

# Hydrogen Criteria

## Frequently Asked Questions

### Table of Contents

<b>Questions on Scope</b>	<b>2</b>
What can be certified by these Criteria?	2
What assets and activities are within scope?	2
Are infrastructure projects to distribute and transport hydrogen eligible for certification under these criteria?	2
What GHG must be included to calculate the carbon intensity of a production process?	2
What are the system boundaries for the GHG accounting? And which scope of emissions are covered?	2
Is there any suggested methodology for the GHG accounting of different production pathways?	2
Are hydrogen carriers production covered by these criteria?	3
Is hydrogen for shipping or aviation covered by these criteria?	3
Is hydrogen for steel, cement or chemicals production covered by these criteria?	3
<b>Questions on Market and Finance</b>	<b>3</b>
Are these criteria likely to be used by the bond market?	3
Can Sustainability Linked Bonds (SLBs) be certified?	4
What does it mean to certify an entity?	4
Does CBI view securitisation as green if the backed assets are green and/or the proceeds from the securitisation are used for green purposes?	4
Can covered bonds be certified?	4
How do the Hydrogen Production Criteria correspond to the EU Taxonomy on Sustainable Finance?	4
<b>Questions on Criteria requirements</b>	<b>5</b>
Can individual decarbonisation measures, retrofits activities or infrastructure improvements be certified?	5
Do decarbonisation measures and retrofitting activities need to meet the carbon intensity benchmarks?	5
Why are there different Adaptation & Resilience requirements for decarbonisation measures and hydrogen production plants?	5
How do I determine whether my carbon intensity meets the threshold?	5
Do these criteria cover other environmental impacts?	5
<b>Questions on the Pathways</b>	<b>6</b>
How was the Hydrogen emissions reduction pathway defined?	6
How was the starting point for the benchmarks defined?	6
Are there regional differences, including availability of feedstock, infrastructure, and technology considered to evaluate a hydrogen facility?	6

## Questions on Scope

### What can be certified by these Criteria?

The Hydrogen Production Criteria can certify:

1. Use-of-Proceed (UoP) bonds financing decarbonisation measures (e.g., retrofits) within facilities producing hydrogen – see section 3 of the Hydrogen Production Criteria.
2. Use-of-Proceed (UoP) bonds financing hydrogen production facilities (i.e., assets and activities) – see section 4 of the Hydrogen Production Criteria.
3. Entities (companies producing hydrogen) and Sustainability Linked Bonds (SLBs) – see section 5 of the Hydrogen Production Criteria.

### What assets and activities are within scope?

The Hydrogen Production Criteria apply to eligible projects, assets, and companies producing low-carbon hydrogen. It can finance entire hydrogen production facilities or groups of facilities. It can also potentially certify any measure within a hydrogen production facility, providing it meets the following criteria. This includes, but is not limited to, decarbonisation measures such as electrification of processes, retrofitting activities and equipment acquisition for energy efficiency measures, feedstock and fuel substitution. CCS and CCU infrastructure can also be financed as decarbonisation measures. A full description of what is in scope can be found in section 2 of the Hydrogen Criteria document.

### Are infrastructure projects to distribute and transport hydrogen eligible for certification under these criteria?

Distribution and transport activities can be certified under the Hydrogen Distribution and Transport Criteria, which is currently under development and will be launched in 2023. The hydrogen production criteria only cover production and conditioning of low-carbon hydrogen.

### What GHG must be included to calculate the carbon intensity of a production process?

All relevant greenhouse gases and not just CO<sub>2</sub> should be included in the assessment of emissions, and the most up-to-date IPCC 100-year global warming potential factors should be used.

### What are the system boundaries for the GHG accounting? And which scope of emissions are covered?

Life cycle GHG assessment for hydrogen production must be conducted for a cradle-to-site system boundary, which includes cradle-to-gate emissions plus any transportation emissions to the site where a product will be used. It means that the GHG accounting includes scope 1, 2 and partial scope 3 emissions.

### Is there any suggested methodology for the GHG accounting of different production pathways?

The life cycle assessment should follow the latest releases of ISO std<sup>1</sup> (ISO 14040, ISO 14044 for life-cycle assessment, and ISO 14067 for product carbon footprint). The Recommendation 2013/179/EU will be acceptable for assets located in the EU.

For the GHG emissions accounting, the following equation must be used.

$$E_{total} = E1 + E2 + E3 + E4 + E5 - E6 + E7 + E8$$

---

<sup>1</sup> ISO standards available at: [www.iso.org/standard/38498.html](http://www.iso.org/standard/38498.html); [www.iso.org/standard/37456.html](http://www.iso.org/standard/37456.html)

**E total:** Total emissions

**E1:** Upstream feedstock related emissions (including sourcing<sup>2</sup>, processing, transport and storage)

**E2:** Upstream energy related emissions (including sourcing, processing, transport and storage)

**E3:** Fugitive emissions (Including hydrogen emissions)

**E4:** Process emissions

**E5:** CCS emissions related to energy consumption and leakages

**E6:** Carbon emissions captured

**E7:** Compression and purification emission (Energy required to compress and purify hydrogen)

**E8:** Transportation emissions to the site where hydrogen will be used (energy and electricity related emissions, and fugitive emissions during transportation)<sup>3</sup>

#### **Additional Guidance for different production pathways up to the point of production<sup>4</sup>:**

The International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) methodology working paper contains guidelines to a calculation method for GHG accounting for the following production pathways up to the point of production<sup>5</sup>:

- Steam Methane Reforming combined with CCS: **Appendix P1 of IPHE working document**
- Biomass as a feedstock combined with CCS: **Appendix P5 of IPHE working document**
- Manure-based production: **P5.4** Biodigestion
- Land fill gas-based production: **P5.4** Biodigestion
- Biomass from secondary sources: **P.5.5** Biomass gasification.
- The IPHE working document also has guidelines for emission sources and allocation for biomass-based production:
  - Emissions sources in Biomass-Based Hydrogen Routes/CCS: **Appendix P.5.6**
  - Allocation for the Biomass/CCS pathway: **Appendix P.5.7**

#### [Are hydrogen carriers production covered by these criteria?](#)

These criteria cover only hydrogen production. Hydrogen storage and carriers will be addressed by the distribution and storage criteria, which are under development and will be launched in Q1 2023.

#### [Is hydrogen for shipping or aviation covered by these criteria?](#)

These criteria cover the production of hydrogen. End uses and applications are covered by each specific Climate Bonds sector criteria, such as shipping or aviation. Aviation criteria have not been developed yet.

#### [Is hydrogen for steel, cement or chemicals production covered by these criteria?](#)

These criteria cover the production of hydrogen. End uses and applications are covered by each specific Climate Bonds sector criteria, such as steel, and cement, and chemicals.

## Questions on Market and Finance

#### [Are these criteria likely to be used by the bond market?](#)

Providing hydrogen investment with transition pathways to reduce emissions overtime will be crucial to meeting decarbonisation targets in line with limiting global warming to no more than 1.5-degrees Celsius. Climate Bonds expects sustainable labelled debt to be a large part of this. Decarbonising hydrogen production is essential to decarbonise some hard-to-abate sector of the economy.

<sup>2</sup> Depending on the feedstock, it can be extraction, cultivation, or collection

<sup>3</sup> Transportation infrastructure emissions are not included

<sup>4</sup> The IPHE methodology will develop guidelines for transport emissions accounting in the coming months.

<sup>5</sup> [www.iphe.net/files/ugd/45185a\\_6159cefcd88f4d9283ab0e60f4802cb4.pdf](http://www.iphe.net/files/ugd/45185a_6159cefcd88f4d9283ab0e60f4802cb4.pdf)

Bondholders have a key role to play in decarbonising the hydrogen industry. According to the Hydrogen Council Hydrogen insights report, there are 228 hydrogen projects announced mainly in Europe, Asia, and Australia, which would represent above the USD300 billion by 2030 in total investments across the value chain, with only USD70 billion from Governments. All the rest will come from the private sector.

Potential investments might be SLBs, but equally the Use-of-Proceeds (UoP) model of bonds should be considered by hydrogen producers and investors. The upcoming updates to the Climate Bonds Standard means that both types of bond will eventually be certifiable.

Remember, the CBI Standard and Certification scheme is an additional layer of information which gives investors an indication of whether an entity's transition strategy or bonds proceeds are aligned with the Paris Agreement. The inclusive nature of the Criteria means there are many opportunities for certification.

### [Can Sustainability Linked Bonds \(SLBs\) be certified?](#)

Yes, Climate Bonds has put out a revised overarching Standard<sup>6</sup> which includes a ruleset for certifying whole non-financial corporate entities and Sustainability Linked Bonds (SLBs).

### [What does it mean to certify an entity?](#)

If an entity (a company producing hydrogen) meets the entity-level sector criteria as outlined in section 5 of the Hydrogen Criteria document, all debt issued by that company to finance a part or business segment producing hydrogen will, by extension, be certified by Climate Bonds. This certification is effective for five years from that point, after which the entity cannot use the certification mark without reapplying for certification.

### [Does CBI view securitisation as green if the backed assets are green and/or the proceeds from the securitisation are used for green purposes?](#)

It is our view that the actual use of proceeds should be green, not necessarily the securitised assets. In other words, it is the projects and assets which the proceeds are allocated to that have to pass the requirements of the Standard. While we encourage the use of green receivables for securitised bonds, it is not a prerequisite.

### [Can covered bonds be certified?](#)

Yes, covered bonds can be certified. Provided that the assets to which the proceeds will be used are compliant with their respective criteria. However, we do not require that the pool of assets used as collateral in the covered bond are compliant with the respective criteria.

### [How do the Hydrogen Production Criteria correspond to the EU Taxonomy on Sustainable Finance?](#)

The Hydrogen Production Criteria are aligned with the requirements for the corresponding economic activities in the EU Taxonomy<sup>7</sup>. This means that if your bond is financing hydrogen production assets or activities and is certified under these Criteria, that investment would be defined as green under the EU Taxonomy.

As the EU Taxonomy works at the scale of hydrogen production *as an activity*, being certified under section 3 (decarbonisation measures) or section 5 (entities or Sustainability Linked Bonds) of the Hydrogen Criteria would not indicate compliance with the EU Taxonomy definitions for hydrogen.

---

<sup>6</sup> Climate Bonds Standard V4.0 | Climate Bonds Initiative

<sup>7</sup> <https://ec.europa.eu/sustainable-finance-taxonomy/activities/activity/15/view>

## Questions on Criteria requirements

### [Can individual decarbonisation measures, retrofits activities or infrastructure improvements be certified?](#)

Yes. A bond may be financing capital investments in specific retrofits or improvements to existing infrastructure. These might be eligible under the criteria for decarbonisation measures (table 3, section 3 of the criteria document). Note, this only covers the cost of the measures, not the facility they operate within.

Decarbonisation measures include electrification of processes, retrofitting activities and equipment acquisition for energy efficiency measures, feedstock substitution. For example, electric boilers, electric furnaces, infrastructure for biobased production. CCS and CCU infrastructure can also be financed as part of the decarbonisation measures.

### [Do decarbonisation measures and retrofitting activities need to meet the carbon intensity benchmarks?](#)

No. Decarbonisation measures and retrofitting activities do not have to comply with the carbon intensity benchmarks; they must comply with the specific requirements. See **Section 3, Table 3** of the criteria document.

### [Why are there different Adaptation & Resilience requirements for decarbonisation measures and hydrogen production plants?](#)

When evaluating the climate credentials of an asset, in light of the Climate Resilience Principles (CRP), all system boundaries and interdependencies within them must be identified. This ensures that all relevant climate risks and impacts on system resilience are managed by the issuer. When the scope of evaluation is a hydrogen plant, this is naturally a more complex and larger list of interdependencies than a single piece of equipment. When a single decarbonisation measure is being financed, it is clearly unfair to require the issuer to consider all possible climate risks that would exist for an entire plant. As such, the A&R checklist for measures is considerably smaller than for plants. This reflects the narrower scope of assessment.

### [How do I determine whether my carbon intensity meets the threshold?](#)

#### [Applicants issuing a UoP bond](#)

Applicants may either:

- Calculate the average facility-level emissions intensity threshold over the term of certification, and demonstrate that the facility meets that average threshold at the time of certification; OR
- Meet the threshold at the time of certification and commit to 3 yearly assessments by an approved verifier throughout the period of certification to verify that at each 3 yearly evaluation, the facility meets the new, lower emissions intensity threshold in place at that time. If on any 3 yearly verification the facility is not demonstrated to meet the emissions intensity threshold then in place, certification will be removed; OR
- Meet the threshold at the time of certification, then at half of the bond duration, and at one year before the end of the bond certification. If on any verification the facility is not demonstrated to meet the emissions intensity threshold then in place, certification will be removed

A linear trajectory should be assumed for time periods between the dates and thresholds provided in *Error! Reference source not found.* of the criteria document.

Where a number of production facilities are being assessed, this should be done facility by facility, i.e., not averaged across a portfolio of assets.

### [Do these criteria cover other environmental impacts?](#)

Climate Bonds Criteria focus on climate; however, some requirements were defined to address water consumption, pollution, and ILUK risks. These include presenting a thorough environmental impact assessment and meeting pollution levels based on Best Available Techniques for some production processes, and avoiding water use competition with other essential uses such as human consumption, and agriculture.

## Questions on the Pathways

### [How was the Hydrogen emissions reduction pathway defined?](#)

A key component in selecting a pathway is that it must be compatible with the 1.5°C global warming relative to pre-industrial level target over time. Mitigation pathways are a guide to estimate the rate of emissions reductions, and carbon intensity reductions, that are needed for achieving a certain target global average temperature rise by a certain year. Thus, the projection of decreasing threshold values was performed to ensure that assets and activities included in the use of proceeds at entity are aligned to a transition pathway that contributes to the 1.5°C target. There are numerous end-to-end hydrogen production pathways depending on the energy source, conversion technology, transport method selected. Thus, it is preferable to develop pathway agnostic carbon emission benchmarks. These benchmarks have 2030, 2040, and 2050 targets that get stricter to offer guidance to investors and industry on how emissions should reduce overtime. The benchmarks were defined based on the technological feasibility of different emissions reduction alternatives, aiming to promote net-zero hydrogen production by 2050.

### [How was the starting point for the benchmarks defined?](#)

The starting point for the benchmarks was taken from the EU taxonomy. The TWG concluded it is too high for projects to be aligned with the Paris agreement. The EU taxonomy set a 3 kgCO<sub>2 eq</sub>/kgH<sub>2</sub> carbon intensity benchmark, and the Green Hydrogen Standard a 1 kgCO<sub>2eq</sub>/kgH<sub>2</sub>. The Green Hydrogen Standard benchmark allows few production pathways, limiting the deployment of other potential innovations and technologies to produce low-carbon hydrogen that still have room to reduce emissions.

In order to be ambitious but not so restrictive to limit the deployment of the hydrogen market at early stages, the TWG defined a below 3 kgCO<sub>2eq</sub>/kgH<sub>2</sub> emissions limit as a point for projects today. It will allow different production pathways to meet the threshold when meeting specific requirements. A detailed analysis of life cycle emission of different natural gas based hydrogen with carbon capture configurations have been studied by Bauer, et.al.. To meet the below 3 kgCO<sub>2eq</sub>/kgH<sub>2</sub> carbon intensity, a minimum capture rate of 90% and a maximum methane leakage rate of 0.2% must met. This is a technologically feasible target.

### [Are there regional differences, including availability of feedstock, infrastructure, and technology considered to evaluate a hydrogen facility?](#)

No. Regional differences were discussed and analysed. These criteria aim to be globally applicable and ambitious enough, regardless of these potential differences.