ResponsibleSteel Proposals and Consultation Questions on GHG Emission Requirements for the Certification of Steel Products

Draft Version 1.1

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Background

In November 2019, version 1-0 of the ResponsibleSteel Standard was approved and ratified by the ResponsibleSteel membership and board. Steel sites can choose to be independently audited against the 12 Principles of this standard to demonstrate that they meet high levels of performance when it comes to environmental, social and governance (ESG) issues. Steel sites that become certified against the standard are able to claim that their site is operated in a responsible manner.

The ResponsibleSteel Standard version 1-0 contains requirements for input materials (then called raw materials) in its “Responsible Sourcing” Criterion 2.2 and for greenhouse gas (GHG) emissions in its "Climate Change and Greenhouse Gas (GHG) Emissions” Principle 8. In relation to input materials it specifies the need for certified sites to implement general policies and procedures for responsible sourcing, but does not specify levels of performance that must be met by suppliers of input materials. In relation to GHG emissions the Standard specifies the commitments that must be met by the corporate owners and managers of certified sites, and requirements to measure, monitor and report site level performance, but does not specify minimum threshold levels of performance that must be met in relation to ongoing GHG emissions.

The ResponsibleSteel membership and board agreed that further requirements for the responsible sourcing of input materials and minimum threshold levels of performance in relation to greenhouse gas (GHG) emissions would need to be met before claims could be made by certified sites about the certification status of the steel they produce. It was agreed that these additional requirements would be developed in 2020, in accordance with ResponsibleSteel’s procedures for the development of standards.

The document ‘ResponsibleSteel Requirements, Options and Consultation Questions on Responsible Sourcing of Input Materials’ covering proposed additional requirements in relation to the sourcing of input materials was published for a 60-day public consultation period on 3rd August.

This document, ‘ResponsibleSteel Proposals and Consultation Questions on GHG Emissions Requirements for the Certification of Steel Products’ now presents the proposed additional requirements relating to GHG emissions that would need to be met to allow claims to be made about ResponsibleSteel certified steel products. This document is published for a 60-day public consultation period from 1st September 2020 through to 31st October 2020.

In 2021, ResponsibleSteel will look into options for including downstream supply chains in the ResponsibleSteel certification programme. Discussions on this with our board and with members will be kicked off later in 2020.
About this document

This document presents draft versions of the additional requirements that ResponsibleSteel certified sites would need to meet in relation to their GHG emissions in order to make claims about the ResponsibleSteel certified status of their steel products.

We have provided guidance on most of the proposed criteria and requirements to explain key terms and concepts. The document also outlines some options for alternative requirements and consultation questions that we ask stakeholders to consider. Background information, options and specific consultation questions have been presented together at the end of the document, with the intent that the criteria and requirements themselves can be read without too many interruptions to the text. Internal document links to the consultation questions have been provided to help readers navigate the text.

Annexes provide the already approved requirements and glossary of terms in relation to climate change and GHG emissions so that readers understand what is already covered by our existing Standard. They also present the data that have been used to help define proposed threshold levels of performance, and general drafting principles that were developed to guide the development of the proposed criteria and requirements.

This document has been drafted by the ResponsibleSteel Secretariat based on discussions with our Board, Members and stakeholders over the last three years and is put out for public consultation with stakeholders. The proposals in this document have not been endorsed by the ResponsibleSteel Board, its Standards and Assurance Committee, or by the ResponsibleSteel membership.

We are keen to hear from stakeholders whether they support our draft proposals, whether they prefer any of the provided options and what their opinions are on the consultation questions we are posing to them. If stakeholders feel that there are other approaches not outlined here that would be better placed to achieve ResponsibleSteel’s objectives we very much appreciate hearing them. Stakeholders are asked to submit their feedback on the draft requirements, options, consultation questions and Annexes to ResponsibleSteel by 31st October 2020 via the Google form on https://forms.gle/gVri4FVieSnswwzXf7.

Following the public consultations on both input materials and GHG emissions, we will collate and review the received feedback. We are planning to hold working group meetings and a second round of public stakeholder consultation on both input materials and GHG requirements towards the end of 2020, and before the draft requirements are put to our Members and our Board for approval and ratification. We aim to have completed both work streams on input materials and on GHG, if consensus can be reached across our Membership, in Spring 2021.

If you have any questions on the proposed GHG emissions requirements, please contact:

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DRAFT Requirements

Climate Change and Greenhouse Gas Emissions – additional requirements for the certification of steel products

Objective:
The objective of ResponsibleSteel Principle 8 for site certification is that, “The corporate owners of certified sites are committed to the global goals of the Paris Agreement, and both certified sites and their corporate owners are taking the actions needed to demonstrate this commitment.”

The objective of the additional criteria required for the certification of steel products is to provide the basis for downstream users and specifiers of steel, policy makers and other stakeholders to support steelmakers in their efforts to reduce GHG emissions in the steel supply chain through their specifications, purchasing commitments, investment decisions, policies or other actions based on the recognition of ResponsibleSteel certified steel products.

Introduction:
Principle 8 of the ResponsibleSteel Standard version 1-0 requires steelmakers to demonstrate their commitment to the goals of the Paris Agreement through strategic planning, goal setting, and the measurement and reporting of progress in reducing greenhouse gas emissions, as summarised in Figure 1.

Figure 1. Summary of the existing criteria of ResponsibleSteel Principle 8

These five criteria are essentially forward-looking, focussed on long- and medium-term planning, performance and reporting, and are of fundamental importance if steelmakers are to make the transition to net zero steel production.
The five criteria of the current Standard do not specify minimum GHG emissions performance thresholds. This is intentional. ResponsibleSteel site certification is intended to give recognition to companies and sites that are publicly committed to making the transition to a zero-carbon future. Such recognition is essential to encourage the capital investments in new, low GHG emission technologies that are urgently needed in the steel sector if the goals of the Paris Agreement are to be achieved. There will be a delay of many years between corporate commitment, investment, and the realisation of GHG emissions reductions. Excluding companies and sites from the ResponsibleSteel programme based on their current GHG emissions performance would make it harder, not easier, for many companies to make the necessary transition, as well as removing incentives for sites to meet the other 11 ResponsibleSteel Principles.

However, providing incentives for companies and sites that are committed to making the transition to low GHG emissions is not the only mechanism that ResponsibleSteel can offer to support the achievement of the goals of the Paris Agreement. A second, complementary mechanism is to provide a means for downstream companies purchasing or specifying steel, as well as policy makers defining public procurement requirements or other policy tools, to differentiate between steel products on the basis of their current GHG emissions performance, rewarding leadership by those companies and sites that have already started on the transition.

Designing the thresholds for the certification of steel products is critically important. If the thresholds are set too high, they will create a barrier to participation. Set too low, and they will lack credibility and fail to reward leadership. They need to incentivise better performance both for steelmaking using scrap, and for steelmaking from iron ore. And they need to meet the needs of downstream users who have their own commitments to reduce their GHG emissions, increasingly focussed on achieving net-zero embodied emissions for their steel supplies by 2050 or sooner.

The additional ResponsibleSteel requirements for steel product certification are designed to address these challenges. Figure 2 summarises the four proposed additional Criteria related to GHG emissions that would need to be met to allow the ResponsibleSteel certification of steel products.

**Figure 2.** Summary of the proposed additional criteria in relation to GHG emissions for the ResponsibleSteel certification of steel products.

- **C8.6:** GHG emissions intensity performance threshold for crude steel production
- **C8.7:** Rules for consistent measurement of crude steel GHG emissions intensity performance
- **C8.8:** Steel product GHG emissions data
- **C8.9:** Transparency & comparability of GHG emissions data

Specification of minimum performance thresholds for the GHG emissions intensity of crude steel production at a site, taking account of the proportion of end-of-life scrap and iron ore used for steelmaking, so that downstream users can reward performance and drive change for all steel making routes.

Specification of globally consistent rules for calculating the GHG emissions intensity of crude steel production, to ensure a level playing field for all sites making claims about their GHG emissions performance, and ensure that differences in claimed performance are real, and not simply artefacts of different measurement methodologies.

Requirements to provide consistent, life cycle based GHG emissions data for steel products (as distinct from performance data for crude steel production itself), to allow downstream users to monitor their own upstream (Scope 3a) GHG emissions and performance in achieving their own GHG emissions reduction targets.

Requirements to make key data relating to GHG emissions intensity for crude steel, and the GHG emissions for steel products, publicly available in a readily comparable format, so that downstream users, specifiers and others can easily identify and specify steel products from the best performing companies and sites.
The proposed approach focuses on two distinct aspects of a site’s GHG emissions performance:

A. The GHG emissions associated with the site’s production of crude steel;

B. The GHG emissions allocated to the site’s products (including steel products, intermediate products, co-products and/or by-products).

The intent is that by focussing on these two indicators the standard will provide the greatest possible traction for downstream users to incentivise and reward low GHG emission steelmaking, from ‘cradle to steel product’.

**Figure 3**: schematic diagram of the flow of materials, energy and associated GHG emissions at a steelmaking site
Criterion 8.8 proposes the basis for allocating GHG emissions to the steel products, intermediate products, co-products and/or by-products produced at the site.

Criterion 8.9 then proposes requirements in relation to the accessibility of the resulting performance measures, to facilitate their use by downstream users, specifiers, policy makers and other stakeholders, to reward performance.

Further consultation questions on each of these aspects are embedded in the text, below.

Criteria, Requirements and Guidance:

Criterion 8.6. Crude steel GHG emissions intensity: performance thresholds for steel product certification

The GHG emissions intensity of the crude steel produced at the site, measured in accordance with ResponsibleSteel requirements, is below the applicable threshold required for ResponsibleSteel steel product certification.

8.6.1. The GHG emissions intensity (metric tonnes of CO₂ equivalent/metric tonne crude steel) of the crude steel produced at the site is below the applicable threshold as specified for carbon steel or for high alloy steel in accordance with the formula:

\[
\text{GHG emissions intensity performance threshold for crude steel} = (X \text{ tonne CO}_2/\text{tonne}) + (1 - \% \text{ end of life scrap}) \times ((Y - X) \text{ tonne CO}_2/\text{tonne})
\]

Where:

X = estimated global median value in 2018 for GHG emissions per tonne of crude steel if produced from 100% scrap

Y = estimated global median value in 2018 for GHG emissions per tonne of crude steel if produced from 100% iron ore

Guidance:

Separate thresholds are specified for carbon steel and high alloy steel in accordance with the following estimates for 2018 global median GHG emissions intensity values (see Annex 3 for discussion of data sources):

<table>
<thead>
<tr>
<th></th>
<th>Estimated global median GHG emissions intensity for 100% scrap-based crude steel production (t CO₂ / t crude steel)</th>
<th>Estimated global median GHG emissions intensity for 100% iron ore-based crude steel production (t CO₂ / t crude steel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon steels</td>
<td>0.5</td>
<td>2.0</td>
</tr>
<tr>
<td>High alloy (including stainless) steels</td>
<td>0.625*</td>
<td>5.0*</td>
</tr>
</tbody>
</table>

* estimates for high alloy steels should be considered to be highly preliminary pending additional information.

Sample calculation based on the estimated median performance data shown above:

Threshold for carbon steel = (0.5 tonnes CO₂ e / tonne) + (1 - % scrap) x (2.0 - 0.5 tonnes CO₂ e / tonne)

Threshold for high alloy steel = (0.625 CO₂ e / tonne) + (1 - % scrap) x (5.0 – 0.625 tonnes CO₂ e / tonne)
This is illustrated in the graphs below for the range of end-of-life scrap use values from 100% to 0%:

**Link to discussion and consultation question on crude steel GHG emissions intensity performance threshold adjusted to take account of the proportion of scrap used for production**

**Link to discussion and consultation question on the use of global median GHG emissions performance in 2018 as the basis for specifying the minimum performance threshold required for ResponsibleSteel steel product certification**

**Link to discussion and consultation question on better sources of data on global GHG emissions intensity performance for crude steel**

**Criterion 8.7. Crude steel GHG emissions intensity threshold determination: specifications and calculation**

The crude steel GHG emissions intensity performance threshold of the site is determined in accordance with the following specifications.

**Link to discussion and consultation question on the specification of ResponsibleSteel accounting rules for the determination of GHG emissions intensity performance**

8.7.1 GHG emissions data for the determination of crude steel GHG emissions intensity performance – general requirements

a. The GHG emissions intensity determination includes consideration of the site's:

- Upstream indirect (Scope 3a) GHG emissions (see 8.7.2);
- Energy indirect (Scope 2) GHG emissions (see 8.7.3);
- Direct (Scope 1) GHG emissions (see 8.7.4)

**Link to discussion and consultation question on inclusion of Upstream indirect (Scope 3a), Energy indirect (Scope 2), and Direct (Scope 1) GHG emissions in the determination of the crude steel GHG emissions intensity performance for the site**

b. The GHG emissions intensity determination includes consideration of the emissions of carbon dioxide
(CO₂), methane (CH₄), nitrogen trifluoride (NF₃), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆), using Global Warming Potential (GWP) values relative to CO₂ (CO₂e) with a 100 year time horizon as published by the IPCC.

c. The unit of measurement is tonnes CO₂ equivalent (CO₂ e).

d. External data sources are recorded together with:
   - The time period to which the data apply
   - The international standard, if any, used for the determination of the GHG emissions data
   - Whether the data comprise:
     - Source specific data (representing emissions for the production of a specific material from a specific facility of the producer, or calculated using source-specific data in relation to the relative quantities of material from specific facilities)
     - Producer average data (representing emissions for the production of a specific material averaged across multiple facilities managed by the producer without consideration of the relative quantities of material from specific facilities)
     - Industry average data (representing emissions for the production of a specific material averaged across multiple facilities managed by multiple producers)
   - Whether the data includes upstream indirect (Scope 3a) GHG emissions, energy indirect (Scope 2) GHG emissions, and/or direct (Scope 1) GHG emissions
   - Whether the reported data include consideration of any offsets.

e. Referenced external data sources must be publicly accessible.

f. External data must be determined in accordance with a recognised international or regional standard.

g. External data sources are reviewed at least annually and data are updated if more recent data are available.

Guidance:

Additional guidance to be developed as required.

8.7.2 Upstream indirect (Scope 3a) GHG emissions

Definition: Other indirect (Scope 3) GHG emissions that occur outside of the organisation and upstream of its activities.

The system to estimate the total GHG emissions (CO₂ e) associated with materials imported to the site from outside the site boundary (i.e. upstream indirect (Scope 3a) GHG emissions) for the purpose of determining the crude steel GHG emissions intensity of the site meets the following requirements:

a. The site includes consideration of the GHG emissions for input materials constituting 95% of the site’s
ResponsibleSteel proposals and consultation questions on GHG emission requirements for the certification of steel products

- GHG emissions associated with the following categories identified in the GHG Protocol as upstream (Scope 3) GHG emissions do not need to be included in the site’s estimate of upstream indirect (Scope 3a) GHG emissions: capital goods; services; business travel; employee commuting; upstream leased assets.
- GHG emissions associated with the following input materials do not need to be included in the site’s estimate of upstream indirect (Scope 3a) GHG emissions: blast furnace and slag additives; chemicals; desulfurizing products; electrodes; lubricants; oils; refractories; rolls.
- In addition to the above exclusions GHG emissions for input materials that collectively constitute less than 5% of the site’s total upstream indirect (Scope 3a) GHG emissions (based on consideration of industry average or other credible data) do not need to be considered further.

b. Data for upstream Scope 3 GHG emissions for input materials includes the material’s direct (Scope 1) GHG emissions as well as its own upstream indirect (Scope 3a) GHG emissions and its energy indirect (Scope 2) GHG emissions.

c. Data are the most specific available, with source specific data used in preference to producer average data, and producer average data used in preference to industry average data or ‘indicative’ emissions factors. Industry average data or ‘indicative’ emissions factors should only be used when more specific data are not available. Where more specific data are not available and both industry average and ‘indicative’ emissions factors are available the higher of the two values should be used.

d. Where range information associated with producer or industry average data are available the top 20th percentile figure (or estimate thereof) is used and not the average (mean or median) figure for the range.

e. The determination of upstream Scope 3 GHG emissions is exclusive of any offsets claimed by upstream suppliers.

f. The determination of upstream Scope 3 GHG emissions includes consideration of the GHG emissions associated with the transportation of input materials.

g. The site’s upstream indirect (Scope 3a) emissions may be reduced pro rata if imported materials whose GHG emissions have been accounted for are subsequently exported from the site.

h. The determination of GHG emissions conforms with the guidance provided for specific input materials (see guidance notes and the summary table below).

**Guidance:**

Guidance on the determination of upstream indirect (Scope 3a) GHG emissions for specific input materials

**Ferrous raw materials**

Iron and steel used as input material for a ResponsibleSteel certified steel product should be sourced exclusively from ResponsibleSteel certified sites. This would include the sourcing of direct reduced iron (DRI), granulated pig iron (GPI), hot briquetted iron (HBI), and pig iron. GHG emissions data for these
materials would therefore be covered by ResponsibleSteel requirements specified in Principle 8, as applicable.

Concentrates, fines, pellets, and sinter must be sourced from sites that provide source specific or producer average GHG data.

When lump ore is sourced from a ResponsibleSteel verified supply chain source specific or producer average GHG data must be used. Industry average or indicative data may be used when lump ore is sourced from unverified supply chains and more specific data are not available.

**External scrap**

ResponsibleSteel distinguishes between manufacturing scrap and end of life scrap. Suppliers of external scrap are required to specify the quantity (tonnes) of scrap that is classed as manufacturing scrap and the quantity (tonnes) classified as end of life scrap.

End of life scrap is assigned an embodied GHG emissions factor of zero. The GHG emissions associated with transportation of the scrap from the commercial supply site to the ResponsibleSteel certified site gate must be estimated.

Manufacturing scrap is assigned the same GHG factor as its upstream indirect (Scope 3a) GHG emission when it was originally supplied to the manufacturing site, prior to any additional GHG emissions associated with processing at the manufacturing site. If such supplier site specific GHG data is not available the ResponsibleSteel site shall treat its GHG emissions as neutral, for the purposes of calculating the site’s current GHG emissions intensity. It should be noted that neutral is not the same as zero emissions, which is the default for end of life scrap.

**Link to discussion and consultation question on ferrous scrap**

**Ferro alloys**

ResponsibleSteel distinguishes between ferro alloys for which steelmaking is a key buyer, defined on the basis of the proportion of the material for which steelmaking constitutes more than 50% of global demand, and other ferro alloys used for steelmaking, as listed:

- Steel sector a key buyer: (Cr, Mn, Mo, Ni, Nb, V)
- Steel sector not a key buyer: (Al, B, Co, Mg, P, Si, Ti, W)

Source-specific or producer-specific average GHG data are required for ferro alloys for which steel is a key buyer. For ferro alloys for which the steel sector is not a key buyer industry average or ‘indicative’ data may be used when more specific data are not available.

**Non-ferrous metals**

ResponsibleSteel distinguishes between non-ferrous metals for which steelmaking is a key buyer, defined on the basis of the proportion of the material for which steelmaking constitutes more than 50% of global demand, and other ferro alloys used for steelmaking, as listed:

- Steel sector a key buyer: (Zn)
• Steel sector not a key buyer: (Al, Mg, Sn)

Source-specific or producer-specific average GHG data are required for non-ferrous metals for which steel is a key buyer. For non-ferrous metals for which the steel sector is not a key buyer industry average or ‘indicative’ data may be used when more specific data are not available.

Process coal, coke and charcoal

Source-specific or producer-specific average are required when the site uses coke as an input material. Industry average or ‘indicative’ data may be used for anthracite, charcoal and pulverised coal for injection when more specific data are not available.

When coking coal is sourced from a ResponsibleSteel verified supply chain source specific or producer average GHG data must be used. Industry average or indicative data may be used when coking coal is sourced from unverified supply chains.

Lime, dolomitic lime, dolomite, limestone

Industry average or ‘indicative’ data may be used for lime, dolomitic lime, dolomite and limestone when more specific data is not available.

Industrial and fuel gases

Source-specific or producer-specific average GHG data are required for gases used as reductive agents for iron and steelmaking, including natural gas and hydrogen.

Industry average or ‘indicative’ data may be used for argon, oxygen, nitrogen and other industrial gases when more specific data are not available.

<table>
<thead>
<tr>
<th>Ferrous raw material</th>
<th>ResponsibleSteel certification of manufacturing site required¹?</th>
<th>Source-specific or producer - specific average GHG data required²?</th>
<th>Industry average or ‘indicative’ GHG data permitted³?</th>
<th>Supply-specific transportation data estimated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrate</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Direct reduced iron (DRI)</td>
<td>✓¹</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Fines</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Granulated Pig Iron (GPI)</td>
<td>✓¹</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Hot briquetted iron (HBI)</td>
<td>✓¹</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Lump ore</td>
<td></td>
<td></td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Pellets</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
### ResponsibleSteel proposals and consultation questions on GHG emission requirements for the certification of steel products

#### Pig iron, Sinter

<table>
<thead>
<tr>
<th></th>
<th>✓¹</th>
<th>✓</th>
<th>×</th>
<th>✓</th>
</tr>
</thead>
</table>

#### External scrap

- **Manufacturing scrap**
  - (See note 4) ✓
- **End of life scrap**
  - (zero tonnes CO₂e/tonne) ✓

#### Ferro alloys

- **Steel sector a key buyer**: (Cr, Mn, Mo, Ni, Nb, V) ✓ ×
- **Steel sector not a key buyer**: (Al, B, Co, Mg, P, Si, Ti, W) ✓

#### Non-ferrous metals

- **Steel sector a key buyer**: (Zn) ✓ ×
- **Steel sector not a key buyer**: (Al, Mg, Sn) ✓

#### Process coal, coke and charcoal

- **Anthracite** ✓ ✓ ✓
- **Charcoal** ✓ ✓ ✓
- **Coke** ✓ × ✓
- **Coking coals** ✓ ✓ ✓
- **Pulverised coal for injection** ✓ ✓

#### Lime, dolomitic lime, dolomite, limestone

- **Lime, dolomitic lime, dolomite, limestone** ✓

#### Industrial and fuel gases

- **Natural gas** ✓ × ✓
- **Hydrogen** ✓ × ✓
- **Argon, oxygen, nitrogen and other industrial gases** ✓

#### Other input materials for steelmaking

- **Blast furnace and slag additives, chemicals, desulfurizing products, electrodes, lubricants, oils, refractories, rolls are excluded from scope of upstream GHG estimate**

### 8.7.2.h Summary Table

#### Footnotes to 8.7.2.h Summary Table:

Note 1. Ore-based metallics, coke and charcoal must be sourced from sites that are certified as meeting...
the applicable requirements of the ResponsibleSteel Standard for site certification. This ensures that the management of social and environmental impacts for the production of these raw materials are addressed for the full supply chain from source through to crude steel production, irrespective of whether those processes take place on- or off- the site for crude steel production itself.

Note 2. Where source-specific or producer-specific average GHG data is required the GHG emissions determination shall include determination of the Scope 1, Scope 2 and upstream Scope 3 GHG emissions for production of the material. Determination of Scope 2 GHG emissions shall be based on up-to-date national grid specific emissions data provided by the IEA where available. If grid specific emissions are not used, the default data used shall be for the top 20th percentile for global grid GHG emissions.

Source-specific or producer-specific average GHG data should be determined in conformity with the requirements of ISO 14040 & ISO 14044, or EN15804. In all cases the site shall require the supplier to provide it with the source of the GHG data provided, any standard(s) which were followed for the calculation of the data, and the time period over which data used for the determination were collected.

Note 3. Industry average of ‘indicative’ GHG data may only be used when source-specific or producer-specific average GHG data are not available. In such cases the figure used by the site for its determination must be based on conservative estimates, defined as the estimate for the top 20th decile of the estimated range. Industry average data should be determined using a recognised international or regional standard such as ISO 14040 & ISO 14044, or EN15804. In all cases the site shall require the supplier to provide it with the source of the GHG data provided, any standard(s) which were followed for the calculation of the data, and the time period over which data used for the determination were collected.

Note 4. If supplier site GHG data is used for manufacturing scrap it shall refer to the embodied GHG emissions for the steel when originally supplied to the manufacturing site, prior to any additional GHG emissions associated with processing at the manufacturing site. If such supplier site specific GHG data is not available the steelmaking site shall treat the GHG emissions as neutral, for the purposes of calculating the site’s current GHG emissions intensity. It should be noted that neutral is not the same as zero emissions, which is the default for end of life scrap.

8.7.3 Energy indirect (Scope 2) GHG emissions

Energy indirect (Scope 2) GHG emissions are determined in accordance with the following specifications:

a. Imported electricity

- GHG emissions for imported electricity are quantified in accordance with the requirements of ISO 14064-1:2018 Annex E.2 Treatment of imported electricity, using the emission factor that best characterises the pertinent grid, i.e. dedicated transmission line, local, regional or national grid-average emission factor.
- Grid-average emission factors should be from the emissions year being reported, if available, or the most recent year if not. Grid-average emissions factors for imported consumed electricity shall be based on the average consumption mix of the grid from which the electricity is consumed.
- GHG emission reductions based on carbon offsets, power purchase agreements, virtual power purchase agreements, or green tariffs paid in relation to the site’s sourcing of electricity are permitted where these meet the requirements of ISO 14064-1:2018 E.2.2 Additional information.
- GHG reductions achieved through the use of biofuels that do not meet recognised sustainability standards shall not be recognised as contributing to the achievement of the net GHG reduction targets associated with the use of imported electricity. Recognised sustainability standards for biofuels include the voluntary schemes recognised as meeting the sustainability criteria of the
b. heating, cooling and steam

- GHG emissions for imported energy other than electricity are quantified using a source-specific emission factor.
- Emission factors should be from the emissions year being reported, if available, or the most recent year if not. Average emissions factors for imported energy shall be based on the average consumption mix of the energy generator.

**Guidance:**

**Energy indirect (Scope 2) GHG emissions:** GHG emissions that result from the generation of or purchased or acquired electricity, heating, cooling and steam consumed by an organisation (Source GRI Standards, GRI 305: Emissions. Global Sustainability Standards Board, 2016).

### 8.7.4 Direct (Scope 1) GHG emissions

The total direct (Scope 1) GHG emissions for the site are measured, recorded and verified in accordance with the requirements of an applicable, recognised international and/or regional standard (from 8.3.2) and in accordance with the following specifications:

a. Emissions associated with the processing of crude steel at the site

GHG emissions associated with the processing of crude steel at the site after production (for example, hot rolling, cold rolling, casting, coating) are not included in the determination of direct (Scope 1) GHG emissions for the purpose of calculating the crude steel GHG emissions intensity of the site.

b. GHG offsets

The determination of scope 1 emissions may not include carbon offsets or similar instruments.

c. Time coverage

Data collection is to be related to one year of operation and shall be representative of current steel production. The 12-month period immediately prior to the site audit shall be used as the default period, and any deviation from this shall be clearly reported and justified.

**Guidance:**

**Direct (Scope 1) GHG emissions:** GHG emissions that result from sources that are owned or controlled by an organisation.

Note 1. A GHG source is any physical unit or process that releases GHG into the atmosphere

Note 2. Direct (Scope 1) GHG emissions can include the CO2 emissions from fuel consumption.


**NOTE:** GHG emissions associated with the further processing of crude steel at the site are considered in relation to the determination of steel product GHG allocations, covered under Criterion 8.8, below.

### 8.7.5 GHG emission credits and corrections

a. Reduction of emissions associated with export of by-products or co-products
There is no reduction of GHG emissions associated with the export of by-products or co-products (including, for example process gases, dust, sludge, chemicals, oils and energy), for the purpose of determining the crude steel GHG emissions intensity performance of the site.

b. Allocation of emissions for exported intermediate products

Where a site produces and exports intermediate products such as coke, pig iron or GPI for steelmaking elsewhere, the GHG emissions associated with the production of the exported intermediate products should be deducted pro rata from the site’s determination of its own crude steel GHG emissions performance.

c. Energy use for on-site processing of crude steel

GHG emissions associated with on-site processing of crude steel are not counted as emissions for the purpose of determining the crude steel GHG emissions intensity of the site. The site should reduce its calculation of energy indirect (Scope 2) GHG emissions in accordance with the energy it uses for the on-site processing of crude steel.

d. On-site carbon capture and storage

GHG emissions that are captured and stored on site are not counted as emissions for the purpose of determining the crude steel GHG emissions intensity of the site. Where this is the case the technology used for capture and storage, and the quantity of GHG emissions captured is publicly reported.

e. Material exported from site as feedstock for downstream processing

GHG emissions that are captured on site and exported as feedstock for downstream utilisation (for example in the production of ethanol) are not counted as emissions for the purpose of determining the crude steel GHG emissions intensity of the site. Where this is the case the technology used for capture and downstream utilisation, and the quantity of GHG emissions captured is publicly reported. There is no allocation of GHG emissions to the exported material as a co-product or by-product for the purpose of determining the crude steel GHG emissions intensity of the site.

f. Energy exported from the site

There is no reduction of GHG emissions associated with the export of energy (including, for example electricity, steam or heat), for the purpose of determining the crude steel GHG emissions intensity performance of the site.

Guidance:

NOTE (8.7.5.a) The site may apply different rules for the purposes of allocating GHG emissions to steel products as covered by Criterion 8.8 below.

NOTE (8.7.5.c) This guidance is consistent with the focus on the GHG emissions associated with crude steel production, and avoids penalising sites that carry out energy intensive processing. However, it also means that sites that are efficient at re-using energy generated on site do not benefit from this in relation to their crude steel GHG emissions intensity performance figure.

The energy use associated with further on-site processing of crude steel is included in the determination of the steel product GHG allocation (see Criterion 8.8), so sites that are efficient at re-using energy generated on site will be able to claim and benefit from lower GHG emissions for their steel products, and pass these benefits on to their customers in terms of lower embodied GHG emissions, even though it is not considered in the determination of the GHG intensity for the production of crude steel.

NOTE (8.7.5.d)
The quantity of GHG emissions claimed as captured must be justified, and it must be demonstrated that the stored emissions will not be released to the atmosphere on a minimum 100-year time horizon.

NOTE (8.7.5.e)

The quantity of GHG emissions claimed as captured must be justified. It is recognised that the carbon ‘captured’ may be fully or partially released to the atmosphere when the products of the downstream process are used – for example as fuel, as feedstock for further industrial processes, or at their end of life disposal. It is proposed that the GHG emissions associated with such further use should be ‘owned’ downstream, and that the steelmaker should receive the full benefit in terms of the reduction of the crude steel GHG emissions intensity for its site. The implication is that the downstream users should not receive any further GHG related credit or benefit from the sale or use of such material downstream. Ethanol produced from the capture and use of process gases should be treated on the same basis as ethanol produced from other sources of material for the purpose of assessing GHG emissions associated with its production or use.

In this case a steelmaking site benefits from exporting GHG emissions to a downstream user that would otherwise be associated its own production of steel. The converse is the case when the steelmaking site exports energy (whether in the form of heat or electricity) to users beyond its site boundary, when the steelmaker continues to own the associated GHG emissions (see below).

NOTE (8.7.5.f)

This approach is consistent with the requirements of ISO 14064-1: 2018 for the treatment of exported electricity (see Annex E.3).

In this case a steelmaking site takes responsibility for the GHG emissions associated with the energy that is used by others. The converse is the case when the steelmaking site exports its by-products as feedstock for downstream carbon capture and utilisation, when the steelmaker benefits from the apparent reduction in its emissions, although these may subsequently be emitted downstream (see above).

Note that different rules may be adopted for the purposes of steel product GHG allocation, covered by Criterion 8.8 below.

8.7.6 Downstream indirect (Scope 3b) GHG emissions

Downstream life cycle considerations such as product GHG emissions in use and emissions associated with end of life disposal are excluded from the calculation of the GHG emissions intensity performance for crude steel production.

Guidance:

**Downstream indirect (Scope 3b) GHG emissions**: Other indirect (Scope 3) GHG emissions that occur outside of the organisation and downstream of its activities.

Consideration of downstream life cycles may be considered in relation to the allocation of GHG emissions to steel products, covered under Criterion 8.8, below.

8.7.7 The use of international or regional standards

Sites should align the collection and use of data for the determination of the ResponsibleSteel GHG intensity performance threshold as specified in criteria 8.7.1 to 8.7.6 with the collection and use of data they use to meet the requirements of other international or regional standards already in use at the site.
Where definitions or requirements specified by ResponsibleSteel differ from those used to meet other international or regional standards the definitions or requirements specified by ResponsibleSteel shall prevail for the purposes of calculating the site’s crude steel GHG intensity performance.

**Guidance:**
Additional guidance to be developed as required.

### 8.7.8. Measurement of scrap use and crude steel production

a. The site measures and reports the GHG emissions associated with its crude steel production in accordance with the requirements specified in Criterion 8.7.1 to 8.7.7 of this standard.

b. The site measures and records its monthly crude steel production.

c. The site measures and records on a rolling basis:
   - the quantity of end-of-life scrap steel used in its production of crude steel in the previous 12 months
   - the quantity of crude steel produced in the previous 12 months
   - the GHG emissions intensity of its production of crude steel over the previous 12 months (CO₂ e / tonne crude steel) calculated in accordance with the requirements of Criterion 8.6

**Guidance:**
Additional guidance to be developed as required.

### 8.7.9 Calculation of crude steel GHG emissions intensity performance

The site calculates and records its crude steel GHG emissions intensity performance in accordance with the equation:

\[
\text{Crude steel GHG emissions intensity performance (tonne } \text{CO}_2 \text{e/tonne)} = \frac{\text{GHG emissions (tonne CO}_2 \text{e)} \text{ for the previous 12 months}}{\text{quantity of crude steel produced in the previous 12 months (tonne)}}
\]

**Guidance:**
Additional guidance to be developed as required.

### Criterion 8.8. Steel Product GHG emissions data

Customers are provided with clear, consistent data for the GHG emissions that are allocated to ResponsibleSteel certified steel products, in accordance with recognised international standards.

8.8.1. The GHG emissions of steel products and co-products produced at the site are calculated in accordance with the World Steel Association (worldsteel) LCA methodology.

**Guidance:**

The resulting steel product GHG emissions data must be publicly accessible as a requirement for ResponsibleSteel steel product certification (see Criterion 8.9).
Link to discussion and consultation question on the use of the worldsteel LCI methodology as the basis for determining steel product GHG emissions allocations

**Criterion 8.9. Transparency and comparability of GHG emissions data**

The site’s crude steel GHG emissions performance, allocations of GHG emissions to steel products and co-products, and the proportion of end of life scrap used in its production are made available to ResponsibleSteel for publication in a readily accessible on-line format.

<table>
<thead>
<tr>
<th>8.9.1</th>
<th>The following data are provided to ResponsibleSteel for publication in a readily accessible on-line format:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>the site’s crude steel GHG emissions performance (as calculated in Criterion 8.6.1)</td>
</tr>
<tr>
<td>b.</td>
<td>the proportion of end-of-life scrap used for crude steel production (as determined in Criterion 8.7.8)</td>
</tr>
<tr>
<td>c.</td>
<td>the allocations of GHG emissions to steel products and co-products (as calculated in Criterion 8.8.1)</td>
</tr>
</tbody>
</table>

**Guidance:**

Additional guidance to be developed as required.

Link to discussion and consultation question on transparency and comparability of GHG emissions data
Annex 1a (for information): Glossary (previously approved)

Already included in the ResponsibleSteel Standard v1-0, approved November 2019:

**Carbon dioxide equivalent, CO\textsubscript{2}e:** Unit for comparing the radiative forcing of a GHG to carbon dioxide.


**Crude steel:** Steel in the first solid state after melting, suitable for further processing or for sale. Synonymous with raw steel.

(Adopted from worldsteel).

**GHG offset:** Offsets are discrete GHG reductions used to compensate for (i.e., offset) GHG emissions elsewhere, for example to meet a voluntary or mandatory GHG target or cap. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the offsets. To avoid double counting, the reduction giving rise to the offset must occur at sources or sinks not included in the target or cap for which it is used.


**Net GHG emissions:** The total GHG emissions (CO\textsubscript{2} equivalent) assigned to a product, process or activity minus the total GHG emission reductions claimed by the site as carbon offsets or through other mechanisms.

**Net-zero GHG emissions:** Refers to achieving an overall balance between emissions produced and emissions taken out of the atmosphere. ResponsibleSteel will work with its membership to agree a technical definition for net-zero GHG emissions as applicable to the scope of this standard, based on ongoing work being undertaken under the auspices of the UN Global Compact.

**Steel Product:** Product produced from steel and shipped out from steelworks.

EXAMPLE Hot rolled steel, pickled hot rolled steel, cold rolled steel, finished cold rolled steel, electrogalvanized steel, hot-dip galvanized steel, tin-free steel, tinplated steel, organic coated steel, section, plate, rebar, engineering steel, wire rod, seamless pipe, UO pipe, welded pipe.

(Adopted from ISO20915:2018(en) Life cycle inventory calculation methodology for steel products)
Annex 1b (for consultation): Glossary (new or updated terms)

New terms proposed for inclusion in updated glossary

DRAFTING NOTE: Deletions are indicated like this. Changes are indicated like this.

Carbon intensity of electricity: the CO2 GHG emissions produced per kilowatt hour of electricity consumed.

Co-product: any of two or more products coming from the same unit process or product system

[Source: ISO 14044:2006, 3.10]

Credit GHG emission: GHG emission that corresponds to exported material and electricity or steam.
(Adopted from ISO 14404:2017 Calculation method of carbon dioxide emission intensity from iron and steel production)

Direct GHG or CO₂ emissions: GHG emissions (CO₂ equivalent) from production facilities within the site boundary. Direct emissions correspond to ‘scope 1’ emissions as referred to in the GHG Protocol.

Direct (Scope 1) GHG emissions: GHG emissions that result from sources that are owned or controlled by an organisation.

Note 1. A GHG source is any physical unit or process that releases GHG into the atmosphere

Note 2. Direct (Scope 1) GHG emissions can include the CO₂ emissions from fuel consumption.

Direct Reduced Iron (DRI): Direct Reduced Iron (DRI) is the product of the direct reduction of iron ore in the solid state by carbon monoxide and hydrogen derived from natural gas or coal.

Most gas-based direct reduction plants are part of integrated steel mini-mills, located adjacent to the electric arc furnace (EAF) steel plant. DRI can be either hot or cold charged to the EAF. Some steel companies ship DRI from their captive direct reduction plants to their remote steel mills and a small volume of DRI is sold to third parties. In India there are many small rotary kiln furnaces producing DRI, known locally as sponge iron, using coal as energy and reductant source. Some of the sponge iron plants are captive to steel mills, but there is a significant domestic merchant market, India producing 57% of its crude steel in electric arc furnaces (2016).

Downstream indirect (Scope 3b) GHG emissions: Other indirect (Scope 3) GHG emissions that occur outside of the organisation and downstream of its activities.

End of life scrap: scrap from after the end of life of final products
(Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

Energy indirect (Scope 2) GHG emissions: GHG emissions that result from the generation of or purchased or acquired electricity, heating, cooling and steam consumed by an organisation.

Exported: in the context of the determination of GHG emissions ‘exported’ refers to energy, materials or products (including intermediate products, by-products or co-products) that leave the site across the site boundary.

External scrap: scrap provided from outside of the steelworks, including manufacturing scrap and end of life
Ferro alloy: alloy of iron with non-iron alloy metals, such as manganese, silicon or chromium used in the steelmaking process.

(Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

Final product: product that requires no additional transformation prior to its use

EXAMPLE: Automobiles, building structures, building envelopes, packaging.

(Source: ISO/TS 18110:2015, 2.2, modified – The example has been added.)

Global warming potential, GWP: Factor describing the radiative forcing impact of one mass-based unit of a given GHG relative to an equivalent unit of carbon dioxide over a given period of time (from EN 19694-1: 2016(E))

Note: GWP factors published by the Intergovernmental Panel on Climate Change (IPCC) shall be used.

Granulated Pig Iron (GPI): From time to time the supply of hot metal from a blast furnace may exceed the demands of the steel plant, for example due to problems further downstream. In most integrated steel mills, the blast furnace plants are not equipped with pig casters, meaning that the excess hot metal has to be cast into an open air sand pit, a process known as "pooling" or "beaching." The ensuing dust and fumes constitute an environmental hazard and the resultant pool or beach iron takes a long time to solidify before it can be crushed into usable material.

Granulation of the excess hot metal is a process that deals with these issues and produces a by-product - Granulated Pig Iron (GPI) - that can readily be used internally, for example as BOF coolant, or sold to third parties as feedstock for electric arc furnaces, cupolas and induction furnaces.

(Source: International Iron Metallics Association (IIMA) https://www.metallics.org, 2020.)

Greenhouse Gas, GHG: Gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds

Note to entry: GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).


NOTE: nitrogen trifluoride (NF₃) was added to the Greenhouse Gas Protocol list of GHGs in 2013.

Home scrap: scrap from a downstream steel production process within the steelworks (e.g. rolling, coating) that is returned to steel making processes (e.g. BOF or EAF)

(Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

Hot Briquetted Iron (HBI): Hot Briquetted Iron (HBI) is a premium form of DRI that has been compacted at a temperature greater than 650° C at time of compaction and has a density greater than 5,000 kilograms per cubic metre (5,000 kg/m³).

HBI was developed as a product in order to overcome the problems associated with shipping and handling of DRI - due to the process of compaction it is very much less porous and therefore very much less reactive than
DRI and does not suffer from the risk of self-heating associated with DRI.

The principle market for HBI is electric arc furnace (EAF) steelmaking, but HBI also finds application as a trim coolant in basic oxygen furnace (BOF) steelmaking and as blast furnace feedstock.


**Imported:** in the context of the determination of GHG emissions ‘imported’ refers to energy or materials that are brought into a site from outside of the site boundary.

**Industrial gas:** gas for steel production other than fuels (3.17) or reducing agent

  EXAMPLE Oxygen, nitrogen, argon, hydrogen, carbon dioxide, compressed air.

  Note 1 to entry: Hydrogen can be used as a fuel, or is included here as an industrial gas when used as an uncombusted industrial gas, e.g. for the provision of reducing atmospheres in production processes.

  (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

**Intermediate product:** the product when an input material undergoes processing on site before being used in subsequent processes. For example, coke may be produced on site from coking coal as an intermediate product prior to its use in the blast furnace. Intermediate products may be used in subsequent processes on site, or may be exported from the site for use outside of the site boundary.

**Internal scrap:** scrap from a crude steel making unit process that is then recycled within the same unit process [e.g. basic oxygen furnace (BOF) or electric arc furnace (EAF)]

  (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

**Manufacturing scrap:** scrap from the manufacturing processes of final products, such as automobiles and buildings

  (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

**Other indirect (Scope 3) GHG emissions:** indirect GHG emissions not included in energy indirect (Scope 2) GHG emissions that occur outside of the organisation, including both upstream and downstream emissions.


**Pig iron:** Pig iron is the product of smelting iron ore (also ilmenite) with a high-carbon fuel and reductant such as coke, usually with limestone as a flux. Charcoal and anthracite are also used as fuel and reductant. Pig iron is produced by smelting or iron ore in blast furnaces or by smelting ilmenite in electric furnaces.


**Process gas:** Gas that is produced as part of the processes on the steel production site

  EXAMPLE Coke oven gas, blast furnace gas, BOF gas.

  (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

**Scope of GHG emissions:** Classification of the operational boundaries where GHG emissions occur

  **Note 1:** Scope classifies whether GHG emissions are created by an organization itself, or are created by other related organizations, for example electricity suppliers or logistics companies.

  **Note 2:** There are three classifications of Scope: Scope 1, Scope 2 and Scope 3.

**Scrap:** iron and steel material in metallic form that is recovered in multiple life cycle stages, including steel production processes, the manufacturing processes of final products and the end of life of final products, and is recycled as a raw material for steel production

(Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

**Metric Tonne (T):** A metric tonne, equivalent to 1,000 kilograms or 2,204.6 pounds or 1.1023 short ton

(Adopted from worldsteel)

**Upstream indirect (Scope 3a) GHG emissions:** Other indirect (Scope 3) GHG emissions that occur outside of the organisation and upstream of its activities.

**Waste:** Any substance or object which the holder discards or intends or is required to discard.


**Waste:** materials disposed of in landfills, both internal and external to steel works, or incinerated.

(Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)

Already included in the ResponsibleSteel Standard v1-0, approved November 2019:

<table>
<thead>
<tr>
<th>Criterion 8.1: Corporate commitment to achieve the goals of the Paris Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The site’s corporate owner has defined and is implementing a long- and medium-term strategy to reduce its greenhouse gas (GHG) emissions to levels that are compatible with the achievement of the goals of the Paris Agreement, with an aspiration to achieve net-zero GHG emissions through work with policy makers and others.</td>
</tr>
</tbody>
</table>

8.1.1. The site’s corporate owner ascribes publicly to a credible, long-term emissions reduction pathway for the steel industry as a whole that is compatible with the achievement of the goals of the Paris Agreement, and which includes:

a. Explicit projections of long-term steel consumption;

b. Explicit projections for the production and use of primary as well as recycled steel, and the associated GHG emissions; and

c. Explicit assumptions in relation to the public policy and other key conditions on which it is based.

8.1.2. The site’s corporate owner has defined and made public both a long-term emissions reduction pathway and a medium-term, quantitative, science-based GHG emissions target or set of targets for the corporation as a whole. The corporation’s emissions reduction pathway and medium-term target(s) are compatible with the long-term emissions reduction pathway it ascribes to for the steel industry, and the projections for the production of primary as well as recycled steel as applicable to its own portfolio of sites.

8.1.3. The site’s corporate owner has a credible, documented strategy for the achievement of its corporate level GHG emissions target(s), outlining the timeline for change across its portfolio of sites and identifying the conditions that would need to be in place for the successful implementation of the strategy, and the specific actions, including policy engagement, it is committed to take to help bring these conditions about.

8.1.4 The corporate owner reviews the implementation of its strategy on a regular basis, documents the findings of the review, and updates the strategy to take account of the review’s findings.

8.1.5 The review shows that the corporate owner is implementing its strategy effectively over time.

Guidance:

(8.1.1) An emissions reduction pathway for the steel industry that is compatible with the goals of the Paris Agreement is one which limits the global average temperature to well below 2°C above pre-industrial levels and supports efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

(8.1.1) Long-term in this context means a time horizon of 15 to 35 years.

(8.1.2) Medium-term in this context means a time horizon between 5 and 15 years from the present time.

(8.1.1, 8.1.2) Medium- or long-term refers to the time measured from the start of the relevant implementation period. For example, a ten-year (medium-term) target set seven years ago is still valid even if it has only three years still to run. However, if a medium-term target expires during the period of
validity of a certificate, this would create a non-conformity with the requirement of the standard unless it is replaced by an updated medium-term target.

(8.1.2) A science-based target (SBT) validated by the SBTi (Science Based Targets initiative) would be sufficient to meet the requirements of 8.1.2. Other quantitative, scientifically justified targets (or sets of targets, for example for separate processes) may also be recognised, as long as the ambition, quality and coverage of the target is comparable.

(8.1.3) Specific actions may also include investments at the corporate or site levels, building of pilot facilities to develop, test and scale up new technologies, proposition to seek funding through ‘green bonds’, general commitments to upgrade sites over a period of time, etc.

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**Criterion 8.2: Corporate Climate-Related Financial Disclosure**

The site’s corporate owner is implementing the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD).

8.2.1. The site’s corporate owner has allocated responsibility for oversight of climate-related risk and opportunity to at least one board committee, with an understanding that material climate-related risks and opportunities that impact business strategy will need to be discussed at the full board level.

8.2.2. The site’s corporate owner has a documented commitment in place to implement the core recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD) according to its four pillars - Governance, Strategy, Risk Management, and Metrics and Targets - in accordance with applicable TCFD guidance, within three years of the date of application for the site’s certification.

**Guidance:**


Implementation in accordance with applicable TCFD guidance requires that the corporate owner makes the recommended disclosures associated with the four core recommendations.

The ResponsibleSteel period of certification is three years. Sites owned by corporations which have not implemented the TCFD recommendations within three years of the date on which their first site applied for certification would not be issued with any further certificates. The failure would also jeopardise the maintenance of any other current site certifications of the corporate owner.

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**Criterion 8.3: Site-level GHG emissions measurement and intensity calculation**

The site measures and records key aspects of its GHG emissions in accordance with a recognised international or regional standard.

8.3.1. There is a system in place to estimate the total GHG emissions (CO2 e) associated with materials imported to the site from outside the site boundary.
8.3.2. The total direct GHG (CO2 e) or CO2 emissions for the site are measured, recorded and verified in accordance with the requirements of an applicable, recognised international and/or regional standard.

8.3.3. For sites that produce crude steel, the GHG emissions intensity for the crude steel produced (metric tonnes of CO2 e/metric tonne crude steel) is calculated in accordance with the requirements of an applicable, recognised international and/or regional standard.

**Guidance:**

(8.3.1) The system to assess upstream emissions should include a screening of imported materials to identify those that may be associated with significant GHG emissions such as mined materials or hydrogen where relevant.

(8.3.1) As a minimum, the site must consider the GHG emissions associated with the materials listed in ISO 14404-1:2013 Table 2 and other materials that may be associated with significant GHG emissions. A material’s GHG emissions are not considered to be significant if there is evidence that they are likely to constitute less than 5% of the total GHG emissions associated with all of the materials imported to the site from outside the site boundary.

(8.3.1) The estimate may make use of emission factors such as those referenced in ISO14404 or from other secondary sources where no other reliable data are available. Where such secondary data or emission factors are used, these data must be referenced in the public report specified in 8.5.1 below. More resources should be committed to estimating the more significant sources of emissions, for example through the collection of emissions data from suppliers.

(8.3.1 - 8.3.2) In cases where pig iron or steel (other than scrap metal) itself is imported to the site from upstream sites, the associated GHG emissions must be accounted for using primary data specific to the site of production and must not be based on generic or secondary sources of data. The site must ensure that GHG emissions associated with imported pig iron or steel are clearly and explicitly included in the calculations of GHG emissions and are included in the calculation of GHG emissions intensity in 8.3.3.

8.3.2 ResponsibleSteel currently recognises the following international or regional standards:

- The GHG Protocol and EN 19694 (parts as applicable) for measurement of GHG emissions by steelmaking and other sites.
- ISO 14404 (parts as applicable) for the measurement of CO2 emissions by steelmaking sites, as applicable.

**Criterion 8.4: Site-level GHG reduction targets and planning**

There is a medium-term GHG emissions target and plan for the site that is aligned with the achievement of the corporate owner’s corporate level GHG emissions target(s).

8.4.1. There is a time-specific, medium-term target for the GHG emissions for the site or defined portfolio of sites that is at or below the trajectory required for the corporate owner to achieve its medium-term carbon emissions target for all of its sites, as specified under requirement 8.1.2.

For steelmaking sites, the target is defined in terms of the GHG emissions intensity of crude steel production (metric tonnes of CO2 equivalent/metric tonne crude steel) calculated in accordance with the international or regional standard as specified in 8.3.3.

8.4.2. There is a time-specific, medium-term target to reduce the net GHG emissions associated with the
site’s use of imported electricity, where the GHG emissions associated with the use of imported electricity are significant.

8.4.3. There are plans in place, approved by senior management, to achieve the site’s GHG emissions target(s) within the specified timelines as defined in 8.4.1 and 8.4.2. The plans include:

a. Time-specific milestones for each target from present through to the achievement of the medium-term target levels;

b. Explicit quantification of the site’s reduction of direct GHG (CO2 e) or CO2 emissions required to achieve the target(s) specified under 8.4.1.;

c. Specification of the international or regional standard that will be used to measure progress towards the target, and a description of the elements that are included or excluded from consideration (e.g. whether upstream scope 3 emissions are considered, and how any emissions associated with the site’s products, co-products, by-products or waste are to be taken into account);

d. Consideration of the technology, equipment, management system changes or other options to achieve the targets over time;

e. Consideration of the costs of installing any specified technology or equipment;

f. Consideration of the proposed mechanism for financing the proposed technology or equipment;

g. Consideration of external conditions that will need to be in place for the plan to be successfully implemented, or conditions that might prevent successful implementation.

8.4.4. Progress on the implementation of the plans is monitored and reported to the site’s board or equivalent oversight body on a regular basis, including an explanation of relevant issues such as changes to production in response to market conditions, closures for repairs or other significant factors, and the plans are updated if appropriate.

8.4.5 The site’s medium-term targets, as specified under requirements 8.4.1 and 8.4.2 and progress towards achieving these targets are reported publicly and on a regular basis.

Guidance:

(8.4.1) The site-level target must itself be below the average trajectory required to achieve the corporate owner’s overall corporate level target, OR, if this is not the case, the corporate owner must show that its whole portfolio of sites meets the requirements of 8.4.1 to 8.4.5, and so demonstrate that in combination its sites are on track to achieve its corporate level target.

(8.4.2) This requirement could be met, for example, through targets for: the purchase of electricity from low or zero carbon sources, carbon offsets, power purchase agreements, virtual power purchase agreements, or green tariffs paid in relation to the site’s sourcing of electricity. GHG reductions achieved through the use of biofuels that do not meet recognised sustainability standards shall not be recognised as contributing to the achievement of the net GHG reduction targets associated with the use of imported electricity. Recognised sustainability standards for biofuels include the voluntary schemes recognised as meeting the sustainability criteria of the European Union’s Renewable Energy Directive (EU) 2018/2001 (see list of approved Voluntary Schemes).

(8.4.2) Where a site introduces a new technology that has a major impact on reducing its direct emissions but results in an increase in the amount of imported electricity, the baseline for reducing net emissions for the imported electricity is set when the new technology is introduced.

(8.4.2) GHG emissions associated with imported electricity are considered significant if they represent
(8.4.2) Where imported electricity is generated from the use of the site’s own co- or by-products (e.g. process gases) whose GHG emissions have already been accounted for under 8.4.1, the GHG emissions for this imported electricity are considered to be zero for the purpose of calculating net GHG emissions under 8.4.2.

(8.4.2) Where offsets are used the offsets must be consistent with a specified, recognised international or national standard or regulation and must be publicly reported (see 8.5.1). The implication is that sites would have broad freedom to select their own approach to reducing net GHG emissions, and deciding what level of verification might be required to support their approach, so long as the approach is consistent with a recognised standard. Examples of recognised standards include:

- ART-TREES Standard, operational from 2020 under the emergent Forest Finance Facility;
- The National Carbon Offset Standard in Australia

(8.4.2) Low-carbon energy procurement must be consistent with a specified, recognised international or national standard or regulation and must be publicly reported (see 8.5.1). Examples of recognised standards include:

- The quality criteria set in the GHG Protocol Scope 2 guidance;
- The RE100 credible claims guidance.

(8.4.3) The content of the site’s plans are considered to be commercially confidential and shall not be disclosed by ResponsibleSteel or any auditors acting to verify compliance with the requirements of the ResponsibleSteel standard. The specified medium- to long-term targets and progress towards their achievement would, however, be reported.

(8.4.1, 8.4.2) the medium-term plan should cover activities planned for the following five to fifteen years, in accordance with the site’s financial and operational planning cycle. Longer term planning is also compatible with this guidance, so long as the time-specific milestones provide for effective monitoring in the medium term.

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**Criterion 8.5: Site-level GHG or CO2 emissions reporting and disclosure**

Key aspects of the site’s GHG or CO2 emissions measurements are publicly reported on an annual basis.

8.5.1. The following information is publicly reported on an annual basis:

a. The site’s estimate of the aggregated GHG emissions (CO2 e) for materials imported to the site from outside the site boundary, and an explanation of the basis for the estimate;

b. The GHG emissions (CO2 e) for heat and steam imported to the site from outside the site boundary;

c. The site’s total GHG emissions associated with its use of imported electricity;

d. Any arrangements to offset the site’s GHG emissions, including a description of the amount and nature of such offsets;

e. Any CO2 or GHG (CO2 e) emissions that are considered to be ‘credit emissions’ for the site;

f. The site’s total GHG (CO2 e) or CO2 emissions calculated in accordance with the requirements of
Criterion 8.3.

g. The total GHG emissions intensity of the crude steel produced at the site (metric tonnes of CO2 e/metric tonne crude steel), as determined in Criterion 8.3.

h. The basis for the site’s measurement of GHG emissions intensity, including:

- The international or regional standard(s) used;
- An explanation of variations in figures reported using different measurement standards if more than one standard has been used by the site and different figures have been reported for different purposes;
- An explanation of whether the reported figure for emissions intensity includes or excludes GHG emissions associated with raw materials imported to the site from outside the site boundary;
- An explanation for the combination of GHG emissions measurements and CO2 emissions measurements, where applicable.

Guidance:

(8.5.1.a) The reporting of GHG emissions associated with the materials imported to the site from outside the site boundary must include an explanation of the basis for the calculation, including the use of emission factors or other secondary data where used. The requirement specifies that reporting is for the aggregated GHG emissions for raw materials, but the determination of this figure will necessarily require that data for the emissions associated with specific types (and, potentially, separate supplies) of raw material has been used to carry out the calculation.

The figure for aggregated GHG emissions of raw material should specify what materials have been included and excluded from the calculation.

(8.5.1.c) The site’s total GHG emissions associated with its use of imported electricity will be the product of the amount of imported electricity multiplied by its carbon intensity. The basis for the calculation will be reviewed by the auditing body, but for reasons of commercial confidentiality only the total GHG emissions need to be reported publicly.

(8.5.1.d) Reporting should include, for example, a description of the purchase of carbon offsets (including the source and quantity), power purchase agreements, virtual power purchase agreements, or green tariffs the site pays in relation to its sourcing of electricity.

This standard does not specify requirements in relation to the quality or verification of claimed offsets, but is intended to create a public record of such claims, as well as to provide an opportunity for certified sites to communicate their initiatives in this regard.
Annex 3 (for information): data used as basis for estimate of current median crude steel GHG emissions intensity

Any estimation of the current global median GHG emissions intensity for 100% scrap-based or 100% iron-ore based steel production should take account of the following factors:

- Data for BF-BOF steelmaking will typically include 6% to 20% scrap use. Existing data for steel made through BF-BOF (or other non-100% iron-ore routes) therefore need to be corrected to give an estimate for the emissions that would be associated with the theoretical use of 100% iron ore, giving a higher figure than is typically referenced for BF-BOF steelmaking.

- Similarly, data for EAF production using some pig iron made from iron ore would need to be corrected to give an estimate of emissions that would be associated with the theoretical use of 100% scrap, assuming the upstream Scope 3 emissions associated with pig iron production were previously included. Data for EAF using pig iron from iron ore, would give a higher emissions figure compared to the use of 100% scrap.

- Data for stainless steel includes a mixture of carbon steel scrap, stainless scrap and ore-based material, as well as variable amounts of alloys of different elements, making it difficult to estimate the emissions for theoretical 100% scrap or 100% ore-based situations.

- Data referenced for steel production is typically for finished products rather than crude steel, and includes emissions associated with at least some downstream processing – actual emissions for crude steel would be somewhat lower than such quoted data.

- Referenced data is unlikely to have been collected following the proposed GHG accounting rules specified in Criterion 8.7. Typically, detailed scope information for referenced data is not provided.

- Referenced data are often outdated. Efficiency gains can result in GHG reductions of around 0.7% per year. Grid emissions for electricity are likely to have fallen due to increases in the supply of renewable electricity, which would reduce Scope 2 emissions, where these have been included.

- Referenced data often refer to specific geographic regions (e.g. EU 27 countries) and may not be representative of global average data.

In practice data for GHG emissions for steel making are rarely publicly available, and where they are available the detailed specifications on which they are based are not provided. The emissions factors used as the basis for the thresholds specified in this draft must be considered to be estimates, in the absence of better data. However, as noted in the text, exact and precise data are not required for the proposed approach to be effective.

For reference, the following sources have been used as starting points for estimating median GHG emission intensity for crude steel production.

**Boston Consulting Group** (*Steel’s Contribution to a Low-Carbon Europe 2050: Technical and Economic Analysis of the Sector’s CO₂ Abatement Potential’, Exhibit 3*) – EU 27 average data

- BF-BOF (1990): 1.968 t CO₂/ t crude steel
- BF-BOF (2010): 1.888 t CO₂/ t crude steel
• BF-BOF (2010, best in class): 1.680 t CO\(_2\)/t crude steel
• BF-BOF (2050): 1.66 t CO\(_2\)/t crude steel (Projected potential improvement by 2050)
• EAF (1990): 0.667 t CO\(_2\)/t crude steel
• EAF (2010): 0.455 t CO\(_2\)/t crude steel
• DRI-EAF (1990?): 1.376 t CO\(_2\)/t crude steel
• DRI-EAF (2010): 1.2 t CO\(_2\)/t crude steel

**CDP pers comm (2019)**

Using data published by WorldSteel in their 2014 publication ‘Energy use in the Steel Industry’:

• BF-BOF: 2.18 t CO\(_2\)/t crude steel (best year over period 2007-2012)
• Scrap-EAF: 0.64 t CO\(_2\)/t crude steel (best year over period 2007-2012)
• DRI-EAF: 1.25 t CO\(_2\)/t crude steel (estimated, assuming 20% scrap share in gas-based DRI)

These figures include scope 1+2 and scope 3 for purchased raw materials. These figures approximately represent the average of worldsteel members. Weighting figures to global BOF, EAF, and DRI production statistics in 2017 yields an overall intensity of 1.81 t CO\(_2\)/tonne crude steel, which corresponds to worldsteel’s sustainability data for the sector, which is slightly higher (1.83) but then not necessarily a ‘good’ year.

**Material Economics (2018):** Average CO\(_2\) Intensity of Global Steel Production (Source: Material Economics, The circular economy: A powerful force for climate mitigation, 2018, Exhibit 2.3)

• BF-BOF: 2.3 t CO\(_2\)/t steel
• BF-BOF with best available technology: 1.9 t CO\(_2\)/t steel
• BOF with bio fuels: 1.1 t CO\(_2\)/t steel
• Direct reduction iron: 1.1 t CO\(_2\)/t steel
• BF-BOF with CCS: 0.9 t CO\(_2\)/t steel
• EAF: 0.4 t CO\(_2\)/t steel
• EAF + zero carbon electricity 0.1 t CO\(_2\)/t steel

**ResponsibleSteel pers com (2020)**

“In normal reporting at steelmaking sites, the carbon referred to is Scope 1. If this is around the 2.0 [t CO\(_2\)/t steel] mark, then accounting for Scope 2 and Scope 3 could raise this to 2.3 – 2.4 [t CO\(_2\)/t steel].”

**EU ETS benchmarks (2020)**

The EU ETS specifies thresholds for manufacturing activities tied to EU ETS benchmarks, designed to reflect the average performance of the 10% most efficient installations in a particular sector. The thresholds are intended to include scope 1 and scope 2 emissions, but do not include scope 3 emissions, making them hard
to interpret. As of February 2020, the EU-ETS benchmarks values for iron and steel manufacturing are:

- Hot metal = 1.328 tCO₂e/t product
- Sintered ore = 0.171 tCO₂e/t product
- Iron casting = 0.325 tCO₂e/t product
- Electric Arc Furnace (EAF) high alloy steel = 0.352 tCO₂e/t product
- Electric Arc Furnace (EAF) carbon steel = 0.283 tCO₂e/t product
- Coke (excluding lignite coke) = 0.286 tCO₂e/t product

All green new steel production, or combination of new and recycled steel production, is eligible if the emissions fall below the thresholds above. Additionally, all production of steel in EAF where at least 90% of the iron content in the final products is sourced from scrap steel is considered eligible. In this case, no other thresholds are applicable.

High alloy/ stainless steels


The average carbon footprint of stainless steel (all grades, all countries) is estimated to be 2.90 kg of CO₂ per kg of stainless steel produced, of which 1.92 kg are emissions from raw materials (Cr, Ni, Mo); 0.54 kg from electricity and steam, and 0.44 kg are direct emissions (i.e., by the stainless steel plant). Note that stainless steel produced in countries that use cleaner sources of electricity (such as France, which uses nuclear energy) will have a lower carbon footprint. Ferritics without Ni will have a lower CO₂ footprint than austenitics with 8% Ni or more.

**EU ETS benchmarks (2020)**

The EU ETS benchmark for EAF high alloy steel is 0.352 tCO₂e/t product compared to 0.283 tCO₂e/t product, a factor of approximately 1.25 higher.

**Link to discussion and consultation question on better sources of data on global GHG emissions**

**intensity performance for crude steel**
Annex 4 (for information): Drafting Principles

During preliminary consultation some stakeholders recommended that general principles should be identified to provide a basis for the development of specific requirements in relation to GHG emissions requirements.

The following principles were identified. The principles are not absolute, and there can be tensions between them, but they have been used where possible to provide consistency in drafting.

General considerations

The standard’s requirements should be designed to achieve the overall objective of the standard in relation to GHG emissions — the achievement of the goals of the Paris Agreement — as effectively as possible. To do this they need to be written with a clear understanding of how the standard may be used to meet the needs of steelmakers, steel users and specifiers, policy makers, investors and other stakeholders, as well as the potential barriers to its use.

The potential uses of the standard for different business sectors need to be considered, including for example its use in the construction, infrastructure, automotive and packaging industries.

International applicability

The standard should be applicable internationally, without favouring or disfavouring steelmakers in any jurisdiction other than as necessary to achieve the objectives of the standard.

Applicability to all production pathways and steel types

The standard should be applicable to all iron and steel production pathways, including EAF, DRI, BF-BOF and new technologies based on the use of hydrogen. The standard should be applicable to all steel types, including carbon steels as well as stainless and high alloy steels.

Scraper and iron ore

Approximately 80% to 90% of available ferrous scrap is currently recycled. Projections for steel use over the timescale in which GHG emissions reductions have to be achieved to meet the goals of the Paris Agreement foresee iron-ore based steel production continuing at approximately today’s rate through to 2050 and beyond, even if recycling rates are increased, steel is used more efficiently, and steel is replaced for some uses by other materials.

The standard therefore has to address two fundamental challenges for steelmaking over the next 30 years: the reduction of GHG emissions associated with energy generation for the recycling of scrap (Scope 2 emissions); and the reduction of GHG emissions associated with conversion of iron ore into steel. If either of these efforts fail, the steel sector will not be able to achieve the reductions that are required by the Paris Agreement. The standard should be designed to drive GHG emissions reductions for the production of steel using both scrap and iron ore.

Consideration of the cost of implementation

Requirements should be designed to minimise the cost of implementation. Cost can be reduced in a variety of ways, including efforts to reduce the direct costs of implementing requirements, by building on existing practises and systems which are already widely implemented, and by seeking to reduce costs of verification. The standard’s requirements should avoid unnecessary costs of implementation and verification where possible.

Interoperability
The standard should be designed for interoperability with other standards used to assess GHG emissions for input materials used for steelmaking, and with downstream standards that seek to compare the GHG emissions of steel with the GHG emissions of other materials. Where possible the standard should build on or reference existing standards, including the use of standardised or widely recognised terms and definitions. Where differences are considered necessary these should be clearly explained and justified.

Whole supply chain approach

The standard should aim to support the reduction of GHG emissions for the whole supply chain, from cradle to the end of life for a final product. The standard should be designed to avoid unintended negative consequences, for example penalising higher GHG emissions at one stage of production or processing that may result in overall reductions through lower GHG emissions at later stages. However, this does not necessarily mean that the standard itself must take a full life cycle assessment approach. Unintended consequences may be avoided by ensuring that the standard is clear and transparent about what is measured and reported, and ensuring that relevant data are available and can be taken into account for the determination of appropriate life cycle comparisons.

Independence of site boundaries

The determination of the GHG measurement for crude steel or a steel product should be the same, irrespective of the physical or legal boundaries of the different sites involved in production. The GHG measurement should not be reduced or increased, for example, depending on whether intermediate processing of input materials occurs on- or off-site.

Consistency across sites and processes

The methodology should be consistent across sites and processes. For example, it should treat upstream GHG emissions, emissions credits, on-site carbon capture and storage or utilisation in the same way at all sites.

Better quality data should be given preference

The standard should give preference to the use of better quality data where they are available. Better quality data are data that are more up-to-date, more specific, or more reliable.

A conservative approach to data gaps

The standard should take a conservative approach when there are gaps in data, in line with the requirements of ISO 21970:2017 paragraph 7.1.8 which states that ‘data gaps shall be filled with conservative assumptions’. Source specific data should be used wherever possible in preference to generic industry data for upstream materials, but where generic industry data is used a ‘burden of doubt’ rather than ‘benefit of doubt’ approach should be applied, using high (e.g. top 20th percentile) estimates for embodied carbon for input materials rather than industry average estimates.

Export or use of intermediate products

The standard should address GHG emissions associated with the transfer of energy or intermediate materials within and across site boundaries clearly and consistently.

Consistent approach to GHG allocations to co-products or by-products

The standard should address GHG emissions associated with the export of co-products or by-products clearly and consistently considering the range of co-products and by-products that may be exported from the site, including for example slags, process gases, dust, sludge, chemicals, oils, and the potential use of such materials as feedstocks for downstream processes such as for the production of ethanol.

Avoiding double counting and missing emissions
The measurement and reporting of GHG data should avoid double counting, considering both the use of data by ResponsibleSteel certificate holders and by other users. Nor should emissions be allocated to co-products, by-products or waste if these are not subsequently recognised. The standard should provide a credible, transparent and consistent approach for the accounting of GHG emissions associated with carbon capture, storage and utilisation, both on- and off-site.

**Avoiding duplicating the use of existing standards**

The ResponsibleSteel Standard should reference rather than duplicate existing tools, standards and methodologies where possible.

**Full life cycle GHG emissions**

Full life cycle GHG emissions for steel products can be significantly affected by in-use and end of life emissions, for example in relation to the use of galvanised or high alloy steels. The standard should be designed to avoid inadvertently resulting in increases of GHG emissions by penalising steel products with higher embodied emissions but which may lead to lower overall emissions when their full life cycle performance is considered.
Annex 5: Discussion and Consultation Questions

Discussion and Consultation Questions on Background to Principle 8 (additional criteria)

Focus on two aspects of GHG emissions performance: GHG emissions intensity for crude steel production; and GHG emissions allocated to steel products

The proposed requirements for the certification of steel products focus on two key elements:

A. The site’s GHG intensity performance for the production of crude steel;

B. The GHG emissions allocated to products (including steel products, intermediate products, co-products and/or by-products) exported from the site.

The focus on these two key elements is intended to provide different but complementary mechanisms to support reductions in GHG emissions.

The site’s crude steel GHG intensity performance provides a basis for stakeholders to compare site level performance in relation to the emission of GHGs. Downstream users may specify that steel is sourced from sites that meet a threshold level of performance, or that achieves high levels of performance compared to other sites. The focus on crude steel provides a common reference point, irrespective of further processing that may take place either on or off site.

The GHG emissions data for the products exported from the site provides a different focus and supports different uses. Here, it is the allocation of GHG emissions to specific products that is important. This information is needed to allow downstream users to monitor the GHG emissions embodied in the materials they buy or specify. This may be critical information for downstream users to meet their own company targets to reduce embodied emissions, for steel products to qualify for use in public contracts, as data for comparing steel’s GHG emissions with emissions associated with competing materials, or to determine whether a product should attract or qualify for a border adjustment.

Crucially, different GHG accounting rules may be required to serve these different purposes most effectively. For example, in relation to the crude steel GHG emissions intensity performance the allocation of GHG emissions to co-products or by-products distorts the apparent performance of the site. The allocation of GHG emissions to a by-product may give the impression that the site’s GHG emission performance has improved, when in fact it has not. However, when it comes to the allocation of GHG emissions to products, it may be appropriate to allocate GHG emissions to co-products to ensure that different downstream users can compare the GHG profiles of different materials on a common basis. And if GHG emissions are allocated to co-products then the allocations to other products will need to be reduced accordingly.

In either case, clear, consistent rules are required to avoid manipulation and ensure that stakeholders are provided with directly comparable data on which to take decisions. Where possible, the same rules should apply. For example, the same rules should apply to the determination of indirect upstream (Scope 3a) and indirect (Scope 2) GHG emissions. However, the GHG accounting rules for the determination of crude steel GHG emissions intensity performance, and the GHG accounting rules for the allocation of GHG emissions to products, may differ. Once this has been recognised it becomes possible to design both sets of rules to optimise their effectiveness. Where the rules on crude steel GHG emissions performance may appear to be to the disadvantage of a steelmaker, the rules for allocating GHG emissions to products may be able to address the concern.

ResponsibleSteel proposals and consultation questions on GHG emission requirements for the certification of steel products
Consultation question on the proposed focus on two aspects of GHG emissions performance

Do you support the standard’s proposed focus on these two aspects of GHG emissions performance:

A. GHG emissions intensity for crude steel production;
B. GHG emissions allocation to steel products sold by the site (e.g. coils, rebar, intermediate products, co-products, etc)

If not, what alternative approach would you propose?

Discussion and Consultation Questions on Criterion 8.6

GHG emissions intensity performance thresholds adjusted for scrap use

Steel products made with higher proportions of scrap will, other considerations being equal, be associated with lower GHG emissions than comparable steel products made with less scrap. However, the steel sector already utilises 80% - 90% of available ferrous scrap for making new steel, so the potential to reduce the sector’s overall GHG emissions by increasing the proportion of scrap that this is reused is limited.

Although some improvement is still possible, and should certainly be encouraged, the use of steel products that contain a high percentage of ferrous scrap cannot result in GHG emissions reductions at the scale required to achieve the objectives of the Paris Agreement for the steel sector, even if leads to a reduction in the embodied GHG emissions reported for a particular product or project.

A mechanism is required that maximises real reductions in GHG emissions for the steel sector as a whole, rather than simply identifies the steel products that contain a high proportion of ferrous scrap. The ResponsibleSteel standard proposes to achieve this by defining a performance threshold for a site’s crude steel GHG emissions intensity that takes account of the proportion of end of life scrap that has been used as an input material.

For example:

The average global GHG emissions intensity for the production of steel using 100% scrap as an input material is estimated at approximately 0.5 tonnes CO₂ e/ tonne crude steel produced. The average global GHG emissions intensity for the production of steel using 100% iron ore as its input material is estimated at approximately 2.0 tonnes CO₂ e/ tonne crude steel produced.

Based on these estimates, a site using 100% scrap as its feedstock would be ‘better than average’ if it achieves GHG emissions less than 0.5 tonnes CO₂ e/ tonne crude steel, whereas a site using 100% iron ore as its feedstock would be ‘better than average’ if it achieves GHG emissions less than 2.0 tonnes CO₂ e/ tonne crude steel. In between these extremes, the applicable threshold can be continuously adjusted in proportion to the percentage of scrap used, providing a fair measure of the site’s GHG emissions performance whatever the proportion of scrap used as an input material.

This approach is described mathematically by the formula given in 8.6.1 and illustrated below. The figure below illustrates the application of the proposed threshold approach for a site producing carbon steel, using an estimated median figures for GHG emissions intensity for the production of carbon steel in 2018 of 2.00 tonnes CO₂ e / tonne of crude steel when using 100% iron-ore as an input material, and 0.5 tonnes CO₂ e / tonne of crude steel when using 100% end-of-life scrap.
Using these data the threshold for the full range of percentages of end-of-life scrap from 100% down to 0% (shown along the x axis) is shown by the diagonal line.

The figure illustrates how the model works for a range of sites using different proportions of end-of-life scrap for their production of crude steel and achieving different GHG emissions intensities.

<table>
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<tr>
<th>Scrap %</th>
<th>GHG emissions intensity (t CO₂ e / t of crude steel)</th>
<th>Notes</th>
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<tbody>
<tr>
<td>a 10%</td>
<td>2.25</td>
<td>The GHG emissions intensity is above the threshold for the proportion of scrap used, and the site’s steel products are not eligible for ResponsibleSteel steel product certification and related claims.</td>
</tr>
<tr>
<td>b 20%</td>
<td>2.0</td>
<td>Increasing the proportion of scrap has reduced the GHG intensity for crude steel production in line with global median emissions for the use of scrap, but the GHG emissions intensity remains above the threshold, and the site’s steel products are still not eligible for ResponsibleSteel steel product certification and related claims.</td>
</tr>
<tr>
<td>c 10%</td>
<td>1.85</td>
<td>The proportion of scrap used is the same as in a), but the GHG emissions intensity is below the threshold, and the site’s steel products are eligible for ResponsibleSteel steel product certification and related claims.</td>
</tr>
<tr>
<td>d 80%</td>
<td>1.0</td>
<td>Although the GHG emissions intensity is well below that for the crude steel in example c), it is above the threshold for steel made using such a high proportion of end-of-life scrap.</td>
</tr>
</tbody>
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ResponsibleSteel proposals and consultation questions on GHG emission requirements for the certification of steel products

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<th>0.4</th>
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scrap, and the site’s steel products are not eligible for ResponsibleSteel steel product certification and related claims.

The GHG emissions intensity is below the threshold given the proportion of scrap used, and the site’s steel products are eligible for ResponsibleSteel steel product certification and related claims.

The approach is designed to create a level playing field for both scrap-based and iron-ore based steel production, and prevents a site manipulating its apparent GHG emissions performance simply by increasing its use of scrap.

Consultation question on threshold based on proportion of scrap used for crude steel production

Assuming there is some minimum threshold level of GHG emissions performance that must be achieved before steel products can be sold as ResponsibleSteel certified, do you support the general approach of specifying a threshold that takes account of the proportion of scrap used as an input material, as proposed? If not, what mechanism would you recommend in preference to this approach?

Use of median performance as the minimum threshold for ResponsibleSteel steel product certification

Stakeholders agreed in 2019 that there should be a threshold level of GHG emissions performance that must be achieved in order for a steel product to be promoted as being ‘ResponsibleSteel certified’. This raises the question of the level of performance at which the threshold should be set. Should the minimum threshold for steel product certification be set at a relatively inclusive level (the global median performance level is proposed), or aim to identify the world’s best performers in terms of current day emissions (e.g. the threshold could be set at the top decile level of international performance)?

We propose that the choice of threshold needs to be considered as one element of ResponsibleSteel’s overall strategy for achieving its objectives in relation to GHG emissions reductions, the responsible sourcing of raw materials, and higher levels of performance in relation to all 12 ResponsibleSteel principles.

In relation to the sourcing of input materials it is assumed, for the purposes of this draft, that ResponsibleSteel will adopt a ‘mass balance’ approach to steel product claims with a relatively low threshold for initial claims, along the lines proposed as draft requirements in the consultation paper ResponsibleSteel Requirements, Options and Consultation Questions on Responsible Sourcing of Input Materials, Draft Version 1.0, 01 August 2020.

On this basis, it is proposed that the threshold level of performance in relation to GHG emissions for claims to be made about ResponsibleSteel steel products should be based on the global median level of performance for GHG emissions, taking account of the proportion of end of life scrap used as an input. It is proposed that this in combination with the demanding requirements that sites must meet the requirements for all 12 ResponsibleSteel Principles (covering health and safety, workers’ rights, community engagement, water stewardship, etc.), and with the requirements for ResponsibleSteel sourcing of input materials, this threshold provides a credible starting point for ResponsibleSteel certification of steel products.
This basic threshold level of performance would be supplemented by the public availability of the GHG emissions data for certified steel products (Criterion 8.8) and potentially by providing additional performance grades for users who wish to specifying more demanding requirements for their own purposes (see Criterion 8.9).

**Consultation question on minimum threshold for steel product certification based on global median GHG emissions performance**

Assuming there is some minimum threshold level of GHG emissions performance that must be achieved before steel products can be sold as ResponsibleSteel certified, should the threshold level, do you think that this threshold should:

- Be based on an estimate of the global median level of performance in 2018?
- Be based on an estimate of global best practice (e.g. the top decile level of performance in 2018)?
- Be based on some other benchmark (please specify)

**Better sources of data on global GHG emissions intensity performance for crude steel**

The figures given in Criterion 8.6.1 Guidance for the estimated global median GHG emissions intensity for 100% scrap-based crude steel production and 100% iron ore-based production, and for carbon steel and high alloy steel respectively, are provisional, based on the data sources given in [Annex 3](#).

The figures are of course dependent on assumptions about scope boundaries, upstream emissions and the possible allocations of emissions to co-products of steelmaking or in the supply chain. High levels of precision and accuracy are not required for the approach to support the intended objectives of the standard. A slightly higher estimate would mean that slightly more than 50% of global steel production would currently be eligible (on this criterion) for steel product certification. A slightly lower estimate would mean that slightly less than 50% of current global steel production would currently be eligible for steel product certification. As GHG emissions reduce over time the number of steel making sites that are eligible for steel product certification would increase.

Although the precise figure is not critical to the standard’s functioning, it would be desirable to use the most accurate data available.

**Consultation question on identification of better sources for GHG emissions intensity performance data for crude steel**

Are there more comprehensive, up-to-date and publicly accessible sources of data on the GHG emissions of steelmaking than those given in Annex 3, that could be used to specify the benchmark figures for the calculation of GHG emissions performance thresholds for carbon steel and/or high alloy steels, if the proposed approach is adopted in principle? If so, please provide references.
Discussion and Consultation Questions on Criterion 8.7

ResponsibleSteel accounting rules for the determination of GHG emissions intensity performance

A fundamental element of ResponsibleSteel’s proposed approach is that ResponsibleSteel certification should allow customers, specifiers and others to be able to compare the GHG performance of steelmaking sites and steel products, and create market benefits for better performance.

If the performance of sites is to be compared in this way in the market, it is essential that performance is measured consistently between different sites, in whatever geographical or jurisdictional region they are situated. Different GHG accounting rules - for example, whether specific upstream indirect (Scope 3a) emissions are included or not, which GHGs are considered, how GHG emissions are allocated to co-products or by-products, whether indirect (Scope 2) GHG emissions are included or not – will give different results. Consistent accounting rules are needed for all ResponsibleSteel certified sites.

There is no agreement between steelmakers on any existing international standard to use to provide consistent measurement of the crude steel GHG emissions intensity between different sites. To the contrary, different companies have indicated preferences for different standards, and strong antipathy towards ResponsibleSteel referencing any single (non-preferred) international or regional standard.

ResponsibleSteel therefore proposes to allow steelmakers flexibility in their preferred choice of international or regional standard for the measurement of GHG emissions, but to require that whichever standard is used there is consistency in the application of GHG accounting rules to be specified by ResponsibleSteel itself. ResponsibleSteel rules would apply to the scope of GHG emissions that need to be considered, the allocation of GHG emissions to intermediate products and by-products, etc. The proposed rules are as specified in Criterion 8.7.

In some areas the ResponsibleSteel requirements are more specific than, but do not conflict with, the requirements of existing international or regional standards. For example, ISO 14404-1:2013 Table 4 provides lists of ‘indicative’ emissions factors that may be used ‘if no other reliable data are available’, and requires that where different emission factors are used they should be clearly identified and justified. Table B.1 is provided as a template for the recording of the emissions factors used. The ResponsibleSteel Standard is more specific, requiring that source-specific or producer-specific average data must be used where available, and that where industry average or ‘indicative’ sources are used they are applied conservatively. The ResponsibleSteel requirements would be more specific than the ISO requirements, but do not conflict with them. A steelmaker can follow the ResponsibleSteel requirements and remain fully compliant with the requirements of the ISO standard.

Similarly, ISO 14404-1: 2013 Table 4 provides an indicative upstream emission factor for imported electricity, using the global average CO\textsubscript{2} intensity of electricity and heat generation (CO\textsubscript{2} emissions per MWh) calculated by IEA in 2006. The standard notes that this factor should be updated. The ResponsibleSteel Standard requires that up to date, grid-specific IEA data must be used. Again, the ResponsibleSteel specification is fully compatible with the continuing application of ISO 14404-1: 2013 while providing additional detail on implementation.

In other areas ResponsibleSteel requirements build on but go beyond the requirements of existing standards. For example, the ResponsibleSteel standard requires that GHG emissions associated with transportation are included in the determination of upstream indirect (Scope 3a) GHG emissions, whereas these are not covered by ISO 14404-1: 2013. The ResponsibleSteel standard also proposes to take a different approach to the inclusion of ferro alloys and non-ferrous metals, proposing that 95% of upstream indirect (Scope 3a) GHG emissions should be considered including ferro alloys and non-ferrous metals where relevant. ISO 14404-1: 2013 in contrast lists three specific alloys to be included in the determination (ferro-nickel, ferro-chromium and ferro-molybdenum).
The ResponsibleSteel standard also specifies that gases other than CO$_2$ must be considered in the determination of the crude steel GHG emissions intensity for the site, and that the unit of measurement should therefore be CO$_2$ equivalent (CO$_2$ e) emissions, and not just CO$_2$. For many purposes the actual measurement of emissions at a steel making site will be the same. However, for some purposes (e.g. GHG emissions associated with coke production) the consideration of additional gases may be significant. Importantly, the use of CO$_2$ e as the unit of measurement brings the collection and reporting of data into alignment with other upstream and downstream GHG standards, with standards applicable to other materials, and with the requirements of ISO 14064-1: 2018.

Consultation question on ResponsibleSteel specification of GHG accounting rules

- Do you support the proposed approach in principle, that ResponsibleSteel should not require steelmakers to follow any single specific international standard for GHG accounting, but should instead focus on seeking agreement on specific accounting rules (currently 8.7.1 to 8.7.9) that should be applied in order to achieve consistency in the determination of the ResponsibleSteel crude steel GHG emissions intensity threshold?

- If not, what alternative approach do you recommend? And if you recommend that ResponsibleSteel should require steelmakers to follow a single specific international standard for GHG accounting, which one should be specified?

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Inclusion of Upstream indirect (Scope 3a), Energy indirect (Scope 2), and Direct (Scope 1) GHG emissions in the determination of the crude steel GHG emissions intensity performance for the site

In terms of scale, the direct (Scope 1) and indirect (Scope 2) emissions associated with steelmaking will usually be much greater than the upstream indirect (Scope 3a) GHG emissions of the input materials. The total GHG emissions intensity for crude steel will be affected by a wide variety of factors, including the upstream indirect (Scope 3a) GHG emissions of the input materials, the indirect (Scope 2) GHG emissions intensity of the energy used, the choice of reducing agent when iron ore is used as a raw material, whether GHG emissions are captured and stored or incorporated into further products or are released to the atmosphere, the extent to which energy generated on site is released or reused, and the efficiency of a site’s operations. Some of these factors are long-term, some medium-term. Some are under the direct control of a particular site, some are not. A site may have more or less influence over the factors that are not under its direct management control. The cost efficiency of reducing emissions through particular measures will vary between sites and geographies. Emission reductions associated with one aspect of steel making may result in increases associated with other aspects.

The proposed approach is that the standard should aim to measure the overall GHG emissions intensity at a point that allows for consistent comparison between sites – the point at which crude steel is produced - and let the site’s managers to determine how best to manage any GHG emissions associated with production up to that point – a ‘cradle to crude steel’ approach. The standard focusses on crude steel as the measurement point. It aims to include all the factors listed above in the determination of GHG emissions intensity, to give a true picture of GHG emissions performance from cradle to crude steel production.

It is proposed that this approach gives managers the maximum flexibility in determining how to reduce their overall GHG emissions most effectively, as well as cost-effectively. The approach reduces the risk of unintended consequences – for example Scope 1 emissions might be reduced by choosing input materials associated with higher upstream (Scope 3) emissions, resulting in higher overall emissions – or vice versa. It
also reduces the risk of unintentionally excluding important emissions from consideration – for example if coke making or pig iron production takes place off site, creating an unfair advantage compared to integrated sites that produce their own coke or pig iron. It puts steelmakers in a position to influence upstream producers – for example miners, coke makers, and producers of ferro alloys – rewarding those that are taking effective actions to reduce their own emissions. And it ensures that the GHG emissions data that steelmakers provide to their own customers gives a true picture of the actual emissions associated with their product.

Consultation question on the inclusion of Upstream indirect (Scope 3a), Energy indirect (Scope 2), and Direct (Scope 1) GHG emissions in the determination of the crude steel GHG emissions intensity performance for the site

- Do you support the proposed approach of including Upstream indirect (Scope 3a), Energy indirect (Scope 2), and Direct (Scope 1) GHG emissions in the determination of the crude steel GHG emissions intensity performance for the site?
- If not, what alternative approach do you recommend?

Consideration of Ferrous Scrap

Ferrous (iron or steel) scrap is a major raw material for steel production. The term ‘scrap’ may be applied to material that has been produced within a steel works, during subsequent manufacturing processes, or that has been reclaimed from final products after use. This standard uses the terminology used in ISO 20915:2019(E) Life cycle inventory calculation methodology for steel products, as illustrated in the schematic diagram above (and see Glossary) to distinguish between different categories of scrap.

Different categories of scrap are associated with different social and environmental impacts, some positive and some negative. The use of scrap as an input material for steelmaking has major influence on the GHG emissions associated with its production. This annex describes ResponsibleSteel’s proposed approach in
relation to GHG emissions accounting for the use of scrap. ResponsibleSteel proposed approach to address other social and environmental issues is covered in a separate paper on the draft requirements for the sourcing of input materials.

For the purpose of determining GHG emissions the following general approach is proposed:

**End of life scrap**

End of life scrap used as an input material should be treated as having ‘zero embodied GHG emissions’. However, the GHG emissions associated with its transportation from the first commercial collection point (for example a ship breaking yard or commercial scrap yard) to the point of use for steelmaking should be estimated and taken into account. The intent is to encourage the use of end of life scrap, recognising that incentives are needed to maximise recovery, and that not all potentially available scrap is currently recovered for recycling or reuse.

**Internal and home scrap**

The use of internal and home scrap should be treated as being neutral for the purposes of determining GHG emissions. The use of internal and home scrap does not need to be monitored to achieve this objective, as its use has no effect on the determination of upstream Scope 3a GHG emissions, on indirect (Scope 2) GHG emissions or on the allocation of direct (Scope 1) GHG emissions.

**External manufacturing scrap**

External manufacturing scrap should be treated in one of two ways: either as an input material with its own associated indirect (Scope 3a) GHG emission intensity, or as being neutral from the point of view of iron and steelmaking.

The former should be implemented where data are available, and the latter as a default only when data are not available. Where data are available, the value of the GHG emissions associated with material should be calculated based on the GHG emissions data for the steel when it was imported as an input material to the manufacturing site from which it is subsequently exported as manufacturing scrap. This approach ensures that GHG emissions are not erroneously omitted from the manufacturing supply chain, and that GHG emissions are treated equally irrespective of whether post production processing of steel takes place within a single integrated site, or at separate downstream processing and manufacturing sites. In effect, external manufacturing scrap is treated in the same way as internal and home scrap for the purposes of GHG accounting, once emissions associated with its transportation are included.

Where data for the GHG emissions associated with the production of the steel before its use by the manufacturing site are not available, the steelmaker should treat its GHG emission as being neutral in relation to its own steel production. This requires that manufacturing scrap is allocated an embodied GHG emissions value equal to the GHG emissions intensity that would be achieved by the steelmaker without its use. Although this would create a GHG accounting anomaly for the overall supply chain if there is a major discrepancy between the steel’s embodied GHG emissions when it was imported by the manufacturing site, and the current GHG emission of the steelmaking site using it as an input material, this is considered a reasonable approximation.

For all external scrap (both end of life scrap and manufacturing scrap), an estimate of the GHG emissions associated with transportation must be included. This is consistent with the approach taken to the determination of upstream indirect (Scope 3a) GHG emissions for other input materials. It also addresses a concern expressed by stakeholders that increasing demand for scrap, driven in part by demand for steel with a low embodied GHG content, may increase the likelihood of scrap being transported for long distances. It would be important therefore to track the increase in GHG emissions associated with such transportation in order to avoid perverse consequences.
Definitions associated with the scrap supply chain (see Glossary):

**Final product:** Product that requires no additional transformation prior to its use

EXAMPLE: Automobiles, building structures, building envelopes, packaging.

[source ISO/TS 18110:2015, 2.2, modified – The example has been added.]

**Scrap:** Iron and steel material in metallic form that is recovered in multiple life cycle stages, including steel production processes, the manufacturing processes of final products and the end of life of final products, and is recycled as a raw material for steel production

**Internal scrap:** Scrap from a crude steel making unit process that is then recycled within the same unit process (e.g. basic oxygen furnace (BOF) or electric arc furnace (EAF))

**Home scrap:** Scrap from a downstream steel production process within the steelworks (e.g. rolling, coating) that is returned to steel making processes (e.g. BOF or EAF)

**Manufacturing scrap:** Scrap from the manufacturing processes of final products, such as automobiles and buildings

**End of life scrap:** Scrap from after the end of life of final products

**External scrap:** Scrap provided from outside of the steelworks, including manufacturing scrap and end of life scrap

**Consultation question on ferrous scrap**

A. Should end of life scrap be assigned zero emissions, as proposed? (if not, what do you propose as an alternative?)

B. Should manufacturing scrap be treated as being neutral, as proposed? (if not, what do you propose as an alternative?)

C. Should GHG emissions associated with the transportation of scrap be considered?

**Discussion and Consultation Questions on Criterion 8.8**

**Use of the worldsteel LCI methodology to provide consistent Life Cycle Assessment data for steel products**

A variety of methodologies exists for determining GHG emissions of products using a life cycle assessment approach. The World Steel Association (worldsteel) has developed a methodology designed to conform with the requirements of *ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and framework*, and *ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and guidelines* (see Life cycle inventory methodology reports for steel products, World Steel Association, 2017, ISBN 978-2-930069-89-0). The methodology has been developed over many years with input from the steel sector. It can be used to generate site specific ‘cradle to gate’ LCA data for steel products and the main co-
products (using the system expansion method), including data for GHG emissions, and is widely used by steelmakers internationally (see https://www.worldsteel.org/steel-by-topic/environment-climate-change/climate-change/Members.html for list of steelmakers submitting data to the programme). A critical review by an external expert has been implemented according to ISO TS 14071: 2014.

It is proposed not to attempt to duplicate the provision of steel product and co-product LCA data using the World Steel Association methodology, but to recognise steel product and co-product GHG emissions data as generated by the worldsteel methodology. It is proposed that the resulting GHG emissions data must be publicly accessible as a requirement for ResponsibleSteel steel product certification.

Consultation question on use of the worldsteel LCI methodology as the basis for determining steel product GHG emissions allocations
Do you agree with the proposed approach to require sites to use the worldsteel LCI methodology and system for the provision of steel product LCA information?
If not, what is your alternative approach do you recommend?

Discussion and Consultation Questions on Criterion 8.9

Transparency and comparability of GHG emissions data
Steel products made with higher proportions of scrap will, other considerations being equal, be associated with lower GHG emissions than comparable steel products made with less scrap. It is also the case that a growing number of downstream users and specifiers of steel are committed to reducing the embodied emissions of the materials they use, often with clear commitments to achieve ‘net zero’ GHG emissions for their materials, including steel, by a target date. ResponsibleSteel explicitly supports these efforts, for example through its collaboration with The Climate Group on the ‘Steel Zero’ project, and by working with other organisations such as ETC, The World Green Building Council, CDP and others.

In order for steel products containing more or less scrap to be compared on a fair basis in relation to their embodied GHG emissions the proportion of scrap used to produce a given steel product needs to be publicly available. It is proposed that the proportion of end of life scrap used in the production of ResponsibleSteel certified steel products must be publicly accessible as a requirement for ResponsibleSteel steel product certification.

ResponsibleSteel will make the data provided accessible in a searchable format, allowing comparisons to be made between ResponsibleSteel certified sites and certified products, and providing the basis for demonstrating effective reductions in GHG emissions over time.
The data may be used to define additional grades of performance in relation to crude steel GHG emissions intensity performance, as illustrated below.

Illustration of a potential mechanism to differentiate between different GHG emissions intensity performance levels, beyond the basic threshold level

**Consultation question on transparency and comparability of GHG emissions data**

Do you agree with the proposed approach to the public availability of GHG emissions data?

If not, what is your alternative approach do you recommend?

Back to Criterion 8.9