Iron and Steel Technology Roadmap

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Focusing on the power sector is not enough to reach climate goals.

Clean energy technology progress in the power sector is encouraging, but alone not sufficient to reach energy and climate goals. About half of all CO₂ emissions today are from industry, transport and buildings.
Emissions from heavy industry sectors are ‘hard to abate’

Fossil fuels account for around 85% of the final energy used in heavy industries, which, combined, account for just under a fifth of total energy system CO₂ emissions.
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Heavy industry final energy demand and direct CO₂ emissions, 2019

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Existing capacity is the starting point for the transition

Around 50% of the existing stock of ironmaking equipment is based in China, with India contributing a further 5%. The current stock is quite young, with a global average age of 13 to 14 years for blast furnaces and DRI furnaces.
Steel continues to play a pivotal role across multiple end-use sectors.

Global demand for steel is projected to increase by more than a third through to 2050 in our baseline projection. In the Sustainable Development Scenario, demand is reduced through material efficiency strategies.
There is great potential for a more efficient use of steel. Material efficiency strategies pursued across the supply chain deliver savings of around 20% in global steel production in the Sustainable Development Scenario, relative to our baseline projection.
A portfolio of mitigation strategies is required

Technology performance improvements and material efficiency deliver 90% of annual emission reductions in 2030. In the longer term, innovative technologies such as CCUS-equipped and hydrogen-based production are required.
A diverse portfolio of energy carriers and processes

Unabated use of coal drops by more than 50% in the Sustainable Development Scenario by 2050, facilitated by widespread deployment of innovative technologies.
Sustainable steel requires a major push for clean energy infrastructure.

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Governments have a critical role to play in accelerating the transition

Driving force: stakeholder collaboration
Governments, steel producers & other actors

Framework fundamentals
Planning and policy for long-term CO₂ emission reductions

Targeted actions for specific technologies and strategies

- Steelmaking technologies
  - Managing existing assets & near-term investment
  - Creating a market for near-zero emission steel
  - Developing earlier-stage technologies

- Scrap use & steel demand
  - Accelerating material efficiency

Necessary enabling conditions

- International co-operation & a level playing field
- Infrastructure planning & development
- Tracking progress & improved data