

Press release

China invests over USD 100 billion in coal-based steel plants, threatening climate goals

With heavy reliance on coal-based manufacturing, Chinese steel plants produce over one billion tonnes of steel for the fourth year in a row; have the highest carbon intensity among the world's major steel-producing countries

BEIJING, 27 March 2024 - China's large investments in the steel sector with a heavy reliance on coal threaten to derail the country's climate commitments, create a slew of exorbitant stranded assets, produce more steel than the market demands, and ultimately make the sector financially vulnerable.

The Centre for Research on Energy and Clean Air's (CREA) latest report has revealed that steel plants approved after 2020 are at risk of becoming stranded assets worth USD 118 billion if China meets its climate targets, which require earlier retirement of these carbon-intensive facilities than their operational lifetime. These coal-based plants contribute to China's steel sector, making it among the highest carbon intensive producers in the world. On average, China generates over two tonnes of carbon dioxide for every tonne of steel it produces. The US has a carbon emission intensity of less than one tCO₂/t, while the global average is 1.91 tCO₂/t, mainly attributed to the high carbon intensity and volume of steel made in China.

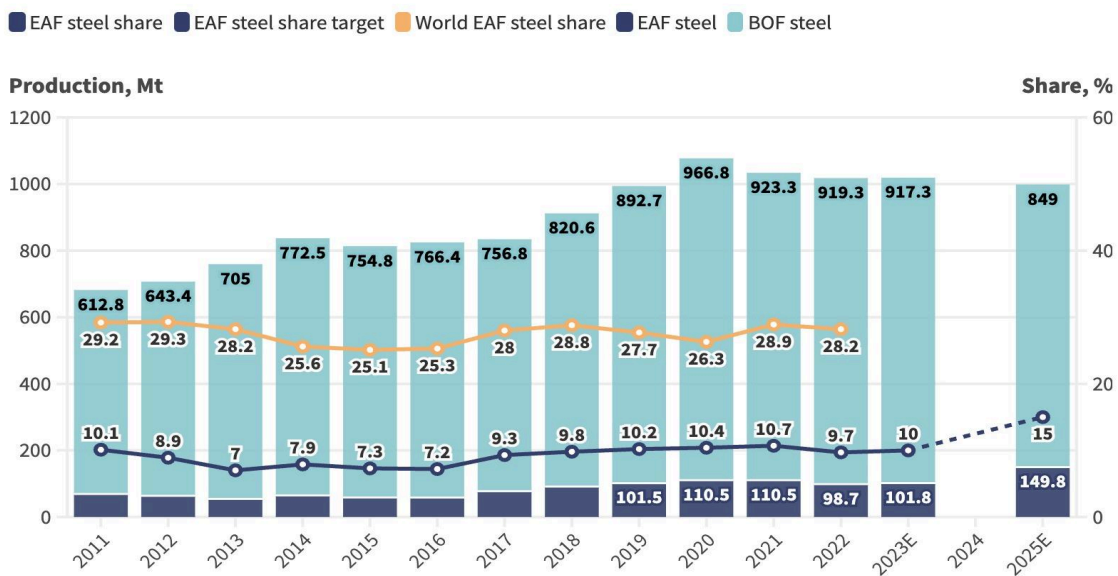
Steel is produced in two major pathways: the Blast Furnace-Basic Oxygen Furnace (BF-BOF) route and the Electric Arc Furnace route (EAF). The former involves using coke to reduce iron-ore to steel and produces 'virgin' steel, resulting in high levels of carbon emissions. On the other hand, the latter primarily uses scrap steel as feedstock and electricity for its operations, which can be made green using renewable sources. With steel being a 100% recyclable material, the EAF route is less carbon-intensive while saving the local ecology from mining new iron ore. Yet, China continues to invest in dying technologies without considering the long-term impacts on its domestic economy and the country's role in mitigating global carbon emissions.

Several models show that China’s steel demand will decline significantly as industrialisation and urbanisation peak. One model expects the country’s crude steel production to decline 58% by 2050 compared with 2020.

The sector is already accelerating towards exorbitant stranded assets. In 2023, the sector's annual fixed asset investments (FIA) were 14 times its total profit.

“China’s steel sector’s total profitability is in its second year of a historical low. It is just managing to survive thanks to the earnings from previous years and increasing exports to Asian and African markets. Yet, the annual investments exceeded CNY 790 billion/year for the last three years—a record high,” said Xinyi Shen, Researcher at CREA and the report's lead author.

China's crude steel production by processes and the share of crude steel from electric arc furnace and its target by 2025



Source: CREA analysis, World Steel Association, China Steel Yearbook • BOF=basic oxygen furnace, EAF=electric arc furnace. EAF steel and BOF steel production data in 2023 and 2025 are based on estimation.



The crude steel sector’s economic and environmental vagaries aren’t new. While the sector has faced excessive production and demand fluctuations since 2006, the unhinged growth contributed significantly to the country’s toxic air quality in the early 2010s. To tackle this, the Ministry of Industry and Information Technology (MIIT) took measures in 2014 to retire a significant portion of the country’s steel capacity and replace it with newer and more efficient plants.

Yet, in the last seven years, 99% of the proposed ironmaking capacity and 70% of the proposed steelmaking capacity use the carbon-intensive Blast Furnace-Basic Oxygen Furnace (BF-BOF).

“Despite the nation's commitment to carbon neutrality and the prevailing overcapacity within the steel sector, there are no strong indications to stop investments in coal-based iron and steelmaking capacities,” continued Shen. “The majority of the exit ironmaking and steelmaking capacity is replaced by new coal-based facilities,” Shen added.

Policy recommendations

Despite being the second largest source of carbon dioxide, investments in new production capacity are not aligned with China's ambitious ‘dual carbon goals’ (to reach CO₂ emissions peak before 2030, and achieve carbon neutrality before 2060). To ensure a quick transition towards cleaner steel production, CREA proposes the following policy recommendations:

- The steel sector should be included in China's emissions trading system (ETS) within the 14th five-year period. The ETS should shift from an intensity-based allocation to an absolute cap.
- To peak CO₂ emissions from the iron and steel sector before 2025, new investments in blast furnace capacity should be limited and the adoption of electric arc furnaces and hydrogen-based steelmaking technology sped up.

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Note to editors

CREA has published the following report related to the press release:

<https://energyandcleanair.org/publication/steel-sector-decarbonisation-in-china-stalls>



All CREA publications can be found here:

energyandcleanair.org/publications

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions, to air pollution. CREA was founded in December 2019 in Helsinki and has staff in several Asian and European countries. The organisation's work is funded through philanthropic grants and revenue from commissioned research.

www.energyandcleanair.org

About the methodology

We mapped new project announcements and existing BF-BOF and EAF capacities. The cost of iron and steel projects was estimated based on [BHP data](#), which might be higher than the actual cost in China.

For our analysis, these were the sources of data:

- National Bureau of Statistics of China
- China Customs Official Data releases
- WIND Information, an industry data provider
- Websites of provincial industrial and Information Technology Bureaus and Ecology and Environment Bureaus