TransitionAsia
ACCELERATING EAST ASIAN CORPORATE CLIMATE ACTION

2023 SUSTAINABILITY REPORT UPDATES FOR NIPPON STEEL, JFE HOLDINGS AND KOBE STEEL

As Nippon Steel, JFE Holdings and Kobe Steel ("the Big Three") have all released their Sustainability Reports for 2023, Transition Asia highlights key updates and areas of lagging from previous years.

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INTRODUCTION

Developments are unfolding in Japan's steel industry in regards to their efforts toward decarbonisation. However, there is still a long way to go to align with a 1.5°C pathway, as Japan's Big Three steelmakers (Nippon Steel, JFE Holdings and Kobe Steel) are delayed in making the needed shift to Electric Arc Furnace (EAF) and Hydrogen Direct Reduced Iron (H2-DRI) technology. The total emissions and emissions intensity remain stagnant overall, with absolute emission reductions being driven through decreases in output. While the decreases in output are material, all three companies' emissions reduction progress and trajectories remain critically misaligned to a 1.5°C pathway. Some steps have been taken, particularly in terms of technical shifts such as more DRI & scrap usage with EAFs. Some announcements have also been made for the production of 'reduced emissions steel'.

NIPPON STEEL

The sustainability report[1] indicates that emissions are steadily getting closer to the 2030 target of 75 million tons, which represents a 30 percent decrease from 2013. However this trend is driven by the reduction in production volume rather than actual emission reduction initiatives. Nippon Steel's emissions intensity remains stagnant, as evidenced below.

	2019	2020	2021	2022
Energy Consumption (PJ)	1,014	854	957	864
Emissions (million tons)	90.675	74.045	83.778	75.309
Production (million tons)[2]	39.540	33.003	38.629	34.262
Emissions Intensity	2.29	2.24	2.17	2.20
Note: All figures are non-consolidated				

The sustainability report details three main ways in which Nippon will seek to reduce emissions from their domestic steel production, COURSE50, H2-DRI and EAFs.

1. COURSE 50

COURSE 50 is the Japanese Steel industry's flagship project incorporating carbon capture and hydrogen injection into blast furnaces (BFs). COURSE 50 has a maximum theoretical CO_2 reduction potential of 30 percent compared to a BF. Nippon Steel's pilot project in Kimitsu is set to commence in 2025 with installation to be completed

1 Nippon Steel 2023 Sustainability Report
2 Nippon Steel 2023 Factbook

by 2030. However, it is unclear if this marks the full commercialisation of the project or not. There are also unanswered questions surrounding CAPEX and OPEX requirements for this technology. Although overall investment figures for reaching carbon neutrality of overall operations of Nippon Steel have been estimated at 4-5 trillion yen.

2. H2-DRI

The installation of a DRI shaft is planned for 2025 - demonstration tests will begin in 2027. There is no clarification over the commercialisation of a DRI-EAF pathway.

3. EAF

An extremely small 10t-class experimental EAF is scheduled for installation in 2024.

JFE HOLDINGS

JFE Holdings has set targets for emissions reduction, aiming for an 18 percent reduction in 2024 and above 30 percent in 2030. JFE's 2024 CO_2e emissions target is 47.6 million tonnes in 2024 and 40.7 tonnes in 2030. This year's emissions disclosure indicates, as with previous years, that JFE is falling significantly short of these targets. Furthermore, these targets are not 1.5°C aligned.

	2019	2020	2021	2022
Energy Consumption (PJ)	620	545	602	581
Emission (million tons)	54.2	47.3	52.6	50.4
Production (million tons)*	26.73	22.76	25.88	24.10
Emission intensity*	2.03	2.08	2.03	2.09
Note: All the data are from JFE Steel * JFE Steel (non-consolidated)[3]				

JFE has identified seven BFs with annual production of 25 million tonnes of crude steel to be replaced by three different technologies, carbon recycling within BFs, DRI and EAFs[4]. Currently all three of these technologies are being developed as small-scale R&D projects. At the point of full scale implementation toward 2030, JFE has not alluded to the proportional composition these three technologies will take in their steel portfolio.

1. Carbon Recycling

JFE's carbon recycling technology is for use within existing BFs. Emission reductions are hoped to be 50 percent compared to regular BF iron although it is important to note that trial operations have not begun on the small pilot BF. This will begin in 2025-2026. Implementation of this technology in a medium sized BF is planned for 2030.

3 JFE Group Report 2023
4 JFE Steel Corporation Carbon Neutrality Strategy Briefing September 1, 2022

2. H2-DRI

A DRI project is being developed with initial testing of this pilot project planned for 2024. Although this R&D project is referred to as an H2-DRI project, the DRI shaft will utilise methane produced from a methanisation plant and is not a pure play Hydrogen-DRI facility. The carbon for this methanisation plant will be supplied via captured off-gases from the DRI shaft, hydrogen will be supplied externally.

3. EAF

Significantly, JFE has announced two EAF expansion projects in Kurashiki (high-quality steel sheet, EAF refurbished from 2027-2030) and in Sendai (upgrading the existing furnace in 2024, low-quality steel products). These projects are hoped to contribute emission reductions of 100,000tCO2e and 3,000,000tCO2e per year respectively. A small 10t test EAF is also planned for testing within 2024.

4. Lastly, JFE has entered into an off-take contract for purchasing fossil methane-based DRI. This DRI will then be exported to other regions for use in EAFs.

KOBE STEEL

Similar to other steelmakers, Kobe Steel's emissions and intensity has remained stagnant over the years since they began disclosing.

	2019	2020	2021	2022
Energy Consumption (PJ)	-	182	192	187
Emission[5] (million tons)	-	15.4	16.1	15.6
Production (million tons) (incl. Rolled products not only crude steel)	-	6.3	7.2	6.7
Emission Intensity		2.44	2.24	2.33
Note: All figures are consolidated				

Kobe Steel has not provided any amendment in the decarbonisation roadmap or other strategies, largely relying on "low-carbon" products, without a defined definition.

5 Emissions are calculated on a consolidated basis and production volumes include rolled products, therefore the emissions intensity on a non-consolidated basis which is divided by the volume of crude steel production is supposed to be higher than the figures in the table above but it is not disclosed by Kobe Steel.

DOWNSTREAM COMMITMENTS

Japanese steel company commitments to produce reduced emissions steel by industry

Company	Auto	Shipbuilding	Construction	Planned Total Volume of Supply
Kobe Steel	Engine parts for Toyota's racing car Toyota's H2 racing car Nissan's passenger cars (component not specified)	Bulk Carrier by Imabari Shipbuilding	Property by IHI, Mitsubishi Estate and Kashima Construction	8k t (FY 2022) 1m t (2030) Cf. Nikkei
JFE Holdings		Dry Bulk Carrier for 8 customers Dry Bulk Carrier for Onomichi & Higaki	Office property by Sumitomo Corp & Kumagai	200k t (FY2023)
Nippon Steel	Commercial vehicle's container for Atago		Geothermal power project in the Netherlands Heat exchangers used in the EXPO 2025	300k t (FY 2023)
Note: all 'reduced emission products' are managed based on the 'mass-balanced method' and those products include ones produced with BF, different from how we define 'green steel'.				

The three sustainability reports demonstrate that despite public claims, none of the steel companies are reducing emissions in line with a meaningful trajectory. And most notably, where they have reduced emissions, this has been via reduced steel production. Although all three steel companies have proven and cutting edge low-carbon steel technology within their production or investment portfolios, plans to expand these technologies are stagnant. Furthermore, where the majority of major global steel industry players are collectively choosing H2-DRI as the technology of the future, Nippon Steel, JFE and Kobe Steel demonstrate hesitation. Instead, these technologies are resigned to being developed as small scale R&D projects despite H2-DRI and EAF being commercially available.

Transition Asia's upcoming report (to be released Nov. 1) on low-carbon steel development dives deeper into what these current choices mean for these three companies emissions pathways in the medium term towards 2030, and further to 2050. Where misalignment to a 1.5°C pathway occurs, we have modelled 1.5°C aligned technology pathways.

DATA AND DISCLAIMER

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OUR TEAM

Program Manager
Lauren Huleatt lauren@transitionasia.org

Analysts
Kenta Kubokawa kenta@transitionasia.org

Communications Specialist
Monica Wong monica@transitionasia.org

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Founded in 2021, Transition Asia is a Hong Kong-based non-profit think tank that focuses on driving 1.5°C-aligned corporate climate action in East Asia through in-depth sectoral and policy analysis, investor insights, and strategic engagement. Transition Asia works with corporate, finance, and policy stakeholders across the globe to achieve transformative change for a net-zero, resilient future. Visit transitionasia.org to learn more.