



# Achieving Net Zero Heavy Industry Sectors in G7 Members

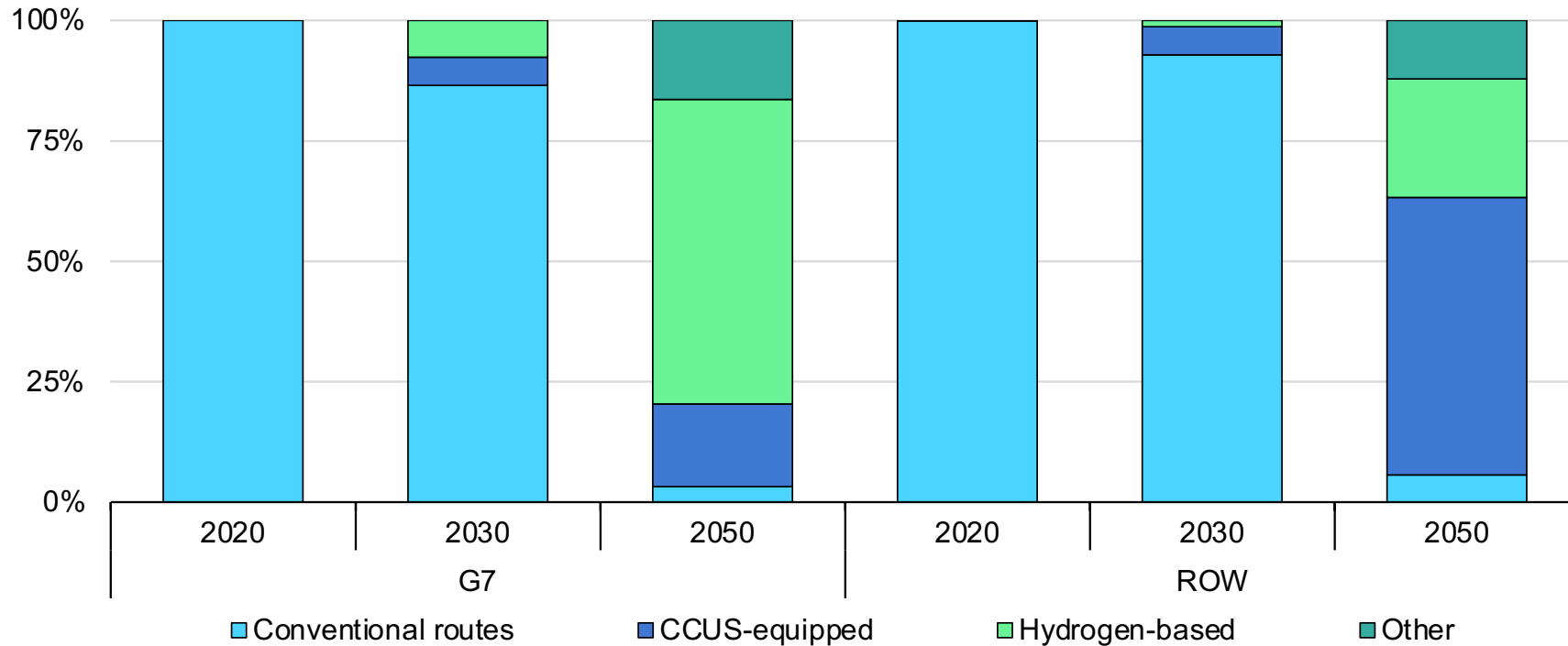
Dr Peter Levi, International Energy Agency

ResponsibleSteel Forum III, October 2022

- The IEA was requested by Germany's 2022 G7 Presidency to support the advancement of its climate and energy agenda, with industrial decarbonisation identified as a priority area
- There are different pathways to net zero heavy industry sectors, but any path will need a strong policy foundation to be successful:
  - Policies and financing mechanisms to drive down industrial emissions
  - Definitions of what constitutes near zero emission material production
- The aim of the project was to provide the technical basis for G7 discussions, arrived at through inclusive engagement of a wide range of stakeholders
- The report builds on two technical workshops on each of these topics, convened in February 2022, and extensive additional consultations
- The focus of the report is on steel and cement production, but many of the principles established are applicable to other heavy industry sub-sectors and materials, and countries beyond the G7

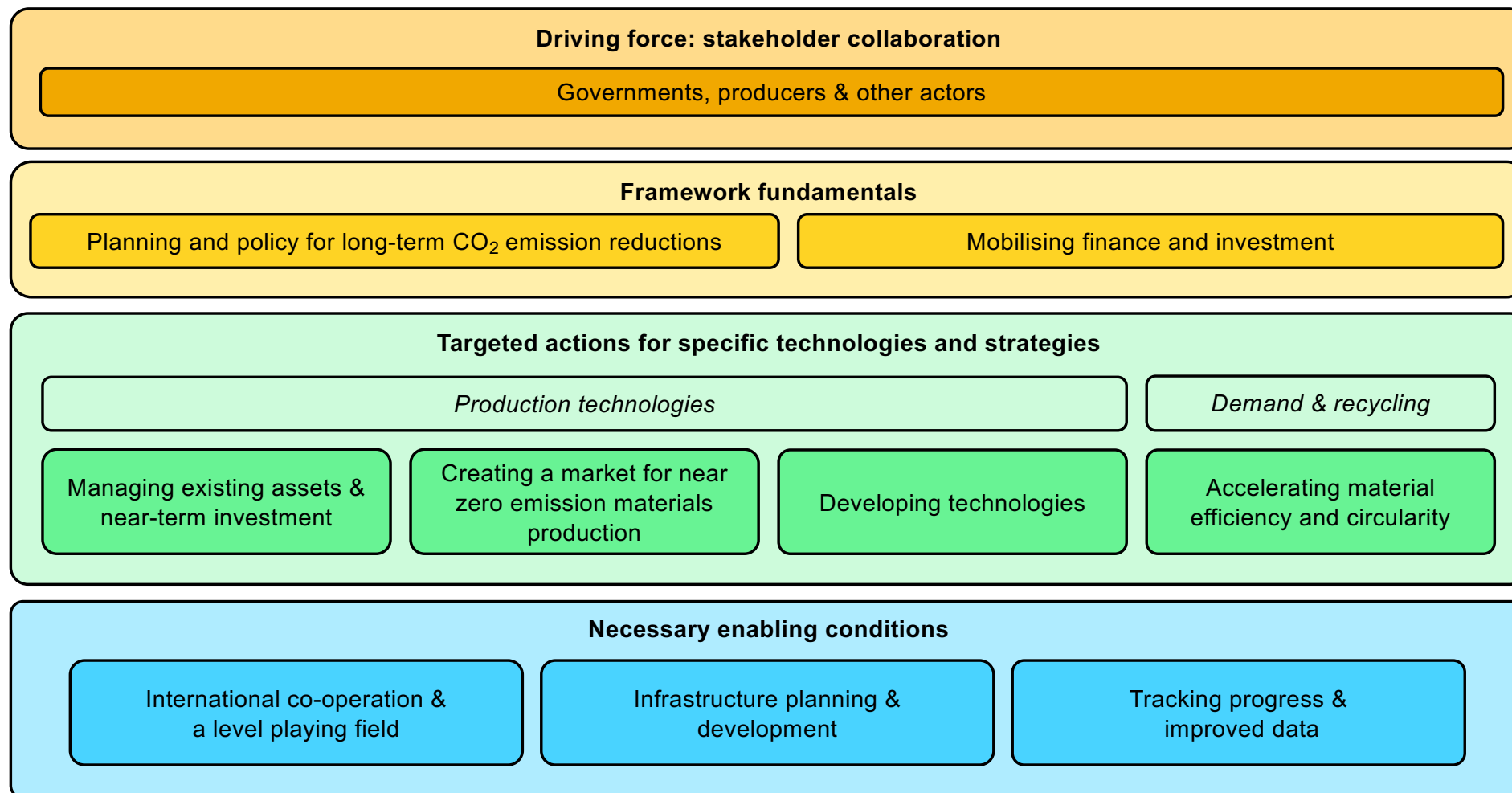
# The G7 moves faster than the rest of the world

Primary steel production by route in the G7 and the rest of world in the Net Zero Emissions by 2050 Scenario



**Among the G7, by 2030, near zero emission routes account for more than 10% of primary steel production in the NZE; by 2050, they account for upwards of 90% of production**

# Governments hold the pen: a policy toolbox for the industry transition



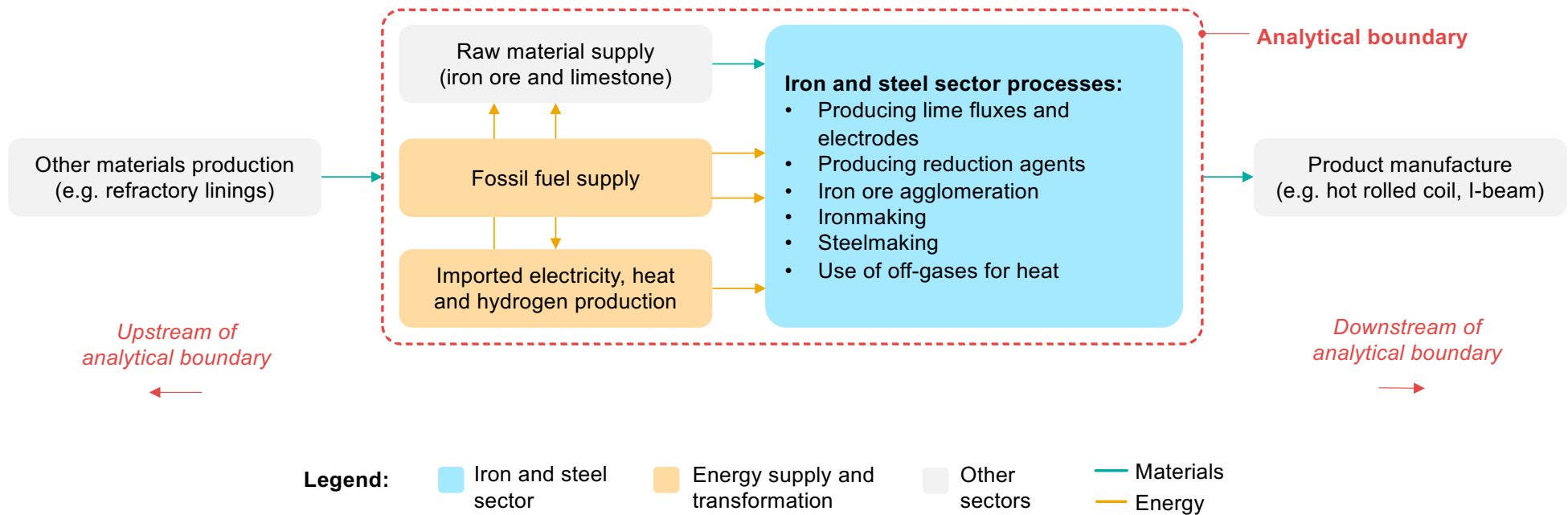
# Definitions of near zero emission material production



- Why do we need definitions of “near zero emission” material production?
  - Common definitions for “near zero emission material production” can establish a shared vision of the future for key production processes in heavy industry sectors
  - They can form the basis for many of the ‘push’ and ‘pull’ mechanisms in the policy toolbox
- What are the key considerations in developing the definitions we propose?
  - Technology neutrality and consistency with other IEA analysis and modelling
  - The focus is on steel and cement, but the principles established are broadly applicable
  - The definitions we propose are stable, absolute and ambitious; take account of sector specificities; focus on production and form the basis for product definitions
- How have we developed the definitions?
  - The analytical basis for our definitions is IEA analysis of net zero emissions energy systems
  - Broad consultation process

# Analytical boundaries

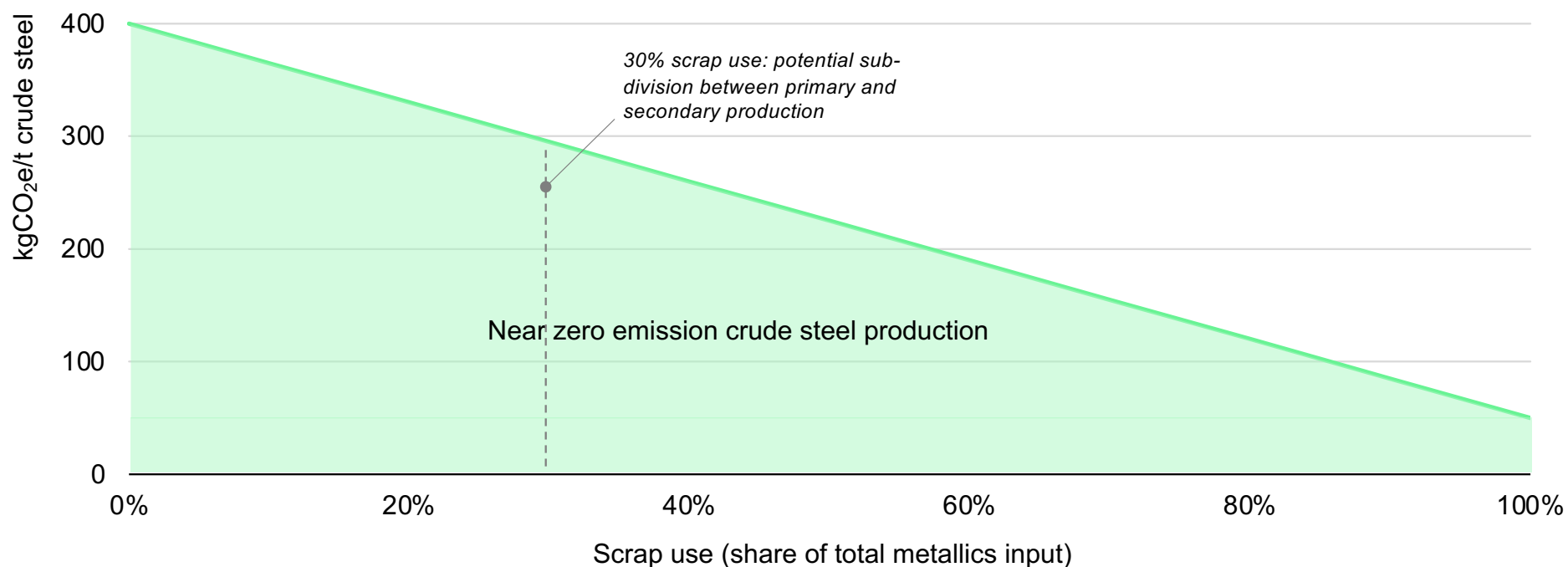
*Analytical boundaries for steel production definitions*



**The analytical boundaries we adopt are wide enough to encompass the key differentiating factors between various conventional and innovative process routes and narrow enough to be manageable**

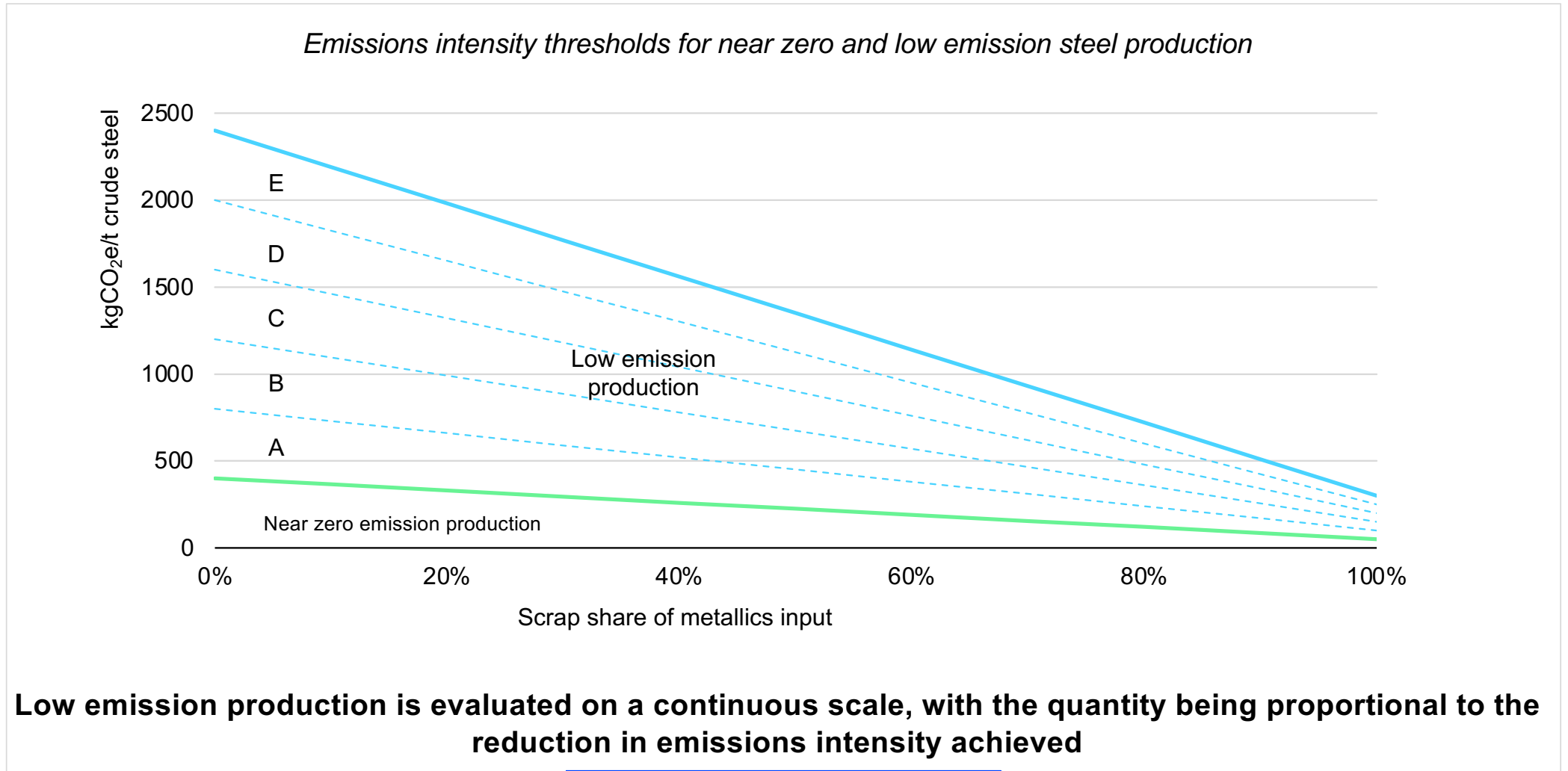
# Definitions of near zero emission material production

*Near zero emission steel production emission intensity thresholds*



**The near zero emission production threshold range for steel production is 50-400 kgCO<sub>2</sub>e/t crude steel, depending on the share of scrap use**

# Valuing interim measures to substantially reduce emissions intensities





# Recommendations on common definitions

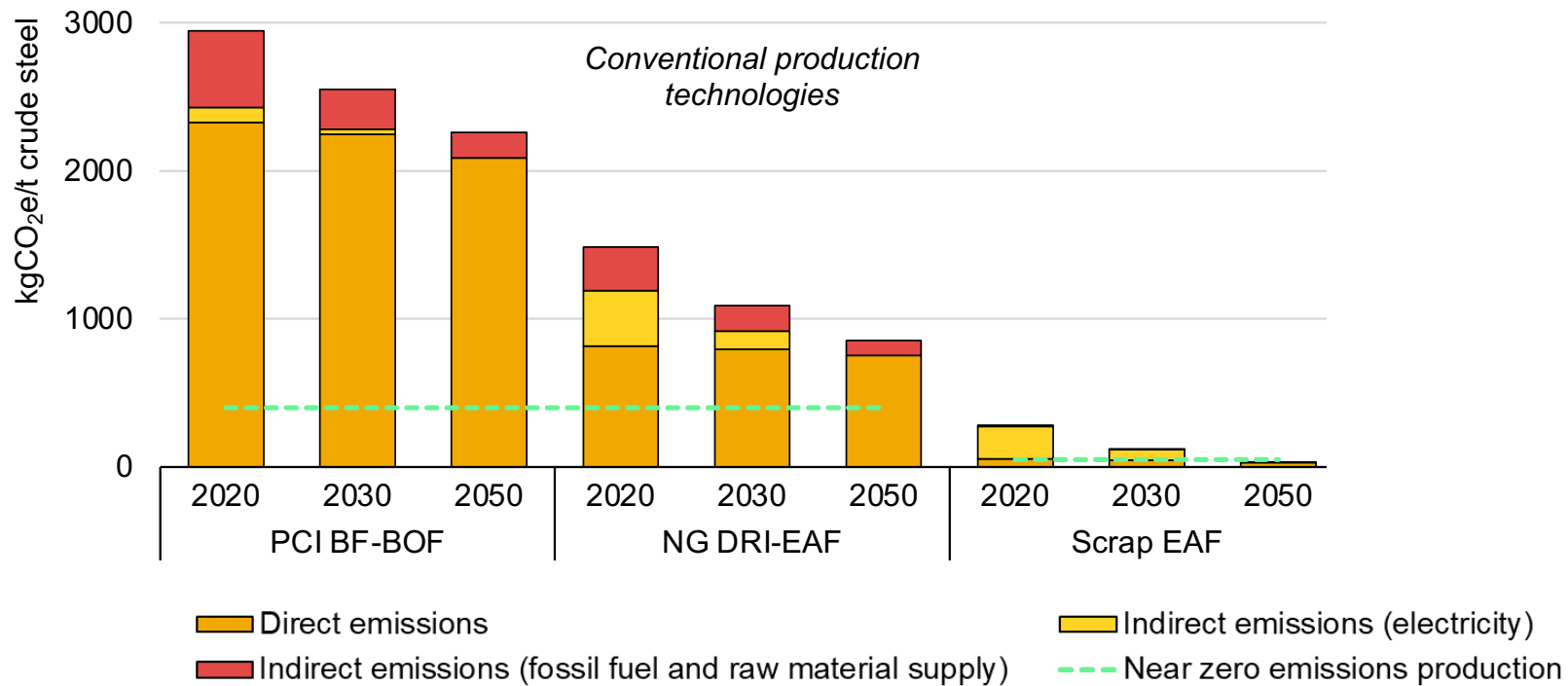


1. Consolidate existing work on measurement standards, ensure their fitness for purpose, and avoid the development of duplicate standards and protocols
2. Adopt stable, absolute and ambitious thresholds for near zero emission material production that take account of sector-specific nuances
3. Value interim steps taken to substantially lower emissions intensity, without compromising the stringency of the thresholds for near zero emission production
4. Extend the reach of work on definitions down existing supply chains, and into new ones

**iea**

# Applying the definitions – steel production

Emissions intensities of crude steel production via key pathways in the Net Zero Emissions by 2050 Scenario

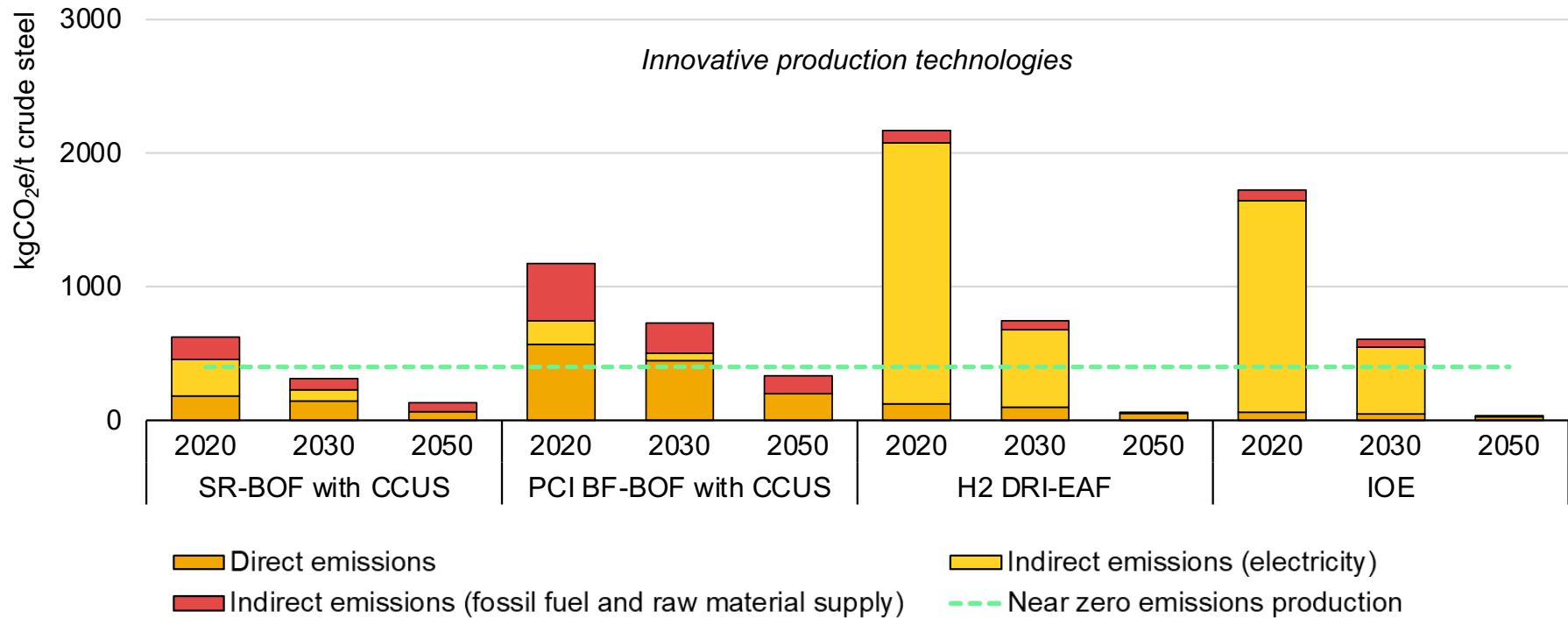


Note: Global average parameters from the Net Zero Emissions by 2050 Scenario used for all process route characterisations, for illustrative purposes.

**Conventional production technologies fall well short of achieving near zero emission production, except the scrap EAF route, for which the majority of indirect emissions stem from electricity generation**

# Applying the definitions – steel production

Emissions intensities of crude steel production via key pathways in the Net Zero Emissions by 2050 Scenario



Note: Global average parameters from the Net Zero Emissions by 2050 Scenario used for all process route characterisations, for illustrative purposes.

**Hydrogen and direct electrification achieve the lowest emissions intensities once the electricity sector is decarbonised – CCUS-equipped routes lead to immediate reductions in direct emissions**