Steel labelling: Beyond the sliding scale

Steel is a major industrial sector, but its production is highly carbon-intensive. To drive demand for "green steel", there is first a need for a shared framework that clearly defines what this means. Without such a labelling scheme, claims of sustainability risk becoming confusing and inconsistent.

The issue is particularly timely in the European context, where the forthcoming **Industrial Accelerator Act (IAA)**, brought forward as part of the Clean Industrial Deal, is set to shape how "low-carbon" materials are defined and labelled. The IAA is expected to introduce a low-carbon product label, starting with steel and cement, to guide procurement, trade, and investment decisions. Within this framework, policymakers and industry actors are debating the appropriate methodologies for certification, including the "sliding scale" approach.

The sliding scale is a generic concept that has been developed by industry and standardisation bodies to classify steel products into different tiers based on the embedded emissions of their non-recycled content, and their scrap content. Several versions have been proposed, notably by ResponsibleSteel[1] and the Low Emissions Steel Standard (LESS)[2], each defining thresholds and certification levels in different ways. In all cases, the system establishes CO_2 intensity thresholds per tonne of steel that producers must meet in order to qualify for green steel certification.

The system is called *"sliding"* because the thresholds vary depending on the proportion of scrap used. As the share of scrap increases, the thresholds become more stringent. By dividing products into several tiers with different CO_2 intensity requirements, the sliding scale is designed to reflect a spectrum of steel "greenness" and to reward incremental progress towards full decarbonisation. This can be visualised with a graph: the horizontal axis represents the scrap share, and the vertical axis represents CO_2 intensity. The different certification levels are defined by descending lines, which act as thresholds between ratings, the higher the scrap content, the lower the maximum allowable emissions. Figure 1 illustrates the ResponsibleSteel version of this sliding scale.

Overall, the sliding scale is presented as a practical pathway to steel decarbonisation. While details vary across initiatives, it is intended to provide a framework for steel decarbonisation that seeks to establish equitable standards across different steel production routes, reflecting variations in technology and scrap availability.

This brief examines the rationale and limitations of the sliding scale and the risks it poses if embedded in EU or international policy. It then proposes a more precise, product-specific certification system designed to reflect the diversity of steel products, reward circularity, and align with global net-zero objectives.

[1] ResponsibleSteel, 2022, December 9, The 'Sliding Scale': Setting Equitable Thresholds to Drive Global Steel Decarbonisation.

[2] Arcelormittal Low-carbon emissions steel standard.

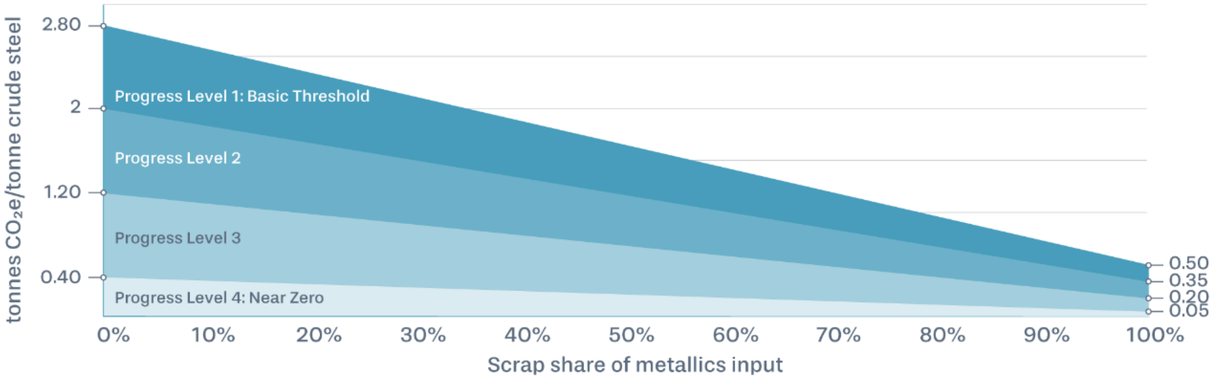

Figure 1. Illustration of the sliding scale, by ResponsibleSteel, ResponsibleSteel International Production Standard, version 2.1.1

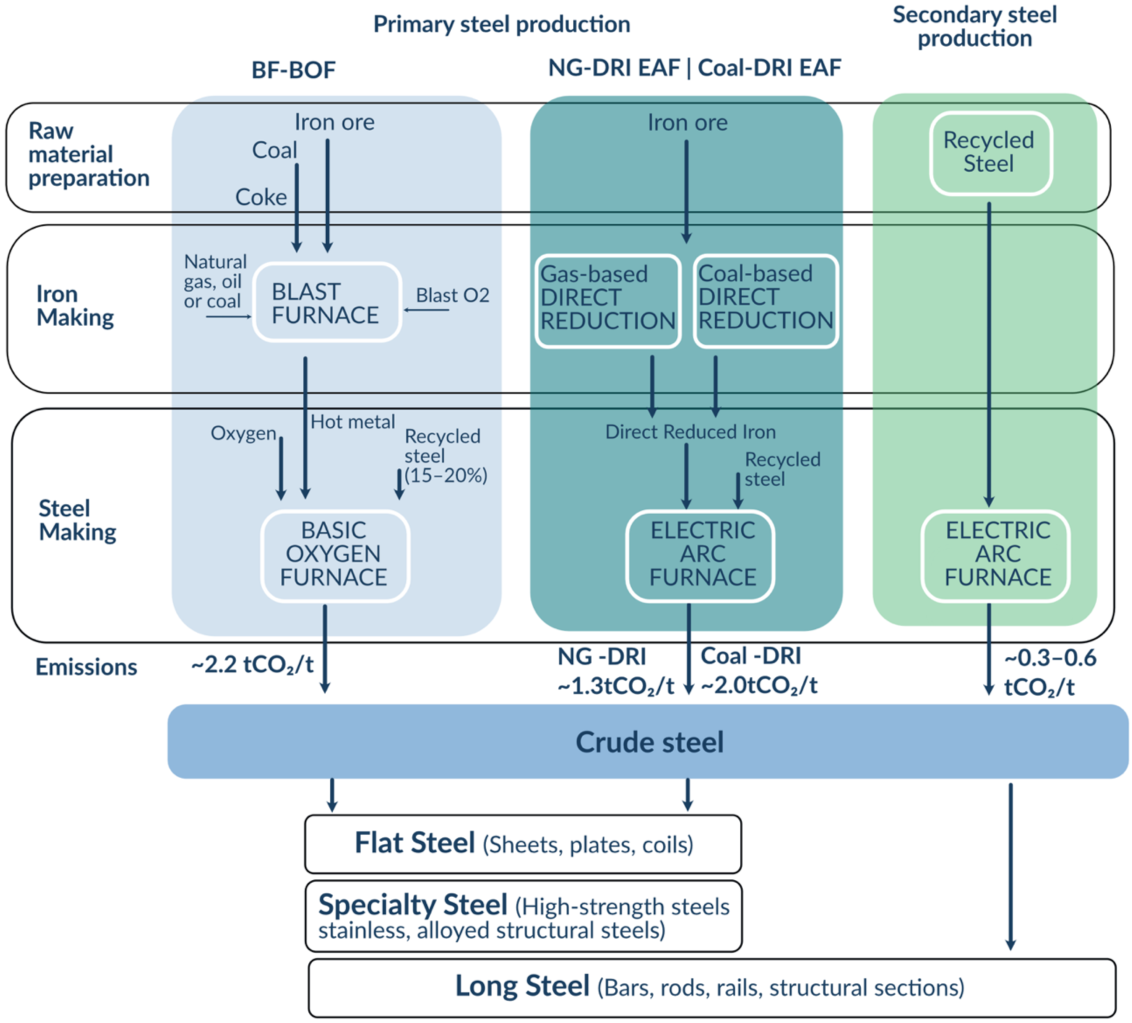

Figure 2. Main Steel production pathways and products[3]

[3] WorldSteel, IEEFA, European Commission, emission for scope 1 and 2 world mean

Limitations of the sliding scale approach

While the sliding scale offers a framework for green steel certification, several limitations have been identified that can affect fairness, transparency, and the incentive structure.

Uniform scales overlook product diversity

Steel products follow different production routes (see Figure 2) with varying emissions and tolerance to scrap intake. Flat steel, especially for automotive or packaging uses, often requires high-purity scrap and cannot easily reach 100% recycled content[4], whereas long products in Europe rely almost entirely on scrap. Certain high-strength steels (AHSS) also have limited scrap capacity[5], meaning a uniform scale can unfairly disadvantage some products.

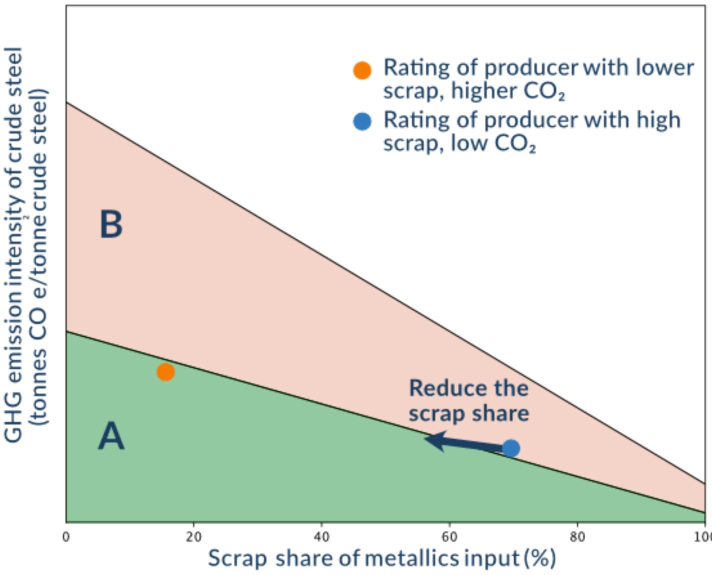

Figure 3. Illustration of how scrap manipulation can distort ratings under the sliding scale

Transparency and circularity disincentives

Because these labels re-interpret Environmental Product Declaration (EPD) data through scrap-based adjustments, they can obscure the actual carbon footprint of the product. This lack of transparency makes it difficult for buyers and investors to assess steel on the basis of its real emissions.

For example, producers can improve their certification rating by reducing their scrap ratio, even if this leads to higher total CO_2 emissions to build the same product. Figure 3 illustrates this paradox: the product illustrated by the blue dot on the figure with high scrap content can achieve a better rating by having a slightly lower scrap content but higher emissions (black arrow). This occurs because the sliding scale sets stricter emissions thresholds for products with higher scrap content, which must reach extremely low-carbon intensity levels to qualify for the top ratings, e.g. an A label).

[4] BCG, 2024, March 12, Shortfalls in Scrap Will Challenge the Steel Industry.

[5] Sandbag, 2025, March 13 2025, Towards a minimum recycled steel content in passenger cars: setting an initial target.

This logic creates a disincentive for circularity: instead of encouraging the best use of scrap to maximise recycling benefits, the sliding scale can make it more attractive for producers to lower their scrap share in order to obtain a better rating. In practice, this means the system does not reward an efficient allocation of scrap that would enhance circularity across the sector. By penalising higher scrap shares, it risks distorting incentives and undermining one of the key levers of a circular economy (which is particularly striking given that rebar in the EU is already produced 100% via scrap-EAF, with over 90% from post-consumer scrap). It also risks creating inconsistencies with EU regulations such as the Construction Products Regulation (CPR) and Ecodesign for Sustainable Products Regulation (ESPR), as well as with the goals of the Circular Economy Action Plan (CEA).

In addition, in the linear economy in which we operate, extracting virgin materials remains more cost-competitive than recycling or upcycling end-of-life products. Consequently, the sliding scale itself makes any investment in closed-loop recycling, or in post-shredding technologies such as LIBS, economically non-viable.

Technological bias and perverse effects

The sliding scale is often presented as technologically neutral. In practice, however, it creates distortions across production routes. Figure 3 also highlights this effect: in some cases, a product with higher scrap content and lower CO_2 emissions (blue dot) may overall receive a worse label than a competitor with lower scrap use and higher absolute emissions (orange dot).

Although a BF-BOF cannot, in principle, ever reach the highest categories (Progress Level 4 and Progress Level 3 in the ResponsibleSteel International Production Standard Version 2.1; see Figure 3, which correspond to emissions below 1.2 tCO_2/t for 0% scrap and 0.2 tCO_2/t for 100% scrap, since thresholds are more lenient at low scrap levels, a BF-BOF product can still achieve a better rating than a scrap-based EAF emitting only around 0.4 tCO_2/t. Under LESS, a BF-BOF can never exceed a D rating, but a DRI-NG + EAF route could, depending on process efficiency and energy supply, achieve emissions low enough to potentially receive a higher rating than a full scrap EAF (Level B: ~1.2 tCO_2/t at below 20% scrap, 0.36 tCO_2/t at 100% scrap for Structural and Reinforcing Stee)[6]. By indexing thresholds to scrap content, the system risks discouraging circularity and driving higher use of raw materials, increasing emissions.

Circularity and Downcycling limitations

The sliding scale typically includes Scope 1, Scope 2, and selected upstream Scope 3[7] emissions. Standards such as ResponsibleSteel, the IEA methodology, and Low-Carbon Emissions Steel Standard include a significant portion of upstream Scope 3, covering raw material extraction, processing, and transport. However, the methodology treats all scrap as nearly zero-carbon, **without distinguishing between pre-consumer scrap (part of primary production) and post-consumer scrap** (genuine circularity). It also overlooks differences in scrap quality and suitability across product

[6] EPICO, 2024 December, Ironing Out the Transformation of EU Steelmaking: Actionable Pathways for Climate Neutrality.

[7] ResponsibleSteel, 2022 October, Our role in "Shaping the future of low carbon steel".

types: while some products can rely on a wide range of recycled inputs, others require high-grade scrap and face stricter limitations. As a result, emissions may be underestimated and comparisons across products distorted. Additionally, these approaches may still omit certain life-cycle emissions, such as downstream use, some upstream activities (e.g., refractory linings, ferroalloys in some cases) or end-of-life treatment (its associated emissions should be transparently reported; however, credits for potential future recycling- e.g., Module D / Scope 4, should not be incorporated into performance scoring, to avoid creating perverse incentives)..

In sum, the limitations outlined above point to a deeper flaw in the sliding scale itself. By linking carbon thresholds to scrap content, the system assumes that emissions performance can be fairly adjusted along a single continuum. This sliding logic obscures the structural diversity of steel production, distorts incentives for circularity, and ultimately undermines the credibility of the label. A more differentiated, product-specific approach is therefore needed to reflect real decarbonisation progress and to minimise downcycling, ensuring that the circularity potential of each product is fully captured-not just its immediate recycling rate.

Introducing the GSCC standard

Before detailing our proposed certification system, it is useful to highlight how The Global Steel Climate Council (GSCC) addresses some of the issues flagged above, particularly the lack of product differentiation.

GSCC has developed a *Steel Climate Standard (SCS)* for both flat and long products[8] (Figure 4), using CO_2 intensity per tonne as the key metric and aligning reduction targets with the Paris Agreement and IEA 2050 pathways. The GSCC rejects sliding scale methods, arguing they risk labelling high-emissions products as green and undermining innovation.

[8] GSCC, The Steel Climate Standard.

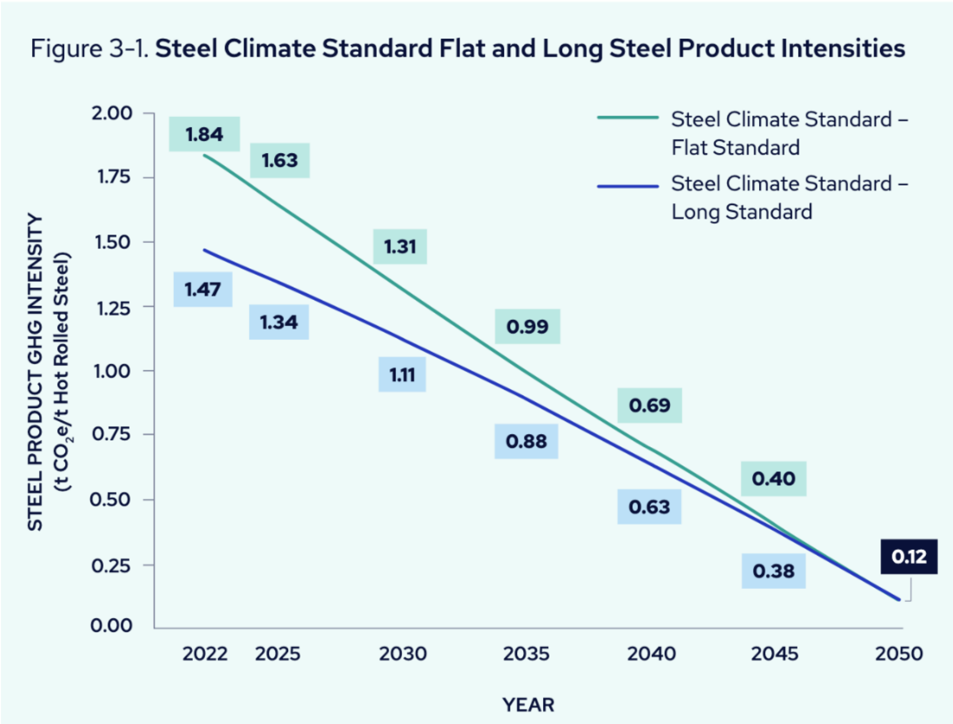

Figure 4. Steel Climate Standard Flat and Long Steel Product Intensities, Global Steel Climate Council

While separating flat and long products is a step forward, this distinction remains overly broad, steel production is more diverse than that, with several additional product types within both categories. The single "make or break" threshold per category fails to create strong incentives: for long products, it is easy to pass for scrap-based producers (many scrap-based producers are already below the 2040 thresholds), regardless of their recourse to downcycling of premium-grade or even pre-consumer scrap. For flat products, it's easier for some grades than others within that category. The absence of graded tiers or product-specific differentiation limits the standard's ability to drive meaningful emissions reductions.

Civil society organisations (CSOs) have similarly raised concerns, noting that the GSCC standard lacked a credible multi-stakeholder process and was largely industry-driven[9] (even if no BF-BOF producers are members). They also note that the framework creates confusion around scrap use, lacks ambition to drive deeper emissions reductions, and focuses narrowly on CO_2 while overlooking broader environmental, social, and labour impacts. Together, these issues suggest that while GSCC makes progress, it does not go far enough to stimulate systemic decarbonisation of the steel sector.

[9] Civil society groups, 2023 August 22, Open Letter by Civil Society Groups Critical of Industry-Created "Global Steel Climate Council".

Our proposal: A product-specific steel certification system

An effective green steel certification system must balance international credibility with practical granularity that reflects the true diversity of steel products and incentivises continuous improvement. Our proposed certification system builds on the GSCC approach but goes further. Our system combines **product-specific benchmarks**, a **multi-tiered system**, a **downcycling adjustment mechanism** and a **sliding time factor** (Figure 5).

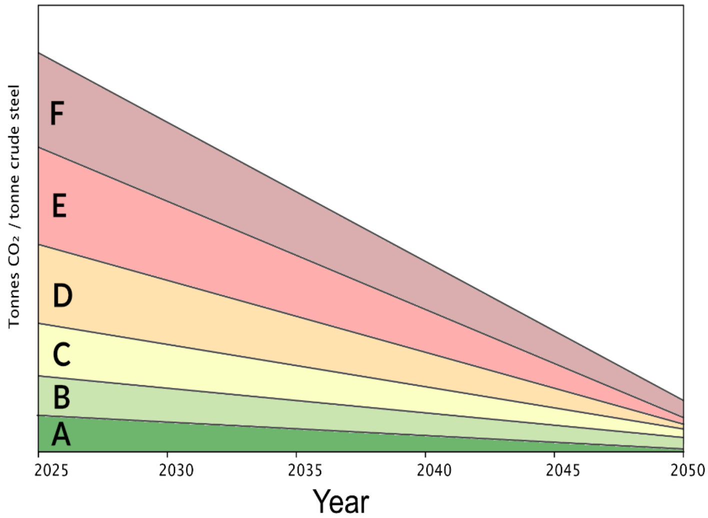

Figure 5. Illustration of our proposal for one type of product.

Product specific

Rather than relying on a single scale for all steel, certification should be based on **product-specific benchmarks**, that reflect different levels of technical challenge in incorporating scrap to meet the product specifications required for end-use applications. This approach goes beyond the GSCC flat/long distinction, as scrap incorporation limits and production treatments vary widely within each category. By including factors such as steel grade and strength, each product type can be fairly assessed and rewarded for progress toward decarbonisation according to its real technical constraints and carbon footprint. For example, flat sheets require very high-quality inputs for surface and mechanical standards, while Advanced High-Strength Steel (AHSS) used in automotive applications has strict purity requirements that limit scrap incorporation; stainless steel (mostly flat products) involves complex alloying and energy-intensive treatments, and its reliance on nickel and other primary alloys can significantly increase upstream emissions when not sourced from recycled inputs; standard long bars and rods tolerate higher scrap content; high-strength steel (HSS) products are higher-quality steel with stricter composition and purity standards; and carburised carbon steels require additional carburisation, which increases energy consumption and associated emissions.

Multi-tiered

Within each product category, a multi-tiered system (A, B, C, D...) differentiates producers according to their actual carbon footprint, ranging from less to more carbon-intensive. The top tier, A, represents the most climate-friendly performance within that category, based on independent, product-specific benchmarks. Lower tiers allow fine-grained distinctions, rewarding incremental improvements and giving every producer a tangible target.

Carbon intensity (tCO_2e per tonne) is the primary metric for the certification, covering Scope 1, Scope 2, and, wherever possible, the full life-cycle Scope 3 emissions, including upstream activities such as mining and transportation, as well as downstream impacts like end-of-life treatment.

Downcycling adjustment

Unlike previously proposed sliding scales, this approach rewards scrap use rather than penalising it, giving full recognition to producers who integrate high-quality recycled materials and promoting circularity across all production routes, through a downcycling adjustment mechanism**:**

- **Pre-consumer scrap** is counted as the original primary production, ensuring its full carbon impact is included in the product's total footprint.
- **Post-consumer scrap (best-use)** carries minimal carbon emissions, mostly associated with collection, sorting, and pre-processing to make it ready for reuse in high-value applications.
- **Post-consumer scrap (downcycled)** is subject to **induced emissions** when used below its best possible application (e.g., diverted from flat to standard long steel). Induced emissions represent the additional CO_2 that would have been avoided in the best-use scenario, calculated per tonne of scrap. For example, consider high-quality scrap that would be ideal for producing flat sheets. If this scrap is instead used for rebar, the flat sheets cannot benefit from it and must be produced using primary steel from a basic oxygen furnace (BF-BOF) for example, which has a much higher carbon footprint. The carbon footprint of the flat sheets therefore increases, reflecting the emissions that could have been avoided if the scrap had been used in its highest-value application.

Encouraging high-quality "closed-loop" recycling (e.g., flat-to-flat) intentionally reduces the attractiveness of using long products as an easy outlet for scrap, explicitly discouraging downcycling-particularly given that only around 6% of steel recovered from end-of-life vehicles (ELVs) returns into automotive steel[10] (even though if Nucor demonstrates that flat steel can already integrate up to 60% of scrap[11]). Consequently, the system prioritises the most effective use of recycled material. This shift intentionally reduces the relative competitiveness of long steel in certain applications, directing scrap toward its highest value uses and maximising emissions reduction across material choices.

Furthermore, while countries with limited scrap availability remain structurally disadvantaged in a circular system, the downcycling adjustment exerts a balancing effect by placing greater responsibility on scrap-rich regions to use their resources efficiently. This partially corrects the global inequity in scrap access, without fully eliminating it, by ensuring that all producers are evaluated not only on their emissions, but also on how effectively they contribute to the global circularity of steel.

[10] Sandbag, 2025 March, Towards a minimum recycled steel content in passenger cars: setting an initial target.

[11] Nucor Corporation, 2023, Environmental product declaration hot-rolled sheet.

Scores should be verified by a third party, as required by the GSCC standard, and communicated clearly, giving buyers, investors, and regulators confidence in the reliability of the certification-including all aspects of carbon accounting, scrap use, and downcycling adjustments.

Sliding time (or periodic revision)

The proposed certification includes a sliding time factor, whereby benchmarks progressively tighten over time to reflect the sector's decarbonisation pathway. Instead of automatically tightening thresholds every year benchmarks could also be updated through a regular, transparent revision cycle (e.g., every 3–5 years). This ensures that the system remains dynamic, encourages continuous improvement, and motivates producers to adopt low-carbon technologies in line with global climate targets.

Global sustainability

Beyond emission intensity, future iterations of steel certification could explore a broader sustainability metric for the sector. A single global sustainability indicator, similar to how the Human Development Index (HDI) combines health, education, and income, could aggregate key environmental, social, and labour metrics across all production routes. Existing initiatives already provide strong foundations in this direction: ResponsibleSteel includes 12 additional principles covering issues such as human rights, labour conditions, biodiversity, and mining impacts, while IRMA (Initiative for Responsible Mining Assurance) sets robust standards for responsible extraction of raw materials**.** This would enable certification to reward overall sustainability performance, alongside carbon intensity.

By combining product-specific benchmarks, a multi-tiered system, downcycling adjustment and the time factor, the proposed certification builds on and extends the GSCC framework, going beyond the one-size-fits-all logic of sliding-scale approaches, rewards high-quality scrap use, and incentivises continuous improvement within each product category. This approach, combined with a global sustainability indicator, would create a credible and adaptable framework that recognises progress across all steel types and supports meaningful advancement toward a low-carbon, socially and environmentally responsible steel sector.