South Korea’s Steel Industry at a Crossroads:

Developing a Green Steel Standard

South Korea's Steel Industry at a Crossroads:

Developing a Credible Green Steel Standard

Publication Date July 2026

Author **Chuyi Lu** | Steel Team, SFOC | chuyi.lu@forourclimate.org

Assistance **Heather Lee, Haebin Gahng, Juna Hwang, Ayantu Mossisa, Chaeleen 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.

Table of Contents

Executive Summary

South Korea's steel industry is at a critical juncture. As one of the world's largest steel producers and exporters, South Korea faces growing pressure to decarbonize while maintaining its international competitiveness. At the same time, the government has identified hydrogen-based direct reduced iron (H_2-DRI) as a key long-term pathway for steel sector decarbonization and has begun establishing policy frameworks to support this transition through the K-GX and the K-Steel Act.

However, South Korea currently lacks a clear and credible green steel standard. If weak certification criteria are adopted, steelmakers may receive green steel recognition without fundamentally transforming production processes, risking continued reliance on carbon intensive blast furnace (BF) production. Green steel standards are not merely product-labeling tools; they influence investment decisions, green technology deployment, market development, and the pace of industrial transition.

Internationally, green steel standards are evolving rapidly. Across major standards, regulatory frameworks, and buyer initiatives, there is growing convergence around clear carbon intensity thresholds and stronger requirements for physical traceability. Taken together, these developments reflect a broader shift: green steel standards are increasingly designed to drive genuine industrial transition, rather than reward incremental emissions reductions within carbon intensive production systems. In this context, standard design plays a decisive role in determining whether market recognition and policy support accelerate the shift away from BF-based production toward genuinely low-emission steelmaking pathways such as H_2-DRI.

For South Korea, the design of a green steel standard will play an important role in determining whether the steel sector successfully transitions toward H_2-DRI production or remains locked into BF-based pathways. To support a credible and competitive transition, South Korea should:

- Avoid mass-balance approaches that allow BF-based production systems to receive green steel recognition without fundamental technological transition.
- Adopt clear, performance-based carbon intensity thresholds grounded in real emissions reductions.

- Align green steel definitions with internationally recognized principles and emerging global trade frameworks.
- Regularly update the standard to remain aligned with technological progress and the H_2-DRI transition.

The choices South Korea makes today in defining green steel will help determine whether its steel sector successfully transitions toward hydrogen-based production or remains locked into carbon intensive BF pathways. A credible green steel standard can strengthen market confidence, improve international competitiveness, and accelerate the decarbonization of South Korea's steel industry.

The Pitfalls of Defining 'Green'

In 2023, POSCO's carbon neutrality brand "Greenate" was reported to the Korea Fair Trade Commission and the Ministry of Environment on allegations of greenwashing. Solutions for Our Climate (SFOC) found that its Greenate Certified Steel™ applies a mass balance approach and that the actual emissions reductions attributed to the product were negligible[1], highlighting a clear mismatch between ambitious announcement and actual decarbonization outcomes. While the controversy centered on a single product line, it exposed a broader challenge facing the steel sector: how should green steel be defined, measured, and verified?

Therefore, this report explains why green steel standards matter, examines emerging approaches to standard-setting, and assesses how different design choices may influence the competitiveness and long-term decarbonization of the South Korean steel industry.

1 Lee, H. & Cho, S. (2024)

1. The Importance of Green Steel Standards

As one of the highest-emitting sectors in the world, steel accounts for roughly 7-8% of global annual greenhouse gas (GHG) emissions[2], and around 70% of global steel production still relies on coal-based blast furnace (BF) process[3], making the sector a critical bottleneck in efforts to achieve global decarbonization. As efforts to decarbonize heavy industries accelerate and net zero targets become a de facto requirement, steel has become a focal point of climate policy, trade governance and industrial transition.

In response, "green steel" has emerged as a key solution. In principle, green steel refers to steel produced with significantly lower GHG emissions than conventional steel. With increasing attention, not only from governments but also from downstream manufacturers, investors, and civil society, green steel is becoming established as a defined market category that is expected to demonstrate measurable, verifiable and comparable emissions reductions.

Green steel standards therefore play a vital role in shaping the future of green steel and the whole steel sector. By establishing criteria for what qualifies as green steel, standards influence which production pathways are recognized as genuinely low emission and therefore eligible for market recognition, policy support, and investment. As a result, green steel standards do not just classify products; they function as industrial transition mechanisms that shape investment decisions, green technology deployment, and the pace of the transition away from carbon-intensive BF-based production.

Beyond their role in shaping industrial transition, standards can also improve transparency and credibility in the market. Across markets, terms such as "green steel", "low-carbon steel" and "near-zero-emission steel" are used inconsistently, reflecting different benchmarks, system boundaries, and emission accounting methods. This lack of clarity makes it difficult to compare steel products, assess emissions reductions, and distinguish meaningful decarbonization. Standards can therefore help improve comparability and reduce the risk of greenwashing, while ensuring that green steel claims are linked to genuine decarbonization outcomes.

2 World Steel Association (2025)
3 IEA (2025)

The implications extend across the entire steel value chain. Most importantly, weak standards can unintentionally prolong reliance on BF-based production by allowing green steel recognition without requiring fundamental technological transition, thereby weakening incentives for steelmakers to invest in low-emission steelmaking pathways.

As a result, a range of follow-up challenges emerge across the market and policy landscape:

- Governments lack a clear foundation for policy design, public procurement, and industrial support measures;
- Downstream buyers, including the automotive industry, face uncertainty about which products should qualify for green steel procurement;
- Investors struggle to assess whether claimed emissions reductions reflect genuine environmental performance and transition progress;
- Consumers and civil society have limited ability to distinguish meaningful decarbonization from greenwashing.

2. South Korea's Steel Transition: Opportunities and Challenges

1) South Korea's Steel Industry Emissions Profile

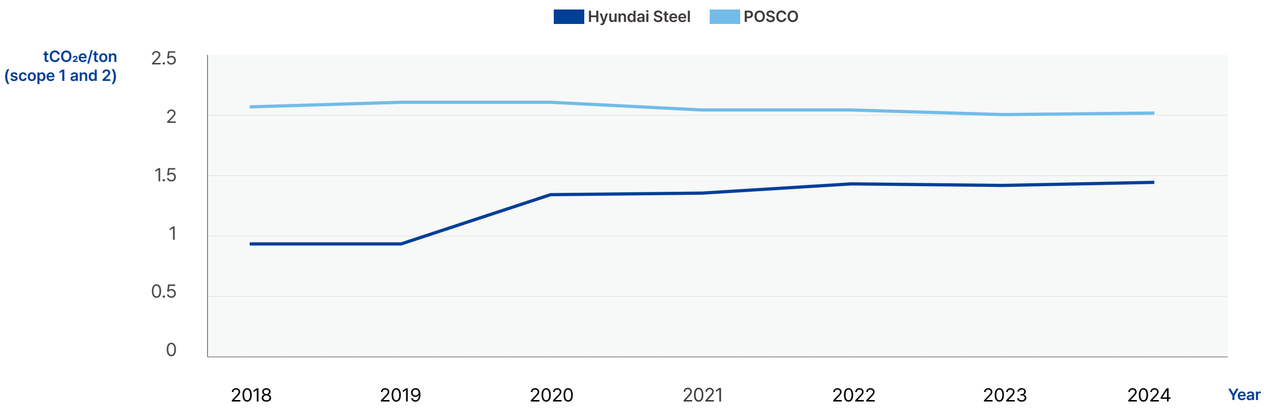
South Korea's steel industry accounts for 14% of the country's total GHG emissions and 40% of total emissions from the industrial sector.[4] The country produces approximately 62.2 million tons of crude steel annually, of which about 70% is produced through BF-based processes. This highlights the steel sector's continued reliance on carbon-intensive production pathways.[5] The country currently operates 11 BFs, with 8 owned by POSCO and 3 by Hyundai Steel.

Against this structural backdrop, both POSCO and Hyundai Steel – the two largest steel producers in South Korea – have publicly announced their 2050 carbon neutrality goals and formulated long-term transformation strategies, including adopting hydrogen-based steelmaking technologies and expanding electric arc furnace (EAF) capacity.[6] However, despite these commitments, meaningful structural changes in the sector have not yet happened.

As shown in Figure 1, Scope 1 and Scope 2 carbon intensity (greenhouse gas emissions per tonne of steel produced)[7] of both companies has shown little improvement in recent years. Overall, despite corporate transition strategies and long-term targets, large-scale emissions reductions in the steel sector remain limited, reflecting the continued structural dependence on blast furnace-based production.

4 KOSA. (n.d.)
5 World Steel Association (2026)
6 Hyundai Steel Company. (n.d.) and POSCO (2025)
7 Scope 1 refers to GHG emissions that are directly emitted from facilities owned or controlled by a company. Scope 2 refers to indirect GHG emissions resulting from the company's consumption of purchased energy, such as electricity and steam. Scope 3 refers to all other indirect GHG emissions associated with the company's activities across its entire value chain.

[Figure 1] Carbon Intensity of Korea's Major Steelmakers[8]



Source: Data derived from Hyundai Steel and POSCO sustainability report factbooks, reorganized by SFOC

2) K-GX and K-Steel Act: A Turning Point for Blast Furnace Phase Out

Recognizing the need to maintain industrial competitiveness while reducing emissions, South Korea has outlined a long-term technological pathway toward decarbonizing its steel sector, centered on the development and deployment of hydrogen-based steelmaking technologies. In November 2025, the Korean government, with relevant ministries, announced the "Plan for the Advancement of the Steel Industry," outlining a phased roadmap for the transition to hydrogen-based steelmaking production ([Table 1]). While commercial deployment is now expected after 2037, the roadmap reflects a clear policy direction: the long-term transformation of Korea's steel sector away from carbon-intensive BF-based production pathways to H_2-DRI.

8 The difference in carbon intensity between Hyundai Steel and POSCO primarily reflects differences in their production structure, with EAF capacity accounting for approximately 49% of Hyundai Steel's total steelmaking capacity compared to around 5% for POSCO (Lee & ASL, 2025)

[Table 1] H_2-DRI Transition Roadmap

Phase	(Original) Timeline	Key Activities	Current Status
Phase 1	2023–2025	Basic technology development for hydrogen-based steelmaking	R&D underway
Phase 2	2026–2030	Demonstration-scale technology development (300,000 tonnes/year)	Preliminary feasibility study completed in June 2025
Phase 3	2031–2035	Scale-up based on demonstration results (2.5 million tonnes/year)	Planned for private-sector implementation
Phase 4	2036–2050	Full transition to hydrogen-based steelmaking (11 blast furnaces → 15 H_2-DRI facilities)	Long-term deployment target (*commercial deployment expected after 2037.[9])

Source: Plan for the Advancement of the Steel Industry, reorganized by SFOC

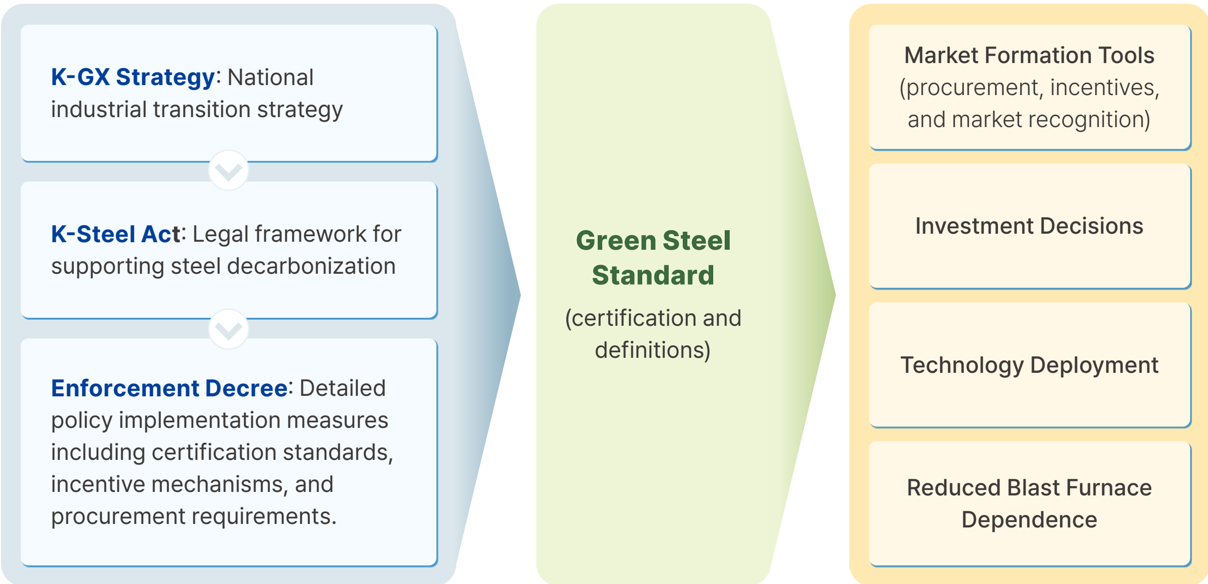
Although decarbonization has been widely recognized as a strategic priority in the steel industry, no certified green steel products have yet emerged at national scale, nor have strong demand-side procurement signals materialized. As a result, the country is entering a critical policy phase in which the rules governing how green steel is defined, certified, and recognized are still being determined.

Against this backdrop, the government has introduced 'South Korea's Green Transformation (hereafter K-GX)' strategy and the enactment of the *'Special Act for Strengthening Steel Industry Competitiveness and Carbon Neutral Transition* (hereafter K-Steel Act),' South Korea's standalone law dedicated to the steel industry. Together, these initiatives seek to support industrial competitiveness, technology deployment, low-carbon product markets, and demand creation through certification, public procurement, and financial incentives. Most importantly, the draft enforcement decree[10] of the K-Steel Act establishes the legal basis for low-carbon steel certification, incentive schemes, and procurement mechanisms. These provisions will determine not only which products qualify for government support, but also which production pathways receive market recognition and policy backing.

9 MCEE (2026)
10 MOTIR (2026)

As illustrated in **[Figure 2]**, green steel standards are not merely technical criteria for certification. They function as policy leverage points that connect broader industrial transition strategies with real-world market outcomes. By influencing market formation, investment decisions, and technology deployment, the design of the green steel standard will ultimately affect whether policy incentives accelerate investment in H_2-DRI or continue to reward incremental improvements within BF-based production systems.

[Figure 2] Role of Green Steel Standards in Reinforcing South Korea's H_2-DRI Transition



Source: SFOC

3) The Cost of Weak Green Steel Standards

A weak green steel standard creates costs that extend beyond questions of definition. Most importantly, it can distort industrial transition by weakening incentives for investment in genuinely low-emission steelmaking pathways. The resulting impact extends across market development, international competitiveness, sustainable finance, and the credibility of environmental claims.

BF Lock-in Risk

Under a weak green steel standard, products that achieve only limited emissions reductions within existing BF-based production systems may still qualify as green steel. This can weaken incentives for investment in transformative technologies and prolong the operational life of carbon-intensive assets.

The risk is particularly significant in South Korea, where steel production remains dominated by BF-based production. A weak standard could allow steelmakers to obtain green steel recognition without fundamentally transforming production processes, thereby delaying investment in and deployment of genuinely low-emission steelmaking pathways such as H_2-DRI. As a result, standards intended to support decarbonization may instead reinforce existing production systems and slow the sector's long-term transition.

Market Uncertainty

Beyond their implications for industrial transition, weak standards can undermine the development of green steel markets. Without a clear and internationally aligned standard, market participants face uncertainty regarding which technologies and production pathways will be recognized as genuinely low emission in future markets. This weakens investment signals, creates uncertainty for buyers and investors, and slows the development of demand for green steel products.

A weak green steel standard can similarly undermine market development. Downstream users remain cautious in procuring green steel products, as they risk purchasing materials that 1) do not clearly demonstrate the quantified amount of carbon emission reduction achieved during production and 2) have not been officially verified as green steel. Market analyses indicate that the lack of a universally recognized standard creates confusion over environmental claims, leading buyers to hesitate due to concerns of credibility, verification, and certification.[11] As a result, green steel has not functioned as trusted procurement products capable of supporting sustained demand-side commitments.

Trade and Policy

South Korea as the world's third-largest steel exporter, also faces rising exposure to global trade regulations such as the EU's Carbon Border Adjustment Mechanism (CBAM), which places a carbon price on the embedded GHG emissions of imported carbon-intensive products including steel. EU CBAM has now entered its operational phase in January 2026. As carbon pricing becomes embedded in trade policy, the competitiveness of steel exports will increasingly depend not only on production costs, but also on whether producers can demonstrate credible and verified low emissions intensity.

In this context, a weak domestic standard can make it harder for exporters to demonstrate genuine low-carbon performance, because products recognized under the weak standard

11 24 Chemical Research (2026)

may not be seen as credible or internationally comparable in markets that increasingly differentiate products based on embedded emissions. This could increase Korean steelmakers' exposure to CBAM-related compliance risks. If CBAM is fully implemented by 2035 and free allowances are phased out, additional costs on Korea's steel exports to Europe are estimated at USD 520 million to USD 1.3 billion.[12]

Greenwashing and Reputational Risks

Weak standards also heighten greenwashing risks at the company level, which in turn creates reputational risks. Without clear criteria and independent verification, companies may market products as "green steel" despite achieving only limited emissions reductions. This can undermine trust in environmental claims, create confusion among buyers and investors, and weaken confidence in the integrity of the emerging green steel market. Over time, credibility gaps may reduce support for genuinely low-emission steel products and slow broader decarbonization efforts.

12 Yun, E. (2026)

3. Green Steel Standard Design Options and Implications

Current international discussions mainly center on 2 distinct methodologies to green steel standard-setting: (1) sliding scale (performance-based) methodology and (2) allocated carbon footprint (mass balance) methodology.

1) Sliding Scale (Performance-Based) Methodology

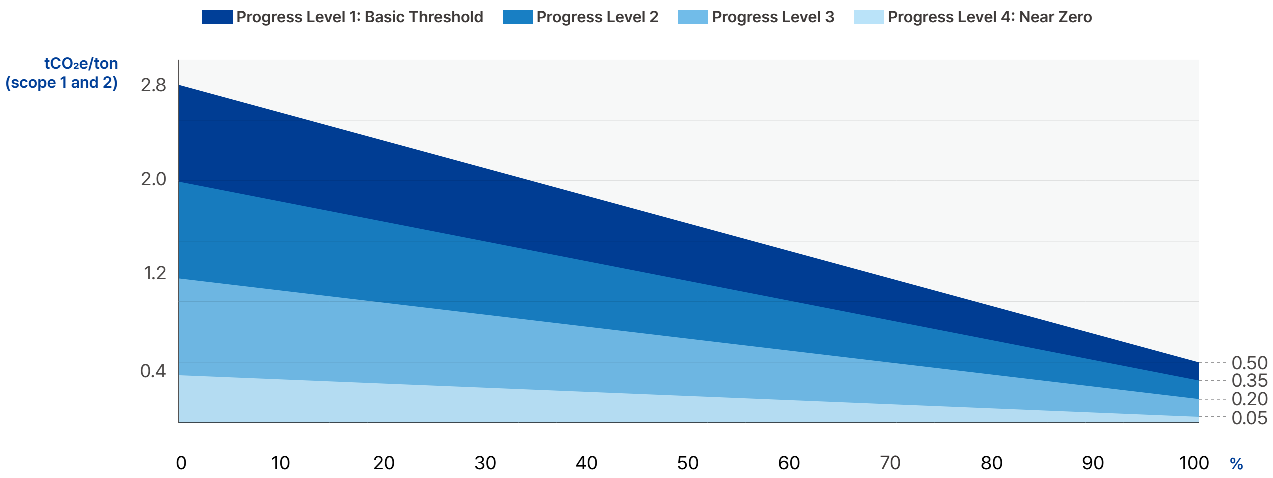
The sliding scale methodology classifies steel products based on product-level carbon intensity, which reflects differences in production routes, including the proportion of steel scrap input. This enables decarbonization performance to be compared across different steelmaking pathways.[13] While several initiatives adopt this principle, they differ in system boundaries[14] and scope coverage levels.

Sliding scale methodology is reflected in several major frameworks, including International Energy Agency (IEA) definitions, the ResponsibleSteel International Production Standard, Europe's Low Emissions Steel Standard (LESS), and China's Low-Carbon Emission Steel (C2F Steel) Standard. As shown in Figure 3, steel products are classified according to emissions performance using progressively stricter thresholds, with higher classifications corresponding to deeper emissions reductions.

13 Blanco Perez et al. (2025)

14 The system boundary refers to the scope of processes and environmental impacts included in an LCA analysis. Typical examples include the "cradle-to-grave", which covers the entire life cycle from raw material extraction to post-use disposal; the "cradle-to-gate", which covers the process from raw material extraction to the point before the product leaves the factory; "gate-to-gate," which focuses solely on a specific production process, and "cradle-to-cradle," a circular economy approach that considers reuse and recycling.

[Figure 3] Environmental Performance Levels defined by ResponsibleSteel



Source: ResponsibleSteel (2024), reorganized by SFOC

Sliding scale methodologies are widely supported by international organizations, standard-setting bodies, and steel manufacturers participating in global decarbonization efforts. Ongoing interoperability efforts among leading standards further demonstrate growing stakeholder consensus on foundational elements of green steel standards, particularly carbon intensity thresholds and physical traceability. However, the application of sliding scale approaches may be shaped by country-specific structural constraints, including scrap availability, despite increasing convergence in international standard-setting efforts.

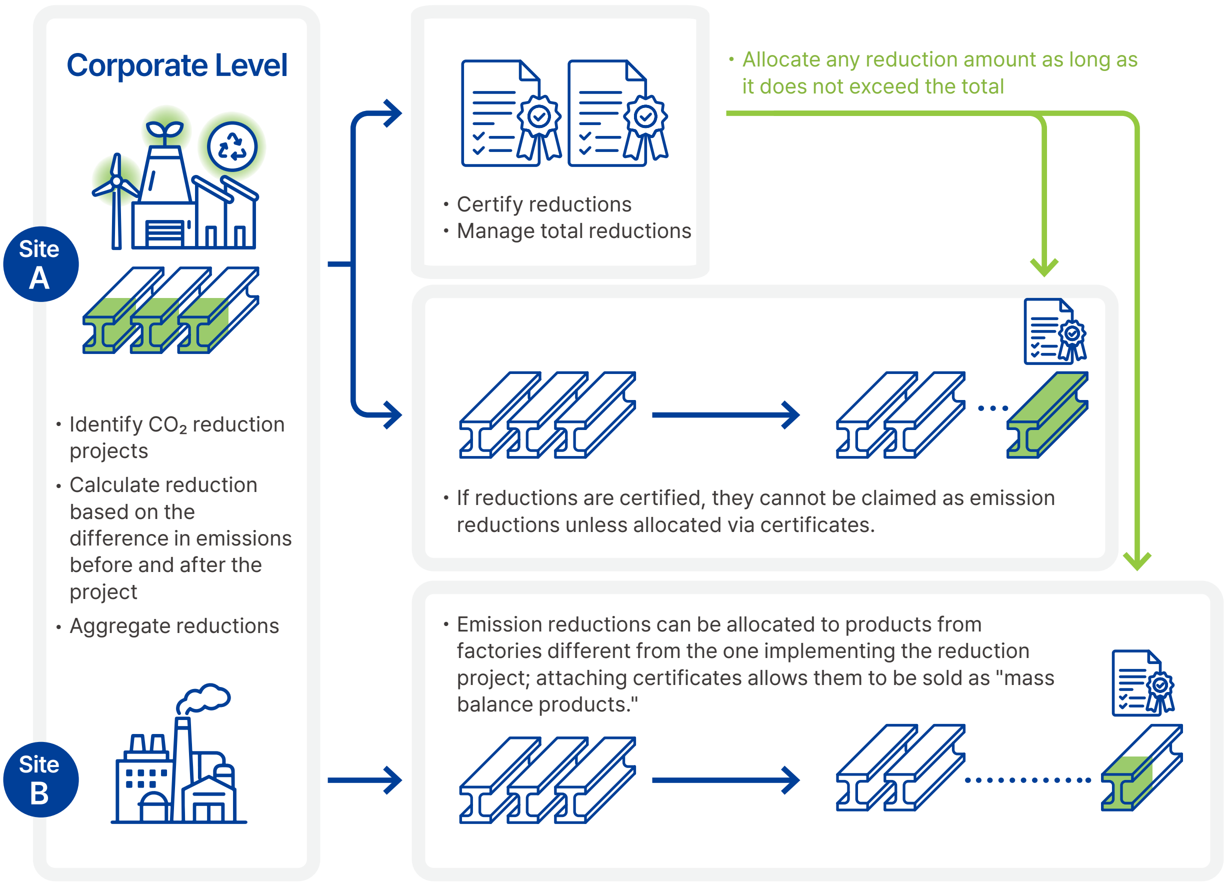
2) Allocated Carbon Footprint (Mass Balance) Methodology

The allocated carbon footprint (CFP) methodology defines green steel by allocating emissions reductions achieved across steel products within a defined boundary, using the mass balance method. Rather than assessing emissions performance at the level of individual production processes, this methodology allows reductions from mitigation activities to be pooled and distributed across total output.

Japan's Green Transformation (GX) framework is the most prominent example of this methodology. Under the framework (see Figure 4), emission reductions from multiple mitigation projects within the same company can be aggregated and allocated across to steel products through certificates.[15]

15 Nishida, Y. (2025)

[Figure 4] **Mass Balance Steel (Japan's GX Framework)**



Source: REI (2025), reorganized by SFOC

The Japan Iron and Steel Federation (JISF) has emphasized the importance of securing international recognition for "Green Steel for GX" and is therefore seeking to integrate its methodologies into relevant domestic and international regulatory frameworks.[16] However, the extent to which the GX methodology will achieve broad interoperability with emerging green steel standards, procurement initiatives, and trade-related requirements remains unclear.

Similarly, South Korea's steel industry has also shown a preference for adopting the allocated CFP methodology for its forthcoming standards, as highlighted in official discussions. For instance, at the 30th Conference of the Parties (COP30) to the United Nations Framework Convention on Climate Change (UNFCCC), the Executive Vice President of the Korea Iron and Steel Association (KOSA)[17] emphasized that international standardization of both the definition

16 Nishida, Y. (2025)
17 KOSA (2025)

of low-carbon steel and the allocated CFP methodology is urgently needed during the transition period before hydrogen-based steelmaking is commercialized, so that steelmakers' emission-reduction investments can be recognized in the market. Aligned to this perspective, POSCO Research Institute (POSRI)'s recent report[18] also supported the allocated CFP methodology as a practical mechanism, while ensuring consistency with the Paris Agreement, including the prevention of double counting.

This position reflects the structural realities of South Korea's steel sector, which remains largely BF based and faces constraints such as limited access to clean hydrogen and renewable electricity. Under such circumstances, mass balance approaches may provide a mechanism for recognizing emissions reductions achieved within existing production systems.

However, because emissions reductions then can be allocated across products regardless of whether they physically embody those reductions, green steel recognition may be obtained without substantial changes to the underlying production process. This risks allowing BF-based production to continue receiving green steel recognition, weakening the transition signal and delaying investment in transformative technologies such as H_2-DRI.

18 Ahn, Y. (2025)

4. Design Principles for a Korean Green Steel Standard

Having established the risks associated with weak green steel standards, the key challenge for South Korea is how to design a green steel standard that supports its long-term industrial transition. As the standard is being developed under the K-GX strategy and K-Steel Act, decisions made today will shape the effectiveness of future market incentives, procurement mechanisms, and decarbonization efforts. It is therefore critical to closely track how green steel standards are evolving both domestically and internationally.

Two design issues are particularly critical: (1) whether to allow mass-balance approach, and (2) how to establish credible carbon intensity thresholds.

1) Moving Beyond Mass Balance, Toward Physical Traceability

The most important design challenge is ensuring that green steel standards do not allow BF-based production to receive green steel recognition without fundamental technological transformation. If mass-balance accounting becomes the basis for green steel claims, steelmakers may continue operating BF-based production while allocating emissions reductions across products, weakening the transition signal that certification systems are intended to provide. As a result, green steel recognition should be linked to product-level emissions performance rather than allocated reductions that are disconnected from the underlying production process.

Civil society organizations (CSOs) have raised similar concerns. In a joint open letter[19] signed by 31 organizations, including SFOC, CSOs warned that allowing emissions reductions to be allocated across products could create a false equivalence between incremental emissions reductions and genuinely low-emission steel, thereby undermining the effectiveness of green steel standards as a driver of industrial decarbonization.

19 IEA (2024)

These concerns are increasingly reflected in emerging international standards, regulatory discussions, and demand-side initiatives. Frameworks such as LESS[20], ResponsibleSteel[21], and GSCC[22] either restrict or exclude the use of mass balance, while ISO guidance similarly prioritizes allocation methods based on physical relationships.[23] Demand-side initiatives such as the First Movers Coalition's (FMC) Steel Commitment exclude group-level mass-balance approaches.[24]

Maintaining a clear physical linkage between emissions reductions and steel products is therefore essential for ensuring that green steel standards support genuine industrial transition. Product-level emissions accounting and physical traceability help ensure that market incentives reward actual decarbonization and technological transformation, while also strengthening the transparency and credibility of green steel claims.

Box 1

CASE STUDY

China C2F Standard

In November 2022, China initiated "Low-Carbon Emission Steel" standard research. After two years of research and consultation, China introduced the C2F (China to Future) Standard developed by the China Iron and Steel Association (CISA) in 2024. The standard establishes a national framework to classify steel based on carbon emissions intensity. It adopts a sliding scale structure conceptually aligned with the IEA's definitions of near-zero and low-emissions steel and does not permit the use of mass balance allocation.[25]

More importantly, China's C2F Standard has become part of broader international interoperability efforts. At COP30 in Belém, ResponsibleSteel announced separate collaborations with LESS and C2F Standard to improve consistency, transparency, and comparability across green steel standards. Together, these standards now cover approximately 60% of global steel production.[26] This partnership

20 WV Stahl (2025)
21 ResponsibleSteel (2024a)
22 Global Steel Climate Council (2024)
23 METI (2025)
24 World Economic Forum (n.d.)
25 Blanco Perez et al. (2025)
26 ResponsibleSteel (2025)

demonstrates that leading green steel frameworks across major steel producing regions, are increasingly converging around shared principles, including quantified emissions thresholds and the rejection of mass balance approaches.

2) Clear and Feasible Carbon Intensity Thresholds

While allocation methodologies determine whether green steel claims are linked to genuine emissions reductions, carbon intensity thresholds determine how ambitious those reductions must be. Carbon intensity thresholds are therefore essential to ensure that green steel standards function as a transition mechanism rather than merely a labeling exercise.

Thresholds determine which levels of emissions qualify as green steel under different production pathways and therefore shape investment decisions, technology deployment, and market incentives across the steel sector. As carbon intensity increasingly becomes a basis for carbon pricing mechanisms, trade regulations, and procurement decisions, there is growing international convergence around the use of quantified emissions thresholds.

The IEA's definition of near-zero emissions steel relies on measurable production-level emissions boundaries[27], and these principles are increasingly reflected in emerging standards and policy frameworks. The EU Emissions Trading System (EU ETS) applies differentiated emissions benchmarks across production routes[28], while the EU CBAM increasingly links market access and compliance obligations to the embedded emissions of steel products. The Industrial Accelerator Act (IAA) has introduced performance-based categories for low-carbon industrial products and anticipates the development of emissions thresholds for steel used in key downstream sectors.[29] Together, these developments signal a broader shift toward quantified emissions performance as a basis for product differentiation, procurement eligibility, and market access.

27 IEA (2024)
28 Eurometal (2025)
29 European Commission (2026)

At the same time, carbon intensity thresholds must be designed to actively support industrial transition. First, thresholds should create strong incentives for decarbonizing the production pathways responsible for the majority of sectoral emissions, rather than disproportionately rewarding producers that already operate relatively low-emission facilities. In addition, threshold should be sufficiently ambitious to distinguish between incremental emissions reductions and genuinely low-emission steelmaking pathways. If thresholds are set too leniently, BF-based production routes may continue to qualify for the highest levels of green steel recognition.

For example, India's Taxonomy for Green Steel defines its highest category using a threshold of below 1.6 tCO_2e/t.[30] This threshold can be considered as very lenient because Hyundai Steel's carbon intensity under its current BF-EAF mix structure has already achieved this threshold. For POSCO, given its strategy to expand EAF technologies, it could also significantly reduce overall emissions intensity without requiring immediate BF phase-out. Therefore, the most stringent threshold of green steel recognition should remain aligned with low-emission steelmaking pathways and should not be achievable through BF-based production routes.

For South Korea, where steel production remains heavily dependent on blast furnaces, thresholds should be both ambitious and feasible, providing a clear direction for progressive emissions reductions. Over time, they should help align market recognition, policy support, and investment incentives with the country's long-term transition toward low-emission steelmaking technologies such as H_2-DRI.

30 Ministry of Steel (2024)

5. Policy Recommendations

The question facing South Korea is no longer whether to define green steel, but how to develop a standard that ensures low-carbon certification systems accelerate the transition away from BF-based production and support the country's long-term shift toward H_2-DRI. Green steel standards should function not only as classification tools, but also as industrial transition mechanisms that guide investment, green technology deployment, and determine whether the steel sector accelerates the transition away from BF-based production. To be effective, any green steel standard developed under the K-GX and the K-Steel Act should be aligned with South Korea's long-term H_2-DRI transition pathway.

Two design choices are particularly important. Standards that permit green steel claims through mass-balance accounting or adopt overly lenient carbon intensity thresholds risk weakening transition signals and prolonging reliance on BF-based production. As carbon intensity increasingly shapes trade competitiveness, procurement eligibility, and investment decisions, weak definitions may create regulatory uncertainty and credibility risks rather than supporting industrial transition.

To ensure that the green steel standard functions as an effective and enforceable transition mechanism, the Government of South Korea, particularly through the implementation of the K-GX strategy and the K-Steel Act, should:

- **Exclude the use of mass-balance approaches and require product-level emissions accounting with physical traceability**, ensuring that green steel recognition reflects actual emissions performance. Certified emissions reductions should be directly linked to the steel products being sold.
- **Adopt clear and sufficiently ambitious performance-based carbon intensity thresholds** that provide a credible pathway for progressive emissions reductions while supporting the transition away from BF-based production.
- **Establish a globally interoperable definition of green steel** under the certification framework of the K-Steel Act, aligning with international frameworks to enable compatibility with international trade regimes and procurement systems.
- **Establish a periodic review mechanism** to ensure that the green steel standard evolves in line with technological progress and international developments. The standard should support South Korea's long-term transition away from BF-based steelmaking and toward genuinely low-emission production pathways such as H_2-DRI.

Embedding these measures will help ensure that the Korean green steel standard operates not only as a classification tool, but as an enforceable policy instrument for industrial transformation. A credible standard can strengthen market confidence, improve international interoperability, and support the development of a robust green steel market. Most importantly, it can reinforce South Korea's transition toward H_2-DRI rather than delay it, supporting both the long-term decarbonization and international competitiveness of the Korean steel industry.

References

1. Ahn, Y. (2025, September 17). Implications for Discussions on Global Carbon-Reduction Steel. POSCO Research Institute.
https://www.posri.re.kr/kor/bbs/bbs_view.do?s_hash=%EC%9E%AC%EC%83%9D&num=8896

2. Blanco Perez, S., Arcipowska, A., Fiorese, G., Maury, T., & Napolano, L. (2025). Defining Low-Carbon Emissions Steel: A Comparative Analysis of International Initiatives and Standards. Publications Office of the European Union.
https://data.europa.eu/doi/10.2760/4271464

3. Enforcement Decree of the Special Act for Strengthening Steel Industry Competitiveness and Carbon Neutral Transition (Presidential Decree No. 36410, enacted on June 16, 2026; effective June 17, 2026). Korea Law Information Center.
https://www.law.go.kr/법령/철강산업경쟁력강화및탄소중립전환을위한특별법시행령

4. Eurometal. (2025, November). EU Draft Sets Out Provisional CBAM Benchmarks for Steel, Shows Wide Carbon Cost Spread Between Steel Routes.
https://eurometal.net/eu-draft-sets-out-provisional-cbam-benchmarks-for-steel-shows-wide-carbon-cost-spread-between-steel-routes/

5. European Commission. (2026, March 4). Industrial Accelerator Act: Annexes to the COM(2026)100 Proposal for the Regulation.
https://single-market-economy.ec.europa.eu/publications/industrial-accelerator-act_en

6. Global Steel Climate Council (GSCC). (2024, July). The Steel Climate Standard.
https://globalsteelclimatecouncil.org/the-standard/web/

7. Hyundai Steel Company. (n.d.). Carbon Neutrality: Pathway to Green Steel.
https://www.hyundai-steel.com/en/sustainability/carbon-neutral

8. International Energy Agency (IEA). (2024, November 08). Definitions For Near-Zero and Low-Emissions Steel and Cement and Underlying Emissions Measurement Methodologies.
https://www.iea.org/reports/definitions-for-near-zero-and-low-emissions-steel-and-cement-and-underlying-emissions-measurement-methodologies

9. International Energy Agency (IEA). (2025, October 30). Breakthrough Agenda Report 2025.
https://www.iea.org/reports/breakthrough-agenda-report-2025

10. Korea Iron and Steel Association (KOSA). (n.d.). Reduction of Greenhouse Gases and Fine Dust.
https://steelpr.kosa.or.kr/promote/future/future01_03_01.jsp?utm_

11. KOSA. (2025, November 18). International standards for carbon-reducing steel discussed at COP30… Establishing a Global Cooperation Foundation for the Korea Iron & Steel Association.
https://www.kosa.or.kr/news/news_view_2011.jsp?index=10581

12. Lead the Charge. (2025, June 5). Civil Society Organizations Urge Rejection of Deceptive Accounting Schemes in Steel Standards.
https://leadthecharge.org/civil-society-organisations-urge-rejection-of-deceptive-accounting-schemes-in-steel-standards/

13. Lee, H. & Cho, S. (2024) POSCO Profile No. 2 - The Journey Toward Greenwashing: Greenate. Solutions for Our Climate.
https://forourclimate.org/research/296

14. Lee, H. & Action Speaks Louder (ASL). (2025). Rethinking Hyundai's 'Eco' Steel: How Fossil Fuels Threaten the Brand.
https://forourclimate.org/ko/research/561

15. Ministry of Climate, Energy, and Environment (MCEE). (2026, April 6). Shifting Away from an Economy Dependent on Fossil Fuels Through a Major Energy Transition Centered on Renewable Energy.
https://mcee.go.kr/home/web/board/read.do?pagerOffset=10&maxPageItems=10&maxIndexPages=10&searchKey=titleOrContent&searchValue=&menuId=10598&orgCd=&condition.fromDate=2026-04-06&condition.toDate=2026-04-10&boardId=1855330&boardMasterId=939&boardCategoryId=&decorator=

16. Ministry of Economy, Trade and Industry (METI). (2025, January). Consolidated Summary of the Study Group on Green Steel for Green Transformation.
https://www.meti.go.jp/shingikai/mono_info_service/green_steel/pdf/20250123_3.pdf

17. Ministry of Steel. (2024, December). Green Steel Taxonomy for India.
https://steel.gov.in/sites/default/files/2025-03/Taxonomy%20Brochure.pdf

18. Ministry of Trade, Industry and Resources (MOTIR). (2026, April 1). Legislative Notice of the Draft Enforcement Decree of the Special Act for Strengthening Steel Industry Competitiveness and Carbon Neutral Transition.
https://www.motir.go.kr/kor/article/ATCLc01b2801b/70980/view

19. Nishida, Y. (2025, October 23). Decarbonizing Steel (Part 1: Japan): Remaining Challenges for Mass Balance Products. Renewable Energy Institute (REI).
https://www.renewable-ei.org/en/activities/column/REupdate/20251023.php

20. POSCO (2025). 2024 POSCO Sustainability Report: Path to a sustainable future.
https://sustainability.posco.com/assets/file/POSCO_Sustainability_Report_2024_eng.pdf

21. ResponsibleSteel. (2024, March 15). ResponsibleSteel Launches Public Consultations on New Downstream Chain of Custody Standard and Revised Responsible Sourcing Requirements.
https://www.responsiblesteel.org/news/responsiblesteel-launches-public-consultations-on-new-downstream-chain-of-custody-standard-and-revised-responsible-sourcing-requirements

22. ResponsibleSteel. (2025, November 14). Landmark Agreements Link Majority of World's Steel Production under Global and Regional Standards for Low-Emission Steel.
https://www.responsiblesteel.org/news/landmark-agreements-link-majority-of-worlds-steel-production-under-global-and-regional-standards-for-low-emission-steel

23. World Economic Forum. (n.d.). First Movers Coalition: Steel Commitment.
https://reports.weforum.org/docs/WEF_First_Movers_Coalition_Steel_Commitment.pdf

24. World Steel Association. (2025). Sustainability Indicators Report 2025: Sustainability Performance of the Steel Industry.
https://worldsteel.org/wider-sustainability/sustainability-indicators/

25. World Steel Association. (2026). World Steel in Figures 2026.
https://worldsteel.org/data/world-steel-in-figures/world-steel-in-figures-2026/

26. WV Stahl. (2025, March). Rulebook for the Classification System of the Low Emission Steel Standard (LESS).
https://lowemissionsteelstandard.org/downloads

27. Yun, E. (2026, May 3) Korean Steel Faces Up to $1.3 Billion in EU Carbon Costs by 2035. Yonhap Infomax.
https://en.infomaxai.com/news/articleView.html?idxno=118688

28. 24 Chemical Research. (2026, January 29). South Korea Green Steel Market Outlook and Forecast 2026–2033.
https://www.24chemicalresearch.com/reports/279091/south-korea-green-steel-market

SFO°C

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.