Decarbonisation of Chinese heavy industry – Status, prospects and international competition

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# Carbon intensive industrial sectors facing serious decarbonisation requirements from the Chinese government

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- China is to cover steel, cement, and aluminum in its national Carbon Trading Scheme (ETS) by the end of 2024.
- China started to emphasise the use of renewable hydrogen to replace fossil in steel, oil-refining, and coal chemical manufacturing.
- China has suspended the approval of new steel production capacity in Aug 2024.
- China promotes circular economy with a series of policies
  - China Resources Circulation Group founded on 18 October 2024, with its business portfolio focusing on scrap and ferrous metal circulation, processing of used plastics, retired batteries, and wind/solar power equipment recycling.
- National debts to boost the renewal of large-scale equipment and consumer goods, especially electric equipment, industrial/agri machines, commercial ships/cars and white appliances.
- China Iron and Steel Association is to establish a sub-association for electric arc furnaces (EAF) development.



## H2 development policies in China have successfully fostered production and FCEVs, next step is industrial application

- 2019.3.26 China kept the subsidies for FCEVs while canceling those for Evs
- 2022.3.23 Medium and Long-term Development Plan for Hydrogen Industry calls for support of FCEVs and refilling stations
- 2023.8.8 Guildlines for Building Hydrogen Industry Standard System, emphasing production, storage, transporatation and application.
- 2024 Local governments issuing subsidies for by-product or green H2 production, refilled H2 price and highway fee exemption for FCEVs.



Photo credit: Rongcheng Steel, Baowu Group

### Two Pilot H2-DRI projects running in China

- HBIS started operating its 600,000 ton DRI plant using coke oven gases in May 2023, saving 0.8 million tons of CO2 emissions each year
- Baowu Zhanjiang H2-DRI plant uses high proportion of H2 outsources from chemical companies.
  Operation started in December 2023, with annual capacity of 1 million tons.

CCUS, CO2 circulation in BFs, Fluid-bed H2 reduction are all under demonstration or R&D by different steel makers.



### Carbon intensity of Chinese steel is not the highest compared with other exporters, but electricity emissions are significant



Carbon intensity of major steel exporters to the EU,

**Integrated route** 

#### Carbon intensity of major steel exporters to the EU, EAF route



RUSSIO

SouthAfrica

China

2.9

0.4

steel

L C

Emission intensity

## Steel companies' efforts to reduce indirect emissions by deploying renewable electricity and efficiency improvement

### Steel companies ranks top for green electricity purchase

- Taiyuan Steel bought 1100 GWh green electricity in 2022, ranking first in China.
- BaoSteel, 1610 GWh in 2023, ranking 2<sup>nd</sup>.

### 2023 Chinese company green electricity purchase





- Jinnan Steel uses rooftops, walls, and water surfaces to install 100MW distributed solar PV
- ShaSteel Group's 5.9MW solar feeds into the grid
- Baosteel generates 1400 GWh/a in its Zhanjiang, Taiyuan and Baoshan sites with 165MW solar



- 3-Year Action Plan for Steel Sector Energy Efficiency Benchmark (2022.12.9) targets 150-200 mt to reach benchmark efficiency and 200-300 mt by 2025.
- Action Plan for Energy Conservation and Decarbonisation 2024-2025 (2024.5.29) calls for 30% of steel capacity to reach benchmark value. Least efficient ones will be banned from production.





Photo: BNEF

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