

2025 INTEGRATED REPORT UPDATES: NIPPON STEEL

October 2025

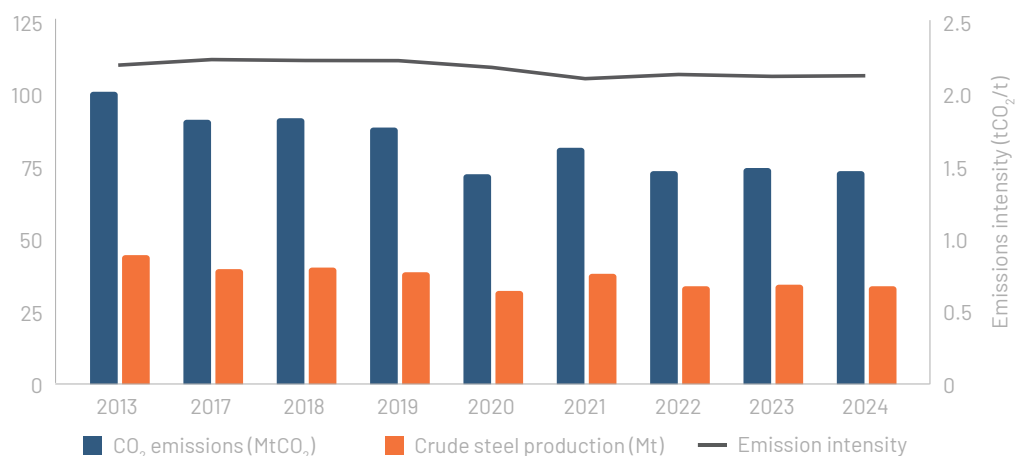
INTRODUCTION

Nippon Steel has recently published its latest integrated report. Compared with previous years, the company now appears somewhat more proactive on decarbonisation, notably by presenting electric arc furnaces (EAFs) as its primary short-term pathway and announcing EAF expansion plans within Japan. The latest emissions disclosure reveals that total domestic emissions also decreased by 1.35 million tonnes year-on-year. These reductions have mainly resulted from lower production rather than targeted decarbonisation measures, highlighting that the company has yet to fully address cutting emissions via technology measures. Furthermore, over the past year Nippon Steel has also signalled its intention to continue investing in blast furnaces (BFs) overseas, underlining the need for a genuinely group-wide effort.

NIPPON STEEL'S DECARBONISATION TARGET: PROGRESS AND CHALLENGES

Nippon Steel is gradually moving towards its 2030 target of reducing emissions to 72.4 Mt, equivalent to a 30% cut from 2013 levels. So far, however, the overwhelming main driver has been falling output rather than effective technological mitigation strategies. In 2024, total CO₂ emissions fell by around 1.35 million tonnes year-on-year, to 75 million tonnes. According to Transition Asia's analysis, between 2013 and 2024, 89% of emission reductions were due to lower production while only 11% came from improvements in emission intensity. This highlights the lack of meaningful progress in decarbonising steelmaking operations.

Figure 1. Nippon Steel's Annual Steel Production and Emissions Trends



Source: Transition Asia, Nippon Steel^{1 2 3 4}

Note: All figures are non-consolidated

- https://www.nipponsteel.com/common/secure/ir/library/pdf/nsc_jp_ir_2025_all_interactive.pdf
- https://www.nipponsteel.com/en/ir/library/pdf/20250509_200.pdf
- https://www.nipponsteel.com/en/ir/library/pdf/nsc_en_ir_2024_all_interactive.pdf
- <https://www.nipponsteel.com/en/csr/report/pdf/report2022en.pdf>

The company's integrated report outlines three key initiatives aimed at cutting domestic steelmaking emissions:

1. **COURSE50:** Launched in 2008, this project integrates carbon capture and hydrogen injection into BF_s, with a theoretical reduction potential of 30%. Large-scale demonstration at the Kimitsu BF, around 400 times the size of the test furnace, is due to begin in 2026, with full deployment targeted by FY2030. Nippon Steel also reports progress on "Super COURSE50": in late 2024, tests at a 12m³ pilot furnace demonstrated a 43% cut in CO₂, with the aim of commercial deployment at large BF_s by around 2040. However, Transition Asia's analysis finds that the reduction potential is limited compared with hydrogen-based DRI (H₂-DRI), making it at best a transitional option, with residual emissions likely exposed to carbon pricing.⁵
2. **H₂-DRI:** Nippon Steel plans to install a small R&D-scale shaft furnace (1 t/hr) in 2025, followed by a scaled-up demonstration in 2027, with commercialisation anticipated around 2040. This timeline lags significantly behind global peers.⁶ Competitors in China, South Korea and Northern Europe have already begun, or are about to begin, actual production from commercial H₂-DRI plants, are building operational track records, and are also advancing projects to import hot briquetted iron (HBI), processed overseas for easier storage and transport.^{7 8 9 10 11 12 13 14 15 16} Greater urgency will be essential to remain competitive.
3. **EAF:** As part of a government Green Innovation Fund project in which Nippon Steel is also participating, a small experimental EAF (10 t) was installed in 2024 to support the development of technologies for producing high-grade steel in large EAFs, and trial operations have already begun. For comparison, leading domestic EAF producers typically operate furnaces of 50 t or more, with some exceeding 300 t. Under its declared strategy to shift from BF-BOF to EAFs as the main decarbonisation route towards 2030, Nippon Steel this year announced plans to invest a total of JPY866.7 (around USD 6.0 billion) billion by 2029, supported by up to JPY251.4 billion (around USD 1.7 billion) in government subsidies. Projects include expanding EAF capacity at Hirohata, converting from BF-BOF to EAF at Yawata, and restarting EAF operations at Shunan.

Our modelling suggests that, if implemented as planned, these measures could enable the company to reach its emissions reduction target by around 2035—driven largely by scheduled BF closures. However, emissions are then projected to plateau for the following decade. Although Super COURSE50 could bring some further reductions by 2040, achieving net zero remains beyond reach.

⁵ <https://transitionasia.org/hydrogen-in-iron-making-is-hydrogen-injection-in-a-blast-furnace-the-best-way-to-cut-emissions/>

⁶ It should be noted that Nippon Steel's planned H₂-DRI process is designed to use low-grade iron ore, which presents greater technical challenges compared with the high-grade ore typically used in Europe.

⁷ <https://stegra.com/news-and-stories/h2-green-steel-has-pre-sold-over-15-million-tonnes-of-green-steel-to-customers>

⁸ <https://www.bbc.com/cn/EN/NewsEN/CNewsEN/3099.html>

⁹ <https://www.prnewswire.com/apac/news-releases/posco-holdings-takes-first-step-in-developing-40-000-tons-of-green-hydrogen-production-in-western-australia-301959009.html>

¹⁰ https://sustainability.posco.co.kr/S91/S91F10/eng/UI-PK_W009.do

¹¹ <http://www.bmw-brilliance.cn/cn/en/news/news/2022-8-4.html>

¹² <https://news.bjx.com.cn/html/20230816/1326041.shtml>

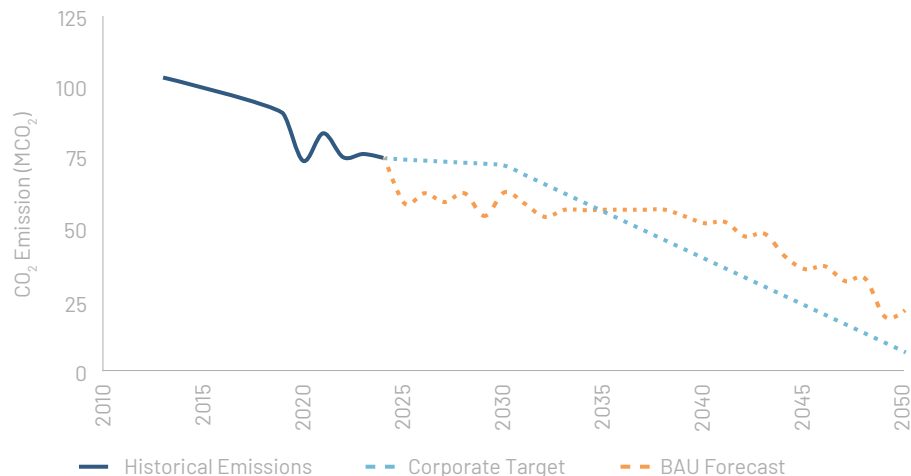
¹³ <https://autonews.gasgoo.com/m/70023054.html#:~:text=In%20terms%20of%20the%20supply%20chain%20ecosystem%2C,for%20technological%20innovation%20and%20R&D%20of%20automotive>

¹⁴ <https://www.steelorbis.com/steel-news/latest-news/baosteel-to-supply-low-carbon-auto-steel-to-beijing-benz-1268735.htm#:~:tex=t=On%20November%2022%2C%20major%20Chinese,green%20steel%20for%20auto%20enterprises>

¹⁵ <https://www.volvogroup.com/en/sustainable-transportation/sustainable-solutions/green-steel-collaboration.html>

¹⁶ <https://group.mercedes-benz.com/sustainability/resources-circularity/materials/h2-green-steel.html>

**Figure 2. Comparative CO₂ Emission Scenarios for Nippon Steel (Non-consolidated):
Nippon Steel Corporate Targets and Transition Asia Model Projection to 2030**



Source: Transition Asia, Nippon Steel^{1 2 3 4}

ENVIRONMENTAL IMPACT OF OVERSEAS BF INVESTMENTS

In June 2025, Nippon Steel finalised its acquisition of U.S. Steel, pledging investment of around USD 11 billion by the end of 2028.¹⁷ USD 4 billion is earmarked for two new greenfield scrap-based EAFs (combined capacity 3 Mt/yr, operational from 2029 onwards), which would contribute positively to decarbonisation.¹⁸ Yet, USD 3.1 billion is reportedly allocated to refurbishing Gary Works' No.14 BF and related facilities—the company's largest BF—signalling continued reliance on BF production in a key region, contrary to the global shift from BF to EAF.¹⁹ Transition Asia estimates that the annual emissions intensity per dollar invested is more than ten times higher for the Gary Works refurbishment (up to 0.17 kgCO₂/USD) compared with the new EAF projects (0.01 kgCO₂/USD).

Separately, in March 2025 ArcelorMittal Nippon Steel India Private Limited (AM/NS India)—a joint venture between Nippon Steel and ArcelorMittal—secured land in Andhra Pradesh for a new integrated steel plant with a crude steel capacity of 7 Mt/yr.²⁰ This is in addition to the ongoing expansion at Hazira, where capacity is set to rise from 9 Mt/yr to 15 Mt/yr.²¹ Together, these developments signal further growth in overseas BF-based capacity. AM/NS India has set a target of reducing its emissions intensity by 20% by 2030 (compared with 2021 levels).²² However, between 2017 and 2022, little change in emissions intensity was observed, and the most recent available data for 2022 show an increase to 2.28 tCO₂/tcs, compared with 2.23 tCO₂/tcs in 2021—highlighting the urgent need for further decarbonisation measures. Thus far, Nippon Steel has not accounted for AM/NS India's emissions as part of its own. While shareholding ratios and other factors may explain this, decarbonising overseas operations remains an urgent challenge.

¹⁷ https://www.nipponsteel.com/ir/library/pdf/20250619_200.pdf

¹⁸ https://www.nikkei.com/article/DGXZ00UC203CY005A820C2000000/?n_cid=kobetsu

¹⁹ <https://www.nikkei.com/article/DGXZ00GN260IA0W5A820C2000000/>

²⁰ https://www.nipponsteel.com/en/news/20250328_100.html

²¹ https://www.nipponsteel.com/en/news/20220928_200.html

²² <https://corporate.amns.in/storage/Reports/AMNS-Climate-Action-Report-2024.pdf>

Taken together, these issues raise doubts about the consistency between Nippon Steel's overseas investment strategy and its stated decarbonisation objectives.

RENEWABLE ENERGY PROCUREMENT

In Japan, the emissions intensity of EAF steel is about 0.33 tCO₂ per tonne when powered by grid electricity, but falls to just 0.10–0.05 tCO₂ when supplied entirely with renewable energy (RE). This highlights that REs are essential to unlocking the full decarbonisation potential of EAFs.

Nippon Steel has indicated that procuring decarbonised electricity is among the measures it intends to consider and pursue. At the same time, however, the company plans to build four new LNG-fired power plants in Yawata, with a combined capacity of 2,000 MW, to provide electricity for its shift to EAFs, including the power required to run the furnaces.²³ The company argues that this will almost halve the current emissions factor of 0.73 kgCO₂/kWh.²⁴ Over the longer term, it aims to co-fire hydrogen and ammonia, before eventually switching to using these fuels alone, with the ambition of cutting the emissions factor to zero. The difficulty is that, unlike RE, hydrogen and ammonia co-firing—or their dedicated use—are still unproven at scale and are expected to take considerable time to become commercially viable. Until then, the full decarbonisation potential of EAFs cannot be realised, leaving the “green steel” value of Nippon Steel's output open to question. For this reason, active procurement of RE will be crucial to maximising the green credentials of its steel products and maintaining a competitive advantage over its peers.

CONCLUSION

Achieving these targets will require Nippon Steel not only to accelerate the move away from BF investments but also to mobilise the entire group behind proven decarbonisation technologies—most notably EAFs that can utilise scrap and low-carbon iron inputs. Without such a transformation, alignment with the 1.5°C pathway will remain out of reach, creating material risks not only for climate objectives but also for investor confidence in the company's long-term value.

²³ https://www.nipponsteel.com/common/secure/works/kyushu/news/2025/pdf/20250411_100_09.pdf

²⁴ <https://www.nikkei.com/article/DGXZ00JC02A7F0S5A700C2000000/>

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ABOUT TRANSITION ASIA

Founded in 2021, Transition Asia is a non-profit think tank dedicated to accelerating decarbonisation in Asia's materials and heavy industries to achieve the 1.5°C climate goal. Our multidisciplinary team combines diverse perspectives, experience and expertise, underpinned by a strong research foundation in Asia and a nuanced understanding of the region. Using analytical models and in-depth assessments, we evaluate and monitor corporations' decarbonisation efforts and actions. By engaging with stakeholders across sectors—including corporates, investors, policymakers and civil society organisations—we facilitate informed and impactful discussions that drive sustainable, low-carbon transitions aligned with a 1.5°C future.

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