

Nippon Steel green bonds: A bare minimum strategy

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In Mar 2023, Nippon Steel Corporation (ticker NIPSTL), Japan's largest steelmaker and the fourth largest in the world, issued JPY 50 bn in green bonds.¹ This sustainable debt issuance marks one of its maiden efforts to achieve carbon neutrality by 2050.

The transition of the steel sector is challenging; its manufacture is highly carbon intensive and global demand is set to rise. Net-zero scenarios rely on decarbonising the production processes potentially using carbon-capture, but also the use of electric arc furnaces.²

Nippon Steel is actively pursuing acquisitions; in Nov 2023 it purchased a minority interest in Teck's steelmaking coal business,³ and in Dec 2023 an all-cash offer was accepted to buy US Steel.⁴ Such material acquisitions can put pressure on balance sheets, plus potentially make significant adjustments to corporate strategy, and so their impact on sustainability needs to be considered.

In this note, we analyse Nippon Steel's green bonds in the current market context, and provide the following takeaways for investors:

- **Nippon Steel's decarbonisation commitments seem inconsistent with its acquisition-fueled growth in capacity.** Analysis of recent investments show a commitment to emissions-intensive technologies such as blast furnaces and metallurgical coal.
- **Proceeds from the recent green bond issuance are being used to expand Business-As-Usual (BAU) production, albeit for Electric Vehicle (EV) manufacture.** Downstream emissions are not included in Nippon Steel's Scope 3 reporting, and so must be either immaterial or not relevant to its business. The reported emissions savings driven by this investment will therefore not reduce Nippon Steel's carbon footprint, and green bond investors should be aware of the issuer's overall sustainability. **This also raises questions around the suitability of use-of-proceeds debt to fund Scope 3 emissions reductions which are, by construction, outside of an issuer's operational control.**
- Nippon Steel, rated BBB+/Baa2, has limited spread, both in absolute terms and compared to government bonds. The green bonds trade particularly tight when compared to CDS levels. **This could make them unattractive to some international sustainability-minded investors.**

¹ "[Nippon Steel Corporation Issues Green Bond](#)", Nippon Steel, 3 Mar 2023.

² "[Steel – Transition to Net Zero](#)", McKinsey, 1 Aug 2022.

³ "[Teck to sell majority stake in \\$8.9 bn coal business to Glencore – Globe & Mail](#)", Reuters, 14 Nov 2023.

⁴ "[Nippon Steel to acquire Pittsburgh-based US Steel for \\$14.1bn](#)", The Guardian, 18 Dec 2023.

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Japanese steel industry, the nation’s largest industrial GHG emitter

According to World Steel Association, Japan was the third largest steel producer, contributing 4.7% to the annual total, following China (53.9%) and India (6.6%).⁵ Japan’s steel industry emits 11% of the nation’s GHG emissions and is the largest industrial emitter underscoring the sector's critical role in achieving carbon neutrality by 2050.⁶

Table 1. Decarbonisation strategies for steel production. Sources: Various.

Technology	Strategy	Current Outlook	Remarks
Blast Oxygen Furnace (BOF)	Make efficient improvement to optimise Blast Furnace (BF) - Blast Oxygen Furnace (BOF) operations. It is a coal dependent process.	Technology readily available at competitive cost.	BF-BOF route releases more than four times the CO ₂ emissions compared to scrap-EAF. ⁶
Carbon Capture, Usage, and Storage (CCUS)	Capture, store CO ₂ from steelmaking process and/or use it in various application.	Currently at a pivot stage.	CCUS has a history of underperforming, being capital-intensive, and facing failures in other sectors. ^{7,8}
Electric Arc Furnace (EAF)	Maximise secondary flows and high recycling rate by melting more scrap in EAF.	Technology readily available at competitive cost.	EAF technology stands out as the sole commercially viable method for producing steel with low emissions and a high recycling rate. It is a well-established steelmaking approach that has been the predominant method for steel production in the United States since 2002. ⁹
Direct Reduced Iron (DRI) + EAF using natural gas	Increase usage of DRI in EAF.	Technology readily available.	Still relies on fossil fuels (natural gas) as a reductant. However, it is estimated to produce less than 50% of the CO ₂ emissions of a BF. ¹⁰
Direct Reduced Iron (DRI) + EAF using Hydrogen	Replace fossil fuels in DRI process with renewable energy or hydrogen.	Technology readily available at competitive cost.	It represents a technically proven production method that enables nearly emission-free steel production. ¹¹

Steelmaking is considered a hard-to-transition sector, with emissions arising both from generating the required heat, but also as a by-product from the transition from iron ore to steel. However, there are technological developments which have reduced emissions intensities in the manufacturing process, as detailed in Table 1.

Japan’s steel production remains highly dependent on emissions-intensive blast furnaces (BFs) rather than the scrap-based electric arc furnace (EAF) or direct reduced iron (DRI) routes because of its large and high-quality steel output. This positions it behind its global and regional counterparts in adopting low-emission technologies, as shown in Figure 1.¹²

In 2020, about 80% of the sector's energy consumption came from fossil fuels.⁶ The limited deployment of renewable energy forces Japan to rely on imported fossil fuels as an energy source and may hinder a switch to hydrogen-based direct reduction. Consequently, Japan’s steelmaking

⁵ [“Total Production of Crude Steel”](#), World Steel Association, 14 Dec 2023.

⁶ [“Industrial Decarbonisation in Japan”](#), World Economic Forum, Jun 2023.

⁷ [“BHP quotes outdated figures as efforts to prop up carbon capture for steel start to get desperate”](#), IEEFA, 15 Dec 2023.

⁸ [“An Oil Giant Quietly Ditched the World’s Biggest Carbon Capture Plant”](#), Bloomberg, 23 Oct 2023.

⁹ [“Low Carbon Steel Development in Japan”](#), Transition Asia, Nov 2023.

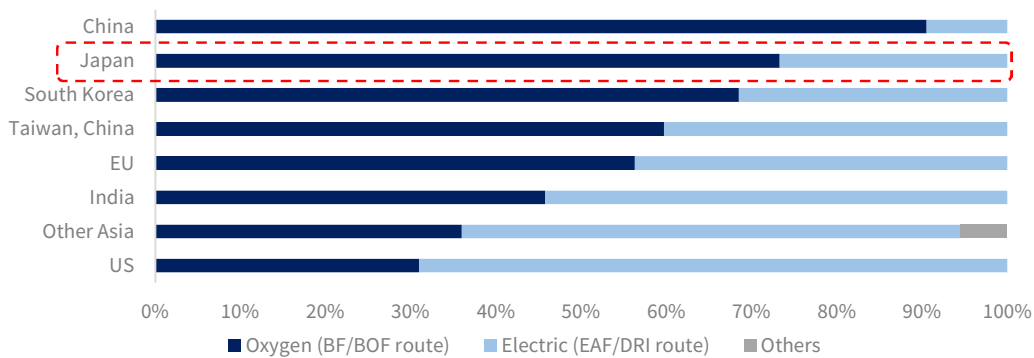
¹⁰ [“Enhancing Direct Reduced Iron \(DRI\) for Use in Electric Steelmaking”](#), Airproducts, accessed 3 Jan 2024.

¹¹ [“Decarbonisation challenge for steel”](#), Mckinsey & Company, Apr 2020.

¹² [“Steel and raw materials”](#). World Steel Association. Mar 2023

production routes involve maintaining blast furnaces, retrofitting with Carbon Capture, Usage, and Storage (CCUS).¹³

Figure 1. Crude Steel Production by Process, 2022. Source: World Steel Association Data accessed 14 Dec 2023.



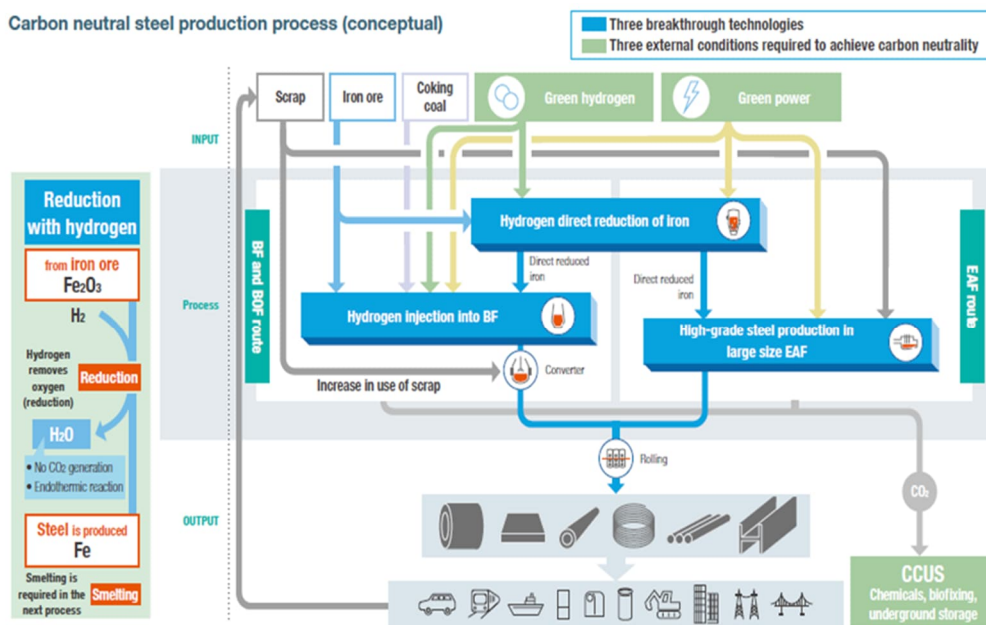
Nippon Steel’s decarbonisation strategy

Nippon Steel Corporation set ambitious goals in March 2021. It targets carbon neutrality by 2050 and a 30% reduction in CO₂ emissions by 2030 compared to 2013 levels.¹⁴

The path toward decarbonising the steel sector poses challenges, particularly as some believe there are no substitutes for metallurgical coal. Sustainable hydrogen is considered a strong alternative to directly replace CO₂ created in the reduction phase of production.¹⁵

However, Nippon Steel has stated that it ‘will keep on hunting for stakes in coking coal’.¹⁶

Figure 2. Nippon Steel's carbon neutral production process. Source: Nippon Steel, accessed 4 Jan 2024.



¹³ “Asian Steel Giants Spread Bets on Hydrogen, Carbon Capture“, Bloomberg NEF, 20 Jun 2023.

¹⁴ “Carbon Neutral Vision 2050“, Nippon Steel Corporation, accessed on 4 Jan 2024

¹⁵ “Albanese says we can’t replace steelmaking coal. But we already have green alternatives“, University of Melbourne, 26 Feb 2020.

¹⁶ “Nippon Steel to hunt for more coking coal, iron ore assets-executive“, Reuters, 29 Nov 2023.

Figure 2 shows Nippon Steel's current plan for carbon-neutral steelmaking.¹⁷ Coking coal remains in the process, with CCUS required to remove emissions, listed as an 'external condition'.¹⁸

Green hydrogen is needed for the iron reduction process, alongside green power to fuel all three elements of production. These are also listed as subject to external conditions.

Nippon Steel's decarbonisation plans rely heavily on 'external factors', and do not seem to be ambitious in utilising new technologies to reduce emissions. MSCI considers Nippon Steel to be misaligned in terms of its global temperature goals, and on track for 2.4 degrees of global heating.¹⁹

In pursuit of these objectives, the company planned to decrease its domestic capacity by 20% by 2025 through the closure of certain blast furnaces. However, this move is not solely a response to curb carbon emissions but more so a 'strategic' action to address falling domestic demand and is expected to reduce operational costs.²⁰

Conversely, Nippon is making acquisitions (for full details see Table 2 overleaf), which appears to expand aggressively its overseas capacity with the aim of reaching a global capacity of 100 million tonnes per annum (mtpa),²¹ an increase of over 50%.²² In particular, the U.S. Inflation Reduction Act 2022 is reported to have generated increased demand for steel to make clean-tech solutions such as EV, solar and wind components.²³ This may have motivated Nippon Steel's interest in growing overseas production.

Nippon Steel acquisitions

In January 2022, the company acquired two EAF steelmakers, alongside scheduling some small organic installations,²⁴ which should help to reduce reliance on coal-based blast furnaces.

At the same time, however, Nippon Steel has also been actively expanding with less sustainable projects. It has entered into a Joint Venture with ArcelorMittal to contract blast furnaces in India, and also acquired a minority stake in steelmaking coal assets sold by Teck Resources. These transactions serve to confirm Nippon Steel's ongoing commitment to coal as a fuel for steelmaking.

The most financially material announcement occurred in Dec 2023, which revealed that Nippon aims to acquire US Steel through an all-cash transaction valued at approximately \$14.1 bn, at a premium of 40%.²⁵ The transaction is still subjected to regulatory approval and expected to close by Q3 2024.

¹⁷ "[Nippon Steel Sustainability Report 2023](#)", Nippon Steel Corporation, Mar 2023.

¹⁸ "[No, metallurgical coal is not a critical material... and carbon capture won't save it](#)", IEEFA, 3 Jul 2023.

¹⁹ [Nippon Steel Corporation](#). MSCI. Accessed 22 December 2023.

²⁰ "[Nippon Steel to cut 20% of domestic production capacity by FY 2025](#)", The Japan News, 7 Mar 2021.

²¹ "[Nippon Steel Integrated Report 2023](#)", Nippon Steel Corporation, Sep 2023.

²² Nippon Steel currently has an annual production capacity of 66 mtpa, as reported in "[Nippon Steel Integrated Report 2023](#)", Nippon Steel Corporation, Sep 2023.

²³ "[Nippon Steel Says Global Push Justified 142% US Deal Premium](#)", Bloomberg, 19 Dec 2023.

²⁴ It scheduled an installation of a small 10t-class experimental EAF in 2024 and began studies to shift away from blast furnaces to EAF, as reported in "[Nippon Steel Sustainability Report 2023](#)", Nippon Steel Corporation, Mar 2023.

²⁵ "[Nippon Steel to buy U.S. Steel for over \\$14bn](#)", NikkeiAsia, 18 Dec 2023.

Table 2. Recent acquisitions by Nippon Steel, Source, Nippon Steel, various.

Date	Deal Details	Deal Value (USD bn)	Production Capacity (mtpa)	In line with 2050 Decarbonisation Strategy?
Dec-23	Nippon is acquiring US Steel, marking one of its largest acquisitions and providing Nippon Steel with a U.S. production base for automotive steel ²⁵ . The company intends to finance the acquisition with debt, potentially leading to a significant deterioration in Nippon Steel's financial position upon completion in mid-2024. ²⁶	14.0	20	No
Nov-23	Nippon acquired a 20% stake in the steelmaking coal unit Elk Valley Resources, sold by the Canadian miner, Teck Resources. ²⁷ This grants Nippon long-term coal offtake rights and ensures stable procurement of hard coking coal.	1.7 + 2.5% interest in Elkview Operations	n.a.	No
Sep-22	ArcelorMittal entered the Indian steel market in a 60:40 joint venture with Nippon Steel—ArcelorMittal Nippon Steel India (AM/NS India). ²⁸ This venture will construct twin blast furnaces at the Hazira steel mill in Gujarat, India funded by existing funds and loans. Nippon Steel will guarantee 40% of the debt if needed. ²⁹	7.4	15	No
Jan-22	Nippon acquired two Thailand-based EAF steelmakers. ³⁰	0.76	3	Yes

In terms of size, this potential acquisition is the biggest move; reported as larger than all Nippon Steel's previously acquired capacity combined.²³ This acquisition offer led to an immediate CreditWatch negative placement on the rating by S&P, citing an increase in debt to fund the transaction.³¹ It also may not lead to significant improvements in sustainability performance, as US Steel, with eight BFs and three EAFs, is not notably ahead of Nippon Steel in terms of decarbonisation.³²

Capital is needed for transition

Nippon has projected a capex need of JPY 4-5 tn (USD 28 – 36 bn) to achieve carbon neutrality,³³ though specific details for this capital allocation remain unspecified. However, Nippon's active and large investment in blast furnaces and 'coal lock-in' through its long-term procurement is hardly consistent with a strategy to reduce its emissions footprint in medium to long term.³⁴

The steel industry could face USD 518 bn in stranded asset risk over the coming years as it continues constructing traditional blast furnaces.³⁵ As such, Nippon's ongoing investments in this

²⁶ "[Nippon Steel 'BBB+' Ratings Placed On CreditWatch Negative](#)", S&P Global Ratings, 20 Dec 2023.

²⁷ "[Acquisition of interest in the steelmaking coal business in Canada](#)", Nippon Steel, 14 Nov 2023.

²⁸ "[ArcelorMittal: Green steel for Europe, blast furnaces for India](#)", IEEFA, 16 Feb 2023.

²⁹ "[Nippon Steel to add 2 blast furnaces at Indian JV with ArcelorMittal](#)", NikkeiAsia, 29 Sep 2022.

³⁰ "[Japan's biggest steelmaker Nippon Steel buys Thai steelmakers in US\\$763 million deal](#)", 22 Jan 2022.

³¹ "[Nippon Steel 'BBB+' Ratings Placed On CreditWatch Negative](#)", S&P Global Ratings, 20 Dec 2023.

³² "[Quicktake: Nippon Steel to Acquire US Steel. Transition Asia](#)", 19 Dec 2023.

³³ "[Nippon Steel Integrated Report 2023](#)", Nippon Steel Corporation, Sep 2023.

³⁴ A Sustainability-Linked Bond can be an option to remain flexible on which technologies can be used to deliver ultimate decarbonisation. For some analysis on Japan's Government Transition bond please see "[Sovereign SLB: an option for Japan's transition](#)", AFII, 19 Jun 2023.

³⁵ "[Global steelmakers face \\$518bn in stranded asset risk](#)", Financial Times, 21 Jun 2022.

area increase its stranded asset risk and should be considered as a risk to ongoing financial sustainability.

Fundamentally, as Nippon strives to decrease domestic carbon emissions, this acquisition-facilitated trajectory suggests both increased international capacity, but also a commitment to emissions-intensive manufacturing methods. This risks locking in coal-based technologies, which presents both environmental but also financial sustainability concerns.

Nippon Steel Green Bonds

Nippon Steel issued its first green bond framework in February 2023.³⁶ Rating and Investment Information Inc (R&I) provides the Second Party Opinion (SPO), which confirmed alignment with the International Capital Market Association (ICMA)'s Green Bond Principles 2021.³⁷

In Mar 2023 two bonds were issued under this framework, details are shown in Table 3. The total green bond notional is JPY 50bn, representing around 5% of NIPSTL's outstanding bonds.

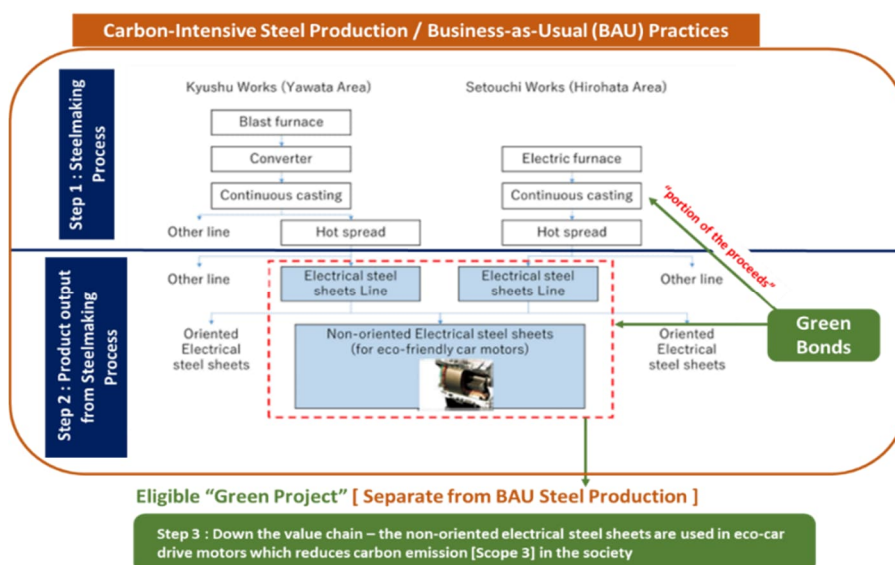
Table 3. Nippon Steel green bond issuance. Source: Bloomberg, accessed 3 Jan 2024.

Issuer	NIPPON STEEL CORP	NIPPON STEEL CORP
ISIN	JP338100AP36	JP338100BP35
Issue Date	09-Mar-23	09-Mar-23
Maturity	17-Mar-28	18-Mar-33
Currency	JPY	JPY
Issued Amount (bn)	30	20
Coupon	0.564%	1.15%

Use of Proceeds

The green bond framework provides details on Nippon Steel's plans to decarbonise its steelmaking process. However, the document clearly states that proceeds will be used to invest in BAU manufacturing, although to produce steel for use EV production, as shown in Figure 3.³⁸

Figure 3. Flow of Nippon Steel's green bond proceeds. Source: Nippon Steel and AFII.



³⁶ "Nippon Steel Corporation Green Bond Framework", Nippon Steel Corporation, 9 Feb 2023.

³⁷ "Second Party Opinion", Nippon Steel, Rating and Investment Information Inc (R&I), 9 Feb 2023.

³⁸ AFII diagram using data from "Second Party Opinion", Nippon Steel, Rating and Investment Information Inc (R&I), 9 Feb 2023.

Specifically, the entire amount of the proceeds from the bonds has been allocated to production facilities for non-oriented (NO) electrical steel sheets including refinancing of similar production facilities disbursed between the fiscal years 2020 and 2022 (encircled by the dotted red line in Figure 3). These sheets are utilised in eco-friendly car motors. This eligible project is categorised as ‘clean transportation’ under the Green Bond Principles.

Nippon has separated the steelmaking process (step 1) from the production related to NO electrical steel sheets (step 2). However, a portion of the proceeds could theoretically be directed towards equipment within the steelmaking process, where there is a need to enhance the production capacity for EV-destined non-oriented electrical steel sheets.³⁷

There is something potentially incongruous about a use-of-proceeds bond being used to reduce Scope 3 emissions. The proceeds are ringfenced for capex investment within the business, and therefore can only be used to reduce emissions that are within the operational processes of the issuer. Scope 3 emissions are outside the direct influence of the issuer, and therefore it is hard to understand how proceeds can directly be used to influence those.

Emissions impact

Despite being issued less than a year ago, Nippon Steel has already reported both on the green bond allocation, but also the avoided emissions.³⁹

The estimated emissions reduction is calculated as follows:³⁹

$$CO_2 \text{ emissions reduction} = \text{The number of eco-friendly cars produced} \\ \times \text{The effect of reducing } CO_2 \text{ emissions per eco-friendly car}$$

The JPY 49.78bn⁴⁰ amount of bonds translates into a theoretical reduction of approximately 3,000 thousand t-CO₂ in annual emissions.

Based on this calculation, there is no proportionate reduction in emissions specifically attributed to Nippon’s NO steel product contribution per eco-friendly car. This suggests that the theoretical reduction may be overestimated.

Table 4 shows 2022 emissions reporting for Nippon Steel.⁴¹ These numbers show that Scope 1 is the most significant source of emissions, producing just under 70% of the total. Within Scope 3 emissions the most significant category is purchased goods and services, which includes purchased iron ore, coking coal, coal and oxygen, which accounts for 14%.

Table 4. Nippon Steel 2022 emissions. Source: Nippon Steel.

CO ₂ emissions (thousand t)	
Scope 1	63,397
Scope 2	11,912
Scope 3 (purchased goods and services)	12,939
Scope 3 (other)	3,649
TOTAL	91,897

The reported reduction of 3,000 thousand t-CO₂ is equivalent to 3.4% of Nippon Steel’s total annual emissions, or 18% of its Scope 3 emissions.

³⁹ “[Reporting on Nippon Steel Corporation’s 7th and 8th Series of Unsecured Straight Bonds](#)”, Nippon Steel Corporation, 6 Sep 2023.

⁴⁰ This amount excludes issuance costs from the total bond issuance.

⁴¹ “[Sustainability Report 2023](#)”, Nippon Steel, accessed 3 Jan 2024.

However, when looking at the breakdown of Scope 3 emissions, it appears that downstream emissions, i.e. those produced by products sold, are not included. This may be by interpreting the steel put into, for example a car, as not being responsible for emissions coming from the engine. This lack of reporting of downstream emissions strongly indicates that Nippon Steel itself considers these emissions to be non-core to its business.

CDP, a global charity focused on emissions disclosure, concludes that Scope 1 and 2 are most significant for the steel sector. It identifies some relevant Scope 3 categories, including Category 11 Use of Sold Products, however it reports that steelmakers could influence emissions here via supporting increased reuse and scrap recovery programmes. It reports that fewer than a third of steel companies included these categories as relevant.⁴²

A low-hanging ‘green bond’

While the allocation of the green bonds is in line with its high-level framework, the more pressing question is whether the issuance improved the fundamental sustainability of the company.

The issued green bonds are presently directed towards initiatives aimed at reducing carbon emissions in society through the widespread adoption of eco-friendly cars. These vehicles are expected to use Nippon’s NO electrical steel sheets, which are produced using carbon-intensive steelmaking processes. It is reasonable to conclude this bond will fail to reduce the carbon footprint of the steel production process, a major contributor to both Scope 1 and Scope 2 emissions, constituting 82% of Nippon’s total emissions.⁴¹

The proceeds raised are implicitly maintaining a steady or growing carbon-intensive steel business particularly as they have acquired new coal-based steel making projects aimed at ensuring the long-term viability of the business. This aligns with Nippon’s expectation of a significant increase in the production of NO electrical steel sheets and high-grade electrical steel sheets to rise by 1.5 times and 3.5 times, respectively, compared with the current levels.⁴³

With demand of EVs projected to grow, steel production of adequate quality is essential to facilitate the decarbonisation of the auto sector.⁴⁴ In Nippon Steel’s case, however, there is a risk that the investments prolong use of emissions-intensive processes under the guise of sustainability.

Nippon has introduced an ambitious carbon neutrality plan to pursue a greener business model, and the green bond issuance is a strong signal towards meeting this aim.

‘We [...] believe that issuing green bonds allows us to reiterate messages about our commitment to our stakeholders.’⁴¹

By focusing on Scope 3 emissions, Nippon Steel is side-stepping its core decarbonisation priorities. It should be demonstrating to the market that it is taking the right steps to align with green bond investors.

⁴² “[CDP Technical Note: Relevance of Scope 3 Categories by Sector](#)”, CDP, 25 Jan 2023.

⁴³ “[Nippon Steel to issue green bond for electrical steel sheets applied in eco-car motors](#)”, Southeast Asia Iron and Steel Institute, 14 Feb 2023.

⁴⁴ For a review of bond pricing in the auto sector please see “[Auto manufacturers: Climate performance and the cost of capital](#)”, AFII, 15 Dec 2023.

Alas, based on current developments and low hanging “green bonds”, it is unclear whether Nippon has the appetite to make a substantial transition. Therefore, investors should conduct due diligence, looking beyond the green bond investment objectives, and assess the sufficiency of the issuer's sustainability performance.

Nippon Steel Bond Curve

Figure 5 shows recent pricing for Nippon Steel’s bonds, and Figure 4 shows changes since prior to the US offer announcement.

Nippon’s green bonds are indicated around z+19bp for the 0.564% 2028s, and z+32bp for the 1.15% 2033s. Spreads have widened following the announcement of the all-cash US steel acquisition on 18 Dec.

Figure 5. Nippon Steel JPY bond spreads, for bonds between one and ten years in maturity, and size greater than JPY10bn. Source: Bloomberg, accessed 4 Jan 2023.

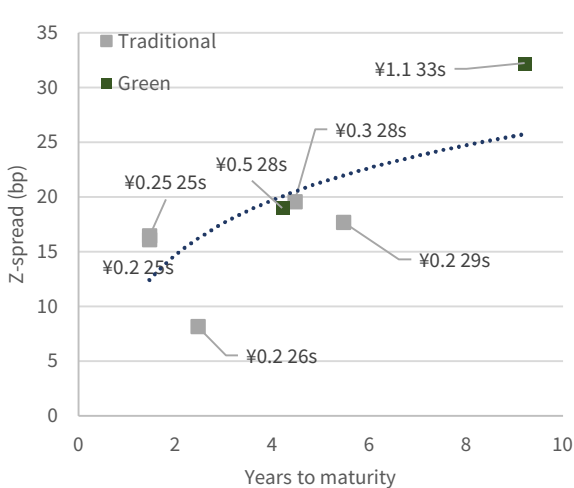
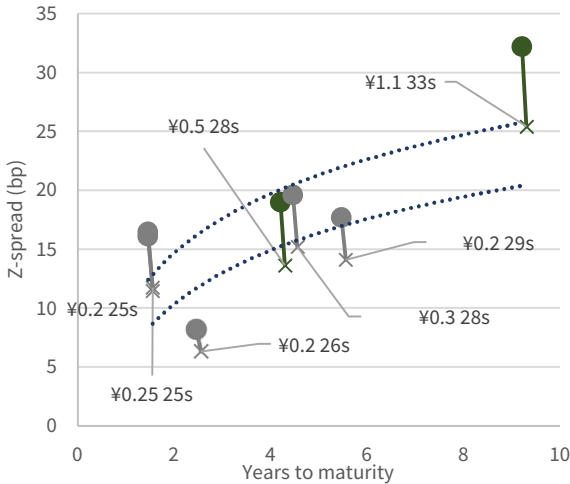


Figure 4. Nippon Steel JPY bond spread changes since 1 Dec 2023 (crosses) to spot (circles). Source: Bloomberg, accessed 4 Jan 2024.



According to Bloomberg holdings information, the most significant holder is the Government Pension Investment Fund of Japan, with 3% of the 10-year and 9% of the 5-year total bond.⁴⁵

At current levels, spreads on Nippon’s green bonds are tight relative to CDS, which is indicated around +57bp for the 5-year. They also offer limited spread pick-up relative to the Japanese sovereign; the 5-year bond is quoted at 44bp over benchmark (JGB 0.1 27s yields 0.118%) and the 10-year bond is 53bp over benchmark (JGB 0.5 32s yields 0.54%). Finally, our analysis indicates that spreads on the 5-year green Nippon bond may not even compensate investors for the historical default risk associated with a BBB-rated credit risk,⁴⁶ which could be understated if stranded asset risks were to crystallise near-term. These comparisons combine to suggest the pricing could be perceived as unattractive to some investors.

⁴⁵ Bloomberg holding data is assimilated from voluntary disclosure, and is incomplete. These holdings are from 31 Mar 2023.

⁴⁶ This is based on S&P’s long-term cumulative 5-year default rate for BBB-rated credits of 1.6%, and an assumed loss-given-default of 60%. Nippon is currently Baa2 / BBB+; both on negative watch. Where current spreads fail to compensate investors for historical default risk, it typically indicates that investors are receiving minimal, if any, compensation for other critical risks such as liquidity risk, and volatility risk.

Given these valuation indicators, and our concerns outlined in this note regarding the credibility of Nippon's green bond programme and broader decarbonisation strategy, we expect that Nippon's green bonds could appear unattractive to some offshore sustainability-conscious investors.

Conclusions

Nippon Steel, the largest steelmaker in Japan, plays a pivotal role in Japan's bid to carbon neutrality by 2050. The company's active investment in blast furnaces and a 'coal lock-in' through long-term procurement suggests both increased international capacity, but also a commitment to emissions-intensive manufacturing methods, raising concerns about environmental and financial sustainability.

The analysis of the use-of-proceeds from the green bonds shows that they will be used to invest in BAU manufacturing, albeit for the production of steel for EV production. By focusing on Scope 3 emissions, Nippon Steel is side-stepping its core decarbonisation priorities and fails to reduce the carbon footprint of its steel manufacturing process, a major contributor to 82% of its total emissions, encompassing Scope 1 and Scope 2 emissions.

Essentially, while the proceeds from the green bond are legitimate, they are merely accomplishing the bare minimum and inadvertently prolonging the lifespan of a carbon-intensive steel production process. Therefore, **green bond investors should conduct due diligence in advance to ensure alignment with their sustainability objectives.**

In terms of valuation, Nippon's green bonds trade at tight spreads in absolute terms, and relative to both CDS and government bonds. Given this, alongside the concerns discussed above, Nippon's green bonds could appear unattractive to some offshore sustainability-conscious investors.

Appendix: Carbon footprint of Nippon Steel’s green bonds

As an appendix to this analysis, we present a hypothetical calculation of the carbon footprint of these green bonds.

Financed emissions, or Weighted Average Carbon Intensity (WACI), is the measure often used to understand the climate impact of an investment portfolio. Traditionally green bonds are accounted for with equivalent WACI to traditional bonds, even if impact reporting is available, which we view as a lost opportunity to understand the true impact of green bond investments.⁴⁷

Table 5. Nippon Steel data. Source: Bloomberg, accessed 3 Jan 2024.

2022 emissions (t)	91,897,000
Reduced emissions (t)	-3,000,000
Total sales (\$mm)	55,548
Total bonds (JPYbn)	957
Green bonds (JPYbn)	50

Table 5 shows a summary of Nippon Steel data, which we will use to calculate a theoretical WACI for the green bonds. The WACI calculations are shown in Table 6

Table 6. Nippon Steel WACI calculation. Source: AFII.

	Total emissions (t)	Sales (\$mm)	WACI	Change
Total bonds	88,897,000	55,548	1,600	
Green bonds	1,801,306	2,902	621	-61%
Vanilla 'rump' bonds	87,095,694	52,646	1,654	3%

Nippon Steel’s unadjusted WACI is 1,600 t/\$mm. As a comparison, iShares \$ Asia Investment Grade Corp Bond UCITS ETF had a portfolio WACI of 170.77 as of 21 Dec 2023,⁴⁸ showing the high emissions from the steel sector.

To estimate the green bond WACI, the 2022 emissions and total sales have been allocated to green bonds in proportion to total bonds outstanding. The emissions reductions are then allocated only to the green bonds.⁴⁹

The impact is significant. Using this method, the green bonds could be considered to have 61% lower emissions, and the vanilla bonds would have 3% higher.

This doesn’t change the key conclusion that the emission reduction reported by Nippon Steel seems uncomfortably large, and non-core to its business. However, it does serve to demonstrate how impactful green-bond specific emissions accounting could be.

⁴⁷ For a full discussion on this topic please see [“The Forensic Carbon Accountant: green bond carbon footprint”](#), AFII, 28 Jun 2023.

⁴⁸ [“iShares \\$ Asia Investment Grade Corp Bond UCITS ETF”](#), iShares, accessed 3 Jan 2024.

⁴⁹ This highlights the challenges of reporting green bond emissions as ‘avoided’ or ‘reduced’ emissions. All investments have emissions, and it would be more transparent to report the emissions of the green bond investments, and show they are lower than the average for other assets.

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