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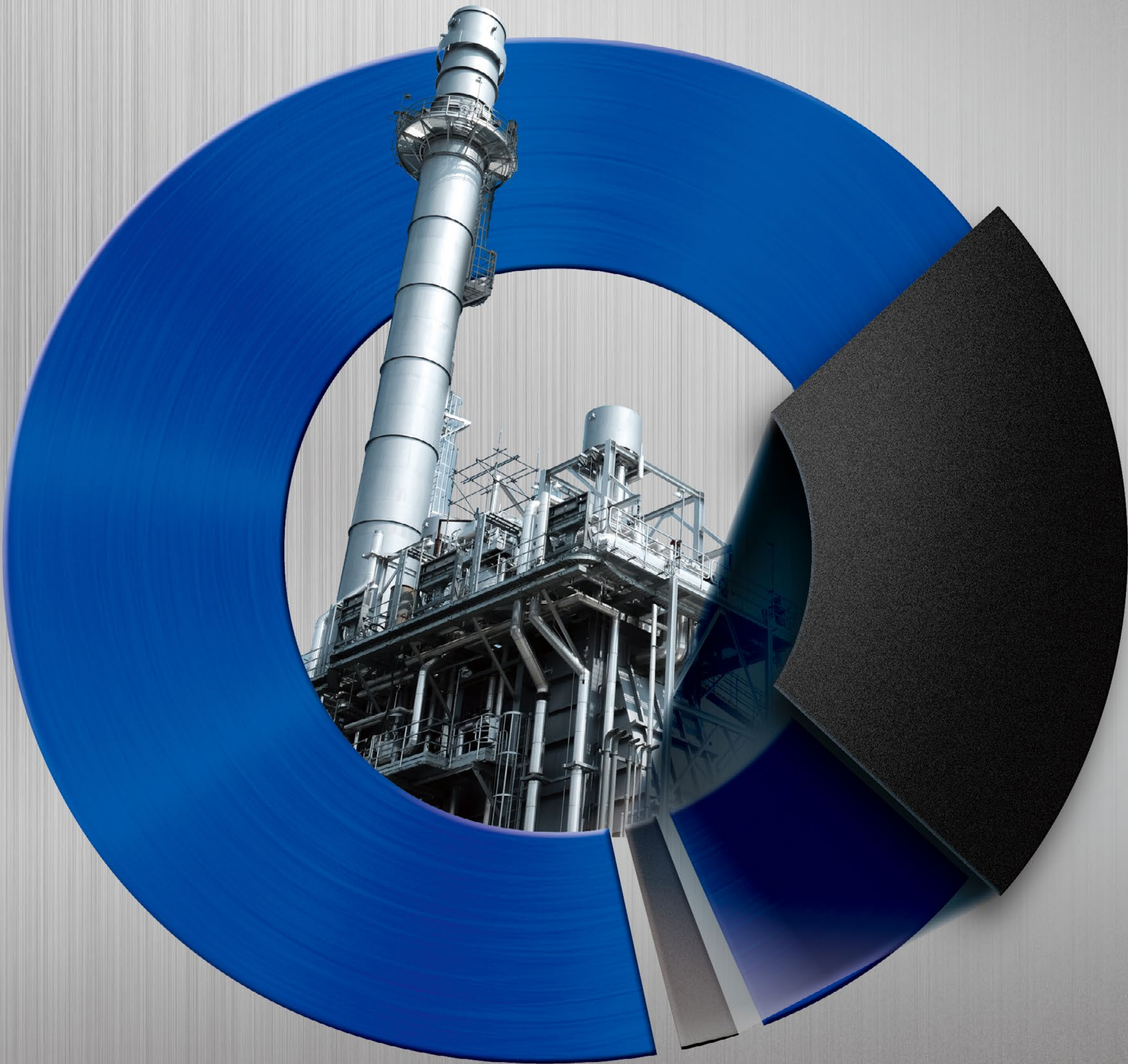

Steel in the Portfolio:

An Engagement Framework for Institutional Investors

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Publication Date	**March 2026**
Author	**Hyunjeong Bak** | Lead, Investor Engagement, Solutions for Our Climate
Assistance	**Steel Team, Solutions for Our Climate**
Editor	**Seonyoung Park**
Design	**sometype**

Solutions for Our Climate (SFOC) is an independent nonprofit organization that works to accelerate global greenhouse gas emissions reduction and energy transition. SFOC leverages research, litigation, community organizing, and strategic communications to deliver practical climate solutions and build movements for change.

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Executive Summary

Steel is more than just another carbon-intensive industry. It is a linchpin of the broader industrial transition, acting as a major driver of financed emissions, downstream sectors' value chain emissions, and hydrogen market development. Accordingly, beyond urging individual steel companies to take climate action, institutional investor engagement with steelmakers can serve as an effective strategy to manage climate transition risks in investment portfolios while unlocking growth opportunities in low-carbon industrial transformation.

- **Financed emissions management**: An analysis of 242 companies within the National Pension Service's domestic equity portfolio shows that the steel sector accounts for only about 1.5% of the portfolio value, yet it represents 24% of financed emissions based on the operational emissions (Scope 1 and 2) of the investees.
- **Downstream industry transition**: Downstream steel sector accounts for approximately 21% of the portfolio value based on the 242 holdings analyzed, yet they contribute roughly 64% of financed emissions on a Scope 1, 2, and 3 basis and approximately 68% on a Scope 3 basis alone.
- **Hydrogen economy opportunities**: By adopting hydrogen-based direct reduced iron (H_2-DRI) technology at scale, the steel industry can anchor long-term demand for clean hydrogen production, low-carbon electricity, power grid, and hydrogen storage and transportation infrastructure.

For engagements to have a meaningful impact, investors must assess whether steelmakers' transition plans are translating into actions, focusing on the following three areas.

- **Transition plan specificity**: A 2050 carbon neutrality target alone is insufficient to assess the feasibility of a steelmaker's asset transition. Therefore, once long-term targets are established, investors must assess the company's transition plans at the asset level.
- **Capital expenditure alignment**: A company's commitment to transition is often reflected more clearly in its capital allocation decisions than in its stated targets. Accordingly, to assess the credibility of a transition plan, it is critical to distinguish investments that advance the low-carbon transition from those intended to maintain or extend existing blast furnaces.

- **Public policy strategy**: Steel transition is heavily influenced by policy support and regulatory environments. This requires an assessment of whether policy frameworks—such as the K-Steel Act, K-GX, Korea's Emissions Trading Scheme, and electricity and hydrogen policies—translate into actual investment in low-carbon facilities, and whether industry association activities are aligned with the carbon neutrality target.

Global investors have already moved past merely calling for enhanced climate-related disclosures from steelmakers. Today, they are demanding 1.5°C-aligned reduction targets, low-carbon asset investment, capital expenditure alignment, climate-linked executive remuneration, and transparent policy engagement. As these cases demonstrate, investor engagement is a process of turning the climate agenda into financial and operational business questions.

Following the passage of the K-Steel Act in November 2025, the steel industry's transition has emerged as a major policy priority. Institutional investors must now assess whether this policy signal is translating into tangible business strategies and investment decisions. This requires closely monitoring whether companies are executing transition plans and deploying capital toward low-carbon initiatives, including transitioning to low-carbon steelmaking, procuring clean hydrogen and low-carbon electricity, and expanding electric arc furnaces (EAF) and hydrogen-based direct reduced iron (H_2-DRI) capacity. Engaging with steelmakers offers institutional investors a practical strategy to manage climate transition risks in the portfolio and capture growth opportunities in the low-carbon economy through a single point of intervention.

I. Why Institutional Investors Should Engage with the Steel Industry

Steel is more than just another carbon-intensive industry. It is a linchpin of the broader industrial transition, acting as a major driver of financed emissions, the downstream sectors' value chain, and the hydrogen economy. Accordingly, beyond urging individual steel companies to take climate action, institutional investor engagement with steelmakers can serve as an effective strategy to manage climate transition risks in investment portfolios while unlocking opportunities in low-carbon industrial transformation.

1. Priority Sector for Managing Financed Emissions

While institutional investors spread their investments across many companies, financed emissions are rarely distributed evenly across a portfolio. Instead, they tend to be heavily concentrated in a handful of carbon-intensive companies. Managing a portfolio's overall climate risks therefore requires investors to prioritize companies and sectors that contribute the most to their portfolio carbon footprint.

The National Pension Service (NPS), as South Korea's largest institutional investor representing approximately 7% of the total domestic stock market capitalization, exerts immense influence over the capital market. Therefore, the Fund's domestic equity portfolio can serve as a useful benchmark for examining what South Korean institutional investors should prioritize for managing climate risks.

As of the end of 2024, the NPS's domestic equity portfolio comprised around 1,200 holdings. To estimate the financed emissions associated with the Fund's domestic equity portfolio, we analyzed the GHG emissions of 242 major holdings, which together represent roughly 95% of the total portfolio value. The methodology for this analysis is detailed in [Appendix 1].

Our analysis estimates that the NPS's domestic equity investments generate approximately 11,591 ktCO_2eq of financed emissions based on the operational emissions (Scope 1 and 2) of investee companies. This accounts for roughly 1.8% of South Korea's total national emissions for 2024, provisionally estimated at 638.97 MtCO_2eq. By individual holding, POSCO Holdings is the single largest contributor, accounting for approximately 2,281 ktCO_2eq or 20% of the

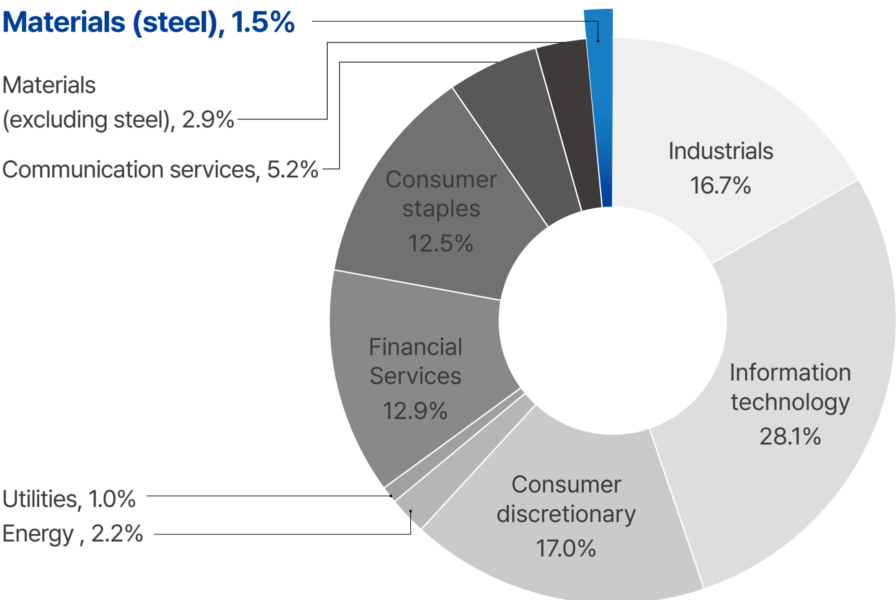
Fund's total financed emissions. The steel industry as a whole—including POSCO Holdings, Hyundai Steel, and three other companies—contribute 2,809 ktCO_2eq or 24% of total financed emissions (**[Figure 1]**, **[Figure 2]**, **[Table 1]**).

The findings suggest that the steel sector should be a central focus of climate risk management within South Korean institutional investors' domestic equity portfolios. While the steel sector accounts for only about 1.5% of the NPS's portfolio value, it is responsible for 24% of its financed emissions based on the operational emissions (Scope 1 and 2) of investee companies. In short, the steel sector contributes disproportionately high financed emissions relative to its portfolio weight. Prioritizing engagement with steelmakers can therefore be an effective strategy to manage financed emissions at the portfolio level, even with limited resources.

Climate risk management has become an important component of responsible investment for institutional investors. In 2023, the NPS revised its *Guidelines on Stewardship Activities* to include "climate change-related risks requiring management" as one of key focus areas. However, it is not realistic for large institutional investors like the NPS to engage with every company in their portfolio with the same level of intensity. Investors therefore need to set engagement priorities based on each portfolio company's contribution to the portfolio's financed emissions, focusing on companies with the greatest emissions impact. From this standpoint, the steel industry represents a primary target for managing climate risk and maximizing engagement impact.

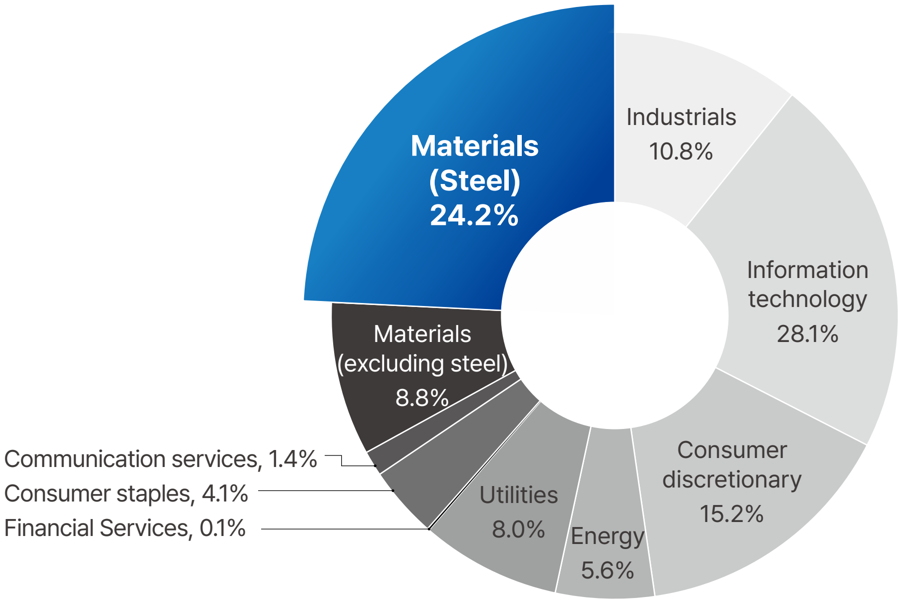
[Figure 1] Sector Breakdown of 242 Companies in the NPS's Domestic Equity Portfolio
(Accounting for 95% of Total Portfolio Value, As of Year-End 2024)

Source: Solutions for Our Climate



[Figure 2] Sector Breakdown of Financed Emissions from 242 Holdings in the NPS's Domestic Equity Portfolio (on a Scope 1 & 2 Operational Emissions Basis, As of Year-End 2024)

Source: Solutions for Our Climate



[Table 1] Top 10 Contributors to Financed Emissions Among 242 Domestic Stocks Held by the NPS (on a Scope 1 & 2 Operational Emissions Basis, As of Year-End 2024)

Company	Financed Emissions (Unit: $ktCO_2eq$)	% of Financed Emissions
Total (242 Holdings)	**11,590.468**	**100.0%**
POSCO Holdings	2,280.490	19.7%
Samsung Electronics	1,319.738	11.4%
KEPCO	922.587	8.0%
LG Corp	684.158	5.9%
Hanjin Kal	543.262	4.7%
SK hynix	476.341	4.1%
Hyundai Steel	462.964	4.0%
Korean Air	354.232	3.1%
Kumho Petrochemical	304.053	2.6%
S-Oil	294.118	2.5%

Source: Solutions for Our Climate

2. Precondition for Downstream Sector Transition

Steel is a foundational material used across major manufacturing industries, including automotive, shipbuilding, construction, machinery, infrastructure, and energy equipment. For these downstream steel users, the emissions generated from steel production are captured in their Scope 3 Category 1 (purchased goods and services) emissions. A shortage of low-carbon steel can therefore limit downstream sectors' ability to reduce emissions coming from raw material sourcing. In this regard, steel is a material critical to decarbonizing other sectors, yet it can also act as a potential bottleneck that limits the transition of downstream sectors.

According to World Steel Association, building and infrastructure sectors accounted for the largest share of global steel consumption in 2024 at 52%, followed by mechanical equipment (16%), automotive (12%), metal products (10%), other transport (5%), electrical equipment (3%), domestic appliances (2%) (**[Figure 3]**). A similar structure can be observed in South Korea. According to the data released by the Korean Iron & Steel Association, construction accounted for 41% of domestic steel shipments in 2024, followed by automotive (20%), shipbuilding (10%), and the electrical and electronics sector (7%) (**[Figure 4]**).

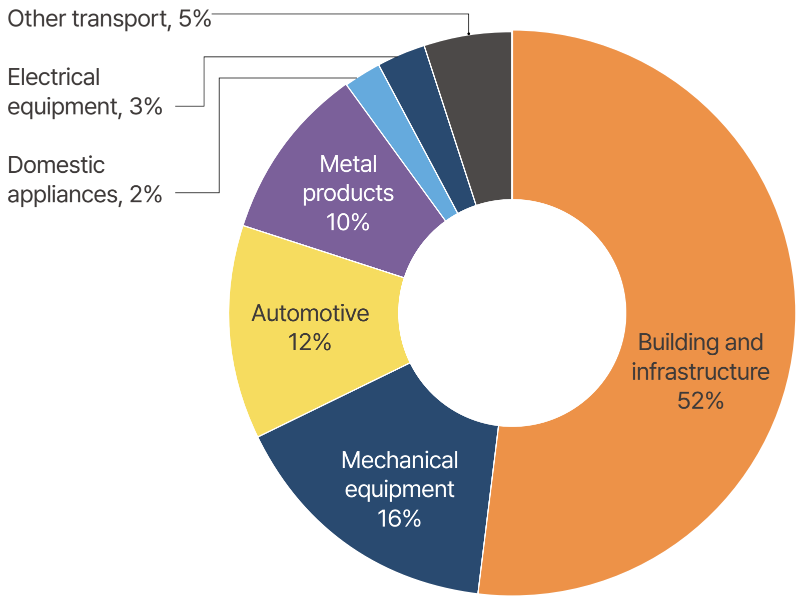
Institutional investors rarely invest in the steel sector alone. Their portfolios often include a wide range of steel-using downstream companies, such as those in the automotive, shipbuilding, construction, machinery, electrical and electronics, and infrastructure sectors. In this report, we selected and analyzed 242 companies, which together account for approximately 95% of the value of the NPS's domestic equity portfolio. Within this analysis group, we further classified 44 downstream companies whose Scope 3 Category 1 emissions are significantly driven by steel.

The analysis reveals that these 44 downstream steel users account for approximately 21% of the NPS's domestic equity portfolio value adjusted to reflect the 242 holdings analyzed. However, when measuring their contribution to portfolio emissions, their share is disproportionately larger. They account for approximately 64% of total financed emissions based on Scope 1, 2, and 3 emissions of investees, and around 68% on a Scope 3 emissions basis alone. This demonstrates that even if institutional investors hold limited investment in the steel sector itself, the impact of the steel industry's transition pathway cascades across the broader portfolio through these downstream sectors.

For long-term investors with diversified portfolios, the steel industry can therefore serve as a strategic lever for portfolio decarbonization. Engaging with steelmakers not only drives emissions reductions within the steel sector but also facilitates a value chain transition across downstream sectors. Scaling up low-carbon steel production is essential to enable downstream sectors—such as automotive, shipbuilding, construction, and machinery—to reduce their emissions from raw materials and to set clear carbon neutrality targets of their own.

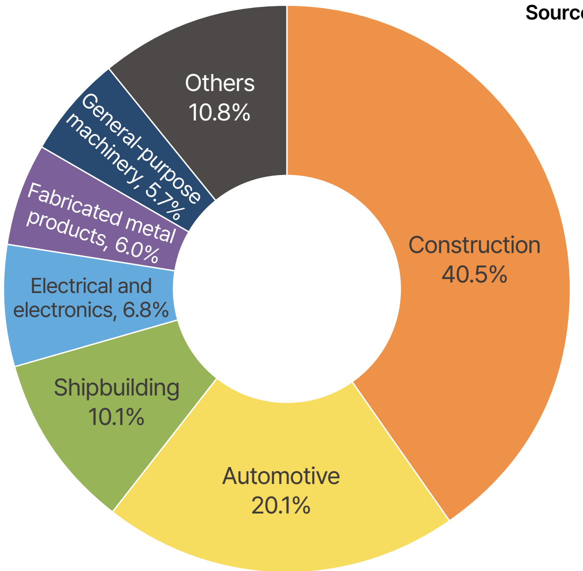
[Figure 3] Global Steel Use by Sector (As of 2024)

Source: World Steel



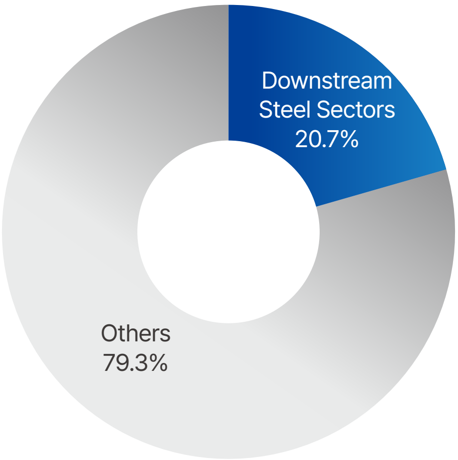
[Figure 4] South Korea's Domestic Steel Shipment by Sector (As of 2024)

Source: Korean Iron & Steel Association



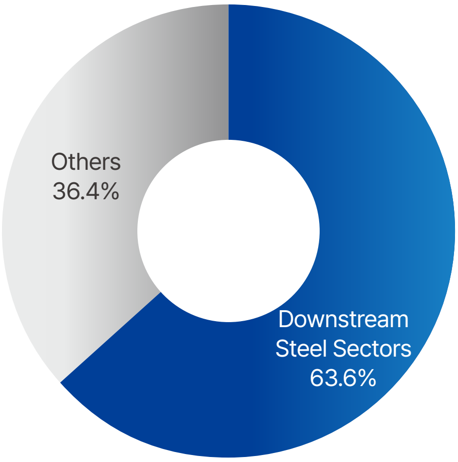
[Figure 5] Downstream Steel Sectors as a % of NPS Domestic Equity Portfolio Based on 242 Holdings Analyzed (As of Year-End 2024)

Source: Solutions for Our Climate



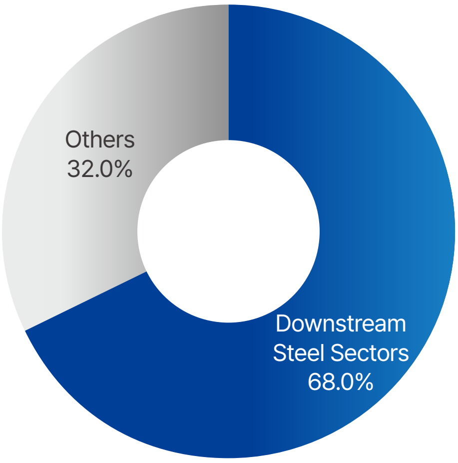
[Figure 6] Downstream Steel Sectors' Contribution to Financed Emissions from NPS's Domestic Equity Investments (Based on Scope 1, 2, and 3 Operational and Value Chain Emissions, As of Year-End 2024)

Source: Solutions for Our Climate



[Figure 7] Downstream Steel Sectors' Contribution to Financed Emissions from NPS's Domestic Equity Investments (Based on Scope 3 Value Chain Emissions, As of Year-End 2024)

Source: Solutions for Our Climate



3. Anchor Demand for Hydrogen Economy

The steel industry can anchor demand for hydrogen, driving investments in South Korea's future hydrogen economy. Increasing supply alone cannot scale a hydrogen economy. A reliable, large-scale demand base must be established to catalyze investment in hydrogen infrastructure across production, storage, transportation, and power generation. South Korea is the world's sixth-largest steel producer by volume and therefore is expected to generate massive demand as its steel sector transitions toward low-carbon production.

In the *First Basic Plan for Implementation of the Hydrogen Economy* released in November 2021, the Ministry of Trade, Industry and Resources projected that industrial hydrogen demand would reach 10.6 Mt by 2050. If the H_2-DRI technology is adopted at scale, a significant share of this demand will come from the steel sector. For instance, South Korea's crude steel production in 2024 totaled 63.6 Mt, of which 72.3% was produced from coal-based blast furnaces. Assuming this entire share transitions to the H_2-DRI route, the steel sector is estimated to create a hydrogen demand of 2.76 to 4.14 Mt (based on the metric that 60 to 90 kg of hydrogen is required per ton of steel). This represents 26%-39% of the government's projected 2050 industrial hydrogen demand. As demonstrated, the pace of the steel sector's transformation and its adoption of H_2-DRI technology will be a critical determinant in anchoring demand for hydrogen to underpin South Korea's hydrogen economy.

A similar implication is outlined in our report, "The Cost of Delay: Socioeconomic Impacts of Steel Decarbonization in South Korea." This report estimates that an accelerated transition scenario will generate a cumulative KRW 3,287 trillion of induced effects on production and value added from 2026 through 2050, which is 2.4 times higher than the KRW 1,378 trillion projected under a more conservative scenario. This additional KRW 1,909 trillion generated in the accelerated scenario stems from reduced coal consumption as blast furnaces are phased out, paired with an increased uptake of renewable energy and hydrogen driven by H_2-DRI and EAF expansion (see **[Table 2]**).

As H_2-DRI technology moves beyond the demonstration phase to commercial-scale deployment, it will provide strong, long-term demand signals for clean hydrogen and low-carbon power infrastructure. This, in turn, will drive broader investments in other relevant sectors, including production, storage, transportation, power grids, and related equipment. Investors like the NPS—which employ long-term, diversified investment strategies—typically invest not only in steelmakers but also across utilities, hydrogen production, transportation, infrastructure, and equipment sectors (see **[Table 3]**). Therefore, investors can engage with steelmakers not just to urge individual steelmakers to reduce emissions, but also to mitigate climate transition risks across the broader portfolio while unlocking growth opportunities in other sectors within the hydrogen value chain.

[Table 2] Cumulative Socioeconomic Impacts of Steel Transition by Scenario (2026–2050)

(Unit: KRW Trillion)	Conservative transition	Accelerated transition	Long-term economic benefit gap
Production induced	1,046.8	2,501.4	-
Value added induced	331.4	785.6	-
Total	**1,378.2**	**3,287.0**	**1,908.9**

Source: Solutions for Our Climate

[Table 3] Major South Korean Companies Across the Hydrogen Value Chain

Hydrogen Value Chain	Major Korean Companies
Production	SK E&S, SK gas, Lotte Chemical, POSCO, Hyundai Engineering & Construction, and others
Storage	HS Hyosung Advanced Materials, SK E&S, and others
Transportation	Hyundai Rotem and others
Refueling	Hyosung Heavy Industries and others
Application	Hyundai Motor Company, POSCO, and others

Source: Company data, press release, Samil PwC

II. Policy Context: The K-Steel Act

In November 2025, South Korea's National Assembly passed the *Special Act on Strengthening the Competitiveness of the Steel Industry and Transition to Carbon Neutrality* (the 'K-Steel Act'). Marking the first steel-specific legislation in 40 years, the act aims to support the industry against three major challenges: steel overcapacity and influx of cheap imports driven by China; tightening tariffs and carbon market regulations led by the U.S. and EU; and high carbon liabilities caused by the industry's heavy reliance on blast-furnace production.

The K-Steel Act views the steel industry not simply as a traditional manufacturing sector, but as a foundational industry underpinning the national economy and industrial security. The legislation binds industrial competitiveness and the transition to carbon neutrality into a single, unified policy agenda. This represents a significant paradigm shift. Whereas low-carbon transition was previously treated as a separate task, it is now recognized as a key driver of the sector's long-term competitiveness.

The legislation establishes a comprehensive framework to support steel transition, including fiscal and financial support, low-carbon steel special zones, and domestic demand creation. However, policy framework and support alone do not guarantee an outcome. Transitioning to low-carbon production, developing hydrogen and power infrastructure, and creating demand for low-carbon steel are foundational. However, for these measures to yield tangible results, they must translate into business investment decisions.

The K-Steel Act sends an important signal to institutional investors as well. Now that the government has adopted steel transition as a national policy agenda, investors must assess whether this regulatory signal translates into meaningful business transition strategies and investments. In particular, 2026-2030 is a critical period during which businesses' transition directions and investment priorities become more clearly defined, as H_2-DRI technology moves into initial facility investment and demonstration phases. Therefore, the questions and demands put forward by institutional investors during this critical window will determine the pace and scale of the steel industry's transition.

III. Key Areas for Engagement with Steelmakers

While policy creates an enabling environment for low-carbon transition, it does not guarantee an outcome. Ultimately, it is business strategies, facility investments, capital allocation decisions, and public policy strategies that determine the pace and scale of the transition. Against this backdrop, institutional investors play a critical role in assessing whether a steelmaker's transition plans are translating into investment decisions and execution. Key areas for assessment include the specificity of transition plans, CapEx alignment, and public policy strategies. A company's transition strategy provides a basis for evaluating the future direction of its capital expenditures, while its public policy strategies help determine whether government support and industry associations' activities are consistent with the company's transition targets. Global investors have consistently engaged with businesses on these three areas in relation to one another.

Investors do not need to rely solely on corporate disclosures for these assessments. While corporate sustainability reports provide an important starting point, they offer limited comparability and objectivity. From this standpoint, investors can use publicly available assessment benchmarks, such as SteelWatch, Climate Action 100+ (CA100+), Transition Pathway Initiative (TPI), World Benchmark Alliance (WBA) ACT Core, Global Energy Monitor (GEM), and InfluenceMap, which provide comparable insights into steelmakers' climate performance, including transition plans, current asset portfolio, capital allocation trends, and policy engagement activities.

In the following sections, this report outlines what institutional investors should look for in these public datasets and what questions they should ask businesses. Furthermore, it examines where POSCO Holdings and Hyundai Steel stand against major global benchmarks. In doing so, this report aims to help institutional investors move beyond making broad, high-level demands to posing specific, data-driven questions to steelmakers.

1. Transition Plan Specificity

Investors cannot adequately assess steelmakers' transition plans based solely on abstract commitments such as "net zero by 2050." Steel production facilities are long-lived assets, and continued reliance on blast furnace routes can lock in emissions for decades to come. Therefore, once a company establishes its long-term targets, investors must assess whether those targets are supported by credible asset-level transition plans.

The most critical element of a transition plan is how the company plans to replace its existing blast furnace capacity, including the pace, scale, and technologies involved. Specifically, steelmakers should explain how much blast furnace capacity they plan to reduce by 2030, along with timelines for closing, retrofitting, or relining of individual assets. They should also specify how the production capacity share will evolve each year for blast furnace–basic oxygen furnace (BF-BOF), EAF, and DRI. In addition, it is vital to assess whether overseas operations, joint ventures, and acquired assets are included within the scope of the company's reduction targets.

Hydrogen strategies should also be evaluated as part of a company's broader transition plan. Depending on whether hydrogen is used in existing blast furnaces or to support a structural transition towards H_2-DRI route, hydrogen uptake can have different reduction impact and investment implications. Investors should therefore assess how they plan to procure hydrogen, secure clean hydrogen and DRI feedstock, as well as their basis assumptions for hydrogen and electricity prices.

Below are relevant questions investors can ask during company engagements.

- How much blast furnace capacity does the company plan to reduce by 2030?
- How will the capacity shares across BF-BOF, EAF, and DRI routes evolve each year?
- What are the timelines for closing, retrofitting, or relining of each asset?
- Are absolute emissions and emissions intensity metrics both included in the company's 2030 interim targets?
- How does the company plan to secure clean hydrogen, low-carbon electricity, and DRI feedstock required to adopt H_2-DRI?

Public benchmark datasets can serve as a useful starting point for such assessments.

1. CA100+ Net Zero Company Benchmark provides a good starting point for assessing steelmakers' transition plans, specifically their target-setting frameworks and implementation strategies. Particularly, Indicators 1-5 and 11 evaluate companies' net-zero ambitions, long-term, mid-term, and short-term GHG reduction targets, decarbonization strategies, and historical emissions reductions. Based on this assessment, while POSCO Holdings meets the criteria for 2050 net-zero ambition and long-term reduction targets, it falls short on short-term reduction targets and decarbonization strategy, indicating a clear need for more detailed plans (**[Table 4]**). This indicates that investors can demand that POSCO provide additional disclosures on pre-2030 implementation plans, emissions-reduction measures, and asset transition timelines.

2. SteelWatch Scorecard is useful for assessing whether steel companies' transition plans are translating into real structural changes in the production process. Both POSCO Holdings and Hyundai Steel rank in the bottom tier among 18 global steelmakers, indicating that their transition plans have yet to demonstrate a sufficiently credible pathway for replacing coal-based steelmaking (**[Figure 8]**).

3. TPI Carbon Performance helps assess steelmakers' transition plans against their projected emissions intensity pathways. For POSCO Holdings and Hyundai Steel, the assessment indicates the need to evaluate how closely their pace of carbon-intensity reduction, decarbonization measures, and asset transition plans align with a 1.5°C pathway from 2030 through 2035, rather than focusing on their 2050 targets (**[Figure 9]**).

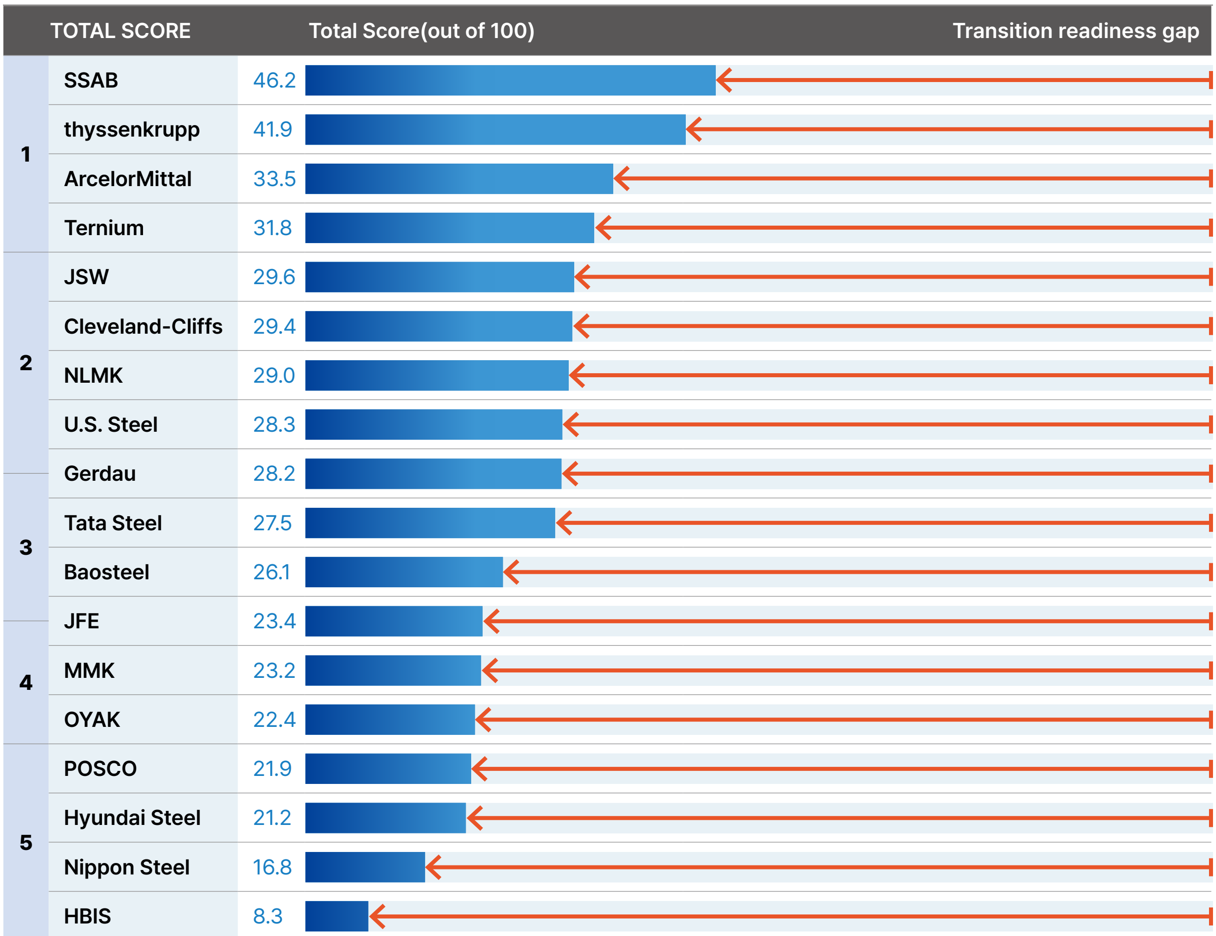
4. WBA ACT Core evaluates the quality of companies' transition plans and their contribution to low-carbon transition. Under this assessment, POSCO Holdings is categorized as "Committed but not planning," indicating that the company demonstrates intent but lacks detailed plans. Hyundai Steel is categorized as "Unstructured plan execution," indicating that the company is implementing certain transition measures but without a structured plan. These assessments suggest that while both companies have net-zero or reduction targets in place, further development is needed with respect to decarbonization levers, implementation timelines, investment plans, and 1.5°C-alignment. (**[Table 5]**).

[Table 4] **Progress on Transition Plan Implementation by Major Steelmakers Based on the CA100+ Benchmark Assessment**

CA100+ Indicator	POSCO Holdings	Baoshan Iron & Steel Co	China Steel	Nippon Steel	Tata Steel	Arcelor Mittal	SSAB AB	Thyssenkrupp AG	Bluescope Steel
1. Net zero GHG emissions by 2050 ambition	O	O	O	O	O	O	O	O	O
2. Long-term GHG reduction targets	O	O	O	O	O	O	O	O	O
3. Medium-term GHG reduction targets	△	△	△	△	△	△	O	△	△
4. Short-term GHG reduction targets	X	△	△	X	X	X	X	X	X
5. Decarbonisation strategy	△	△	△	△	X	△	△	△	△
11. Historical GHG emissions reductions	△	X	△	△	△	△	X	△	△

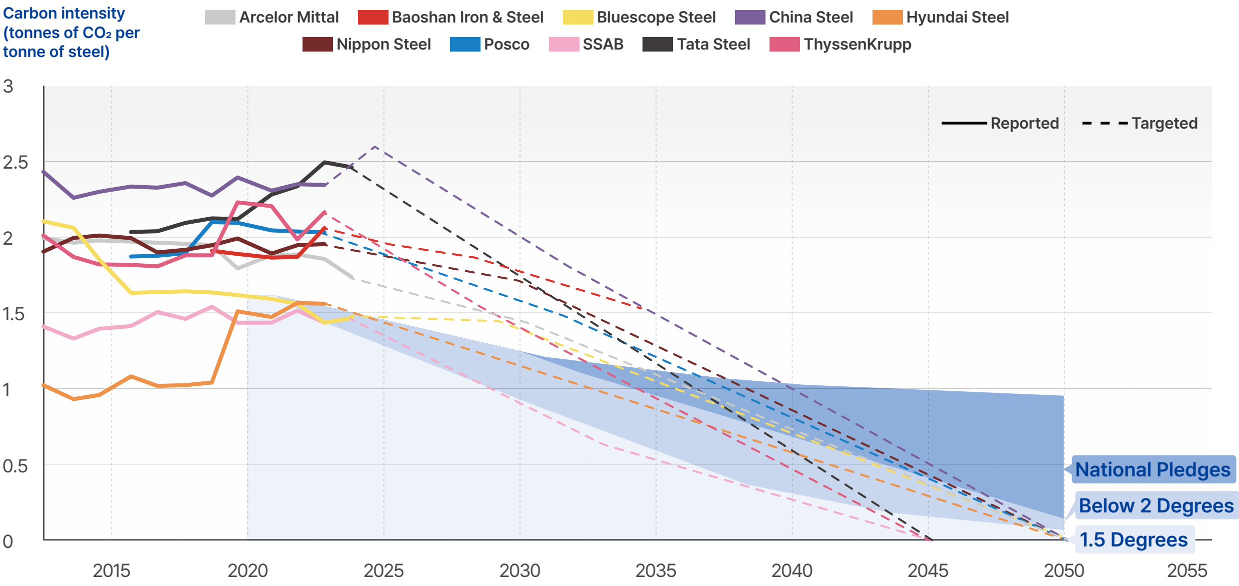
Source: Climate Action 100+

[Figure 8] **Transition Readiness Scores and Gaps by Global Steelmakers Based on the SteelWatch Assessment**



Source: SteelWatch

[Figure 9] Carbon Intensity Pathways by Major Steelmakers Based on the TIP Carbon Performance Assessment



Source: TPI

[Table 5] Transition Plan Quality and Contributions to Low-Carbon Transition by Major Steelmakers Based on the WBA ACT Core Assessment

Category	Transition Plan Quality (Range: 0-5)	Contribution to the Low-Carbon Transition (Range: 0-2)	Total Score	Performance Level
Nippon Steel	4	0	C	Inconsequential planning
Arcelor Mittal	3	0	D	Unstructured plan execution
China Steel	3	0	D	Unstructured plan execution
SSAB AB	3	0	D	Unstructured plan execution
Tata Steel	3	0	D	Unstructured plan execution
Thyssenkrupp AG	3	0	D	Unstructured plan execution
Hyundai Steel	3	0	D	Unstructured plan execution
POSCO Holdings	2	0	E	Committed but not planning

Source: World Benchmark Alliance

2. Capital Expenditure Alignment

A steel company's commitment to transition is often reflected more clearly in its capital expenditure decisions than in its targets. The steel industry is highly capital-intensive and has long-lived assets. Continued investments in blast furnaces and coal-based ironmaking facilities can therefore lock companies into a high-emissions production process, even when long-term carbon neutrality targets are in place.

Institutional investors should therefore examine how steelmakers allocate their capital expenditures. Looking at total investment volume alone is insufficient. Meaningful assessment requires distinguishing investments that advance the low-carbon transition from those aimed at maintaining existing facilities. Low-carbon investments can include expanding EAF, DRI, or H_2-DRI capacity, procuring clean hydrogen, securing low-carbon electricity supply, and increasing steel scrap use. Meanwhile, investments aimed at maintaining, relining, or extending existing blast furnaces should be disclosed separately.

In particular, relining of blast furnaces should not be viewed merely as maintenance, as it can extend their operational life. Investors must therefore assess whether such investments are intended to ensure short-term production stability or whether they risk locking in high-emission steel production over the long term. Investors should also examine whether government subsidies and policy financing are being directed toward low-carbon transition efforts rather than maintaining existing blast furnaces.

Below are relevant questions investors can ask during company engagements:

- Over the next three years, what share of CapEx will be allocated to low-carbon transition investments versus the maintenance, retrofitting, or relining of existing blast furnaces?
- What is the expected lifetime extension for planned blast furnace relinings?
- Within low-carbon transition investments, how much capital is allocated to the demonstration phase versus the commercialization phase?
- What are the expected reduction impacts and execution timelines for each of the low-carbon investment projects?

Public benchmark datasets can provide a basis for such assessments.

① CA100+ Benchmark's 'Capital Allocation' indicator evaluates whether a company is working to decarbonize its capital expenditures and if the company explains how it intends to invest in climate solutions. The benchmark assesses that POSCO Holdings only partially meets the criteria of this indicator (**[Table 6]**). This indicates that while the steelmaker has demonstrated its low-carbon investment plans to some extent, the company needs to provide further information to clearly distinguish investments that advance low-carbon steelmaking from those aimed at maintaining existing blast furnaces.

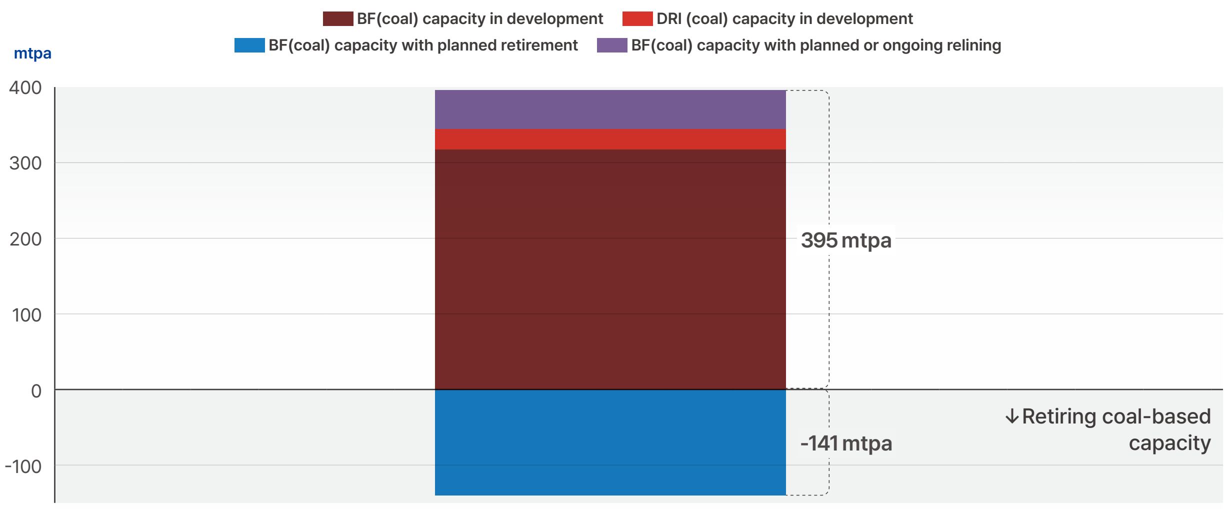
② GEM provides a useful dataset for tracking investments in coal-based ironmaking capacity at the asset level. Globally, the data confirm that coal-based capacity with planned development continues to outpace planned retirements (**[Figure 10]**), underscoring that ongoing investment in coal-based assets remains a critical challenge across the steel industry. In South Korea, capital is primarily allocated into blast furnace relines and reinvestment rather than new coal-based capacity (**[Figure 11]**). This highlights the need for a closer examination of whether South Korean steelmakers' capital allocations align with their transition targets.

[Table 6] Capital Allocation Alignment by Major Steelmakers Based on the CA100+ Benchmark Assessment

CA100+ Indicator	POSCO Holdings	Baoshan Iron & Steel Co	China Steel	Nippon Steel	Tata Steel	Arcelor Mittal	SSAB AB	Thyssenkrupp AG	Bluescope Steel
6. Capital allocation	△	X	△	X	△	△	△	△	X

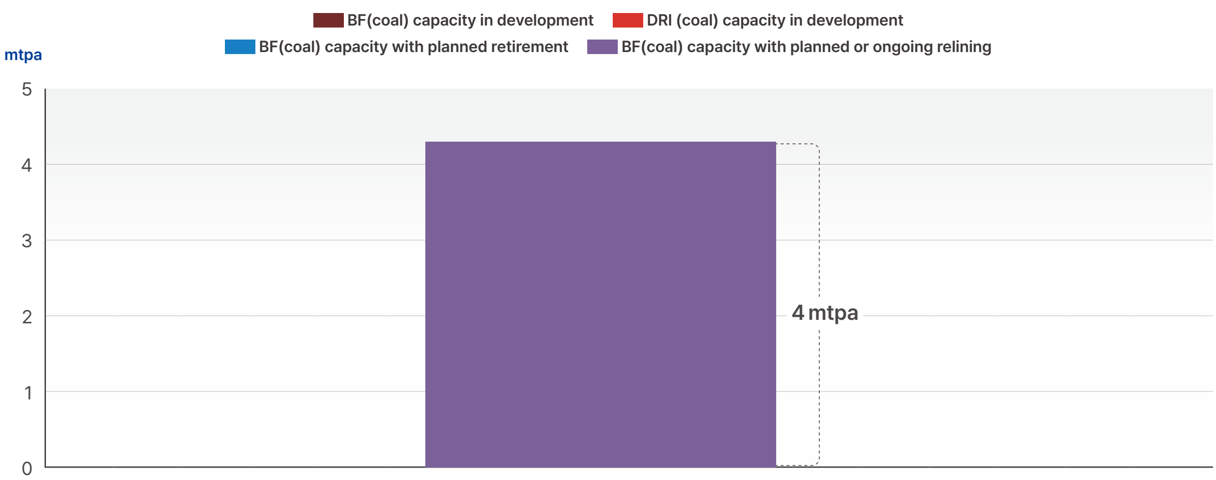
Source: Climate Action 100+

[Figure 10] Global Coal-Based Iron Investment According to GEM Report



Source: Global Energy Monitor

[Figure 11] South Korea's Coal-Based Iron Investment According to GEM Report



Source: Global Energy Monitor

3. Public Policy Strategy

Steel transition cannot be achieved by businesses alone. Business investments are directly shaped by policy environments—including low-carbon steel certification, clean hydrogen standards, grid expansion, public procurement, subsidies, and carbon pricing. Institutional investors should therefore assess whether a steelmaker is merely using policy as a support system, or if the company is actively engaging to help shape policies that accelerate transition.

A company's public policy strategy should be assessed from two perspectives. First, investors should examine whether government support and policy frameworks translate into investment decisions. A company may mention the K-Steel Act, K-GX, Korea's Emissions Trading Scheme(K-ETS), or electricity and hydrogen infrastructure policies, but it is difficult to assess the feasibility of its transition plan unless the company explains how these policies are tied to its project timelines, including asset-level investments, demonstration projects, and commercial-scale production.

Second, investors should assess whether a company's policy engagement activities are consistent with its transition goals. A company may publicly commit to carbon neutrality and low-carbon transition while simultaneously lobbying to delay or weaken regulatory action. Such inconsistencies should raise concerns about the credibility of the company's transition plan. It is important to note that industry associations' activities may diverge from a company's official position, requiring an independent assessment of the company's actions.

Below are relevant questions investors can ask during company engagements:

- How are the K-Steel Act, K-GX, ETS, electricity and hydrogen infrastructure policies, and public finance tied to which specific low-carbon investment project?
- What contingency plans are in place in the event that policy implementation is delayed or government funding remains uncommitted?
- Do the company's policy positions and its industry associations' activities align with carbon neutrality goals?
- Does the company plan to regularly publish a review of its industry associations' activities, along with corresponding countermeasures?

Public benchmark datasets can provide a basis for such assessments.

① CA100+ Benchmark's 'Climate Policy Engagement' indicator evaluates whether a company's climate policy engagement actions align with the goals of the Paris Agreement. POSCO Holdings does not meet the criteria for this indicator (**[Table 7]**). While this assessment does not necessarily imply that the company's policy engagement activities run counter to decarbonization, it does indicate that investors may demand additional disclosure regarding its direct climate policy positions, its industry associations' activities, and the process for reviewing these activities.

② InfluenceMap analyzes the alignment of corporate climate policy engagement (both direct and indirect) with a 1.5°C pathway, as well as the quality and completeness of related disclosures. POSCO Holdings received an overall D+ grade with an Engagement Intensity score of 33, while Hyundai Steel received a C- grade with an Engagement Intensity score of 9 (**[Table 8]**). This analysis indicates a need to further evaluate both companies on their direction and the transparency of their policy engagement activities. In particular, given POSCO Holdings' relatively high engagement intensity, investors should assess whether its engagement actions align with the carbon-neutrality targets and low-carbon transition plans.

[Table 7] Climate Policy Engagement Performance of Major Steelmakers Based on the CA100+ Benchmark Assessment

CA100+ Indicator	POSCO Holdings	Baoshan Iron & Steel Co	China Steel	Nippon Steel	Tata Steel	Arcelor Mittal	SSAB AB	Thyssenkrupp AG	Bluescope Steel
7. Climate policy engagement	X	X	△	X	X	O	X	△	X

Source: Climate Action 100+

[Table 8] Climate Policy Engagement Performance and Engagement Intensity of Major Steelmakers Based on InfluenceMap's Assessment

Company	InfluenceMap Performance Band	Policy Engagement Intensity
Tokyo Steel	A-	13
SSAB	C+	44
ArcelorMittal Nippon Steel India (AM/NS India)	C+	12
Tata Steel	C	33
Baowu Steel Group	C	15
Bluescope Steel	C-	31
Hyundai Steel	C-	9
thyssenkrupp	C-	31
Rio Tinto Group	C-	35
ArcelorMittal	D+	46
POSCO Holdings	D+	33
Nippon Steel	D+	44
Kobe Steel	D	5
China Steel	D-	10
Nucor Corporation	D-	9

Source: InfluenceMap

4. Investor Engagement Case Studies

Global investors have already engaged repeatedly with domestic and international steelmakers. Today, investors are looking beyond carbon neutrality pledges to engage on more specific metrics, including near-term GHG reduction targets around 2030, asset transition plans, low-carbon investments, policy engagement transparency, and remuneration schemes linked to reduction targets.

International **ArcelorMittal**

- **Investor**: LAPFF, Ruffer, Aegon Asset Management, and other CA100+ investor group members
- **Period**: 2018-2020

Investors demanded that the company specify its carbon-neutrality targets, strategies for responding to evolving policy environments, and its position on the EU Carbon Border Adjustment Mechanism.

In response, the company published its first Climate Action Report in 2019 and announced target to reduce emissions by 30% by 2030 in its European operations. The company also shared an internal assessment of its industry association memberships.

- **Investor**: LAPFF, Ruffer, Aegon Asset Management, and other CA100+ investor group members
- **Period**: 2021

During a pre-AGM Q&A session in 2021, investors evaluated the company's progress on climate action and asked whether hydrogen-based DRI and electrolysis technologies were included as key low-carbon steel technology routes being pursued, and whether the company could accelerate the adoption timeline. Investors also urged the company to include an assessment of progress against the CA100+ benchmark in its next Climate Action Report and improve its disclosures on climate lobbying and industry associations' activities.

In response, the company reaffirmed its commitment to achieving net zero by 2050 and a 30% reduction in carbon emissions in Europe by 2030. It also confirmed that hydrogen-based DRI and electrolysis were part of its key low-carbon technology routes. However, the company noted that electrolysis is still in the research and development phase, while hydrogen-based DRI is more advanced. In addition, the company stated that the forthcoming Climate Action Report 2 will include an assessment of progress against the CA100+ benchmark, as well as additional disclosures on its climate policy positions and internal processes that enable alignment on its advocacy activities, both direct and indirect. The company also shared its plan to update its Climate Policy Mapping Report.

- **Investor**: Shareholders and institutional investors at the AGM
- **Period**: 2025

At the 2025 AGM, investors asked questions regarding the company's sustainability strategy, decarbonization strategy and roadmap, decarbonization investments, remuneration and performance criteria, the Board's sustainability and climate-related skills, and corporate governance.

The company explained that it had provided an update on its climate progress in its 2024 Sustainability Report, while also noting that achieving its 2030 reduction targets was becoming increasingly difficult due to policy uncertainty. The company added that the decarbonization CapEx will be contained within the annual CapEx envelope of USD 4.5-5 billion.

International Nippon Steel

- **Investor**: CA100+ investor group
- **Period**: 2019-2025

Investors called for refinement of its GHG reduction targets to cover overseas operations, Paris alignment, and improved transparency in its external climate policy engagement activities. On policy engagement, investors sent a letter outlining their priorities and encouraged discussions with InfluenceMap. Investors also held an investor-company roundtable in 2023 and visited Nippon Steel's steelworks in Chiba, Japan, in 2024.

In April 2025, the company published its climate and energy policy position along with its first review of industry associations. In May 2025, the company also announced that it would invest JPY 868.7 billion in EAF expansion.

- **Investor**: LGIM, ACCR, Corporate Action Japan (CAJ), Amundi, Nordea Asset Management, Storebrand Asset Management, and others
- **Period**: 2024

Ahead of the 2024 AGM, investors jointly filed three shareholder proposals, asking for ① disclosure of GHG reduction targets aligned to the goals of the Paris Agreement for scope 1, 2, and 3 emissions, along with disclosure of CapEx for decarbonization investments, ② executive remuneration to be linked to GHG reduction targets, and ③ improved disclosure of climate-related lobbying activities.

Regarding the proposals, shareholders explained that the company's reduction targets were not Paris-aligned and that its decarbonization strategy relies heavily on technologies that have not been proven to materialize, presenting risks to shareholders, including the risk of stranded assets. The investors also pointed out that the company's current reporting is insufficient for investors to properly assess whether its climate lobbying activities align with its decarbonization targets and the goals of the Paris Agreement.

International

JFE Holdings

- **Investor**: ACCR, Corporate Action Japan (CAJ), and investor groups
- **Period**: 2023

Ahead of the 2023 AGM, ACCR and CAJ, alongside a broader group of investors, filed climate-related shareholder proposals calling for a Paris-aligned decarbonization strategy, enhanced reduction targets for Scope 1, 2, and 3 emissions, disclosure of planned CapEx for decarbonization investments, and improved disclosure of climate-related lobbying activities.

Subsequently, the company announced a new climate strategy, reaffirming its commitments to a 30% reduction in Scope 1 and 2 emissions by 2030 and to achieving carbon neutrality by 2050. Additionally, the company published its capital investment plans, which included the installation of large-scale EAFs and increased scrap use. It also enhanced disclosures regarding its climate policy positions, trade association activities, and policy engagement.

South Korea Hyundai Steel

- **Investor**: APG
- **Period**: 2022

In February 2022, APG sent a letter to 10 major carbon emitters in South Korea, including Hyundai Steel, asking whether their emissions-reduction targets were ambitious enough, whether they were investing sufficiently in these efforts, and whether they were communicating sufficiently with shareholders about their emissions to ensure shareholders understood the risks involved.

Following this engagement, the company announced its first long-term reduction target.

South Korea POSCO Holdings

- **Investor**: EOS at Federated Hermes and CA100+ investor group
- **Period**: 2016-2021

EOS engaged with POSCO Holdings on climate change as a co-lead for the company under CA100+. The investor asked the company to set long-term targets for reducing its Scope 1 and 2 emissions in line with the Paris Agreement, adopt the TCFD recommendations, set short- and medium-term targets, present a decarbonization strategy, ensure alignment of CapEx and R&D spend, and strengthen corporate governance.

Following the engagement, POSCO Holdings has set targets to reduce emissions by 20% by 2030, by 50% by 2040, and achieve carbon neutrality by 2050, against the 2017-2019 average baseline of its Scope 1 and 2 emissions.

IV. Conclusion

The K-Steel Act sends an important policy signal for the low-carbon steel transition in South Korea. However, policy support alone does not guarantee an outcome. While policy can create enabling environments, it is ultimately business strategies and investment decisions that will determine the pace and scale of transition achieved.

Against this backdrop, institutional investors have a critical role to play. A steelmaker's climate profile is never an isolated issue confined to a single company, as the steel sector is a major driver of financed emissions and downstream sectors' Scope 3 emissions while acting as a major anchor for hydrogen demand. Meanwhile, large, long-term institutional investors like the NPS typically invest not only in steelmakers but also across the automotive, shipbuilding, construction, machinery, infrastructure, hydrogen, and power sectors. Therefore, engagement with steelmakers should be viewed as more than a sector-specific intervention. Rather, it can serve as an effective mechanism for investors to manage climate transition risks while unlocking growth opportunities across the broader portfolio.

Global investors are already pointing in this direction. Investors are no longer just demanding better disclosures. They now assess the credibility of transition plans, CapEx alignment, and policy engagement transparency. Investor engagement is, therefore, a process of turning climate agenda into financial and operational business questions. At its core, investors should seek to assess how long steelmakers plan to operate each of their current assets, how much capital they intend to allocate to specific technologies, how they plan to secure clean hydrogen and low-carbon electricity, and how government support measures are tied to their specific transition projects.

The priorities for investor engagement are clear. First, investors should demand asset-level transition plans. They should move beyond 2050 targets to assess the decommissioning and transition timeline for each asset and the evolution of the steel production technology mix leading up to 2030. Second, it is critical to distinguish investments that advance low-carbon transition from those that maintain existing facilities. Based on this, investors must assess whether investments in blast furnace maintenance or relining are consistent with its transition pathway. Third, investors must evaluate how the government support measures tie into companies' low-carbon investment timelines, while verifying whether policy frameworks—such as the K-Steel Act, K-GX, and electricity and hydrogen initiatives—are translating into low-carbon facility investments.

Steelmakers may point to low technological maturity, policy uncertainty, and the commercial viability of hydrogen as barriers to transition. However, company-investor engagement must move beyond these broad discussions to focus on concrete, credible implementation plans. For instance, if low-carbon technologies are still in their early stages, the company should provide demonstration project timelines and milestones for commercial deployment. If policy environments remain uncertain, companies should present alternative low-carbon investment strategies. Furthermore, if hydrogen remains a long-term challenge, companies should provide near-term procurement plans, power purchase agreements, and demonstration project timelines leading up to 2030.

Ultimately, South Korea’s steel transition hinges on execution, not ambition or strategy. Investors should therefore continuously assess whether steelmakers are executing transition strategies and deploying capital toward low-carbon initiatives, including transition to low-carbon steel production, procurement of clean hydrogen and low-carbon electricity, and expansion of EAF and H_2-DRI capacity. For long-term investors, this represents a practical engagement strategy to address sector-specific transition risks while simultaneously reducing downstream sectors’ value chain emissions and unlocking growth opportunities in the hydrogen economy at the portfolio level.

Appendix 1:

Methodology Used to Estimate and Calculate Financed Emissions from NPS's Domestic Equity Investments

This analysis was conducted to estimate the financed emissions associated with the NPS's domestic equity portfolio, based on the stock holdings disclosed by the Fund at the end of 2024. Financed emissions were calculated by attributing investees' emissions to the NPS in proportion to the market value of the Fund's holdings in those companies.

1) Selecting Analysis Group

The NPS disclosed 1,200 holdings of South Korean equities as of year-end 2024. Among these, stock listings representing the same company but traded under different ticker symbols—such as preferred stocks—were consolidated into a single entity. Through this process, the analysis group was adjusted from 1,200 to 1,139 holdings.

Within this group, companies were further selected based on the following criteria:

① Top 250 holdings by market value

② Additional 45 holdings that fell outside the top 250, but with NPS's stake of 5% or higher

As a result, an initial group of 295 companies were selected, which together account for approximately 97% of the NPS's domestic equity portfolio value.

However, not all companies disclose their GHG emissions data. Therefore, the final analysis group was selected to include companies whose emissions data were available through sustainability reports, corporate websites, or other sources. As a result, financed emissions were calculated for a final sample of 242 companies, which comprise approximately 95% of the NPS's domestic equity portfolio value.

2) Data Processing

The analysis was conducted based on the following steps.

① The NPS's domestic equity holdings data as of year-end 2024 were downloaded from the Fund's website.
② These holdings data were matched to their corresponding ticker symbols.
③ Using the ticker symbols, corporate financial and emissions data were collected from Bloomberg to the greatest extent possible.
④ Stock listings representing the same company but traded under different ticker symbols—to represent preferred stocks, bonus shares, or other classes—were consolidated to treat each issuer as a single corporate entity.

3) GHG Emissions Data

For this analysis, companies' self-reported emissions data available through public disclosures (e.g., sustainability reports and corporate websites) were prioritized.

For Scope 2 emissions, where companies disclosed both market-based and location-based figures, the location-based emissions were used. This approach was adopted to more consistently reflect the companies' GHG emissions exposure to energy systems resulting from electricity consumption.

For Scope 3 emissions, while companies' self-reported data were prioritized, the completeness of their disclosure scope was also considered. For financial institutions, Category 15 investment emissions were included whenever available. Where Scope 3 disclosures were limited to selected categories, such as business travel, waste generated in operations, or purchased goods and services, third-party estimates from sources including Bloomberg were used as a supplement. It should be noted, however, that this approach may result in double counting of non-financial entities' emissions and financial institutions' investment emissions.

4) Holding Companies and Corporate Group Structures

For holding companies, consolidated or group-wide GHG emissions data were used whenever available. This approach reflects the NPS's economic exposure to the entire group through its equity stakes in the holding company. However, where the NPS holds investments in both a holding company and its publicly listed subsidiaries, some double counting of emissions may occur. This limitation is inherent in calculating the emissions of South Korean conglomerates, due to their unique corporate governance structures and the EVIC-based attribution methodologies applied.

5) Financed Emissions Calculation Methodology

Financed emissions were calculated by multiplying each investee company's GHG emissions by the NPS's investment share in the company. The calculation formula is as follows:

Financed Emissions =
Investee company's emissions x Current value of the NPS's investment in the investee / EVIC

The EVIC values applied in these calculations were obtained from Bloomberg.

6) Analysis Limitations

As this analysis relies on public disclosures and third-party data, it is subject to several limitations.

First, the scope and quality of GHG emissions disclosures vary across companies. Some companies only disclose Scope 1 and 2 emissions, while the completeness of Scope 3 disclosures varies by category.

Second, the Scope 3 emissions of financial institutions can vary significantly depending on whether investment emissions are included. Therefore, for financial institutions, the completeness of disclosure scope was carefully assessed, and third-party estimates were used where necessary.

Third, where both a holding company and its publicly listed subsidiaries are included, overlapping economic exposures may occur. This is an inherent limitation arising from the governance structures of South Korean conglomerates and the investment value-based attribution methodologies applied.

Fourth, among the total 1,200 domestic stocks held by the NPS, the analysis covers 242 companies for which GHG emissions data were available. While these companies account for approximately 95% of the total portfolio value, the analysis does not cover all 1,200 holdings.

Despite these limitations, this analysis is valuable for identifying which companies and sectors contribute most to the NPS's financed emissions within its domestic equity portfolio. In particular, by examining the contribution of the steel sector and its downstream sectors, this analysis can serve as a foundational framework for institutional investors to manage climate risk and define engagement priorities.

Appendix 2:

Downstream Steel Users in NPS Domestic Equity Portfolio (As of End-2024)

Company	Ticker	Industry Group	Industry Subgroup
Hyundai Motor Company	005380	Auto Manufacturers	Auto-Cars/Light Trucks
Kia	000270	Auto Manufacturers	Auto-Cars/Light Trucks
Hyundai Mobis	012330	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig
HD Hyundai Heavy Industries	329180	Shipbuilding	Shipbuilding
Samsung C&T	028260	Engineering&Construction	Building&Construct-Misc
Hanwha Aerospace	012450	Aerospace/Defense	Aerospace/Defense
LG Electronics	066570	Home Furnishings	Audio/Video Products
HD Korea Shipbuilding & Offshore Engineering	009540	Shipbuilding	Shipbuilding
HD Hyundai Electric	267260	Machinery-Constr&Mining	Machinery-Electric Util
Doosan Enerbility	034020	Machinery-Constr&Mining	Machinery-Constr&Mining
Samsung Heavy Industries	010140	Shipbuilding	Shipbuilding
Hanwha Ocean	042660	Shipbuilding	Shipbuilding
HD Hyundai Mipo	010620	Shipbuilding	Shipbuilding
HD Hyundai Marine Solution	443060	Shipbuilding	Shipbuilding
LIG Defense & Aerospace	079550	Aerospace/Defense	Aerospace/Defense
Korea Aerospace Industries	047810	Aerospace/Defense	Aerospace/Defense
Hyosung Heavy Industries	298040	Machinery-Constr&Mining	Machinery-Electric Util
LS ELECTRIC	010120	Machinery-Constr&Mining	Machinery-Electric Util
Hyundai Rotem	064350	Miscellaneous Manufactur	Miscellaneous Manufactur
Hankook Tire & Technology	161390	Auto Parts&Equipment	Rubber-Tires
Doosan Bobcat	241560	Machinery-Constr&Mining	Machinery-Constr&Mining
HL Mando	204320	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig

Source: Bloomberg

Company	Ticker	Industry Group	Industry Subgroup
Samsung E&A	028050	Engineering&Construction	Engineering/R&D Services
KCC	002380	Chemicals	Coatings/Paint
Hyundai Engineering & Construction	000720	Engineering&Construction	Building&Construct-Misc
Hanwha Engine	082740	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig
Hyundai Elevator	017800	Machinery-Diversified	Machinery-General Indust
IPARK Hyundai Development	294870	Engineering&Construction	Building&Construct-Misc
HD Hyundai Infracore	042670	Machinery-Constr&Mining	Machinery-Constr&Mining
DL E&C	375500	Engineering&Construction	Building&Construct-Misc
GS Engineering & Construction	006360	Engineering&Construction	Building&Construct-Misc
Hanon Systems	018880	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig
Taihan Cable & Solution	001440	Electrical Compo&Equip	Wire&Cable Products
SL	005850	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig
Iljin Electric	103590	Electrical Compo&Equip	Electric Products-Misc
HD Construction Equipment	267270	Machinery-Constr&Mining	Machinery-Constr&Mining
Kyung Dong Navien	009450	Building Materials	Bldg Prod-Air&Heating
Hyundai Wia	011210	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig
Daewoo Engineering & Construction	047040	Engineering&Construction	Building&Construct-Misc
DN Automotive	007340	Auto Parts&Equipment	Auto/Trk Prts&Equip-Orig
Doosan Fuel Cell	336260	Energy-Alternate Sources	Energy-Alternate Sources
SK oceanplan	100090	Shipbuilding	Shipbuilding
Nexen Tire	002350	Auto Parts&Equipment	Rubber-Tires
IS Dongseo	010780	Engineering&Construction	Building&Construct-Misc

Source: Bloomberg

Reference List

- ACCR. (n.d.). “JFE Holdings shareholders welcome company’s new climate commitments.” https://www.accr.org.au/news/jfe-holdings-shareholders-welcome-company%E2%80%99s-new-climate-commitments/
- APG. (2022). “APG urges Korean companies to take strong climate action.” https://apg.nl/en/publication/apg-urges-korean-companies-to-take-strong-climate-action/
- APG. (2022). “Without Asia-Pacific, we won’t achieve climate neutrality by 2050.” https://apg.nl/en/publication/without-asia-pacific-we-won-t-achieve-climate-neutrality-by-2050/
- ArcelorMittal. (2021). “Virtual Q&A session before AGM.” https://cdn.arcelormittal.com/media/ze3bi003/virtual-q-a-session-before-agm.pdf
- ArcelorMittal. (2025). “Minutes of the Annual General Meeting of Shareholders.” https://cdn.arcelormittal.com/media/ce5bjfdh/agm-2025-minutes.pdf
- Climate Action 100+. (2025). “Nippon Steel: Advancing climate policy disclosure and decarbonisation efforts.” https://www.climateaction100.org/news/nippon-steel-advancing-climate-policy-disclosure-and-decarbonisation-efforts/
- Climate Action 100+. (n.d.). “ArcelorMittal S.A.” https://www.climateaction100.org/company-assessments/arcelormittal-s-a/
- Climate Action 100+. (n.d.). “Baoshan Iron & Steel Co., Ltd.” https://www.climateaction100.org/company-assessments/baoshan-iron-steel-co-ltd/
- Climate Action 100+. (n.d.). “Bluescope Steel Ltd.” https://www.climateaction100.org/company-assessments/bluescope-steel-ltd/
- Climate Action 100+. (n.d.). “China Steel Corp.” https://www.climateaction100.org/company-assessments/china-steel-corp/
- Climate Action 100+. (n.d.). “Nippon Steel Corp.” https://www.climateaction100.org/company-assessments/nippon-steel-corp/
- Climate Action 100+. (n.d.). “POSCO Holdings Inc.” https://www.climateaction100.org/company-assessments/posco-holdings-inc/
- Climate Action 100+. (n.d.). “SSAB AB.” https://www.climateaction100.org/company-assessments/ssab-ab/
- Climate Action 100+. (n.d.). “Tata Steel Ltd.” https://www.climateaction100.org/company-assessments/tata-steel-ltd/
- Climate Action 100+. (n.d.). “Thyssenkrupp AG.” https://www.climateaction100.org/company-assessments/thyssenkrupp-ag/

- Corporate Action Japan. (2024). “Global Asset Managers Back Shareholder Proposals Urging Nippon Steel to Lead on Steel Decarbonisation.”
  https://corporateactionjapan.org/en/news/announcement/global-asset-managers-back-shareholder-proposals-urging-nippon-steel-to-lead-on-steel-decarbonisation/
- EOS at Federated Hermes. (2021). “Public Engagement Report Q2 2021: Abate and switch.”
  https://www.hermes-investment.com/uploads/2021/10/d27d70d6e9ab5ab19b45b663992c6adc/eos-per-q2-2021-abate-and-switch.pdf
- Global Energy Monitor. (n.d.). “Global Iron and Steel Tracker.”
  https://globalenergymonitor.org/projects/global-iron-steel-tracker?popup=5692
- InfluenceMap. (n.d.). “LobbyMap Scores.”
  https://lobbymap.org/KR/LobbyMapScores
- LAPFF. (2020). “ArcelorMittal progress on tackling carbon emissions.”
  https://lapfforum.org/engagements/arcelormittal-progress-on-tackling-carbon-emissions/
- PwC. (2024). “수소 사업 전략 수립을 위한 제언: 탈탄소 시대를 위한 미래 에너지의 새로운 대안.”
  https://www.pwc.com/kr/ko/insights/industry-focus/hydrogen-business-strategy.html
- SteelWatch. (n.d.). “Scorecard – Hyundai Steel.”
  https://steelwatch.org/tracker/company/hyundai-steel/
- SteelWatch. (n.d.). “Scorecard – POSCO.”
  https://steelwatch.org/scorecard/?company=posco
- SteelWatch. (n.d.). “Scorecard.”
  https://steelwatch.org/scorecard/
- Transition Pathway Initiative. (n.d.). “Steel.”
  https://www.transitionpathwayinitiative.org/sectors/steel
- World Benchmarking Alliance. (n.d.). “ACT Core – ArcelorMittal S.A.”
  https://www.worldbenchmarkingalliance.org/company/arcelormittal
- World Benchmarking Alliance. (n.d.). “ACT Core – Company Scoreboard.”
  https://www.worldbenchmarkingalliance.org/benchmark/act-core
- World Benchmarking Alliance. (n.d.). “ACT Core – China Steel Corp.”
  https://www.worldbenchmarkingalliance.org/company/china-steel
- World Benchmarking Alliance. (n.d.). “ACT Core – Hyundai Steel.”
  https://www.worldbenchmarkingalliance.org/company/hyundai-steel
- World Benchmarking Alliance. (n.d.). “ACT Core – Nippon Steel Corp.”
  https://www.worldbenchmarkingalliance.org/company/nippon-steel

- World Benchmarking Alliance. (n.d.). "ACT Core – POSCO Holdings." https://www.worldbenchmarkingalliance.org/company/posco-holdings
- World Benchmarking Alliance. (n.d.). "ACT Core – SSAB AB." https://www.worldbenchmarkingalliance.org/company/ssab
- World Benchmarking Alliance. (n.d.). "ACT Core – Tata Steel." https://www.worldbenchmarkingalliance.org/company/tata-steel
- World Benchmarking Alliance. (n.d.). "ACT Core – Thyssenkrupp AG." https://www.worldbenchmarkingalliance.org/company/thyssenkrupp
- World Steel Association. (2025). "World Steel in Figures 2025." https://worldsteel.org/data/world-steel-in-figures/world-steel-in-figures-2025/
- 국가기후위기대응위원회. (2025). "우리나라 온실가스 배출량(국가 온실가스 통계)." https://www.pcccr.go.kr/base/board/read?boardManagementNo=69&boardNo=6655&page=1&search-Category=&searchType=&searchWord=&menuLevel=2&menuNo=97
- 국민연금 기금운용본부. (2025). "국내주식 보유 현황. https://fund.nps.or.kr/oprtprcn/ivsmprcn/getOHED0003M0.do?menuId=MN24000616
- 기후솔루션. (2025). "[미디어킷] 게임의 룰이 바뀐다: K-철강 넷제로 전환의 조건 4가지." https://forourclimate.org/ko/newsroom/1181
- 기후솔루션. (2025). "속도가 만드는 경제적 편익: 철강산업 저탄소 전환의 사회경제적 효과 분석." https://forourclimate.org/ko/research/635
- 기후솔루션. (2025). "수소환원제철 국내 정착을 위한 핵심 과제: 그린수소 조달 방안을 중심으로." https://forourclimate.org/ko/research/587
- 산업통상자원부. (2021). "제1차 수소경제 이행 기본계획." https://www.motir.go.kr/kor/article/ATCLc01b2801b/67130/view
- 중앙일보. (2025). "'K-스틸법' 통과에 철강업계 환영…'40년만에 철강 지원법 부활'." https://www.joongang.co.kr/article/25385685
- 지표누리. (n.d.). "철강산업동향." https://www.index.go.kr/unity/potal/main/EachDtlPageDetail.do?idx_cd=1152
- 페로타임즈. (2025). "[기획특집] 벼랑 끝의 포항 철강산업, 'K-스틸법'과 'HyREX'로 대전환." https://www.ferrotimes.com/news/articleView.html?idxno=46039
- 포스코그룹 뉴스룸. (2025). "철강산업, K-스틸법과 함께 미래를 그리다." https://newsroom.posco.com/kr/%EA%B8%80%EB%A1%9C%EB%B2%8C-%EC%9D%B4%EC%8A%88-%EB%A6%AC%ED%8F%AC%ED%8A%B8-%EC%B2%A0%EA%B0%95%EC%82%B0%EC%97%85-k-%EC%8A%A4%ED%8B%B8%EB%B2%95%EA%B3%BC-%ED%95%A8%EA%BB%98-%EB%AF%B8%EB%9E%98%EB%A5%BC/
- 한국철강협회. (2025). "철강보 7·8월호."

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