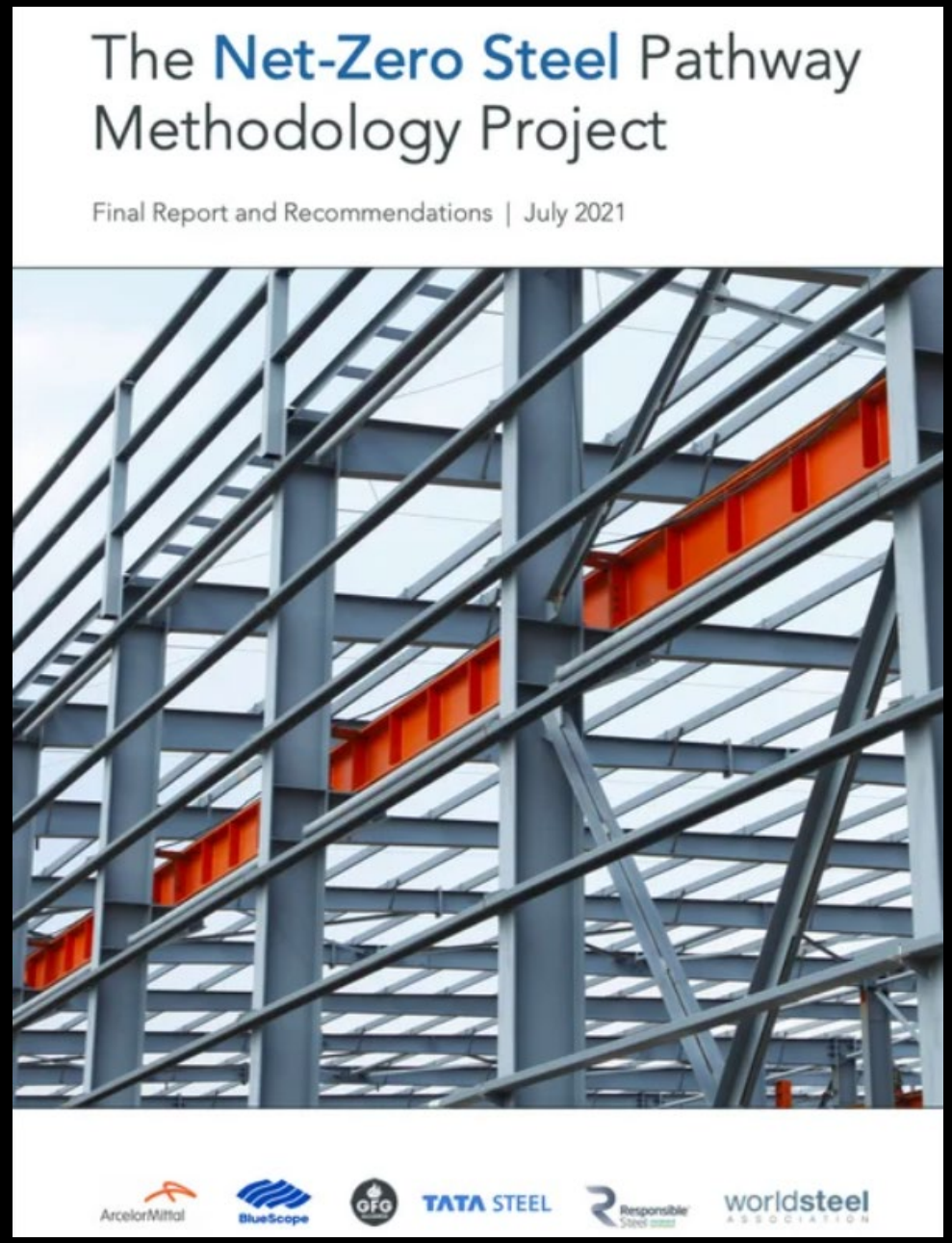
The Net-zero Steel Pathway Methodology Project

How to measure and track emissions from steel production

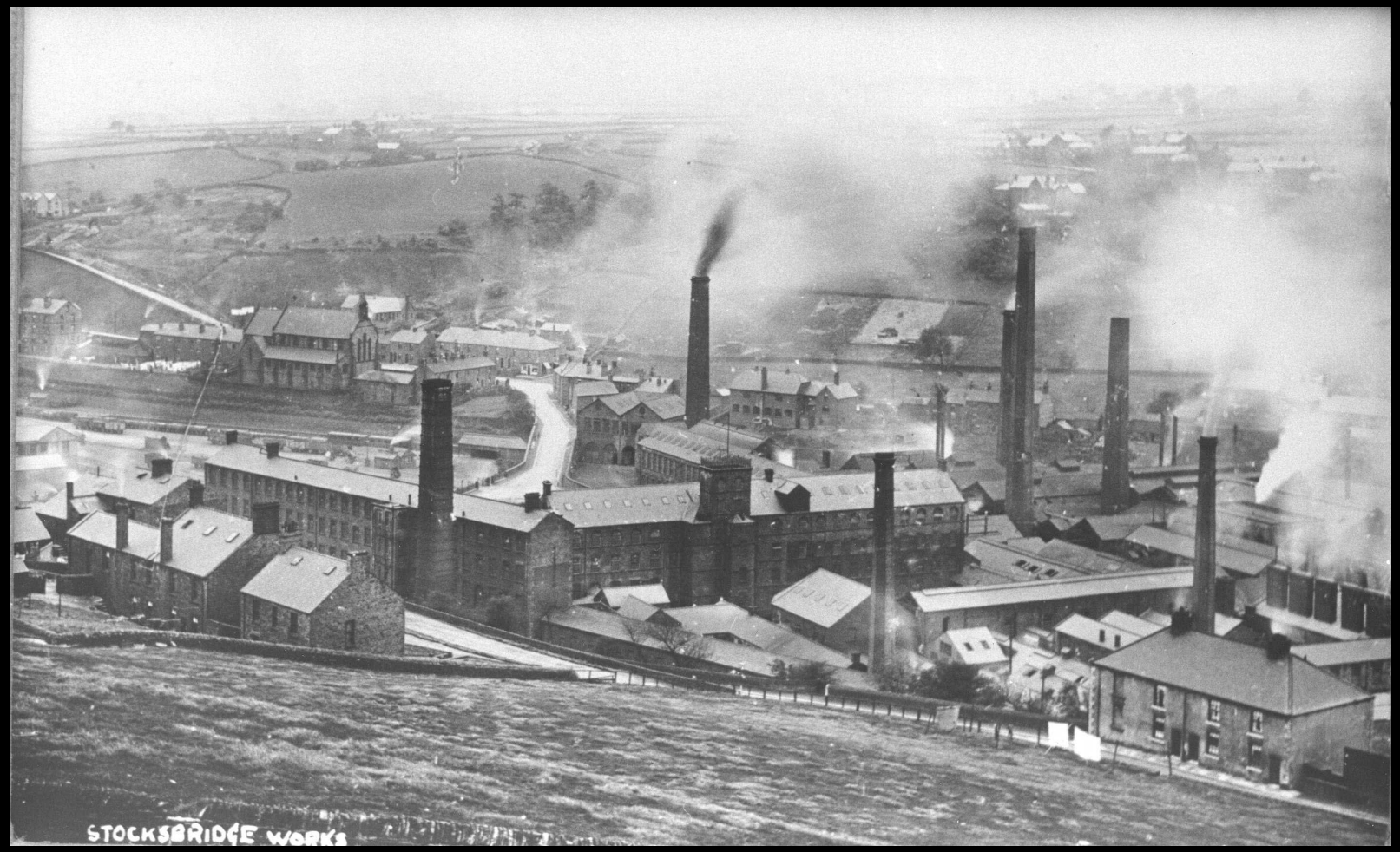
October 2022

Edward Heath-Whyte, BSc(Hons), CEnv, MIEMA, MIET
Head of Environment and Sustainability
Liberty Steel UK



‘Difficult to Abate’

- 7-8% of Global CO_2 Emissions
- Carbon intensive
- High capital cost
- Long investment cycle
- Low average asset age



The Net-Zero Steel Pathway Methodology Project

3.1.2 Steel readiness tracker

Steel Summary

Steel benefits from promising technological pathways, but more decisive action is required to boost demand and investments in green steel.

Click on the enablers below to find out more.

Key messages

Low-emission production technologies are increasingly available but far from commercially competitive to be deployed at scale.

The cost of transforming steel assets is dwarfed by the cost of infrastructure needed – a significant bottleneck risk exists.

The green premium for end consumers is low, but steel buyers need to be incentivized to generate demand for producers.

Further decisive policy action can incentivize steel players into low-emission production.

Further de-risking and better returns will be needed to reorient larger investment flow towards the low-emission industry.

Technology

Readiness stage 2

The low-emission production technologies are **largely prototyped at scale.**

+25-50%

Production cost increase for low-emission production today

2025

Expected year of commercial readiness of first low-emission production.

Infrastructure

Readiness stage 1

The necessary infrastructure required by the low-emission industry **needs to be developed almost entirely.**

$1,750 billion

Investments required in low-emission power generation

$222-586 billion

Investments required in low-emission hydrogen production

$35-109 billion

Investments required in CO_2 transport and storage

Demand

Readiness stage 4

Most of the market can pay the required green premium.

+25-50%

Expected green premium for steel buyers

+0.5-1%

Expected green premium for end consumers

Policies

Readiness stage 1

Very limited policies complement current environment (technology, infrastructure, demand, capital), to support growth of the low-emission industry.

$180-360/ tCO_2e

Carbon price equivalent required to level competitive landscape

Capital

Readiness stage 1

Low-emission investments generate sufficient return for **barely any** CapEx to flow towards low-emission production assets.

$300 billion

CapEx required to transform industry asset base by 2050 (~$10 billion/year)

The Net-Zero Steel Pathway Methodology Project overview

- **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 the challenges by defining what is expected from a steelmaker to make a realistic and credible commitment to the Paris Agreement, with a net zero or 'science-based target'***

Project background, presentations and draft recommendations available at:

https://www.netzerosteelpathwayproject.com/

The Net-Zero Steel Pathway Methodology Project

Steering Group

ArcelorMittal
BlueScope Steel
Tata Steel
GFG Alliance

Supported By

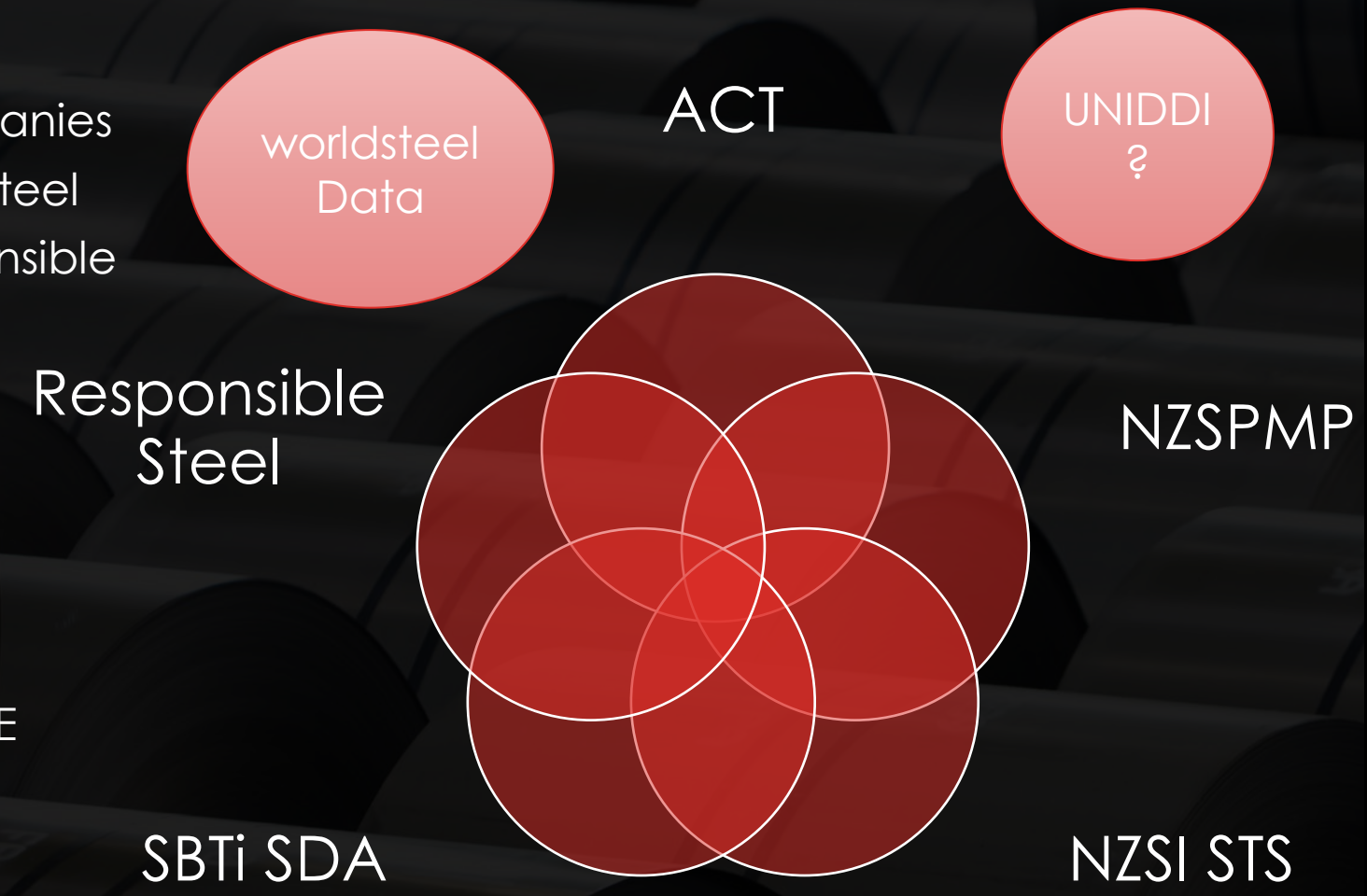
World Steel Association
ResponsibleSteel

Technical Working Group Members

- Celsa Group
- JSW
- Liberty Steel / Infrabuild
- Nippon Steel
- NLMK
- Outokumpu
- POSCO
- Severstal
- Tenaris
- Ternium
- Voestalpine
- Wirtschaftsvereinigung Stahl

ACT I&S > NZSPMP > SBTi SDA > NZSI

- Steel Companies
- worldsteel
- Responsible Steel
- WEF
- ETC
- MPP
- RMI
- ACT
- ADEME
- CDP



- ACT Developed a Methodology to measure Steel Sector Decarbonisation with a defined value chain. March 2021 (Road-test)
- The NZSPMP kicked off the debate on how to develop a common methodology to measure the decarbonisation of the Steel Sector (7% Global GHG emissions) July 2021
- SBTi Development of a method for measuring the achievement of a 1.5oC Aligned decarbonisation pathway for the Steel Sector. Ongoing
- NZSI Steel Transition Strategy a 2 scenario 1.5oC aligned strategy for Steel Sector Decarbonisation. September 2022
- Responsible Steel Standard V2 September 2022
- UNIDDI – partial sector coverage

The Net-Zero Steel Pathway Methodology Project

NZSPMP STEEL SBT SYSTEM BOUNDARY FOR SBTS + VALUE CHAIN BOUNDARY

ACT ASSESSING LOW CARBON TRANSITION ®

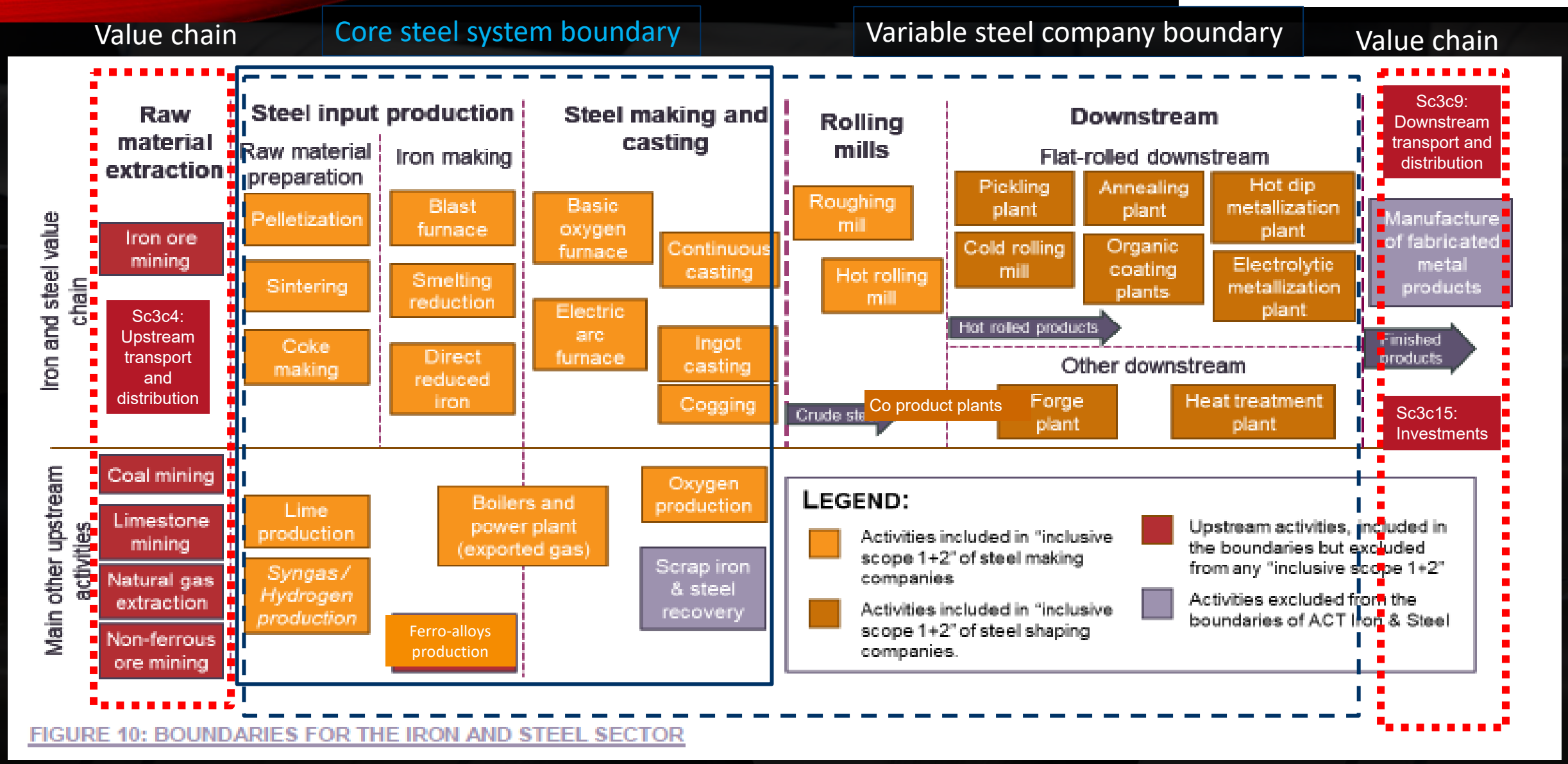
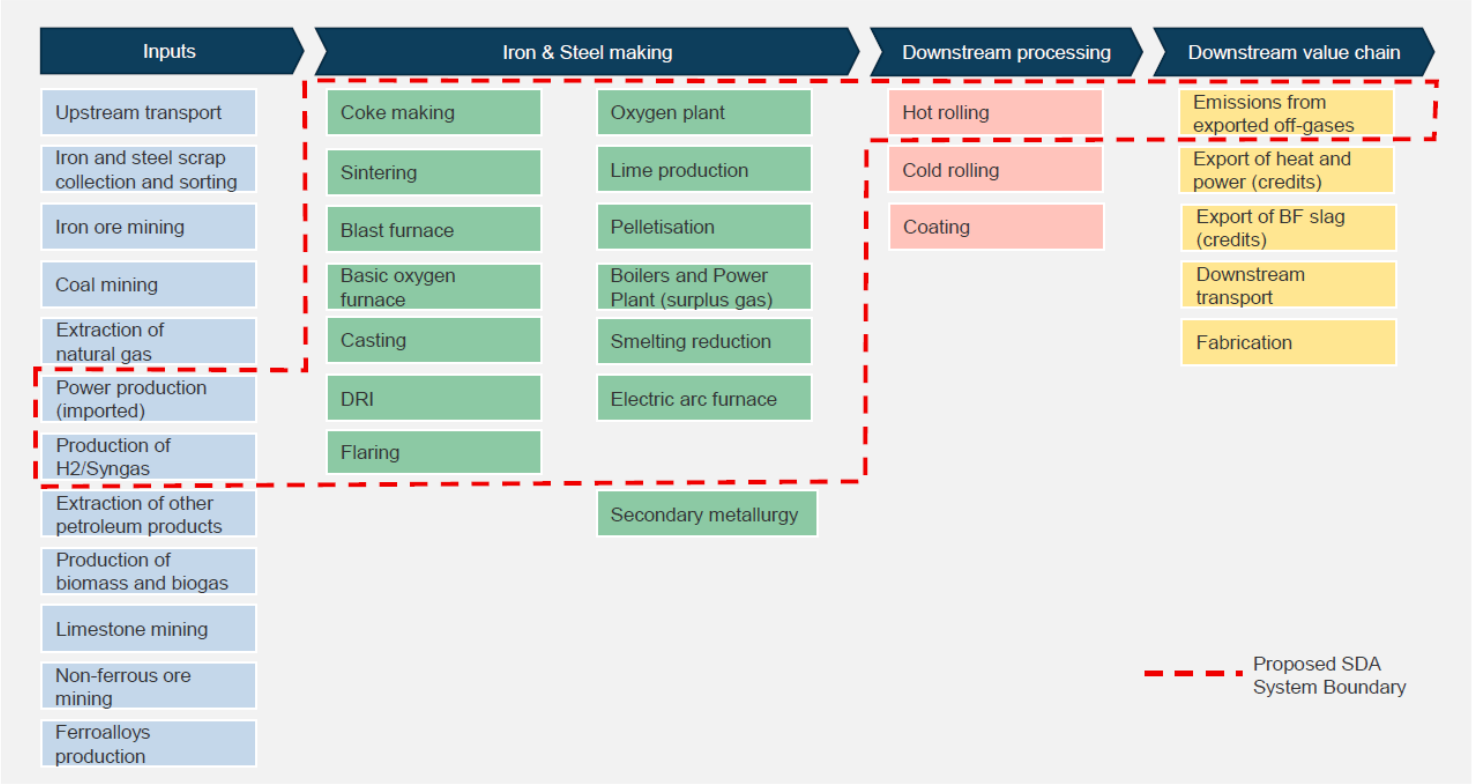


FIGURE 10: BOUNDARIES FOR THE IRON AND STEEL SECTOR

SBTi – Key recommendation 1 SDA Proposed Boundary *

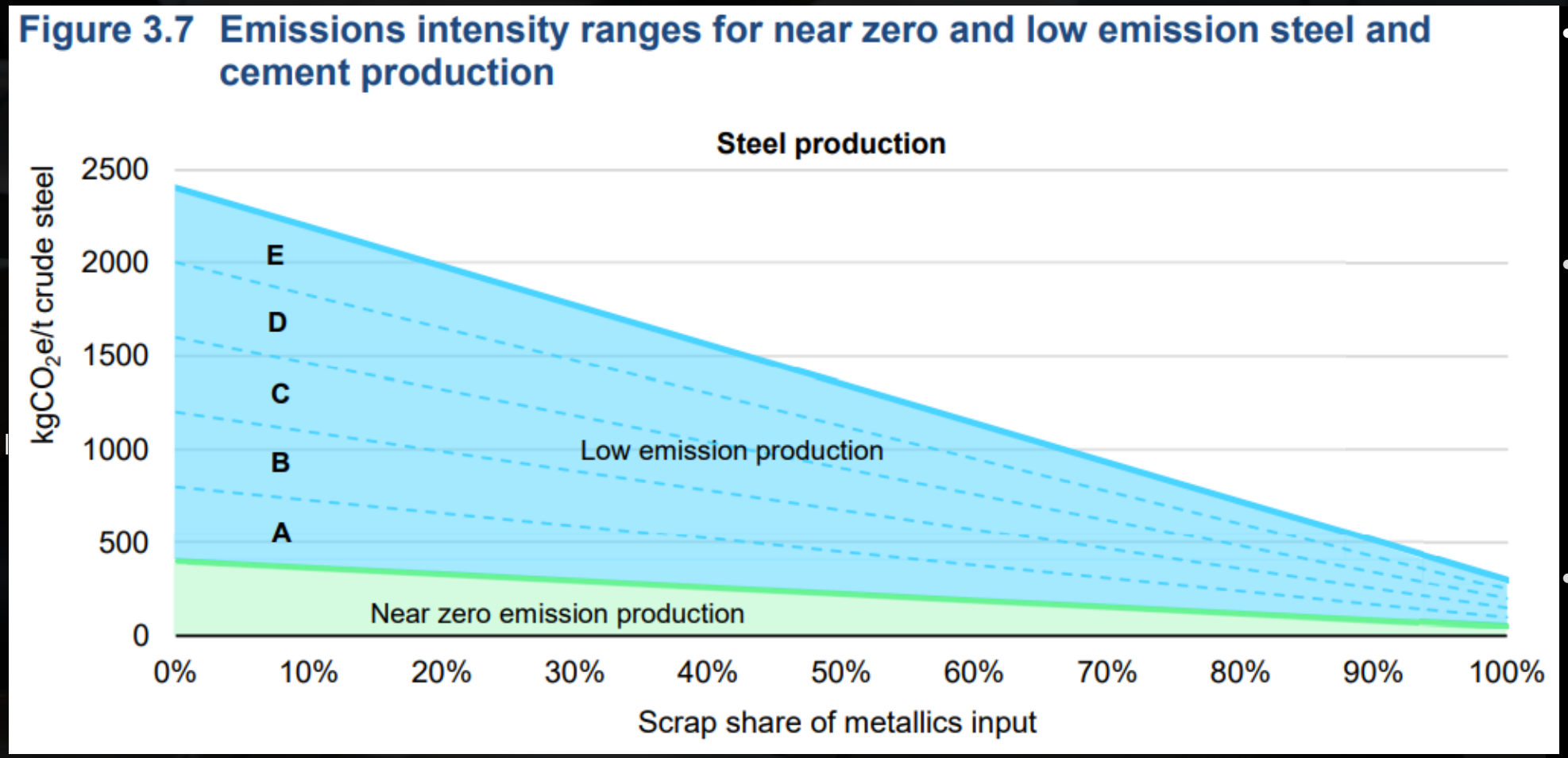
Based on expert feedback, we have adapted the system boundary to include hot rolling, exclude upstream scope 3 and exclude credits for exported power



Boundary changes

- Exclude secondary metallurgy (IEA Scrap curve issue)
- Include Hot Rolling
- *Still under development

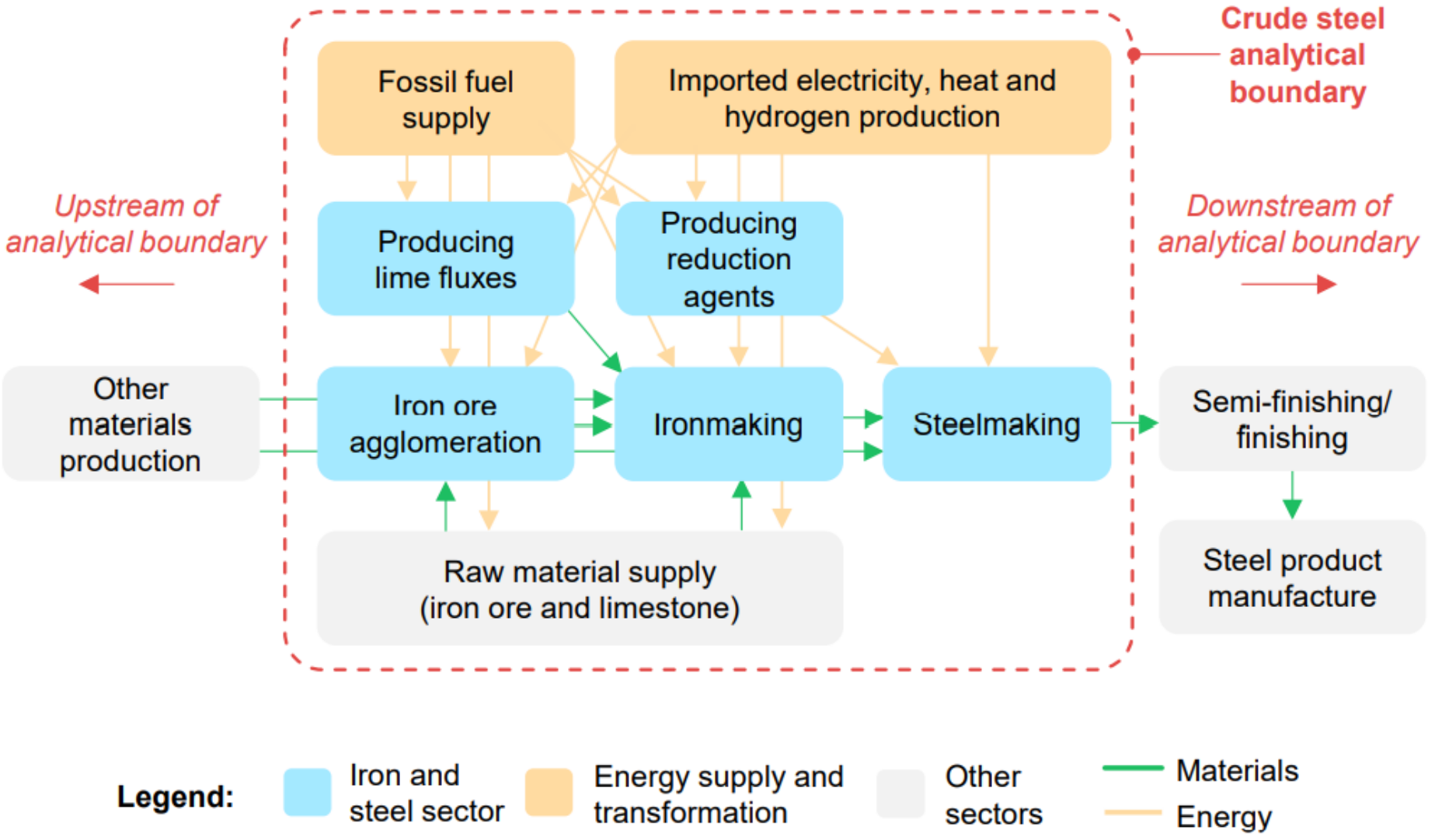
Use of Scrap Curve (Sliding Scale)



- The Scrap sliding scale is used in several methodologies.
- However, it is not always used as intended - It is not suitable for use at a product level. (UNIDDI)
- It is only suitable for normal carbon steel production, not for engineering steels, High Alloy Steels or Stainless Steels.

IEA (2022), Achieving Net Zero Heavy Industry Sectors in G7 Members, IEA, Paris https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members

Figure 3.1 Analytical boundary for defining near zero emission steel production

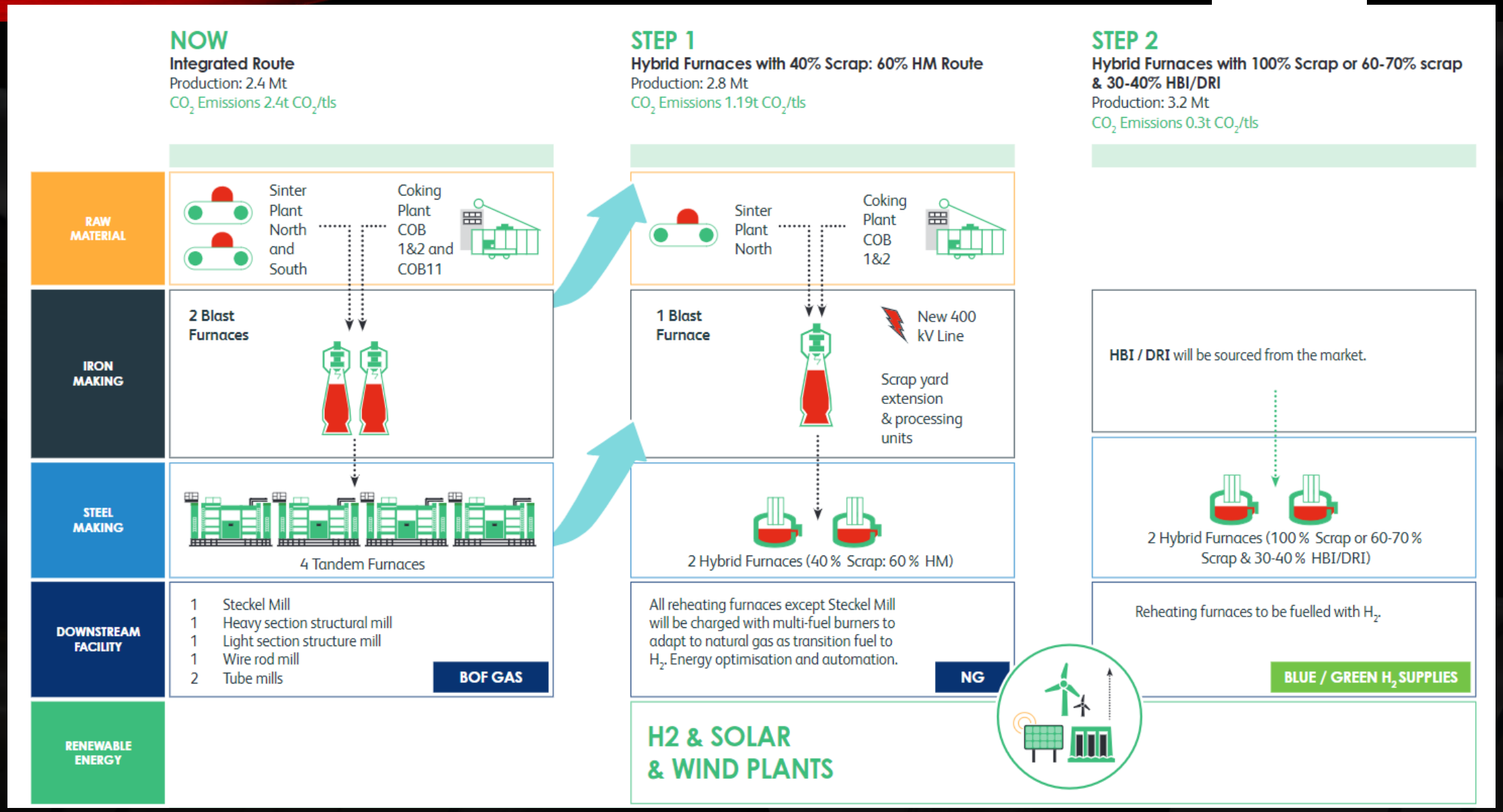


Notes: "Other materials production" refers to the production of material inputs to the iron and steel sector besides iron ore and limestone, including electrodes, alloying elements and refractory linings.

This Boundary should be noted as it does not include Semi Finishing or Hot Rolling

IEA (2022), Achieving Net Zero Heavy Industry Sectors in G7 Members, IEA, Paris https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members

Liberty Steel – Decarbonisation @ Ostrava



Summary

- The Steel Sector Boundary is Key for a consistent methodology that can compare company progress towards a 1.5^{o}C 2050 de-carbonization pathway.
- The Scrap Sliding-Scale/Curve is an appropriate method of defining Near-Zero and low emission steel production. However currently it has limitations:
  - It is based on the boundary defined by the IEA.
  - It is suitable for company and plant level use but not for products.
  - It is not suitable for Stainless Steel or High Alloy Steels.

Conclusion

- To measure de-carbonization of the Steel Sector methodologies have been developed that can provide a consistent measurement.
- The boundary must be recognized when setting targets (the measurement of downstream processing must also be included).
- The Scrap Sliding-Scale/curve should be used for the boundary it was based on. If the boundary is different than the sliding-scale/curve will need to be adjusted to include any extra emissions.
- Convergence in Methodologies will be critical to ensure progress to a 1.5^{o}C Compatible Net-Zero pathway is transparent and comparable.

The Net-Zero Steel Pathway Methodology Project

QUESTIONS?

USEFUL WEBSITES

GFG Alliance

NZSPMP

ACT Methodologies

worldsteel

Responsible Steel

SBT – Steel Sector Guidance

ETC – Net-Zero Steel STS

IEA – I&S technology Roadmap