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COUNTRY PROFILE – SOUTH KOREA¹

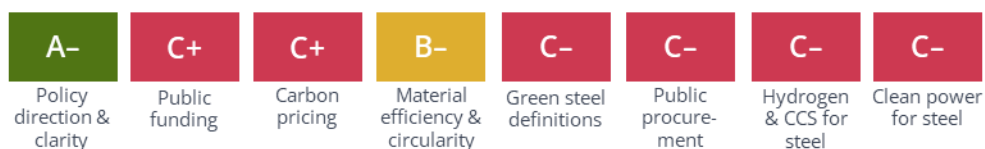
2023 STEEL POLICY SCORECARD

KATINKA WAAGSAETHER, ALEKSANDRA WALISZEWSKA & JOHANNA LEHNE (E3G), AND DASEUL KIM (SFOC)

Not yet an Asian front-runner

Korea could become an Asian front-runner in steel decarbonisation as a major global steel producer with a highly developed and mixed economy. However, with an energy sector still dominated by fossil fuels, and the lack of an ambitious decarbonisation pathway and supporting policies, the signals on steel decarbonisation are ambiguous at best.

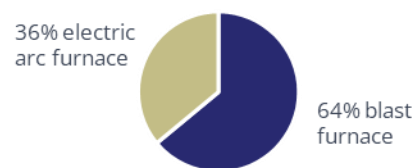
Country profile: South Korea



Production capacity



Production methods



Source: Global Energy Monitor, 2023, 2023 Pedal to the metal



¹ This document supplements the main **2023 Steel Policy Scorecard report: Raising ambition on steel decarbonisation**.



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The South Korean government has a long way to go to get its steel industry on track for a 1.5 °C future. It is dragging its feet on clean power, with a renewable energy target of under 20% by 2030. Korean policy also falls short of making the connection between clean hydrogen and steel production. There is ample potential for South Korea to leverage both policy pushes and pulls to get the steel industry on track: these include leveraging its emissions trading system, K-ETS, and channelling government funding towards near-zero emission steel technology.

Priority recommendations for South Korean steel policy

- > Shift funding for R&D and capital expenses towards technologies with emissions reduction potential of at least 90%.
- > Set a timeline for phasing out free allowances for the steel sector in the next phase of K-ETS (from 2026).
- > Clearly connect clean power ambition and green steel production by: addressing the steel sector's renewables and green hydrogen procurement in the national steel strategy; and creating an enabling policy environment for economical and flexible direct renewable power purchases for corporates.

Unambitious emission reduction targets and lifetime extensions for coal-based production

South Korea is currently the sixth largest global steel producer, with 64% of its 83 Mtpa steelmaking capacity coal-based.² Steel is directly responsible for 16.7% of national GHG emissions as the largest industrial emitter in the country.³ No **new** coal-based facilities are in the pipeline domestically,⁴ but Korea's largest steelmaker, POSCO, is in the process of extending the lifetime of several coal-based facilities through relining.⁵ There is a pipeline for green steel production, but it is minuscule in relation to the country's production capacity: just 1 Mtpa H₂-DRI capacity by 2030.⁶

² Calculated from Appendix C in Global Energy Monitor, 2023, **Pedal to the Metal 2023**

³ SFOC, 2023, **Industry Trends Brief - Korean Government's Low Carbon Steel Production Strategy: Key Challenges and Improvements**

⁴ Global Energy Monitor, 2023, **Pedal to the Metal 2023**.

⁵ SteelWatch & SFOC, 2023, **Redline not reline: 4 leading steel companies in OECD set to lock in almost half a billion tonnes of CO₂**

⁶ Global Energy Monitor, **Global Steel Plant Tracker** (retrieved: November 2023); Eurometal, September 2023, **POSCO plans 1 mty hydrogen steelmaking plant by 2030**



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South Korea is home to several large and medium-sized steel makers, including POSCO, Hyundai Steel, Dongkuk Steel and KG Dongbu Steel. In February 2023, the Ministry of Trade, Industry and Energy (MOTIE) announced South Korea’s Steel Industry Development Strategy for Transition to Low-Carbon Steel Production.⁷ It is one of few countries with a dedicated steel decarbonisation strategy, though that strategy falls short of setting an emissions reduction target for steel. Emissions reduction targets for industry overall, as set out in the NDC, are minor – just over 10% by 2030.⁸ Thus the government is not sending a clear signal for the swift reduction in emissions from the Korean steel sector.

Dragging its feet on clean power, and a missing link between clean hydrogen and steel production

Korea is not sending a promising signal on clean energy – an element central to the green steel transition. Its power sector is still dominated by imported fossil fuels and the share of renewables capacity is planned to increase by only around 10 percentage points from 7.15% in 2022 to 18.2% in 2030.⁹ A strategic focus on meeting rising renewable energy demand from the steel sector is missing. Yet this demand is only set to grow due to a shift in production methods to EAFs and H₂-DRI, which require significant quantities of green electricity. More remains to be done to ensure competitive access to renewables in Korea although 2022 saw some developments in the corporate PPA market: consumers are now able to purchase electricity directly from renewables generators.

South Korea’s hydrogen strategy is to incrementally reduce its reliance on imports of “clean hydrogen” (with specific targets for blue and green hydrogen). To achieve this, it aims to increase domestic production of clean hydrogen to 34% by 2030 and 60% by 2050. Recognising the need for clean hydrogen for the steel sector transition, Korea’s national hydrogen policy mentions the possible introduction of incentives for steelmakers to produce clean hydrogen.¹⁰ However, the hydrogen policy lacks a clear prioritisation of end-uses, focusing on its application in commercial vehicles and in the power sector.

⁷ Ministry of Trade, Industry and Energy (MOTIE), 2023, **Steel Industry Development Strategy for Transition to Low-Carbon Steel Production**

⁸ Government of the Republic of Korea, 2021, **The Republic of Korea’s Enhanced Update of its First Nationally Determined Contribution**

⁹ SFOC calculation excluding the “new energy (i.e., hydrogen, fuel cell, coal gasification/liquefaction energy that utilizes existing fuels in a new way or through chemical reactions)” included in the government definition of “new-renewable energy” which is unique to South Korea.

¹⁰ Ministry of Trade, Industry and Energy of the Republic of Korea, 2019, **Hydrogen Economy Roadmap**; OECD STIP Compass, 2022, **Act on Hydrogen Economy Promotion and Safety Management**



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An alternative to hydrogen imports or local production is the import of green iron ore, which is being scoped out by several steelmakers globally. However, this raises concerns over whether increased reliance on imports of green steel raw material would hinder maximising domestic renewable energy and green hydrogen production.

Not yet fully leveraging its emissions trading system and untapped potential on public funding and green procurement

As the first East Asian country to implement an ETS back in 2015, South Korea has helped set an example for the region. The K-ETS is however not applied to the steel sector, which remains fully covered by free allocations.

The pull effect from public funding for low-carbon steel technology is missing as much as a policy push through carbon pricing. Currently, the private sector has to carry the bulk of the financial burden of the transition. Public funding for capital expenses is miniscule, and support for operational expenses is lacking. Targeted R&D funding for steel decarbonisation is available, but the proportion going towards technologies with high abatement potential (for example, green hydrogen DRI) and CAPEX funding is highly insufficient.

The South Korean government is also not making use of another important policy lever: green public procurement (GPP). Growing demand for green steel through requirements or targets in public procurement could not only enable the transition but also accelerate it. There is also a lack of focus on establishing a common definition for green steel, and related emissions intensity thresholds and measurement standards. This keeps the door open to product lines that are marketed as “green” without clear assurances for customers on the accuracy of these claims (such as Greenate Steel, POSCO’s new product line based on a mass balance methodology).



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About E3G

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E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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