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FEBRUARY 2024

## COUNTRY PROFILE – JAPAN<sup>1</sup>

### 2023 STEEL POLICY SCORECARD

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#### Lagging behind on deep decarbonisation

A major long-standing steel producer and key steel exporter, Japan is a clear laggard dragging its feet on steel decarbonisation. The lack of domestic ambition is reflected in the failure to progress the international agenda on industrial – and steel – decarbonisation under its G7 leadership in 2023.

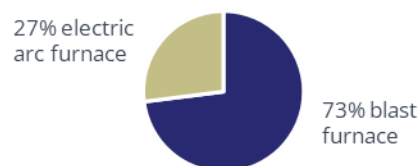
#### Country profile: Japan



#### Production capacity



#### Production methods



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



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



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Japan scores poorly across the board in this analysis, taking the bottom position among the G7 – its scores are also below those of fellow Asian countries China and South Korea. Prospects for carbon pricing and commitments on public procurement are positive but have not yet come to fruition. The lack of direction on clean power and hydrogen is a real concern, and ambition on emission reductions and public funding is limited. Japan’s hesitation to lead on international ambition during its 2023 G7 Presidency further indicates a lack of intent towards industrial decarbonisation.

### **Priority recommendations for Japanese steel policy**

- > Explicitly earmark resources available for steel sector decarbonisation for specific facility upgrades, prioritising support for technologies with an emissions reduction potential of at least 90%.
- > Introduce a mandatory carbon pricing mechanism with a clear timeline for phasing in coverage of the steel sector.
- > Clearly prioritise the steel sector as an end-user in hydrogen strategy.
- > Rapidly increase Japan’s ambition on greening the power grid to ensure it can meet rising demand from steel electrification in an environmentally sustainable manner.

### **A major producer focusing on production pathways with low or incremental emission reduction potential**

Japan is the world’s third largest steel producer and a major steel exporter, with a long history of steelmaking. Japan’s steel industry accounts for 14% of the country’s total CO<sub>2</sub> emissions.<sup>2</sup> Production capacity is still predominantly coal-based (73%);<sup>3</sup> the pipeline for green primary production is non-existing, with no commercial scale H<sub>2</sub>-DRI capacity announced or under way.

Instead, steel decarbonisation to date has centred around the “COURSE50” and “SuperCOURSE 50” projects. They aim to demonstrate CCUS technologies in steelmaking, often combined with increasing hydrogen concentration in the coke oven gas. The overall emissions reduction potential of this technology is only in

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<sup>2</sup> Eguchi, E., and Shinkai, T., in *The Asahi Shimbun*, 2021, **Steel industry sets 2050 target for net zero CO<sub>2</sub> emissions**

<sup>3</sup> Calculated from Appendix C in Global Energy Monitor, 2023, **Pedal to the Metal 2023**



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the realm of 30–50%.<sup>4</sup> Recent research by Transition Asia further<sup>5</sup> shows that the application of COURSE50 technology at one of the production sites of Nippon Steel (Kimitsu Area BF), responsible for 10% of the company’s total emissions, will only result in a 1–2% drop in Nippon’s annual emissions by 2026.

Japan’s strategic policy documents reflect a focus on technological shifts in steelmaking coming from both hydrogen and CCUS. However, the strategies do not offer a clear picture of how these will come together. For instance, the recently updated Japanese hydrogen strategy (2023), with only a supply target, assumes high reliance on imports from abroad.<sup>6</sup> It also includes plans for a CfD scheme to bridge the price gap between “clean” and “unabated” hydrogen; but without introducing a clear timeline for adopting the emission threshold for low-carbon hydrogen. Its foreseen end-use sectors include DRI steelmaking, though the strategy’s main focus is in the power sector.

Since the hydrogen strategy will depend on scaling up CCS, there is a carbon storage capacity target – yet there are concerns as to whether there will be sufficient capacity for the steel sector to store its emissions once captured.<sup>7</sup> Japan’s 2021 Green Growth Strategy highlights the role of CCUS in steel decarbonisation, but without clarity on sectoral prioritisation for storage capacity targets.<sup>8</sup> The government has provisionally announced readiness to back Nippon Steel’s CCS projects.<sup>9</sup>

### **Concerning lack of direction on clean power**

Japan does not yet have a viable plan to achieve the G7 2035 power sector carbon neutrality commitment. Its 2021 Green Growth Strategy mentions growing demand for electricity due to widespread electrification; at the same time it stresses the importance of growing gas supply to meet heat demand, while focusing on energy saving measures.

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<sup>4</sup> Renewable Energy Institute (REI), 2023, **The Path to Green Steel – Pursuing Zero-Carbon Steelmaking in Japan**

<sup>5</sup> Transition Asia, 2023, **Transition Asia's response to Nippon Steel's proposed plans to increase share of EAF-based technology in bid to achieve net zero**

<sup>6</sup> Ministerial Council on Renewable Energy, Hydrogen and Related Issues (third meeting), 2023, **Policy Framework for Realizing a Hydrogen Society (draft)**

<sup>7</sup> Renewable Energy Institute, 2022, **The Path to Green Steel**

<sup>8</sup> Cabinet Secretariat & Ministries, 2021, **Green Growth Strategy – Through Achieving Carbon Neutrality in 2050**

<sup>9</sup> Global CCS Institute, June 2023, **Seven CCS Project to Receive Support from the Japanese Government**

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Emphasis on co-firing hydrogen and ammonia with fossil fuels has also significantly increased since the 2017 iteration of the Japanese hydrogen strategy. An analysis from E3G shows this is costly and inefficient and risks delaying decarbonising the power sector, while taking away a premium resource which remains the only viable solution for steel sector decarbonisation.<sup>10</sup>

### **Limited ambition on emission reductions and funding**

The strongest signal for policy clarity and direction comes in Japan's NDC: the emissions reduction target for industry is 174 Mt CO<sub>2</sub>e by 2030 (38% relative to 2013).<sup>11</sup> However, the 2021 Technology Roadmap for "Transition Finance" in Iron and Steel Sector fails to provide a clear immediate direction.<sup>12</sup> It speaks only to the very long-term aim of reaching carbon neutrality by 2050, without setting any interim emissions reduction targets.

The Japanese government does provide funding towards steel decarbonisation, largely through R&D. The Green Innovation Fund dedicates over \$3bn to the use of hydrogen in the steel sector.

### **Prospects for carbon pricing and commitments on public procurement**

A Japanese Emission Trading System (ETS) is currently in the works, referred to as GX-ETS. The Japanese Iron and Steel Federation has been found to actively lobby against the ETS;<sup>13</sup> it will be based on voluntary participation until at least 2026. The GX-ETS is set to focus on power system decarbonisation well into the 2030s, and there are no clear plans to include heavy industry sectors.

The Japanese government sent a positive signal on public procurement when it joined the IDDI at COP27 (2022). This showed an intention to set green steel public procurement targets or requirements – an important pull factor for the industry. However, as of December 2023, no apparent in-country process was under way to create a green steel market through public procurement; that is despite a long-standing focus on green public procurement, with relevant policies and regulations dating back to the 1980s.<sup>14</sup>

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<sup>10</sup> E3G, 2023, **Explained: Why ammonia co-firing in coal power generation is a flawed approach**

<sup>11</sup> Government of Japan, 2021, **Japan's Nationally Determined Contribution (NDC)**

<sup>12</sup> Ministry of Economy, Trade and Industry, 2021, **Technology Roadmap for "Transition Finance" in Iron and Steel Sector**

<sup>13</sup> InfluenceMap, no date, **Emission Trading Schemes**

<sup>14</sup> Global Energy Intelligence (GEI), 2023, **Green Public Procurement of Steel in India, Japan and South Korea**



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### **Hesitant to lead on international ambition for decarbonising steel**

In 2023 Japan had the opportunity to demonstrate international leadership on industry and steel decarbonisation through its G7 Presidency. It picked up on Germany's 2022 steel decarbonisation focus by commissioning a report from the IEA focused on Emissions Measurement and Data Collection for a Net Zero Steel Industry.<sup>15</sup> However, there was no move towards a G7 agreement on definitions and standards, nor is there currently any domestic action towards these.

The current in-country movement towards mass-balance methods<sup>16</sup> by companies like Kobe Steel, Nippon Steel and JFE Steel indicates the need for direction on green steel definitions and standards: according to such methods, a 10% emissions reduction across 100 tonnes of manufactured steel is translated into the sale of 10 tonnes of zero-emission steel.<sup>17</sup>

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<sup>15</sup> IEA, 2023, **Emissions Measurement and Data Collection for a Net Zero Steel Industry.**

<sup>16</sup> In this method, steel manufacturing companies issue reduction certificates by GHG or CO<sub>2</sub> emissions reductions from "projects" with additionality (actual emission reductions) and supply steel products with the reduction certificates. The Japan Iron and Steel Federation, October 2023, **Green steel applying mass balance approach**

<sup>17</sup> Renewable Energy Institute, 2022, **The Path to Green Steel.**

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## About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

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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