

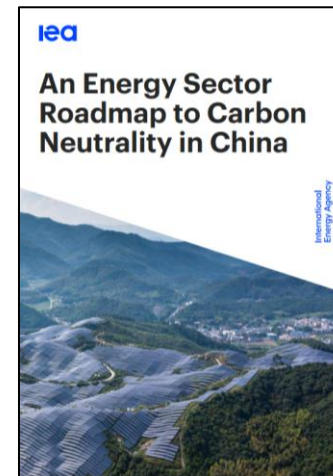
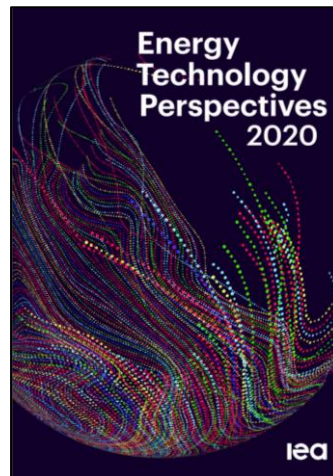
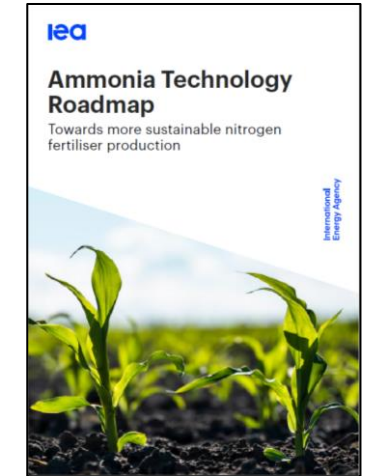
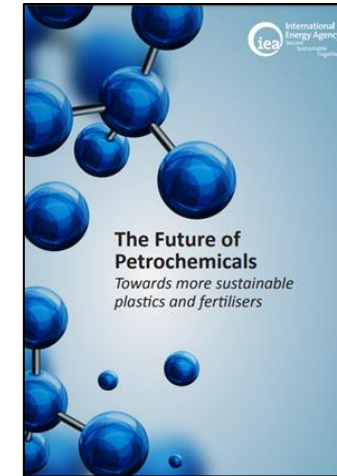
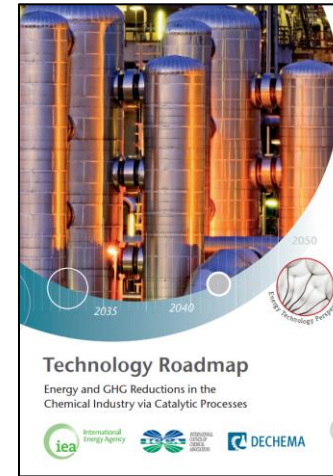
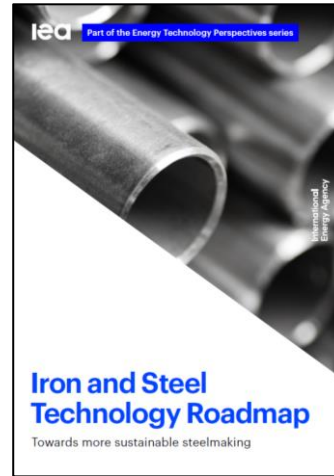
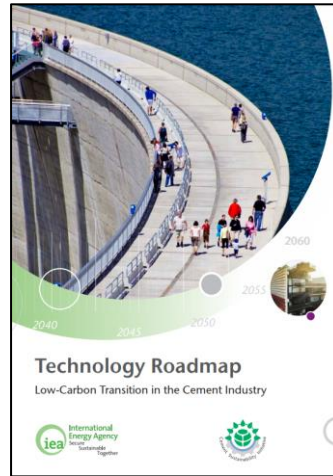
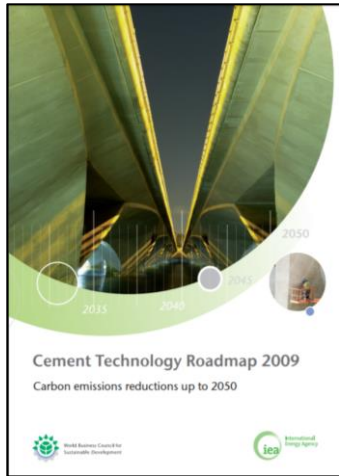


# Net Zero Heavy Industry Sectors – Iron and steel

Dr Peter Levi, International Energy Agency

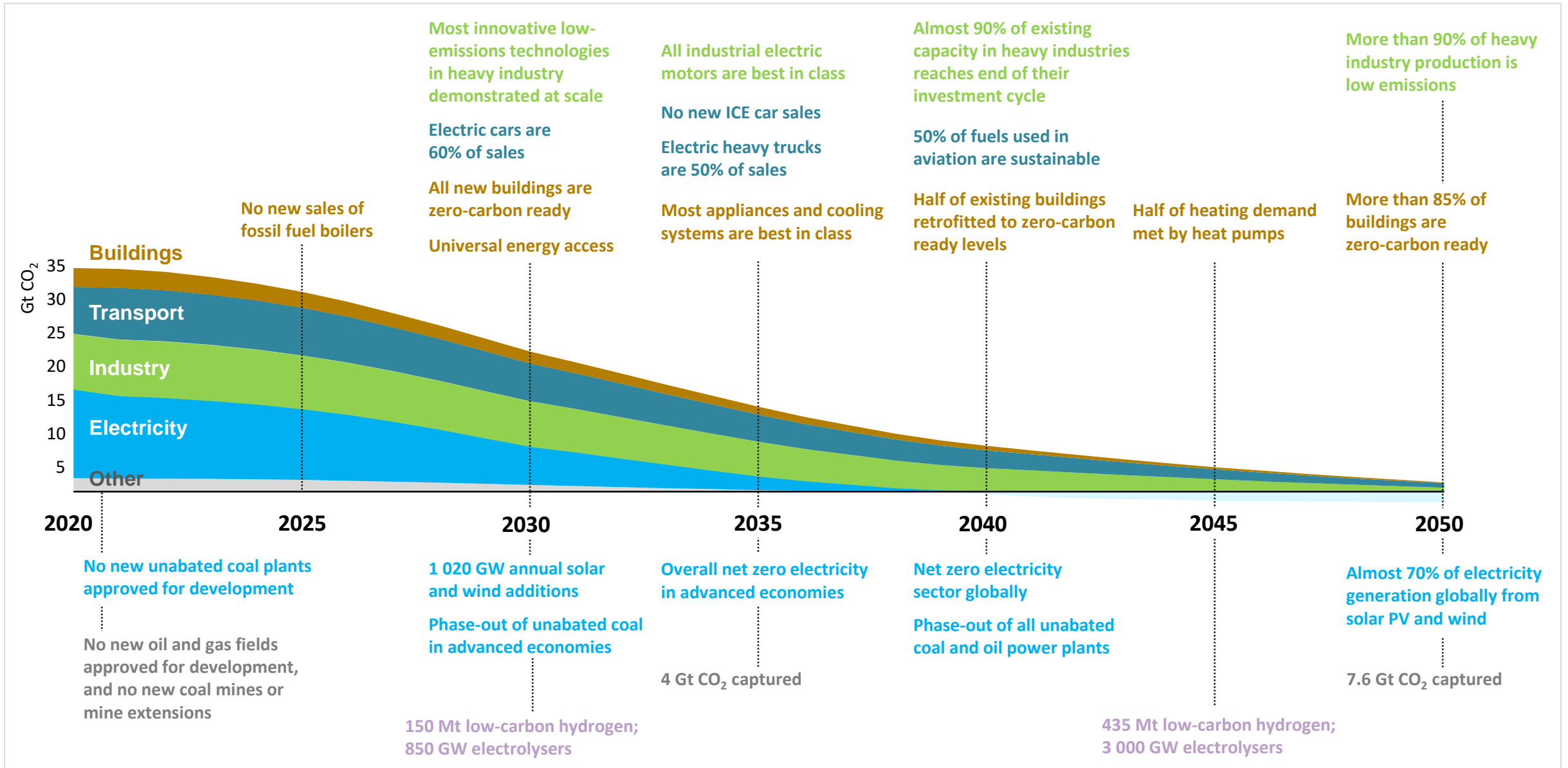
World Steel Association Open Forum, Brussels, October 2022

# Some of the IEA's work on the Industry sector...

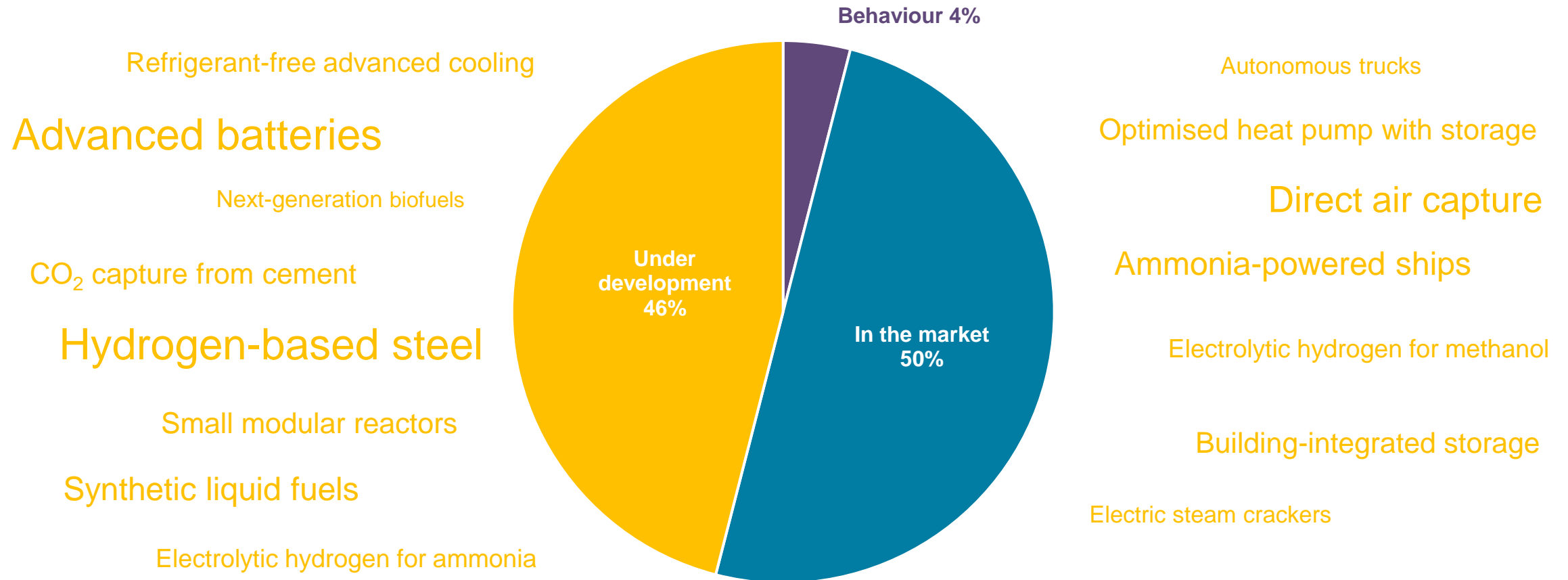


The IEA's roadmap and other deep-dive series have covered numerous topics over the past decade, spanning three dimensions: technologies, sectors and countries.

# Set near-term milestones to get on track for long-term targets



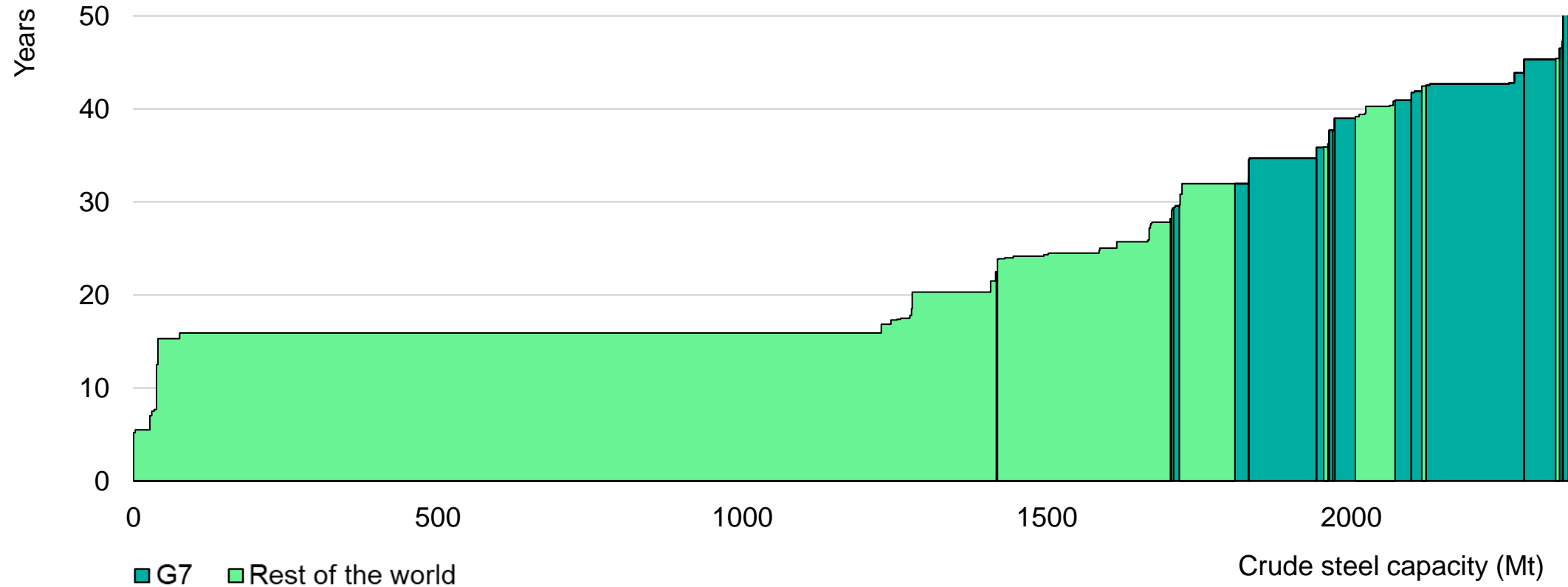
CO<sub>2</sub> savings by technology maturity in 2050, NZE scenario



**Unlocking the next generation of low-carbon technologies requires more clean energy R&D and \$90 billion in demonstrations by 2030; without greater international co-operation, global CO<sub>2</sub> will not fall to net-zero by 2050.**

# Challenges and opportunities associated with existing assets

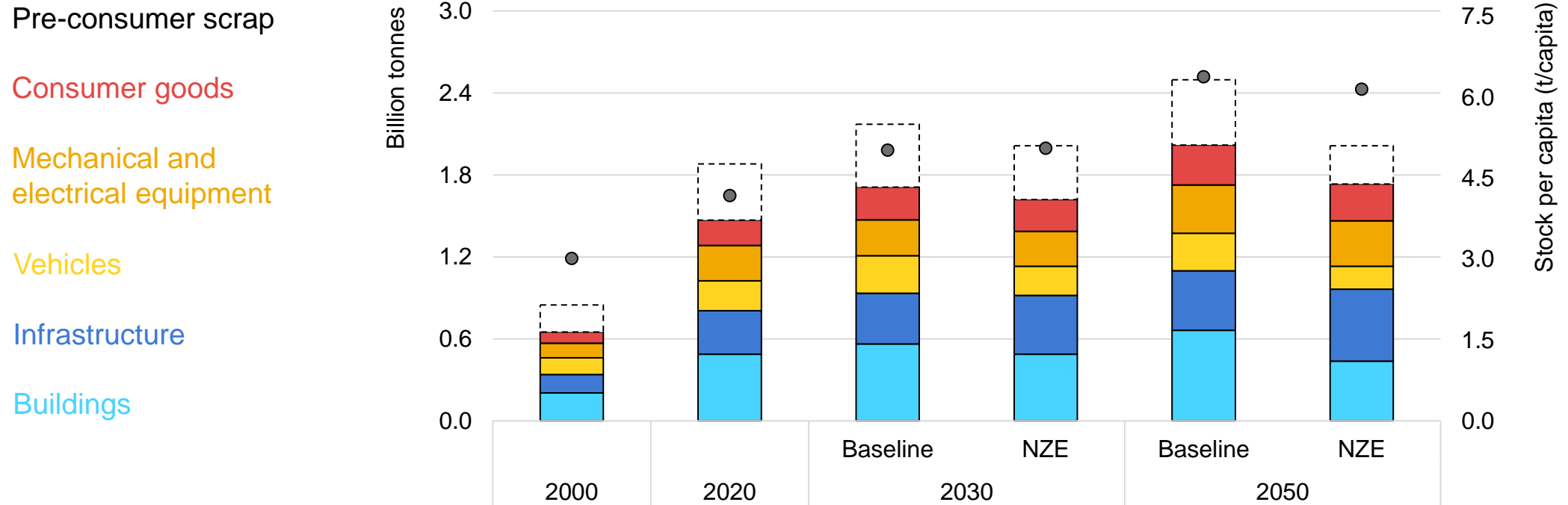
*Average age and regional distribution of key emissions-intensive assets in the iron and steel sector*



**Given the longevity and cost of key industry assets, 2050 is just one investment cycle away. In the G7, many industrial plants are quite old and will face a major investment decision this decade**

# Steel continues to play a pivotal role across multiple end-use sectors

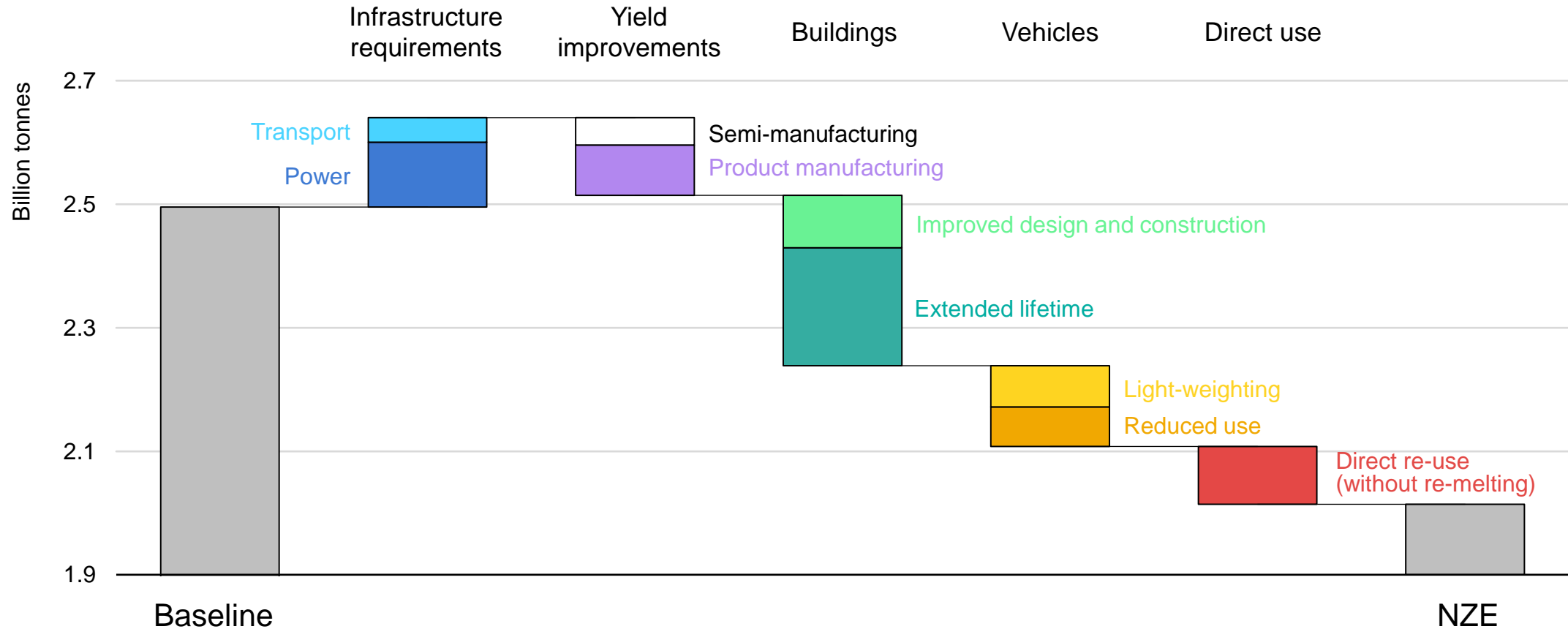
*Global end-use steel demand and in-use steel stock by scenario*



**Steel demand steel is projected to rise by more than a third through to 2050 in our baseline projection. In the Net Zero Emissions by 2050 Scenario, demand is reduced through material efficiency strategies.**

# There is great potential for more efficient use of steel

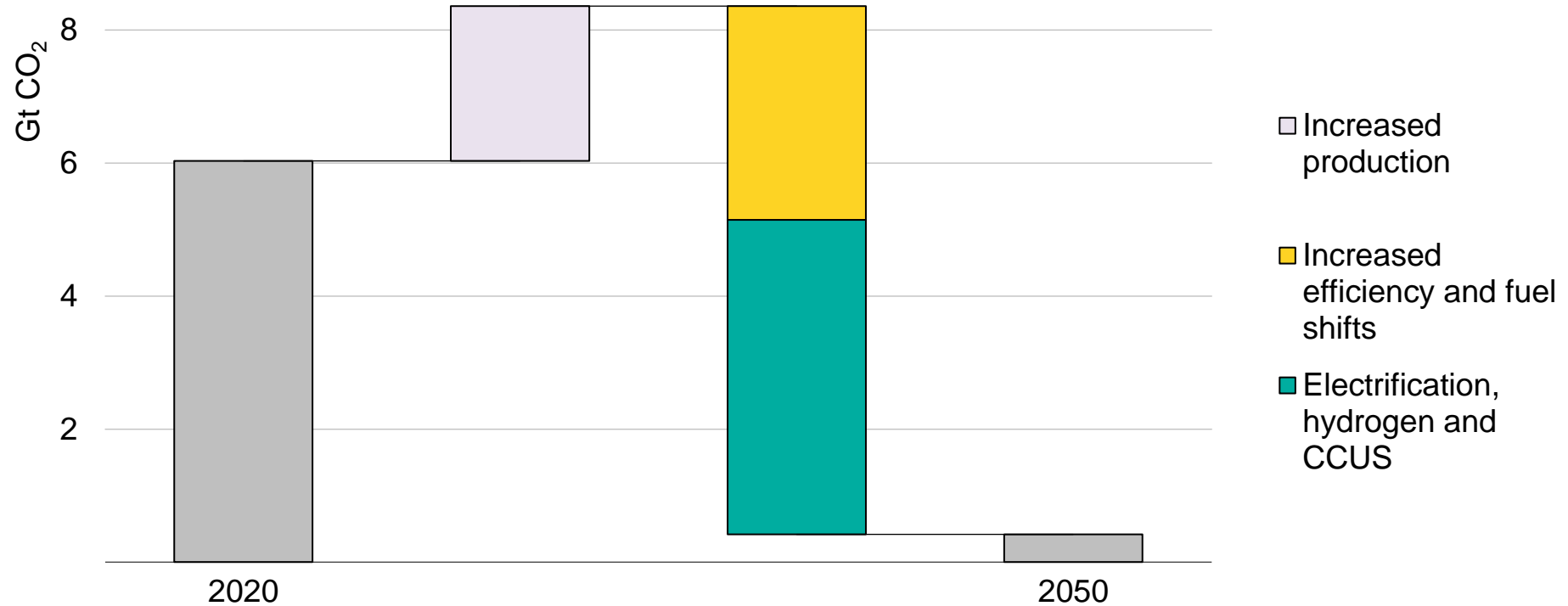
Contributions to changes in global steel demand, 2050



**Material efficiency strategies pursued across the supply chain deliver savings of around 20% in global steel production in the Net Zero Emissions by 2050 Scenario, relative to our baseline projection**

# Addressing CO<sub>2</sub> emissions from heavy industry

*Global CO<sub>2</sub> emissions reductions in heavy industry in the NZE*

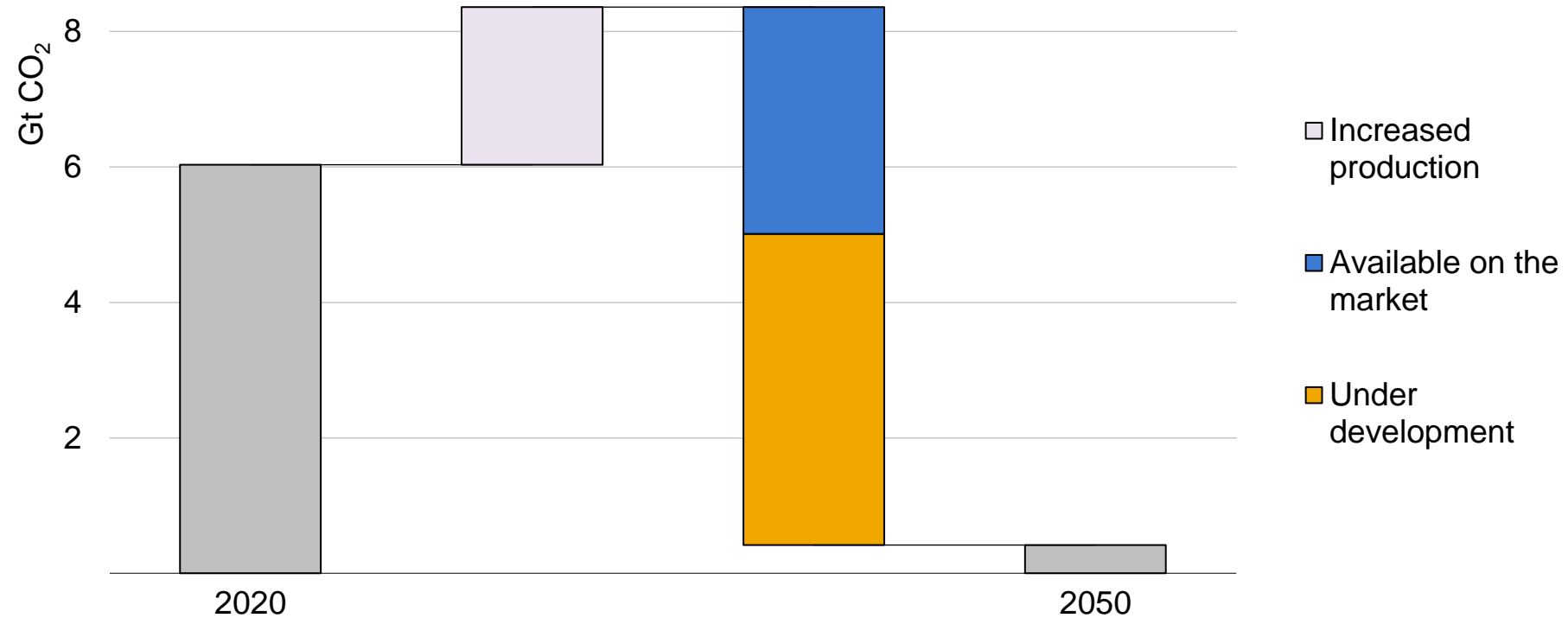


**An array of measures can help reduce emissions in heavy industry, with innovative technologies like hydrogen and CCUS playing a critical role**



# Addressing CO<sub>2</sub> emissions from heavy industry

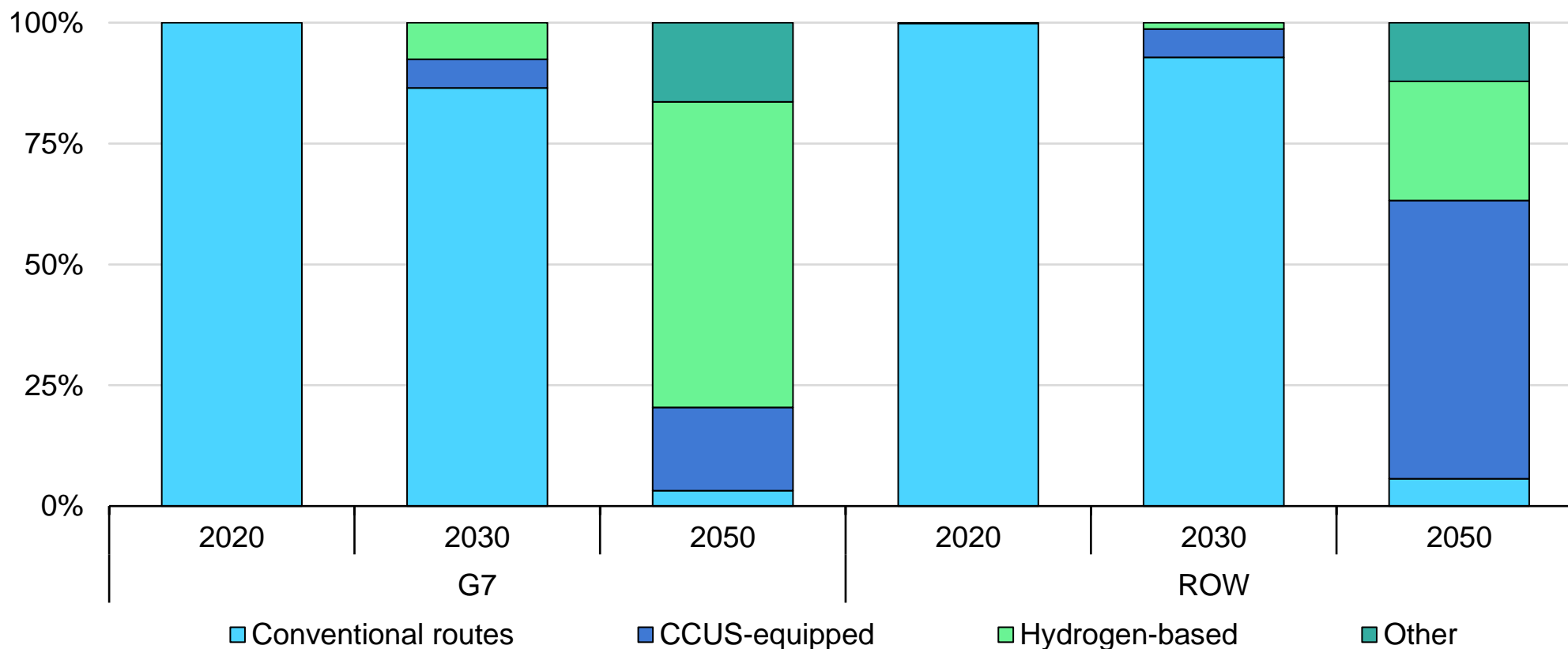
*Global CO<sub>2</sub> emissions reductions in heavy industry in the NZE*



**An array of measures can help reduce emissions in heavy industry, with innovative technologies like hydrogen and CCUS playing a critical role**

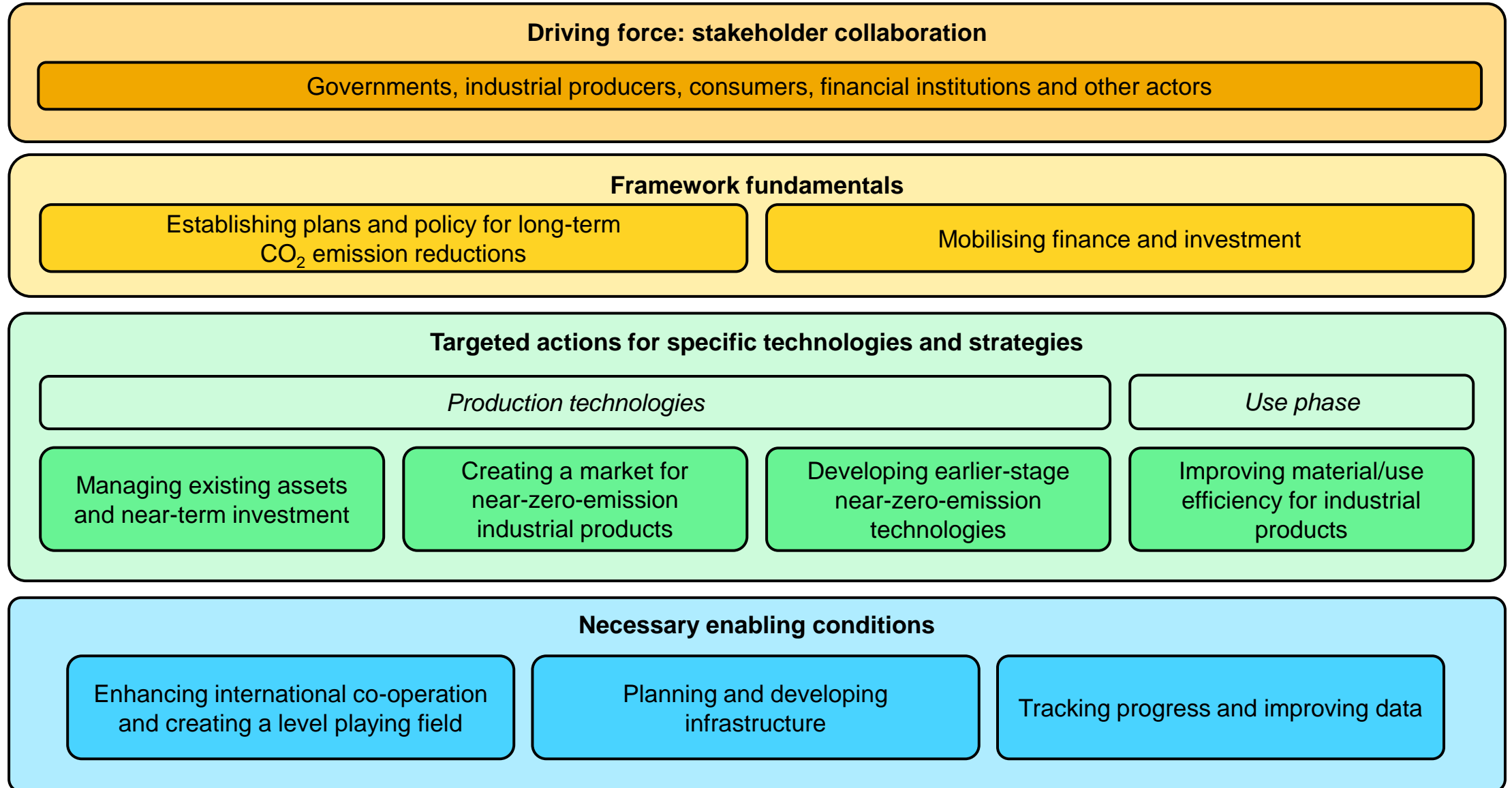
# Net zero means a profound transformation to the way we produce steel

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



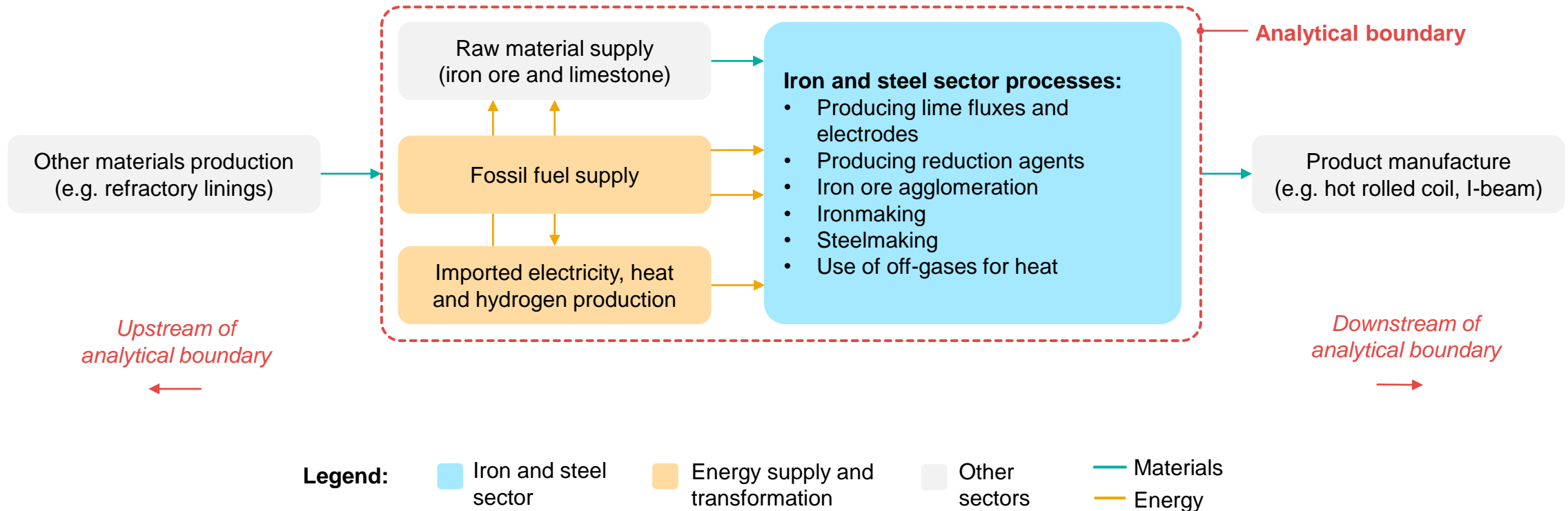
**While advanced economies lead deployment to 2030, all regions must deploy near-zero emissions steel production – these routes account for upwards of 90% of global production by 2050**

# Governments have a critical role to play in accelerating the transition



- 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

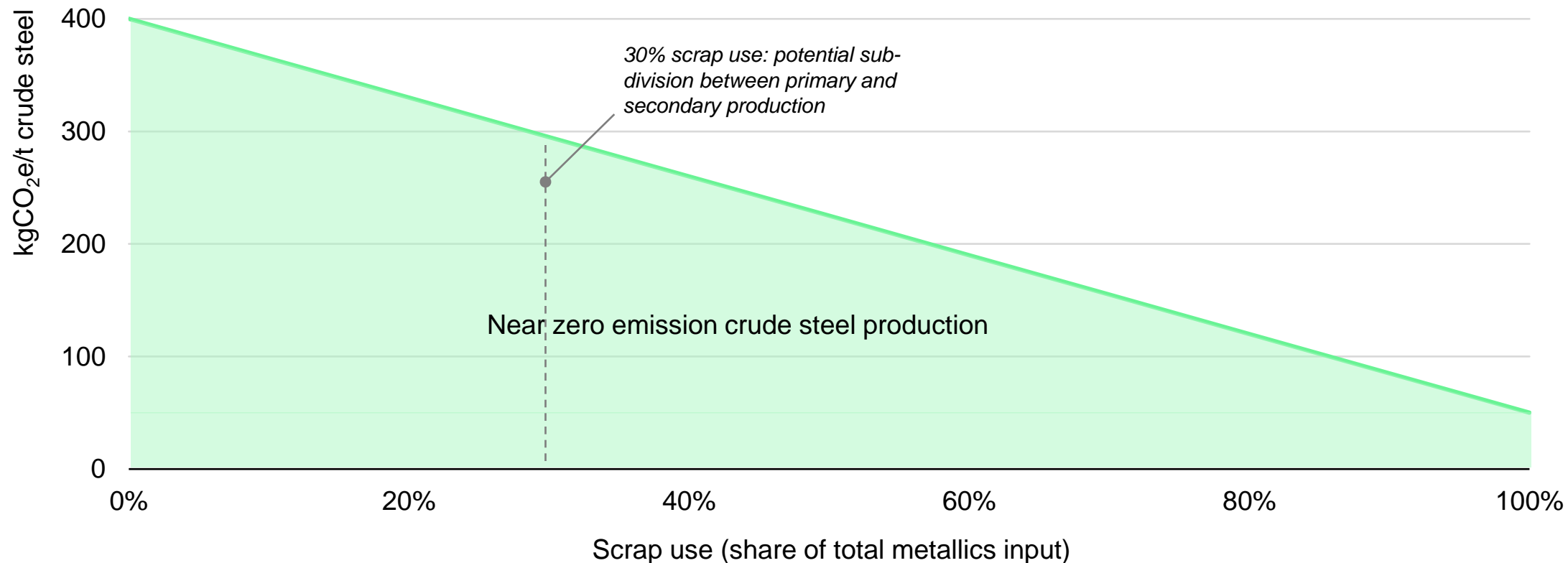
## Analytical boundaries for crude steel production definitions



**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

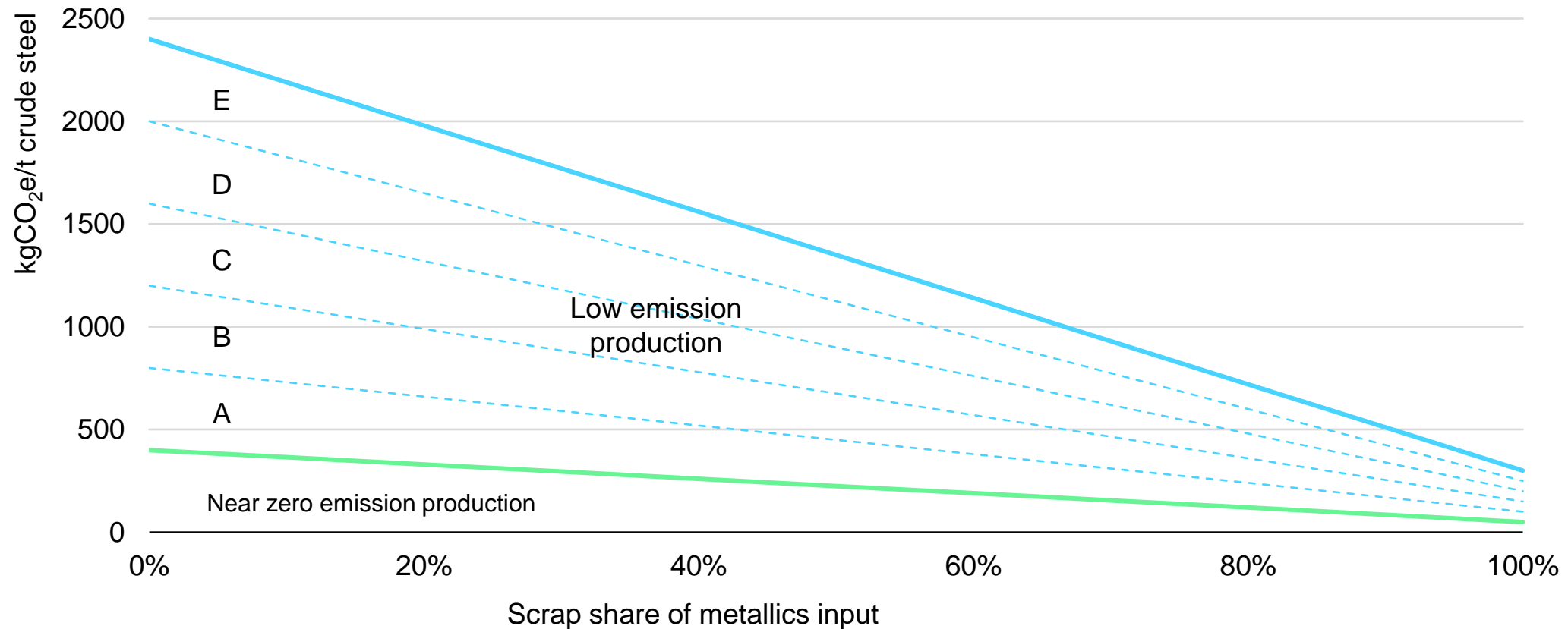
*Near zero emission steel production emission intensity thresholds*



**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

*Emissions intensity thresholds for near zero and low emission steel production*



**Low emission production is evaluated on a continuous scale, with the quantity being proportional to the reduction in emissions intensity achieved**

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



**led**