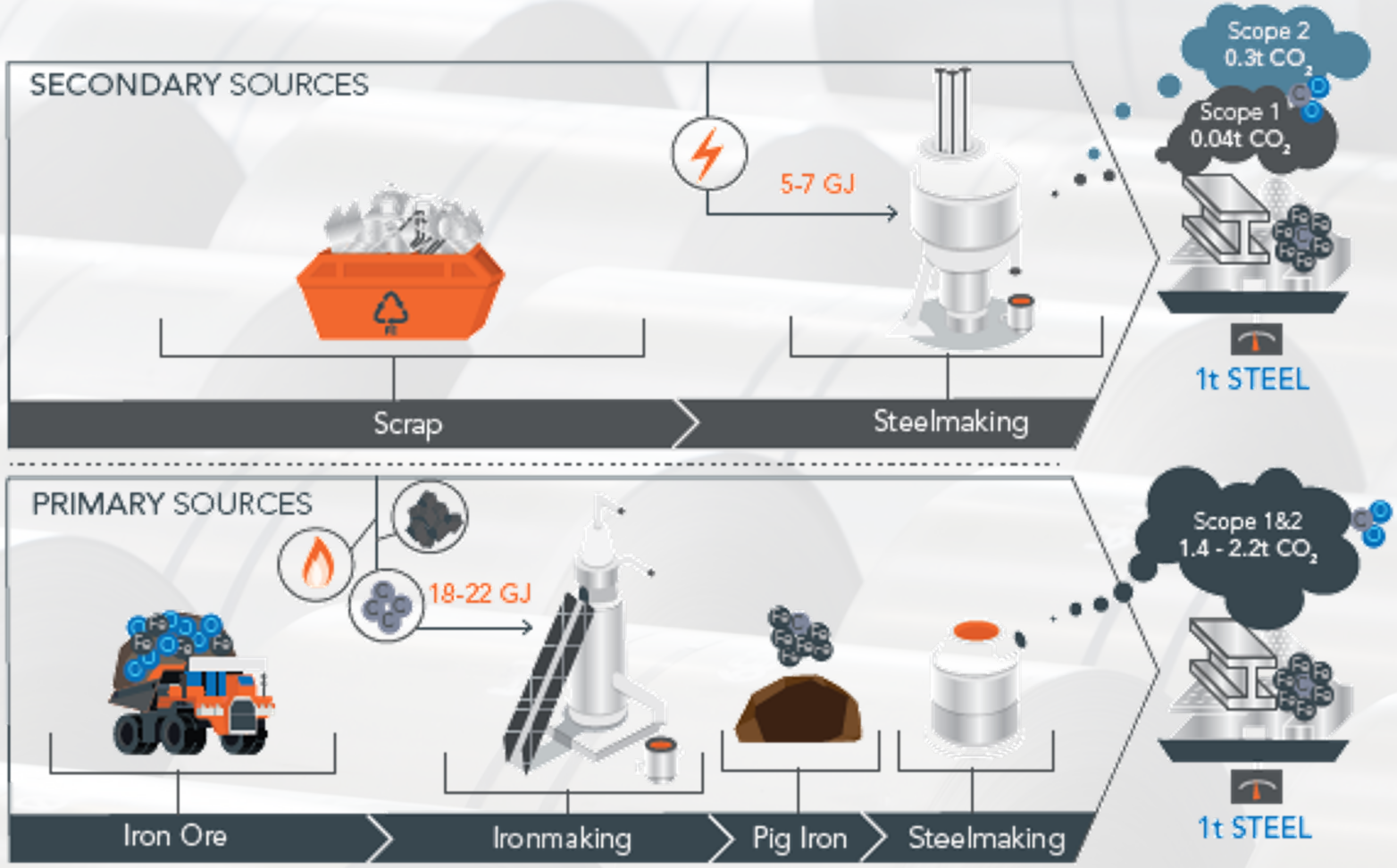
Differentiate between primary and secondary steel

Recommendation 3

Establish a consistent steel sector budget and trajectory

Javier Bonaplata, ArcelorMittal

Primary and secondary sources use drive CO2 emissions in steelmaking



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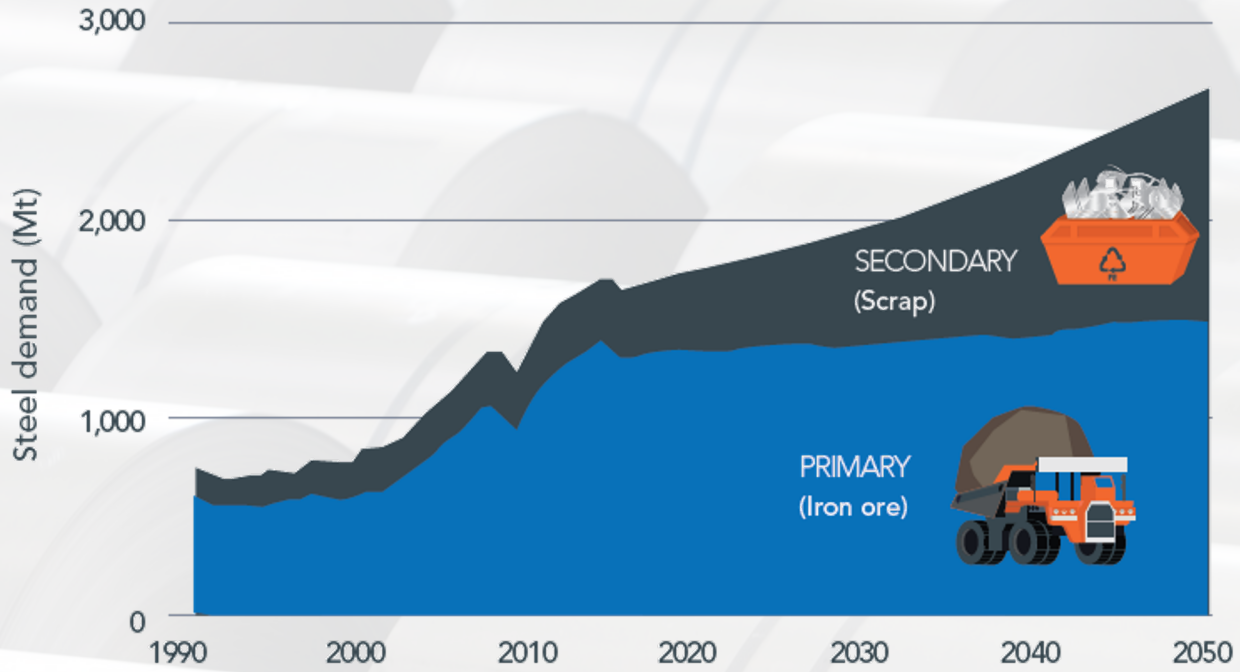
Can’t rely on scrap to decarbonise steelmaking; iron ore (primary) based steelmaking will remain critical beyond 2050

Figure 3: Projection of global steel demand to 2050 with split of primary and secondary production (source: ArcelorMittal).



Steel production from scrap releases much less GHG compared to primary steel from iron ore, but it will only satisfy about 45% of future demand due to limited scrap availability. A focus on reducing the primary steel emissions intensity is, therefore, essential to have a chance of reaching net zero targets.

Recommendation 1: Differentiate between primary and secondary steel

- We advocate for a process neutral approach to setting an SBT

- An SBT for a steel company should be made up of separate targets based on its use of iron ore and scrap metallic inputs:
  - **A primary steel SBT** (applicable to steel made from primary iron ore sources)
  - **A secondary steel SBT** (applicable to steel made from iron scrap and steel scrap sources)

- This approach requires splitting the steel sector carbon budget of a net zero trajectory into iron ore based (primary) budget trajectory and scrap based (secondary) carbon budget trajectory

- Adjustments to the steel sector carbon budget will be a needed to accommodate specific product families with diverging emission profile, such as stainless steel

$$SBT_{primary} = \frac{Global\ primary\ steel\ GHG\ budget}{Global\ primary\ steel\ GHG\ production}$$

$$SBT_{secondary} = \frac{Global\ secondary\ steel\ GHG\ budget}{Global\ secondary\ steel\ GHG\ production}$$

$$Company\ SBT = (\%\ primary\ steel \times SBT_{primary}) + (\%\ secondary\ steel \times SBT_{secondary})$$

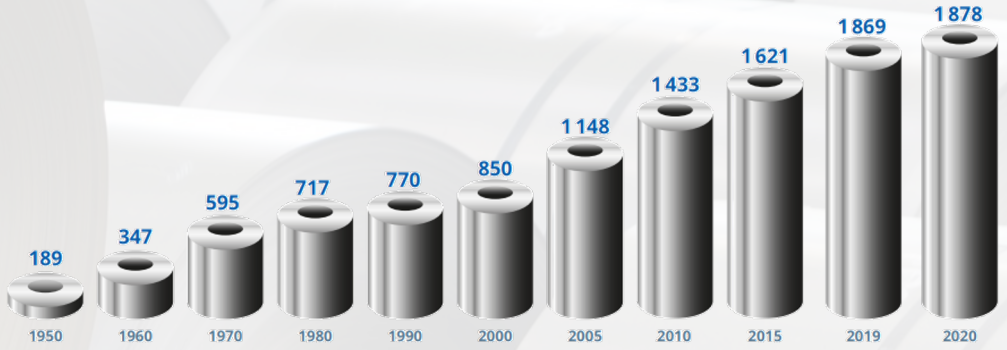
To make it work we need reliable data

To make a primary and secondary SBT to work we need to have reliable data on

…use of primary/secondary sources in steelmaking, and… global steelmaking carbon budget trajectory

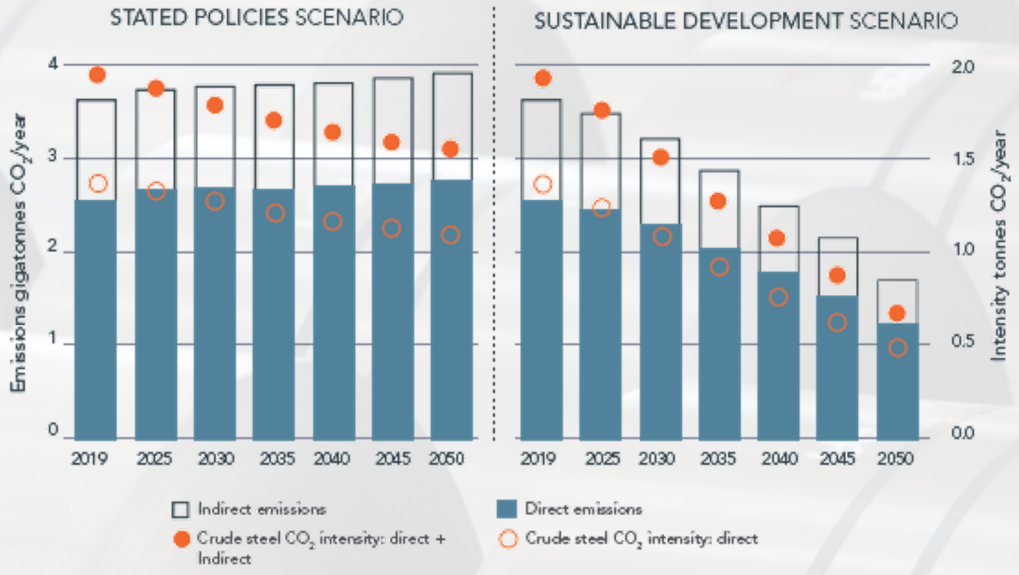
worldsteel ASSOCIATION

World crude steel production 1950 to 2020 (million tonnes)



IEA

Figure 6: IEA direct and indirect emissions and intensities of crude steel production over time, using different modelling scenarios (overall budget shown without splitting into primary and secondary steel sources) (IEA, 2020a).



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Recommendation 3: Establish a consistent steel sector budget and trajectory

- The proposed approach of splitting the overall steel sector carbon budget between ore-based and scrap-based steel production would require the following to be implemented:
  - Companies calculate the ratio of their primary and secondary steel using a prescribed standard on determining the secondary content of crude steel produced, such as ISO 14021.
  - To investigate how IEA or worldsteel can provide provide regularly updated GHG emissions for primary crude steel production and secondary crude steel production separately, including separation of carbon steel low alloy, high alloy and stainless steel contributions.
  - A 2050 decarbonisation trajectory, agreed with the SBTi community, should be applied to current emissions to model the necessary future 'budgets'7 for primary and secondary emissions.
  - Adjustment of the steel budgets to encompass a more relevant scope of steel sector emissions with respect to decarbonisation strategies.

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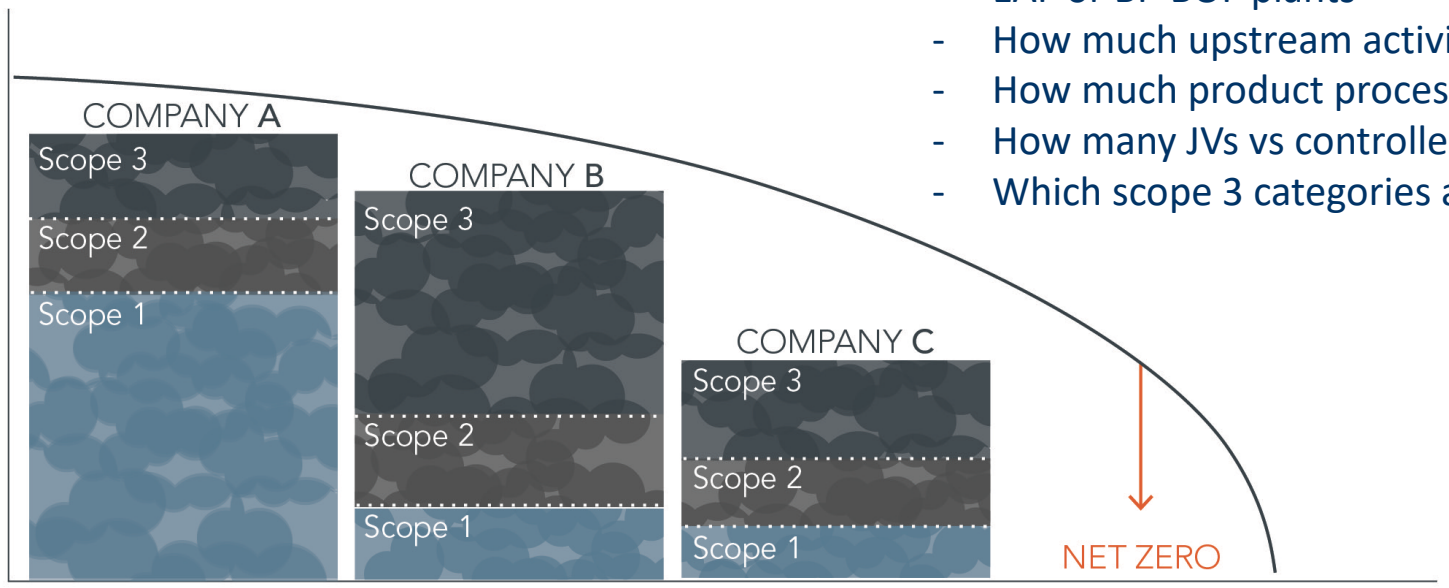
Recommendation 2

Set a consistent scope and system boundary

Annie Heaton, ArcelorMittal

Framing the pathway to net zero – focus on scopes can be misleading

- SBTs focus on Scopes 1, 2 and 3. But these vary for each company depending on a number of variables. Scopes 1 and 2 alone may not include the key sources of steelmaking emissions, making benchmarking of CO2 intensity data may be meaningless. Steel sector has no guidance on Scope 3 (unlike e.g. automotive)



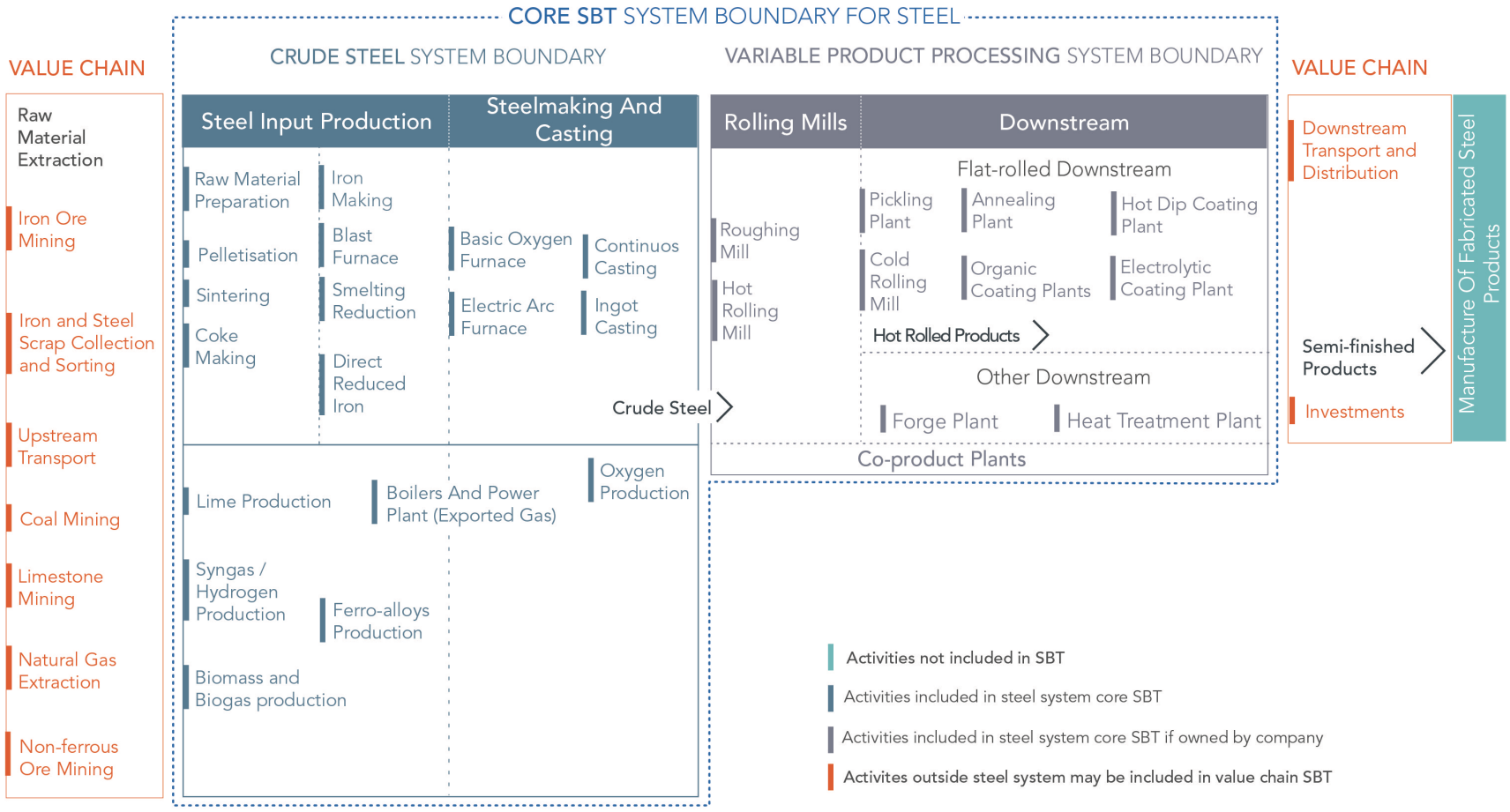
Variables :

- EAF or BF-BOF plants
- How much upstream activity is owned
- How much product processing is owned
- How many JVs vs controlled sites
- Which scope 3 categories are calculated

To ensure that a steel SBT tackles the consistent footprint of steelmaking, and to enable targets to be understood consistently, *a* ***common system boundary*** *is needed to define the sources of CO2 included*

Steel SBT system boundary for SBTs

ACT ASSESSING LOW CARBON TRANSITION ®



Crude steel system boundary = Scope 1+2 (+3)

Inclusive of the preparation of raw materials and reductants

GFG ALLIANCE · BLUESCOPE STEEL · ArcelorMittal · TATA STEEL

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Recommendation 2

A consistent system boundary is needed to:

a) reduce the variability in reporting and target-setting

b) allow for likelihood that emissions will move further upstream in future as steelmaking is decarbonized.

This consistent boundary is required to define the core activities that should be included in a steel SBT (core steel SBT). The core SBT for steel companies should be made up of two sub-SBTs:

• **Crude steel SBT** (processes within the crude steelmaking system boundary (regardless of whether they are on site or not), split into differentiated subsets of primary and secondary crude steel SBTs)

• **Product processing SBT** (processes within the variable system boundary for downstream processing)

Additionally, a **value chain SBT** may be added if the company chooses to include additional scope 3 upstream and downstream emissions that are outside of the core steel SBT system boundary

Methodology Project

From past to future: recommended steel SBT scope and boundary summary

Current steel SDA

Scope 1 SBT (single carbon budget for steel - no distinction between iron ore-based route and scrap based steel)
+
Scope 2 SBT
+
Scope 3 SBT (no guidance on what should be included)

NZSPMP recommendation

Steel system boundary SBT (iron ore based + scrap based as per Topic A; co products considerations as per Topic B)
+
Product finishing SBT (required if >5% SBT boundary)
+
Optional Value chain SBT (upstream mining and transport)
+
Guidance on Scope 3

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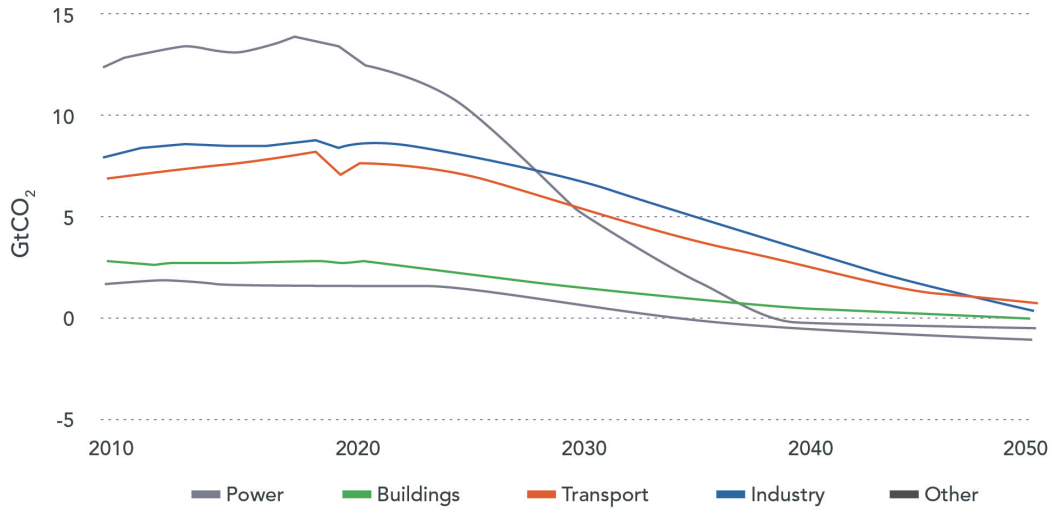
Recommendation 4 Acknowledge the GHG reduction from using co-products made by the steel industry

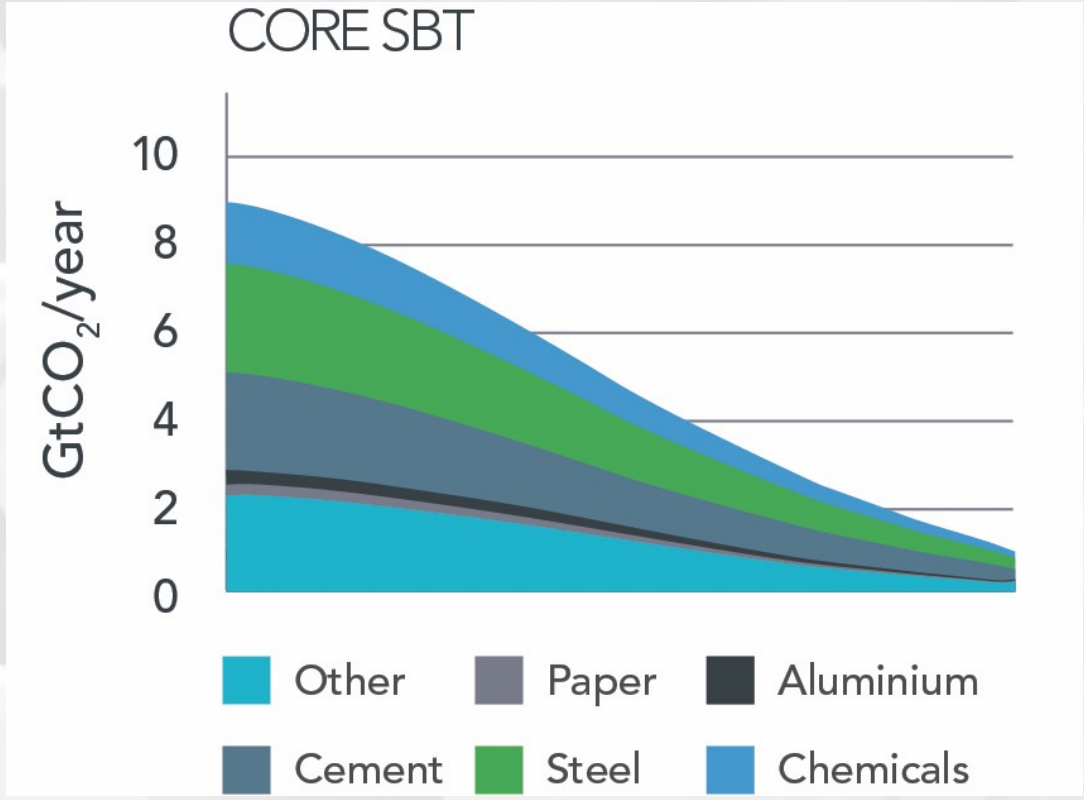
Pete Hodgson, Tata Steel

Recommendation 4:
Acknowledge the GHG reduction from using co-products made by the steel industry



Emissions fall fastest in the power sector, with transport, buildings and industry seeing steady declines to 2050. Reductions are aided by the increased availability of low-emissions fuels.

Note: Other = agriculture, fuel production, transformation and related process emissions, and direct air capture.



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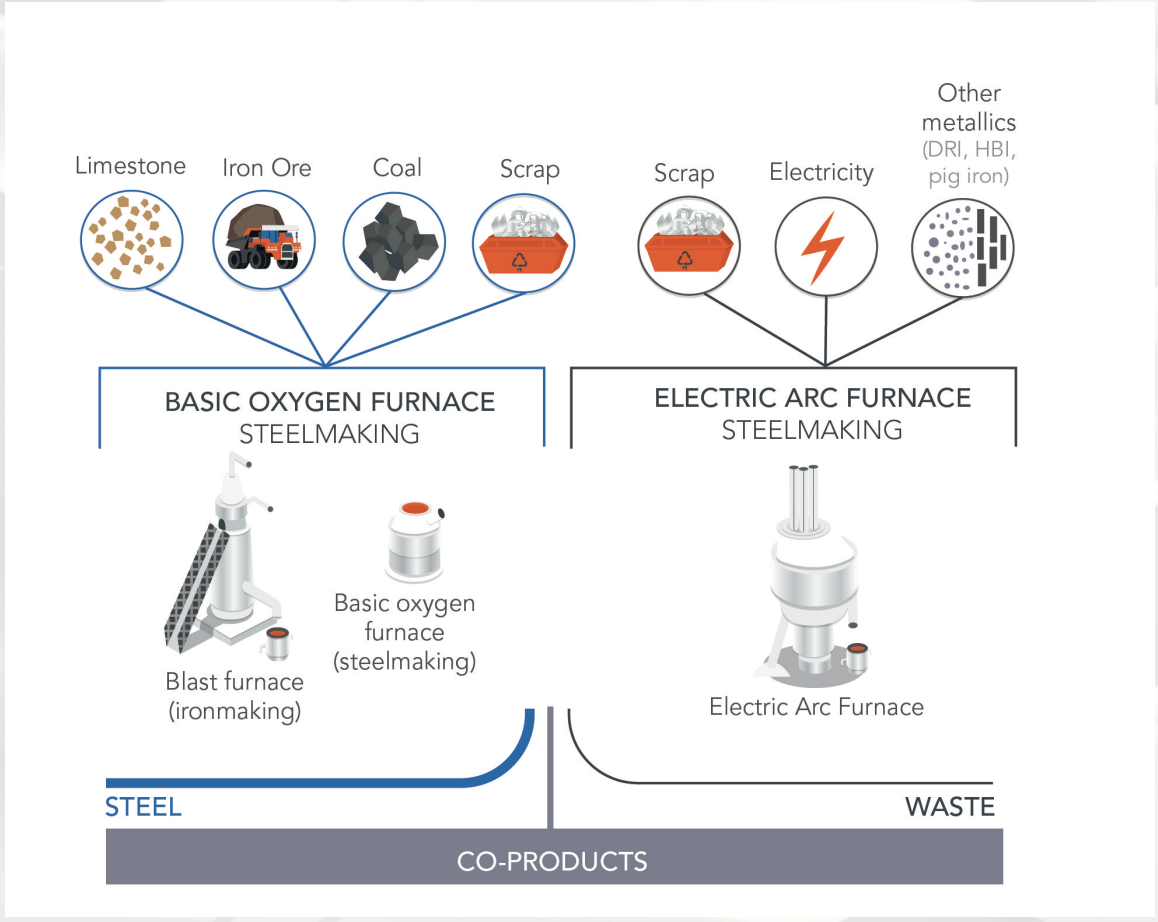
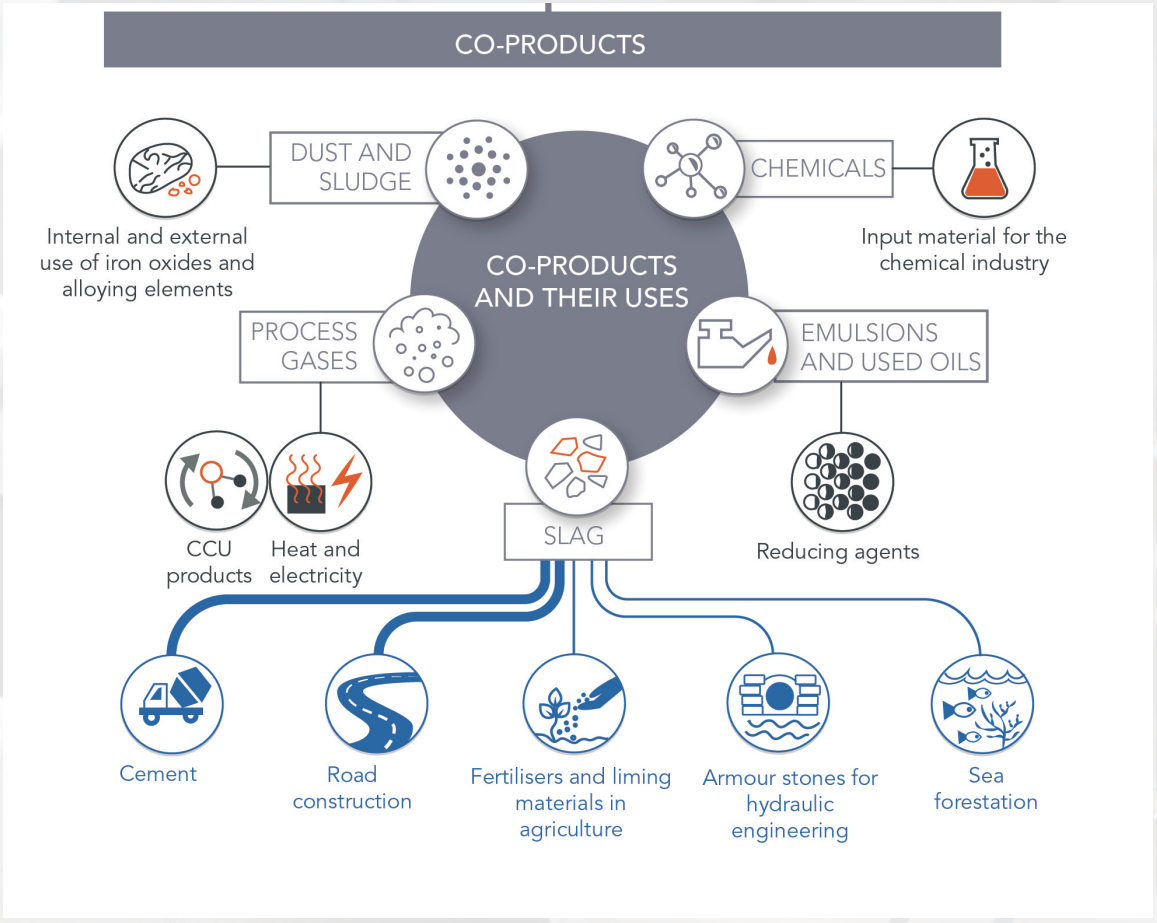
Steel industry co-products





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Exploring options for recognising the value of co-products

OBJECTIVES

1) Recommend options for a co-products framework in steel sector target setting

2) Propose a methodology to quantify the greenhouse gas emissions associated with co-products and their use

KEY REQUIREMENTS

The approach for dealing with co-products should have the following features:

i) works cohesively with all other aspects of the target setting approach;

ii) is applicable across a range of steel industry co-products;

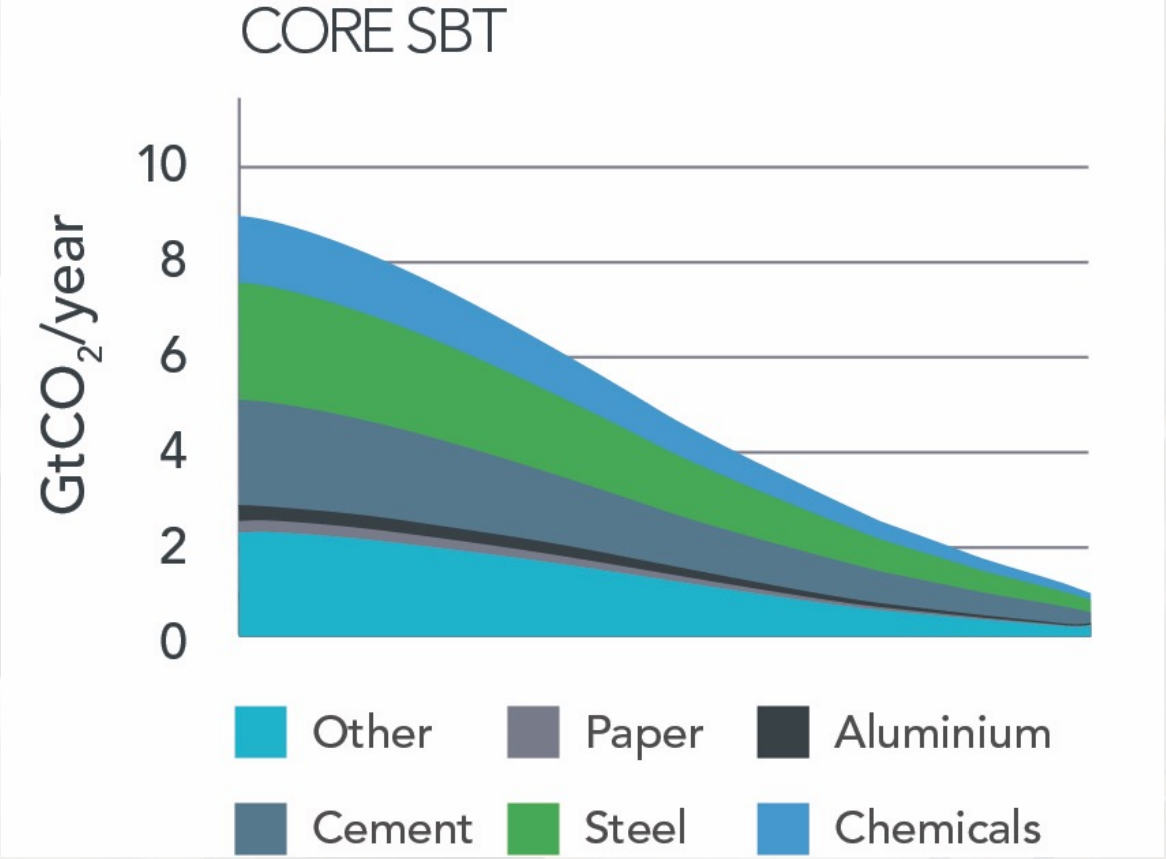
iii) is acceptable to a range of stakeholders and pragmatic in recognising the benefit of co-products to the manufacturer of the co-product, the user and the wider industrial / societal system;

iv) recognises / incentivises the potential of innovation / new co-products *e.g.* via Carbon Capture & Utilisation (CCU).

Exploring framework options

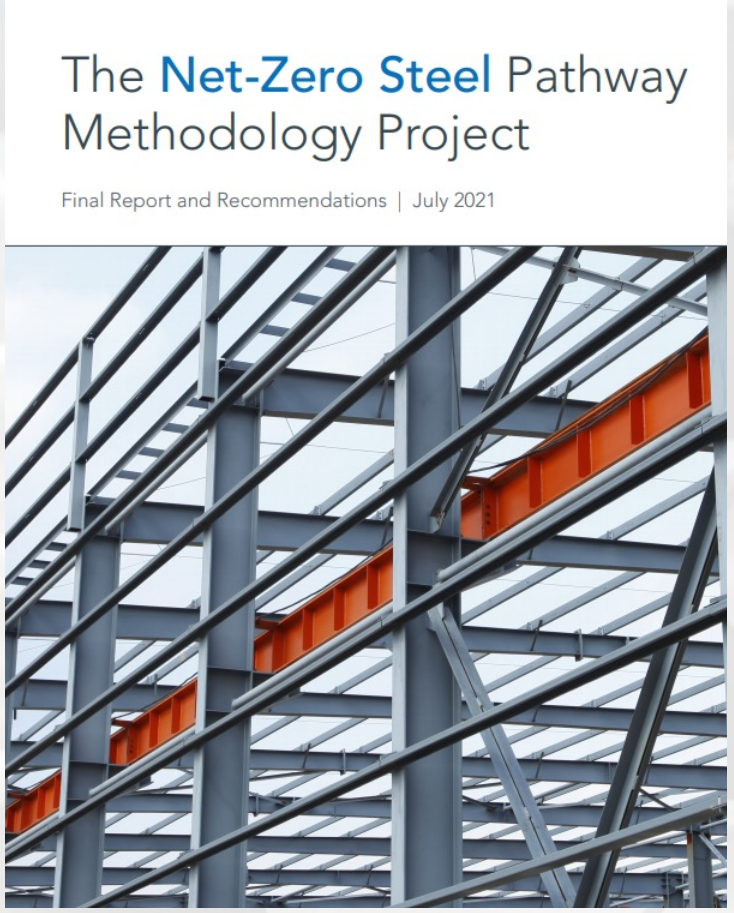
This project has explored three framework options for dealing with co-products in the context of an SDA

1. A redistribution of sectoral budgets *e.g*. a proportion of other sectoral budgets are 'amalgamated' into a steel budget, commensurate with the GHG value of co-products
2. A steel company's direct emissions are assigned to products and co-products according to their GHG value. When setting a company target, the overall target is built up with sub-targets based on relevant trajectories *e.g.* for steel, cement, chemicals
3. Emissions avoided in other sectors by the use of steel company co-products are acknowledged as a valuable means of GHG / CO_2 reduction, or compensation. In this approach the steel sector still reports any scope 1, 2 & 3 co-production emissions from processes occurring within the core steel system boundary.



Recommendation 4:
Acknowledge the GHG reduction from using co-products made by the steel industry

- A steel company target should focus primarily on the abatement of core system boundary emissions;
- A company should be able to recognise the value of GHG emissions reductions in other sectors through the use of its co-products;
- Various frameworks could be used to account for the GHG emissions and benefits associated with making and utilising co-products;
- A calculation of the avoided impacts to reflect the actual application of the co-product in the market could be used as a basis for quantifying and sharing the value of co-products in these frameworks;
- Process gases used in CCU products may require a different approach, as captured emissions are not necessarily released by the co-product producer.



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Recommendation 5
Integrate the influence of regulatory policy when setting an SBT

Ed Heath-Whyte, GFG Alliance

Steel and Policy

The steel sector is seen to be ‘hard to abate’ for several reasons:

- Coal and fossil fuels are intrinsic to the primary production process.
- The sector has numerous capital intensive assets.
- The sector has a long investment cycle from approximately 25 years (interim investments) to 40 years.
- The lock-in effect, due to rapid growth in production capacity in China since 2000 (now 50% of global capacity), means that there is a low average asset age of approximately 13 years (IEA, 2020a).
- Steel is a globally-traded commodity, competition is high, selling price for commodity steels is low, and this leads to low profitability which, in turn, reduces the ability to invest.

NZSPMP and SBTi – Policy and Cost – Pathway Development

In the first technical working group it was identified that the cost of implementation of technology also has an effect on implementation.

Policy on 'Sustainable Finance and Taxonomy' is developing in the EU and globally, this demonstrates the finance sectors understanding the risks associated with Sustainability and De-carbonisation on the industries they finance. Therefore the pathways have been developed further to show

- i. The cost of CAPEX is vastly different for an EAF producer compared to an integrated BF/BOF producer.
- ii. Policy-related investments relate to compliance investments. For example, European producers need to meet the latest Industrial Emissions Directive (IED) emission limit values. These can also vary significantly depending on if you are an EAF or integrated BF/BOF producer.
- iii. Normal CAPEX expenditure, for example, on energy efficiency improvements.
- iv. Normal OPEX expenditure, for example, making a power purchase agreement to source renewable electricity.

The Tables in the report show Pathway Steps

The Graphs in the report show the effect of the Pathway step on the Carbon Intensity and the Cost of the Pathway Step

Policy & Legislation Maturity and Policy Horizon

When setting an SBT, the company should assess the policy landscape and horizon, which means considering what is happening now and what is likely to happen in the medium to longer term. Regions that have a more mature policy landscape, will have a wide range of policies in place to encourage and push towards more decarbonisation, such as:

- An emissions trading scheme with an established market for CO2/GHG emissions reduction, with a declining cap on total emissions and an ambition to increasing the price for CO2/GHG allowances.
- National GHG budgets and roadmaps.
- Strict industrial emissions regulations – placing limits on industrial emissions and increasing efficiency.
- Circular economy – policies to increase resource efficiency, including recycling.
- Access to research and development funding and scale up funding for pilot plants.

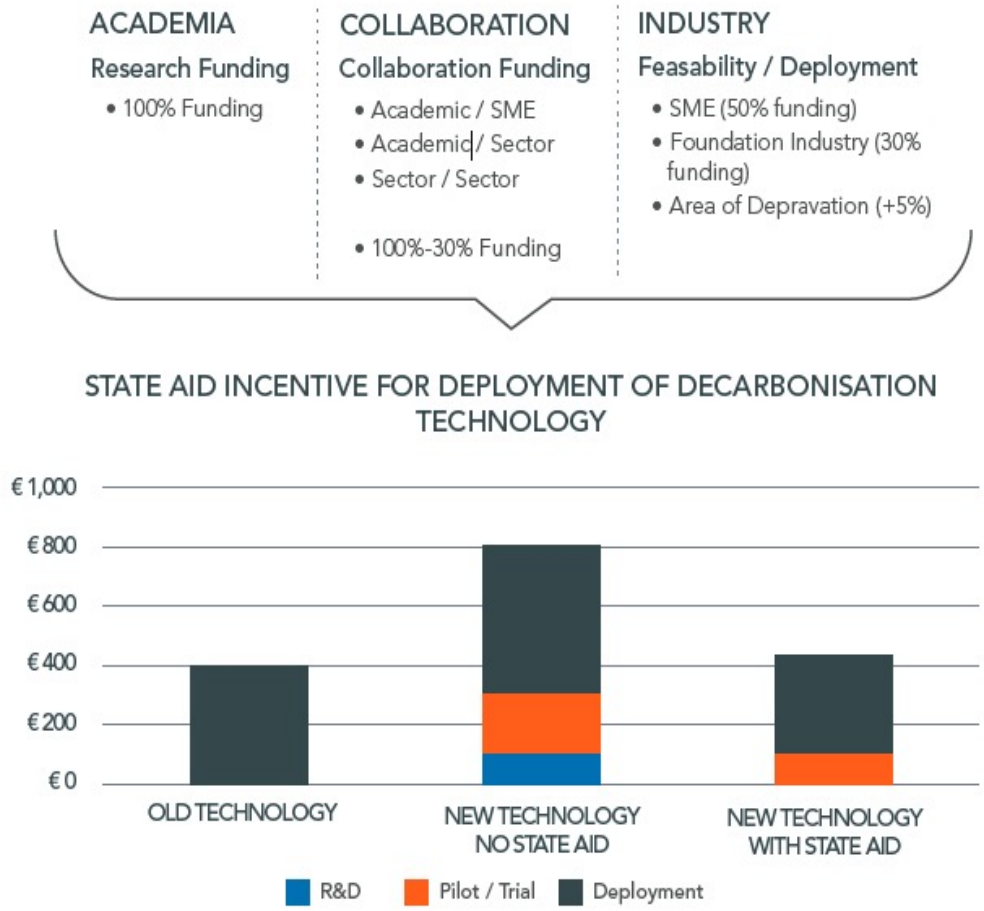
Some regions will be less developed or less stringent in terms of the policies in place, and this can have a bearing on the company's confidence or ability to invest in new technology. The IEA has looked into the differences in policies between regions in more detail (IEA, 2020a), and also updates a policy database for each country.

Regions with more mature policies in place will also have a longer-term perspective and try to address barriers to technology implementation, or risks, with policies to overcome those risks. This will give businesses more confidence in being able to make investment decisions and set the level of ambition accordingly. In less developed governance systems, the policy horizon may be more short term, which will be reflected in businesses being more reactive and unable to plan for future risk mitigation.

STATE AID

- State aid for an industrial sector can vary from country to country, depending on national priorities. There are rules in
- place (World Trade Organization and national/regional) to determine what is an acceptable level of support that can be
- provided by the state. In the context of enabling decarbonisation, state aid can be used to support the developmental
- process from the academic research stage to the industrial deployment stage. Funding from the state decreases
- throughout the process but is designed to be at a level so that the risk, or cost disadvantage, of deployment is removed

Figure 18: Illustration of state aid funding levels for different stages of technology development and potential effect on decarbonisation costs.



Recommendation 5:
Integrate the influence of regulatory policy when setting an SBT

Policy and legislation have an important part to play in helping a steel company to set a meaningful SBT and pathway towards net zero GHG emissions. The level of importance or influence of policy on investment decisions will be affected by several variables:

- The **capital intensity** of the process route (and so reflecting the 'cost to change' the process).
- The **age** of existing installed assets.
- The **carbon intensity** of the existing process route.
- The current **policy landscape** – mature or developing, high support or no support (sticks vs carrots).
- **Stakeholder expectations**, including employees, customers, and financiers.
- **Policy horizon** – anticipated future policies.

A company must consider the policy landscape that its operations are subject to, when making an SBT. Policy is likely to influence the ability to make investments in the short term. For longer term investment plans required to meet specific targets, the company must publicly disclose the policy assumptions it expects to be in place and the uncertainty of those assumptions, as part of the SBT. Progress against these policy assumptions should be included in any subsequent company SBT updates. If communicated this way, SBTs may serve as a message to policymakers of the decarbonisation potential a steelmaker believes they can deliver given certain policies.

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Head of Environment and Sustainability

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LIBERTY STEEL UK

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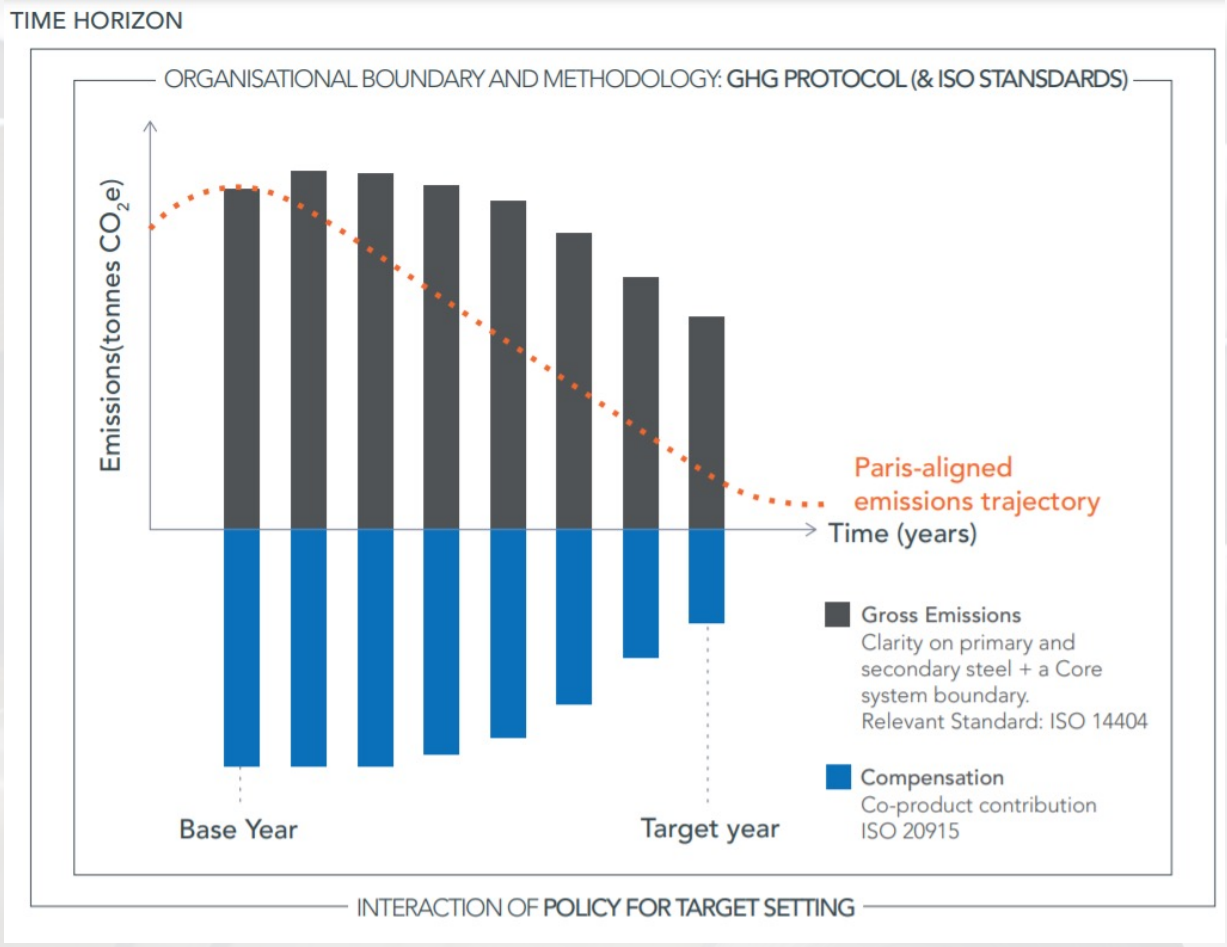
Recommendation 6
Compatibility with existing standards and accounting methods

Tim Rodsted, BlueScope Steel

Recommendation 6: Compatibility with existing standards and accounting methods

Leverage existing standards and methods into a steel sector decarbonisation approach for more consistent target setting and performance reporting



Specific areas of focus within Recommendation 6:

1. Utilise a recognised approach to organisational boundaries (e.g. GHG Protocol)
2. Leverage ISO 14404 and EN19694 as the starting point for the calculation of GHG emissions
3. Leverage ISO 20915 as a method for calculating the avoided impact of steel industry co-products
4. Other considerations: Scope 2, offsets

Recommendation 6: Compatibility with existing standards and accounting methods

Development of further guidance required:

1. Further developments and technical guidance are needed to ensure greater consistency in the overall steel accounting method, whilst taking into account the recommendations of this report.
2. This is vital to enable stakeholders and steel companies to prepare, compare and implement the commitments of different steelmakers on a like-for-like basis

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Recommendation 6
Develop unambiguous guidance for companies making different types of steel products

Nick Avery, Independent Technical Writer

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Q&A