

The Sustainable STEEL Principles: Fixed System Boundary

Key takeaways

- The fixed system boundary of the Sustainable STEEL Principles solves for inconsistencies in emissions accounting.
- Through achieving uniformity in reporting, it allows financial institutions to more consistently compare the emissions intensity of steelmakers.
- The boundary should not require additional data collection for most steelmakers, who are otherwise reporting on their emissions according to scope 1, 2 and 3 of the GHG Protocol.
- This approach does not intend to supplant the GHG Protocol. It is simply a change in the way emissions are reported, which offers a fairer and more direct framework to compare steelmakers' emissions.

Approach: A Fixed System Boundary

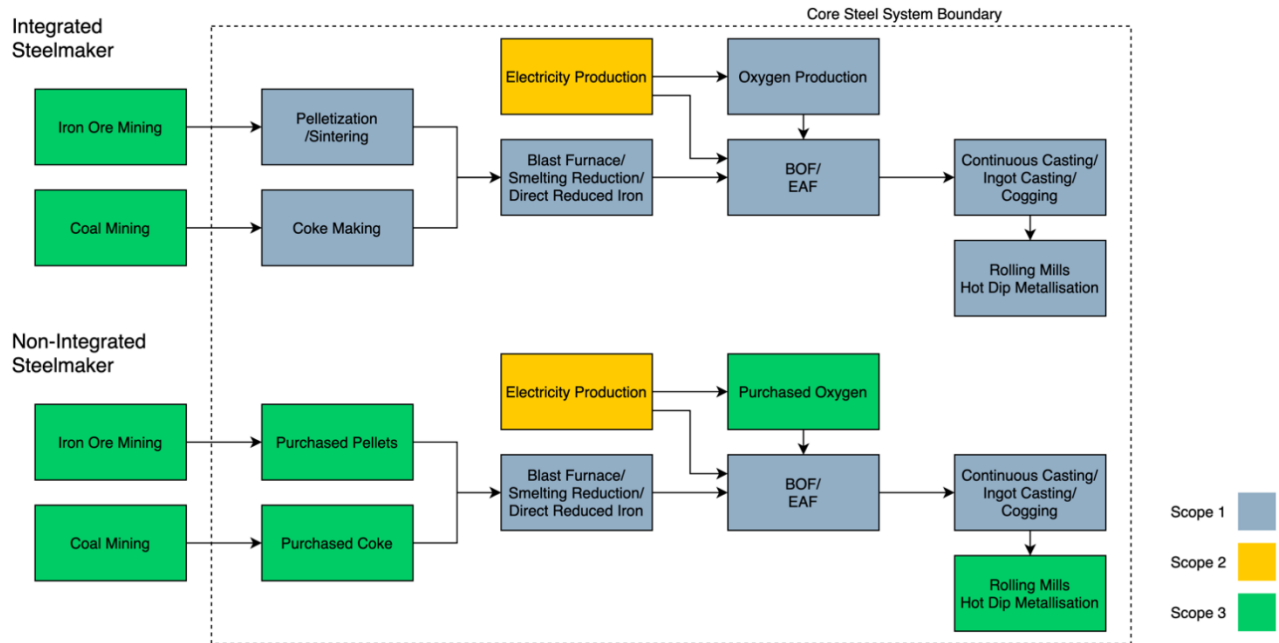
Commonly, steelmakers report on their emissions in accordance with scope 1, 2, and 3 categories outlined by the GHG Protocol. However, emissions can vary greatly depending on ownership structure and the level of vertical integration of each company (Figure 1). In response, the Net-Zero Steel Pathway Methodology Project (NZSPMP), comprising some of the largest steelmakers, has proposed a consistent system boundary intended to improve emissions accounting for the steel sector, which has inspired the fixed system boundary of the Sustainable STEEL Principles.

Rationale

The primary aim of the fixed system boundary is to enable a more direct comparison of emissions performance between steelmakers. This approach solves two key problems:

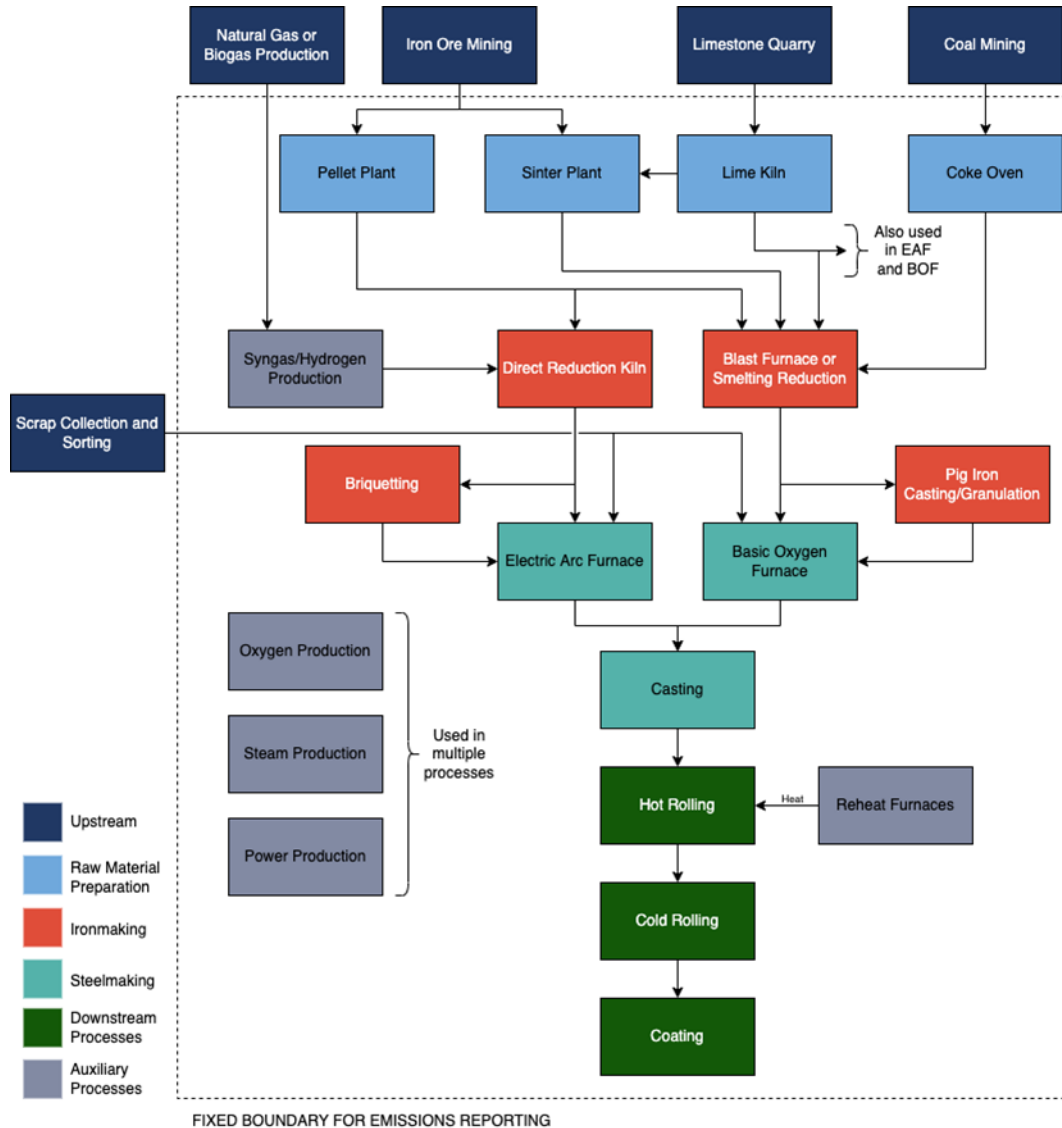
1. **Emissions will vary depending on the degree of vertical integration.** In some instances, vertical integration can extend to emissions-intensive upstream processes such as sintering or coke production. If these processes are operated (and owned) by a steelmaker, emissions will be included in scope 1 (according to the GHG Protocol). For non-integrated operators, these same emissions would count as scope 3, which may not otherwise be reported, presenting challenges to comparing greenhouse gas emissions between steelmakers (Figure 1).
2. **Scope 1, 2 & 3 will likely become more fluid over time, further limiting comparability.** For example, as the use of direct reduced iron (DRI) increases to enable a shift to hydrogen-based steelmaking, emissions resulting from DRI could be included as scope 1 (for DRI produced on-site), scope 2 (where purchased electricity is used to make hydrogen), or scope 3 (for DRI produced by a third party).

Figure 1. Example of scope 1, 2, and 3 emissions within the fixed system boundary



Therefore, the fixed system boundary solves for inconsistencies in emissions accounting between steelmakers by requiring all companies to report on their emissions within a consistent boundary, irrespective of ownership of various processes (Figure 1). The boundary has been selected with the aim of covering 95% of emissions associated with steelmaking and includes emissions of raw material preparation, ironmaking, steelmaking, and auxiliary processes. This covers a steelmaker's scope 1 and 2 emissions and a portion of scope 3 (depending on the level of vertical integration), specifically from purchased goods and services, and the processing of sold products (Figure 2).

Figure 2. Fixed system boundary of the Sustainable STEEL Principles



To ensure all emissions within the fixed system boundary are captured, non-vertically integrated producers can use standard emissions factors provided by the Sustainable STEEL Principles, if unable to secure primary emissions data from their suppliers.

Emissions from iron ore mining and coal mining are not included in the fixed system boundary for the following reasons:

1. The emissions intensity scenarios utilized by the Sustainable STEEL Principles to measure climate alignment do not include mining emissions. Therefore, the inclusion of mining emissions in the data reported by steelmakers would result in inconsistencies in scope between steelmaker emissions data and the scenarios lenders use to assess clients' emissions;



2. The CO₂ emissions that result from iron ore and coal mining represent a relatively small portion of total steel sector emissions,¹ and
3. The desire to align with various standards to the greatest degree possible.²

In the future, the Sustainable STEEL Principles may consider expanding the fixed system boundary to include emissions from mining in the future, and also may consider the inclusion of additional greenhouse gases within the boundary.

Reporting requirements

The fixed system boundary approach is aligned with the World Steel Association's current standardized emissions data collection tool (based on ISO 14404), which was used by approximately 55 steelmakers in 2019 for benchmarking emissions performance across sites. Therefore, compliance with the fixed system boundary approach does not require additional data collection for most steel producers, only a change in the way emissions are reported.

¹ While the CO₂ emissions resulting from iron ore and coal mining represent a relatively smaller portion of the sector's emissions, upstream fugitive methane (particularly from coal mining) can be significant. Lifecycle assessment studies indicate that direct CO₂ emissions (excluding methane) of [0.013 tCO₂/t of iron ore](#) and [0.04 tCO₂/t coal](#), based on ~2t of iron ore and 0.5t of coal consumed for each ton of steel, produced results in ~0.05 tCO₂/t steel of mining emissions or ~3% of the average steel emissions footprint.

² Emissions resulting from mining are not included in the NZSPMP recommendations, ISO standards, Worldsteel Climate Action data collection framework, or the ACT methodology.