Cement Criteria

The Cement Eligibility Criteria of the Climate Bonds Standard & Certification Scheme

Updated: April 2023

NOTE: *These Criteria can be used to certify Use-of-Proceeds Instruments, Sustainability-Linked Debt Instruments, Assets and Entities per the Climate Bonds Standard v4.0*

Revision	Date	Summary of Changes
Rev. 1.2	April 2023	Minor revisions to framing to reflect release of CBS v4.0
Rev. 1.1	December 2022	Amendment to bring Carbon Capture and Utilisation within scope and add corrections and clarifications
Rev. 1.0	October 2022	Published as Final for Certification
Rev. 0.2	July 2022	Issued as Draft for second Public Consultation
Rev. 0.1	February 2022	Issued as Draft for Public Consultation

Acknowledgements

Climate Bonds gratefully acknowledges the Technical and Industry Working Group members who provided their time and expertise during the development of these Criteria. Members are listed in ***Appendix A*** at the end of this document.

Special thanks are given to ***Cyrille Dunant***, the lead specialist, and ***Chris Moore,*** for coordinating the development of the Criteria through the Technical Working Group.

The Industry Working Group provided critical and useability focused consultation and feedback on the Criteria, but this does not automatically reflect endorsement of the criteria by all members.

Definitions

Applicant: The term or name for any potential bond issuer, or non-financial corporate entity that might seek certification under the Cement Criteria.

Capital Expenditure (CAPEX): Funds used by a company to acquire, upgrade, and maintain physical assets such as property, plants, buildings, technology, or equipment.

Certified Entity: The entity or part thereof which is being certified under the Climate Bonds Standard. Currently, Entity Certification is limited to non-financial Entities or segregated segments thereof, for which the Climate Bonds Initiative has Climate Bonds Standard Sector Criteria for Entity Certification.

Climate Bonds Initiative (Climate Bonds): An investor focused not-for-profit organisation, promoting large-scale investments that will deliver a global low carbon and climate resilient economy. Climate Bonds seeks to develop mechanisms to better align the interests of investors, industry and government to catalyse investments at a speed and scale sufficient to avoid dangerous climate change.

Climate Bonds Standard (CBS): A screening tool for investors and governments that allows them to identify green bonds the proceeds of which are being used to deliver climate change solutions. This may be through climate mitigation impact and/or climate adaptation or resilience. The CBS is made up of two parts: the parent standard (CBS v4.0) and a suite of sector specific eligibility Criteria. The parent standard covers the certification process and pre- and post-issuance requirements for all certified bonds, regardless of the nature of the capital projects. The Sector Criteria detail specific requirements for assets identified as falling under that specific sector. The latest version of the CBS is published on the Climate Bonds website.

Climate Bonds Standard Board (CBSB): A board of independent members that collectively represents $34 trillion of assets under management. The CBSB is responsible for approving (i) Revisions to the CBS, including the adoption of additional sector Criteria, (ii) Approved verifiers, and (iii) Applications for Certification of a bond under the CBS. The CBSB is constituted, appointed, and supported in line with the governance arrangements and processes as published on the Climate Bonds website.

Climate Bond Certification: allows the applicant to use the Climate Bond Certification Mark in relation to that bond. Climate Bond Certification is provided once the independent CBSB is satisfied the bond conforms with the CBS.

Clinker: an intermediate product in cement manufacture. It is made from the decarbonisation of limestone before it is melted (a term called sintering) and then rapidly cooled.

Clinker factor: the percentage of clinker in cement.

Concrete: a material produced by mixing cement, water and gravel where the cement acts as a binder making up about 15% of the total.

Critical interdependencies: The asset or activity's boundaries and interdependencies with surrounding infrastructure systems. Interdependencies are specific to local context but are often connected to wider systems through complex relationships that depend on factors 'outside the asset fence' that could cause cascading failures or contribute to collateral system benefits.

General Corporate Purpose Bond: a bond the proceeds of which are not ringfenced for specific assets or activities, but which finance general OPEX and CAPEX of a company without disclosing the exact uses. SLBs are examples of general corporate purpose bonds.

Green Bond: A green bond is a bond of which the proceeds are allocated to environmental projects or expenditures. The term generally refers to bonds that have been marketed as green. In theory, green bonds proceeds could be used for a wide variety of environmental projects or expenditures, but in practice they have mostly been earmarked for climate change projects.

Industry Working Group (IWG): A group of key organisations that are potential applicants, verifiers and investors convened by Climate Bonds. The IWG provides feedback on the draft sector Criteria developed by the TWG before they are released for public consultation.

Investment Period: The interval between the bond's issuance and its maturity date. Otherwise known as the bond term or tenor.

Operating Expenditure (OPEX): Expense a business incurs through its normal business operations. Often abbreviated as OPEX, operating expenses include rent, equipment, inventory costs, etc.

Ordinary Portland Cement (OPC): cement made from 95% of ground clinker and 5% gypsum.

Parent Company/Group: A company is considered a parent company of another entity (a subsidiary) if it exercises control over the subsidiary. The terms "control" and "subsidiary" have the meaning assigned to them under International Financial Reporting Standard 10 (IFRS 10). A Parent Group consists of the Parent Company and all the companies that the Parent Company exercises control over. Where the Applicant does not belong to a group of companies, the term Parent Company applies to the Applicant.

Supplementary Cementitious Material (SCM): material that can act as a partial substitute for clinker in cement.

Sustainability-Linked Debt (SLD): Any debt instrument for which the financial and structural characteristics can vary depending on whether the issuer achieves predefined Sustainability/ ESG objectives. Such objectives are measured through predefined KPIs and assessed against predefined performance targets. Proceeds of SLD are intended to be used for general purposes.

Technical Working Group (TWG): A group of key experts from academia, international agencies, industry and NGOs convened by Climate Bonds. The TWG develops the Sector Criteria - detailed technical criteria for the eligibility of projects and assets as well as guidance on the tracking of eligibility status during the term of the bond. Their draft recommendations are refined through engagement with finance industry experts in convened Industry Working Groups (see below) and through public consultation. Final approval of Sector Criteria is given by the CBSB.

Use-of-Proceed (UoP) Bond: a bond the proceeds of which are ringfenced for specific assets and activities. Green bonds, blue bonds, and transition bonds are examples of UoP bonds.

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1 Introduction

1.1 The Climate Bonds Standard

Investor demand for climate bonds is strong and is expected to increase in line with the delivery of quality products into the market. However, investor concerns about the credibility of green labelling are also growing. Standards, assurance & Certification will be essential to improve confidence and transparency, which in turn will enable further strong growth in the market.

Today, the Climate Bonds Standard and Certification Scheme is an easy-to-use screening tool that provides a clear signal to investors and intermediaries on the climate integrity of Certified Climate Bonds. Proposals are currently under consultation to also expand certification to entities with climate integrity.

A key part of the Standard is a suite of sector-specific eligibility Criteria. Each sector-specific Criteria sets climate change benchmarks for that sector that are used to screen debt instruments, assets and/ or entities, so that only those that have climate integrity, either through their contribution to climate mitigation, and/or to adaptation and resilience to climate change, will be certified.

These sector-specific Criteria are determined through a multi-stakeholder engagement process, including TWG and IWG, convened and managed by Climate Bonds, and are subject to public consultation. Finally, they are reviewed and approved by the Climate Bonds Standard Board (CBSB).

The second key part of the Climate Bonds Standard (CBS) is the overarching Climate Bonds Standard v4.0. This documents describes the cross-sectoral criteria all certified instruments/ assets/ entities must meet, in addition to meeting the sector specific Criteria.

1.2 Environmental scope

Currently, certification requirements address:

- Climate change mitigation; and
- Climate adaptation and resilience.

1.3 What can be certified?

Subject to meeting the eligibility criteria in the following sectors, the following can be certified under these criteria:

- Use-of-Proceed (UoP)[1] bonds financing decarbonisation measures (e.g., retrofits) - see ***Section 3.***
- Use-of-Proceed (UoP) bonds financing cement production facilities (i.e., assets and activities) - see ***Section 4.***
- Assets not linked to any specific financing instrument (cement production facilities) - ***see Section 4.***
- Entities (cement production companies) and Sustainability Linked Debt (SLD) instruments issued by those entities - see ***Section 5.***

See also the Climate Bonds Standard v4.0 for any cross sectoral requirements for Use-of-Proceeds, Sustainability-Linked Debt, Asset or Entity Certification. These cross sectoral requirements must be met in addition to the cement-specific requirements described in this document.

To demonstrate compliance with the following Criteria, in accordance with the CBS, it is the applicant's responsibility to provide the information to prove compliance with each component of these Criteria. Verifiers must include this information in the scope of verification.

[1] Use-of-Proceed (UoP) is used as shorthand throughout this document for a variety of targeted finance instruments, including green loans, repos, and asset-backed securities.

Where the bond portfolio includes several separately identifiable projects, expenditures, or groups of assets, these criteria must be met for each separately identified project or asset grouping. Applicants should determine these project boundaries, which may be based on geographical and/or supply chain linkages.

1.4 Documents supporting these Criteria

Information to support applicants and verifiers is available at Cement | Climate Bonds Initiative as follows:

- Background Paper that details why the criteria were chosen
- Cement Criteria FAQs (FAQ's)
- Public-Consultation-Issues & Response Report
- The Climate Bonds Standard v4.0: contains the requirements of the overarching CBS
- The Climate Bonds Standard v4.0 Entity and Sustainability-Linked Debt Checklist documents: provides further information on the cross-sectoral requirements for Entity and Sustainability-Linked Debt Certification respectively.

For more information on Climate Bonds and the Climate Bonds Standard and Certification Scheme, see www.climatebonds.net.

1.5 Revisions to these Criteria

These Criteria will be reviewed on a regular basis, at which point the TWG will take stock of the deals that are printed in the early stages and any developments in improved methodologies and data that can increase the climate integrity of future deals. As a result, the Criteria are likely to be refined over time, as more information becomes available. Certification will not be withdrawn retroactively from bonds certified under earlier versions of the Criteria.

2 Cement activities in scope

2.1 The Cement Production supply chain in scope

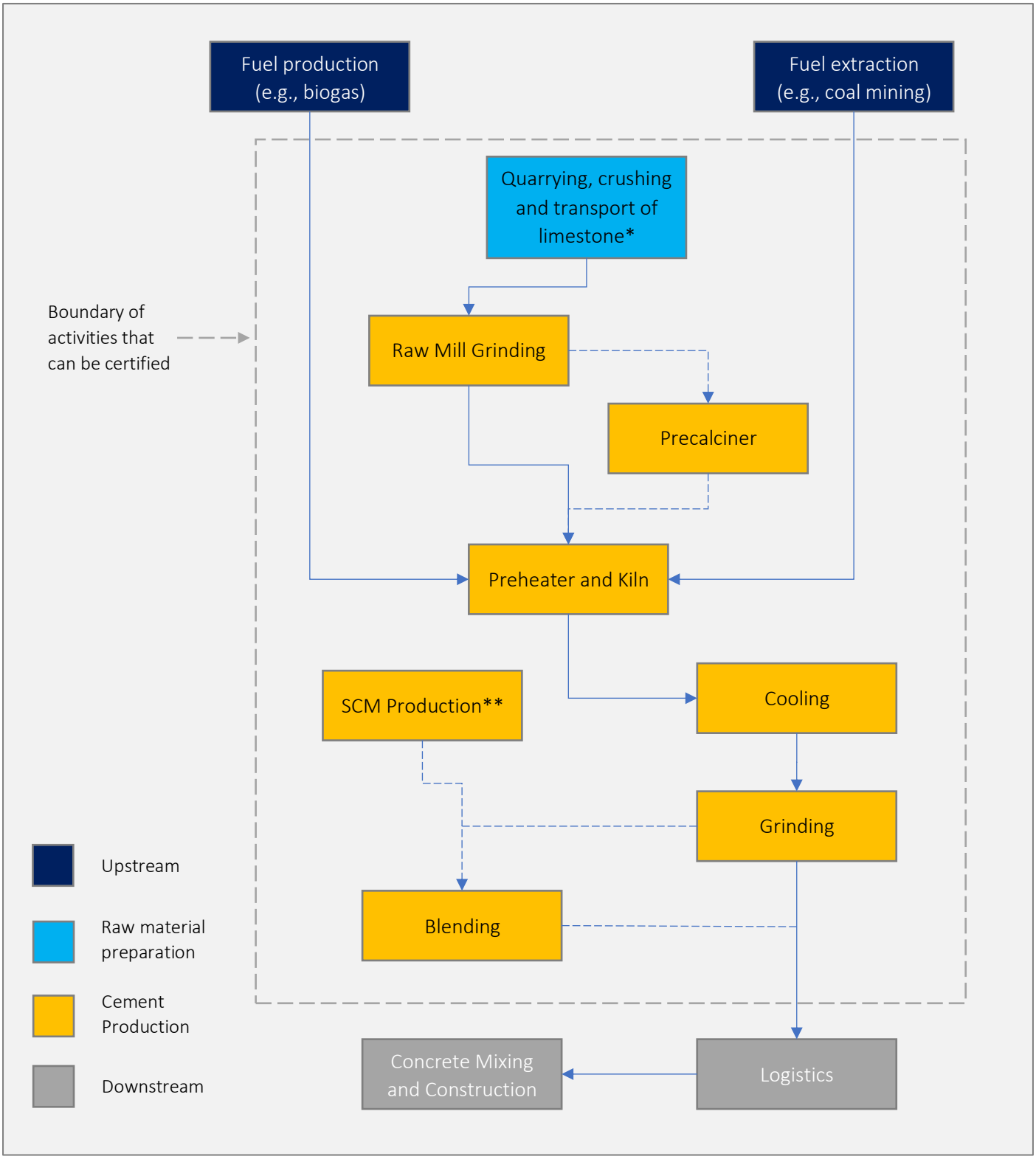
These Criteria cover assets and activities involved in the production of cement, and companies that operate such assets or activities. The scope boundaries begin at the quarrying of limestone (only if integrated on the same geographical location(s) as cement production facilities and operations[2]) and end at the final blended cement product. As such, potential assets and activities that might be certified (subject to meeting the eligibility criteria) include whole cement facilities, but also kilns, burners, grinding equipment, blending equipment, calciners, precalciners, Supplementary Cementitious Materials (SCM), digitisation measures, heat recovery systems, and others. Cement production facilities may be integrated from quarries to blended cement, or they may be responsible for only one stage of production, for example, clinker production, grinding, or blending.

> ***NOTE:*** *Some entities whose sole business activity is one of the above production stages (such as clinker production) may not be eligible for certification. See* ***section 2.4*** *for details.*

Figure 1 below details the cement production activities within scope and which can thus be certified, subject to meeting the criteria.

> ***NOTE:*** *The scope of activity is not the same as the scope of emissions. The scope of activity describes what activities can potentially be certified under these criteria. The scope of emissions (**section 4.2.4.2**) describes what emissions are accounted for when meeting the pathway.*

[2] If the quarrying *is not* carried out on the same geographical site as cement production, the scope boundary begins when cement production begins (i.e., raw mill grinding of materials).



* Within scope provided it is located on the same site as cement production (see ***Section 2.1***).

** Entities which produce solely SCM cannot be certified at this time.

Figure 1. The scope of activity when meeting the Cement Criteria

2.2 Alignment with other Sector Criteria

In respect of UoP bond certifications, where the proceeds will be allocated to multiple sectors, proof of compliance with multiple sector criteria may be required across the portfolio. For example, if the UoP bond is financing both cement activities and steel activities, then the applicant would have to prove compliance with the Cement Criteria in respect of the former and the Steel Criteria in respect of the latter.

In respect of SLD and Entity Certifications, where the SLD or entity Performance Targets span multiple activities within the entity, all those activities will need to be assessed against the appropriate sector criteria and an overall 'pass threshold' reached. See the Climate Bonds Standard v4.0 Parts D and C respectively for more information on this.

In some cases, it may not be immediately clear whether activities or projects might fall under these criteria or other sector criteria. The most common examples, and appropriate sector criteria to be used, are clarified in ***Table 1*** below.

Table 1: Assets or projects partially or wholly covered by other sector criteria

Potential use-of-proceeds	Sector Criteria
Production of Hydrogen.	**Hydrogen Production**
Buildings, commercial and/or residential, that are not solely dedicated to a cement production facility. For example, office buildings for staff.	**Buildings**
Vehicles that cannot be demonstrated to exclusively support compliant cement activities.	**Transport**
Co-processing and sorting of municipal solid waste or waste derived fuels.	**Waste Management**
Production of bioenergy.	**Bioenergy Criteria**
Energy generation including Solar, Wind, Marine Renewable energy, Hydropower and Bioenergy.	**Relevant corresponding sector criteria**

2.3 Assets out of Scope

NOTE: *Being outside of the scope of criteria does not indicate that the TWG view these assets and activities as inconsistent with meeting Paris Agreement goals or with a Paris-aligned economy. Rather, due to time and resource constraints, these Criteria do not take a stance on these issues. Future versions of the Cement Criteria may address these and set robust criteria alongside*

Table 2: Assets and activities out of scope

Excluded Assets and Activities	Comment
Production of fly ash and blast furnace slag	Certified bonds cannot finance the production of these through coal power or steel production. However, the processing of such materials extant from a power plant that no longer functions can be certified.
Concrete	The production of concrete itself and associated activities (mix design, mixing itself, transportation to site, quality control, etc.) are out of scope.
Quarrying	Quarrying in and of itself (i.e., that is separate from a cement plant or is a pureplay quarry company) is not within scope.

2.4 Entities out of Scope

NOTE: Being outside of the scope of criteria does not indicate that the TWG view these activities or entities as inconsistent with meeting Paris Agreement goals or with a Paris-aligned economy. Rather, due to time and resource constraints, these Criteria do not take a stance on these issues. Future versions of the Cement Criteria may address these and set robust criteria alongside

Table 3: Entities out of scope

Excluded Entities	Comment
Pureplay concrete producers	Companies whose sole activity is the production of concrete itself and associated activities (mix design, mixing itself, transportation to site, quality control, etc.).
Pureplay quarrying companies	Companies whose sole activity is quarrying (i.e., separate from a cement production company).
Pureplay clinker production companies	Companies that solely produce clinker which is then sold downstream for further processing into cement. Note: companies that produce clinker *and* cement are within scope, as a companies that *purchase* clinker.

3 Criteria for decarbonisation measures within cement production facilities

These criteria cover capital investments (decarbonisation measures) within facilities in operation pre-2022. This differs from an investment that would finance the cost of a whole facility in that it is focused on measures or specific areas of improvement within a production facility.

All measures must meet the following:

- Mitigation criteria (***Section 3.1***).
- Adaptation and resilience criteria (***Section 3.2***).

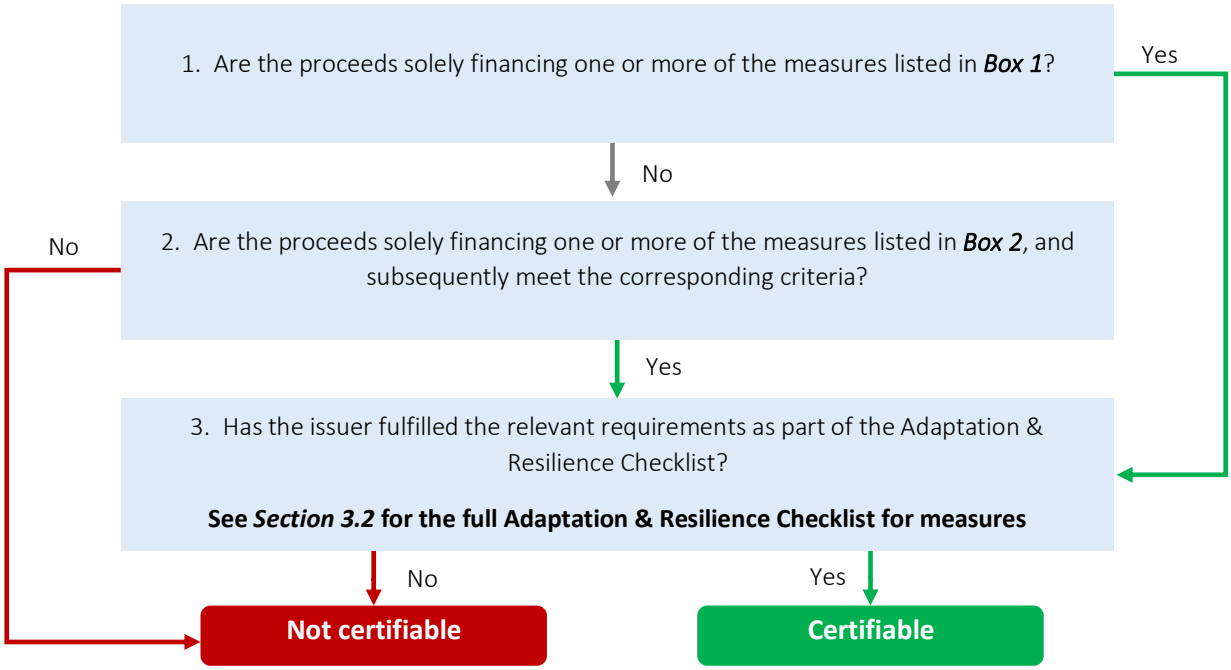


Figure 2: Overview of the Criteria for specific mitigation measures within cement production facilities

3.1 Mitigation Criteria

These measures or capital investments are split into two groups, illustrated in Box 1 and Box 2. Box 1 contains measures that are automatically eligible from a mitigation standpoint. Box 2 includes measures that are eligible conditional on meeting specific eligibility criteria.

Box 1: Measures which automatically meet the mitigation component

- Installation, upgrade and operation of precalciners.
- Installation, upgrade, and operation of heat recovery systems.
- Installation, upgrade, and operation of digitized control equipment or infrastructure. This may include:
  - Sensors and measurement tools (including software to allow real-time and close control of processes to improve efficiency).
  - Communication and control (including advanced software and control rooms, and automation of plant processes).
- Installation, upgrade, and operation of testing equipment. For example:
  - Automated XRD systems.
- Electrification of heat (for example, electrified kiln processes).
- Installation, upgrade and operation of equipment dedicated to calcined clay use in cement production as distinct from clinker.
- Installation, upgrade and operation of equipment dedicated to processing legacy or historic fly ash and blast furnace slag, extant from power plants that no longer exist.

Note: *These assets and activities must still meet the requirements for Adaptation & Resilience set out in Section 3.2.*

Box 2: Measures which are eligible subject to meeting measure-specific criteria

- Installation, upgrade, retrofit and operation of measures which achieve emissions savings equivalent to the emissions decrease for facilities between the start year of the bond and the end year (see **worked example** below).
- Installation, upgrade, and operation of carbon capture and storage equipment where the average capture rate across all point sources is greater than 70% of total emissions, and where the criteria for transport and storage components are met by the applicant (see ***Section 6.4*** for details).
- Installation, upgrade and operation of carbon capture, storage and utilisation processes that utilise CO_2 either through curing carbonation, mineralisation of CO_2 in concrete waste, or production of recyclable products (see ***Section 6.5***.
- Infrastructure, revamps or modifications of equipment needed for the production of cement using hydrogen as a fuel where the criteria for hydrogen are met by the applicant (see ***Section 6.2*** for details).

Note: **These assets and activities must still meet the requirements for Adaptation & Resilience set out in *Section 3.2*.**

Worked example for calculating the necessary emissions reduction for an eligible measure/ bundle of measures

A group of cement plants will all have retrofits carried out to equip them with state-of-the-art burners and calciners. The bond term is 5 years and starts in 2025.

Per the emissions reduction pathway for facilities in ***section 0***, the emissions intensity threshold for plants in 2025 is 0.416, and the threshold in 2030 is 0.363. This represents a percentage decrease of 13%. Therefore, to be eligible, the measure or bundle of measures must achieve a reduction in emissions of 13% at plant level in order to be eligible. If achieved, the applicant can include the whole cost of the measures in the certification.

The applicant certifying measures using this method shall:

- Have a contract or agreement with a certified energy auditor demonstrating the assets emissions intensity shall be improved over the term of the bond such that its end performance is equivalent to the upgrade performance requirements determined by the term of the bond
- Report pre-retrofit emission intensity
- Report post-retrofit emissions intensity
- Report percent improvement achieved

Emissions intensity shall be calculated according to the scope of emissions per ***section 4.2.4.2***.

3.2 Adaptation & Resilience Criteria

This section describes the Adaptation & Resilience (A&R) Component of the eligibility Criteria for decarbonisation measures. To demonstrate compliance, all measures must satisfy the requirements of the checklist detailed in ***Table 4***.

The checklist is a tool to verify that the applicant has implemented sufficient processes and plans in the design, planning and decommissioning phases of a measure to ensure that the operation and construction of the asset minimises environmental harm and the asset is appropriately adaptive and resilient to climate change and supports the adaptation and resilience of other stakeholders in the surrounding system, if applicable.

All elements of the checklist must be addressed, and appropriate evidence provided that these requirements are being met or are not applicable in respect of the specific measure(s) linked to the bond. It is expected that the applicant's evidence will encompass a range of assessment and impact reports and associated data, including but not limited to those reports required to meet national and local licensing and approval processes. This might include Development Consent Orders, planning regulations adhered to, Environmental Impact Assessments, Vulnerability Assessments and associated Adaptation Plans.

It is the applicant's responsibility to provide the relevant information to the verifier. Verifiers must include this information in the scope of verification.

For each question in the scorecard:

- A 'yes' indicates sufficient proof given.
- A 'no' indicates insufficient proof.
- In case of a 'n/a,' please justify why the question is not applicable.

Table 4: Adaptation and Resilience Checklist for cement production mitigation measures

No.	Adaptation and Resilience checklist for Cement Production Mitigation Measures	Proof Given	Overall Assessment
		For verifier to complete	
Area 1: Clear boundaries and critical interdependencies between the measure and the system it operates within are identified.			
1.1.	Boundaries of the measures are defined using: 1. a listing of all equipment associated with the use of the bond proceeds, 2. a map of their location or illustration of their place/role within the overall facility, and 3. identification of the expected operational life of the equipment.		
1.2.	Critical interdependencies between the measure(s) and the system within which it/they operate(s) are identified. Identification of these interdependencies should consider the potential for adverse impacts arising from, but not limited to: 1. relationships of the measure(s) to nearby flood zones; 2. relationships of the measure(s) to surrounding water bodies and water courses; 3. reduction in pollinating insects and birds; 4. reduction in biodiversity or High Conservation Value[3] habitat; 5. dust and other practices that affect air quality; 6. appropriation of land or economic assets from nearby vulnerable groups[4].		
Area 2: An assessment has been undertaken to identify the key physical climate hazards to which the measure will be exposed and vulnerable to over its operating life.			

2.1	Key physical climate risks and indicators of these risks are identified in line with the following guidelines:
	• Risks are identified based on (a) a range of climate hazards, and (b) information about risks in the current local context, including reference to any previously identified relevant hazard zones, e.g., flood zones.
	In order to be confident that measures are robust and flexible in the face of climate change uncertainties, it is essential that the climate risks being assessed and addressed cover those that are of greatest relevance to cement production equipment. The physical characteristics of climate change that must be considered in the risk assessment include:
	• Temperature rise
	  ○ High temperatures can impact the operation and efficiency of certain types of equipment.
	• Increasing intense precipitation events
	  ○ Heavy rainfall can result in flash pluvial flooding, which could significantly impact industrial assets[5].
	  ○ Drought may alter or reduce availability of water with temperature increase.
	• Changes in cloud cover, wind speed or increasing temperature extremes
	  ○ Poses risks to the availability of reliable energy, both electrical or thermal.
	• Sea-level rises
	  ○ Potential for flooding of coastal infrastructure and assets at risk from storm surge events.
	• Increased soil erosion		

[3] High Conservation Value (HCV) habitat criteria in accordance with www.hcvnetwork.org.

[4] According to IFC Performance Standards

[5] Flood risk and resilience will likely have interdependencies with local and national agencies, for example related to local flood defences, coastal flood risk management, shoreline management plans etc.

No.	Adaptation and Resilience checklist for Cement Production Mitigation Measures	Proof Given	Overall Assessment
		For verifier to complete	
	○ Risks to the availability of raw materials. ○ Risk to transport routes for supply chains. **Guidance for carrying out Risk Assessments:** • Users should apply climate scenarios based on representative concentration pathway (RCP) 4.5 and 8.5 or similar/ equivalent to ensure consideration for worst case scenario. • Risk assessments should use both top-down methods and bottom-up methods that look at inherent system vulnerabilities in local context. • A broad range of models can be used to generate climate scenarios. • For risk assessment, the TCFD The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities is recommended.		
Area 3: The measure is suitable to climate change conditions over its operational life			
3.1	The equipment must be tolerant to the range of climate hazards identified in item 2 of this checklist and not lock-in conditions that could result in maladaptation.		
3.2	Risk reduction actions/strategies must be tolerant to a range of climate hazards and not lock-in conditions that could result in maladaptation.		
Area 4: The measure does no harm to the climate resilience of the defined system it operates within, as indicated by the boundaries of and critical interdependencies with that system as identified in item 1 in this checklist.			
4.1	The equipment itself does not pose significant risk of harm to the system it is located within or others' natural, social, or financial assets according to the principle of best available evidence during the investment period, taking into account the boundaries and critical interdependencies as defined in item 1 in this checklist. Harm is defined as an adverse effect on any of the following items: 1. Adverse effects on local water bodies and water courses; 2. Air pollution from dust and other pollutants; 3. Relationships of the measure to nearby flood zones; 4. Reduction in pollinating insects and birds; 5. Reduction in biodiversity or High Conservation Value[6] habitat; 6. Appropriation of land or economic assets from nearby vulnerable groups[7].		

[6] High Conservation Value (HCV) habitat criteria in accordance with HCV Network

[7] According to IFC Performance Standards

4 Criteria for cement production facilities

4.1 Overview

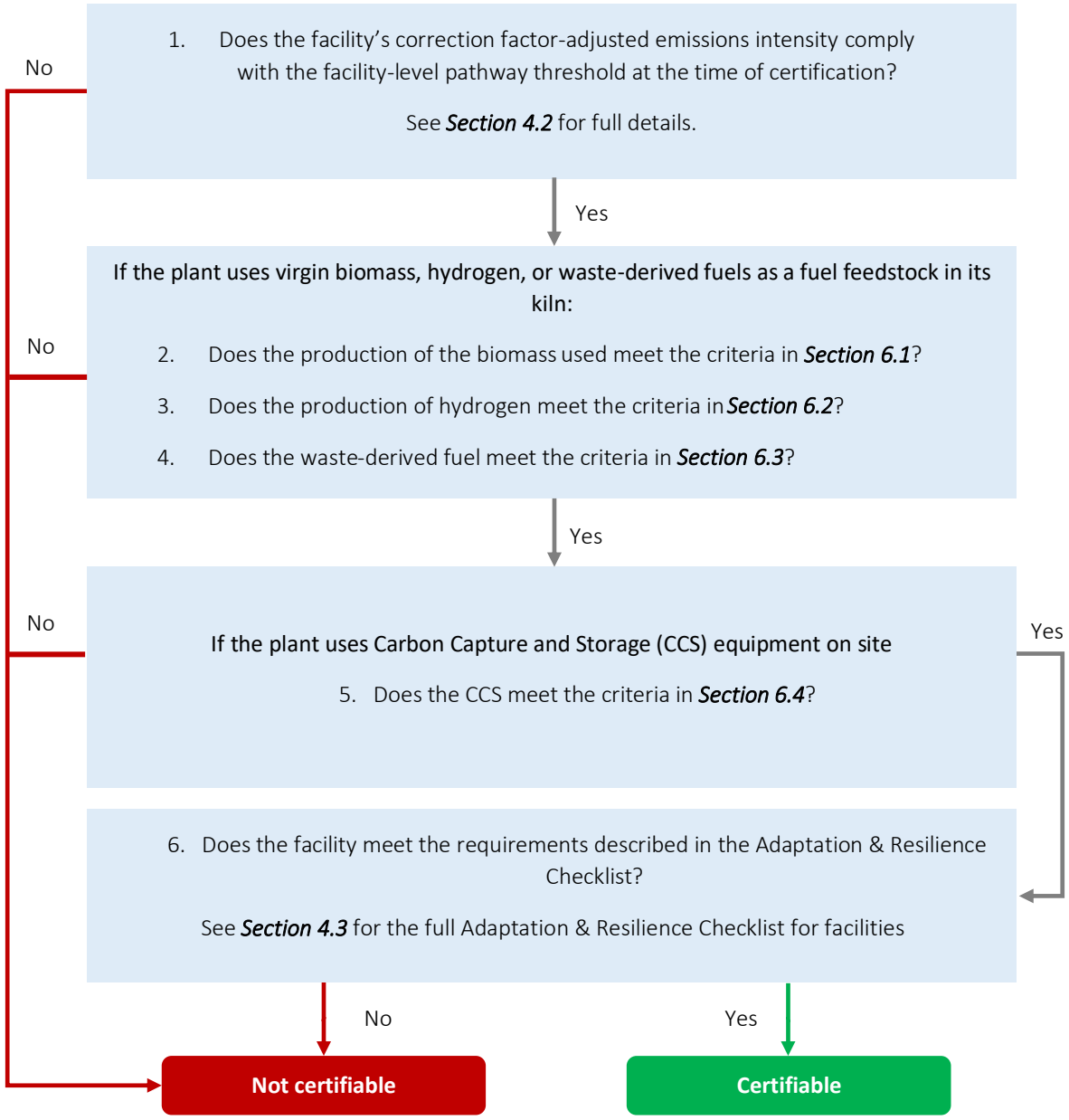


Figure 3: Overview of the Criteria for cement production facilities

4.2 Complying with the facility-level emissions intensity pathway

The facility is eligible if its emissions intensity, **adjusted using the relevant correction factor (*section 4.2.3*)**, is lower than the **relevant facility-level emissions intensity threshold (*section 0*)**.

4.2.1 The pathway

The pathway GHG intensity metric is in terms of t CO_2/ t cementitious product or t CO_2/ t cement (equivalent)[8].

"Cementitious product" means clinker, cement and cement substitutes produced by the reporting company. The full definition for t CO_2/ t cementitious product shall be according to the Cement CO_2 Protocol v3.0 (2011) "Specific CO_2 per ton of cementitious product".

The facility-level emissions intensity thresholds over time are given in ***Figure 4*** and ***Table 5***. The applicant must first calculate the facility's correction factor-adjusted emissions intensity to account for the cement grade being produced as per ***section 4.2.3***. This number can then be compared to the relevant threshold in this section.

The use of these corrected pathways depends partly on the term of certification and partly on applicant preference. Guidance on all of these aspects is provided below.

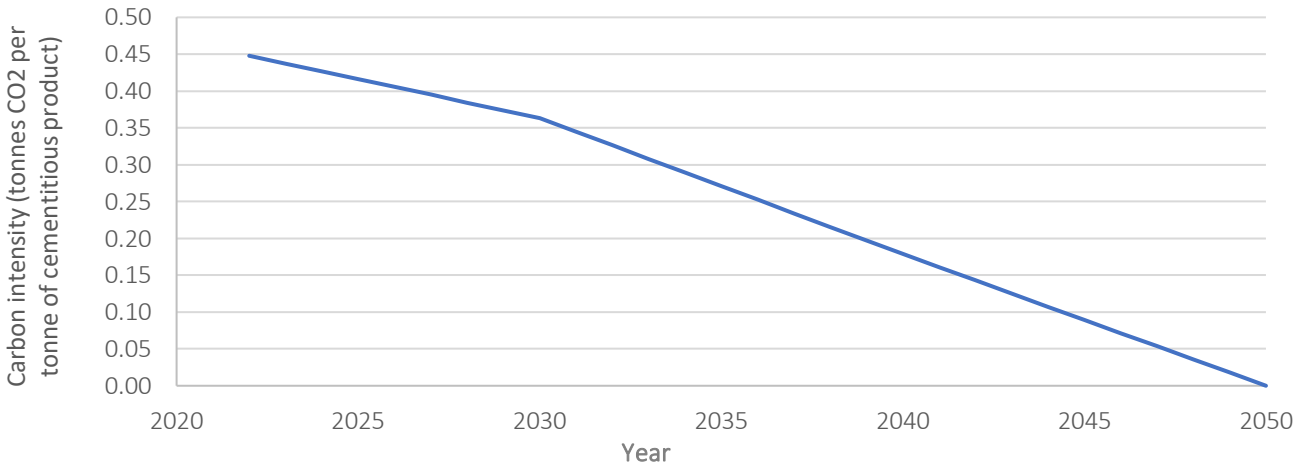


Figure 4. Emissions pathway for all cement production facilities

Table 5. Threshold values forming the emissions pathway for all cement production facilities

Year	Carbon intensity (t CO_2/ t cementitious product)	Year	Carbon intensity (t CO_2/ t cementitious product)	Year	Carbon intensity (t CO_2/ t cementitious product)	Year	Carbon intensity (t CO_2/ t cementitious product)
2020	0.469	2028	0.384	2036	0.253	2044	0.107
2021	0.458	2029	0.374	2037	0.234	2045	0.089
2022	0.448	2030	0.363	2038	0.216	2046	0.071
2023	0.437	2031	0.345	2039	0.197	2047	0.054
2024	0.427	2032	0.326	2040	0.179	2048	0.036
2025	0.416	2033	0.308	2041	0.161	2049	0.018
2026	0.406	2034	0.289	2042	0.143	2050	0.000
2027	0.395	2035	0.271	2043	0.125		

Note: Pathway based on a starting point (in 2020) of the EU Taxonomy thresholds for cement. Trajectory of the Science-Based Targets Initiative sectoral decarbonisation pathway applied to this starting point to reach net zero by 2050. Full methodology in the Background Paper.

[8] Where no non-cement materials are being processed and so cement and cementitious product are effectively the same.

4.2.2 Determining the appropriate threshold(s) for a specific facility

In terms of meeting the facility-level emissions intensity thresholds going forward, **applicants issuing a UoP bond for a cement facility** may either:

a) 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
b) Meet the threshold **at the time of certification and commit to three yearly assessments** by an approved verifier throughout the period of certification to verify that at each three yearly check-in, the facility meets the new, lower emissions intensity threshold in place at that time. If on any three yearly verification the facility is not demonstrated to meet the emissions intensity threshold then in place, certification will be removed. Correction factor should be applied as per ***section 4.2.3***.

Applicants seeking certification of an asset **not linked to any financial instrument** must:

a) Meet the facility-level pathway threshold at the time of certification.[9]

NOTE: *Applicants determining the appropriate threshold(s) through route (a) above need not apply a correction factor based on the cement grade (**section 4.2.3**).*

Example (a) - compliant

- A 10-year bond starting in 2025 may demonstrate that the plant's emissions intensity at the point of issuance meets the average emissions intensity of the plant pathway between 2025 and 2035:
  2025 threshold = 0.416
  2035 threshold = 0.271
  (0.416 + 0.271)/ 2 = 0.344t CO_2/t cement
- The applicant does not need to apply a correction factor to their emissions intensity for this route.
- The facility's emissions intensity in 2025 is already 0.320t CO_2/t cement.
- **This is lower than the necessary averaged threshold and the facility meets the criterion. No further verification is required for meeting emissions intensity thresholds.**

Example (b)

- A 10-year bond starting in 2025 would have to show compliance in annual reporting for the thresholds of 2025, 2028, 2031 and 2034.
- For each of those years, the applicant must recalculate the facility's corrected emissions intensity based on the cement grade produced per ***section 4.2.3***.
- **Verification must demonstrate every 3 years that these thresholds are met.**

[9] As this is a point-in-time certification, there is no need to continuously meet the pathway thereafter.

4.2.3 Calculating the corrected facility-level emissions according to cement class/grade

The facility shall test their product following EN 197-1[10] and report the value. Based on the cement grade produced (or the mass-weighted average strength grade produced where multiple grades are produced by a plant), the corresponding correction factor for that class should be applied to the facility's emissions intensity for that year.

- If EN 197-1 is not used, applicants should use a corresponding nominal strength according to a locally used standard (**see Worked Example 3 below**).
- Where multiple classes/grades are produced by a plant or company, the mass-weighted average strength grade produced should be used to calculate the appropriate correction factor (**see Worked Example 2 below**).
- Where certification covers a new facility or group of facilities that do not yet know the mix of different cement products to be produced (for example, because clients have not yet specified), the correction factor for year 1 of certification can be set as 1. The applicant must then apply the appropriate correction factor no more than three years after production begins as part of the annual reporting for that year, in line with ***section 4.2.2***. However, it is possible to do this sooner using one- or two-years' production data.

NOTE: *Application of correction factors does not apply to applicants determining thresholds through route (a) per **section 4.2.2** above.*

The factors are:

Table 6: Correction factors to determine the carbon intensity of the production

Cement class	Expected emissions (t CO_2eq/ t cementitious product)	Correction factor
32.5	0.550	1.18
42.5	0.649	1.00
52.5	0.748	0.87

Worked example 1 - one single cement grade produced on site

- A single facility produces cement of strength class 32.5 (correction factor of 1.18 per Table 5).
- The facility's emissions intensity is 0.416 t CO_2/ t cementitious product.
- The corrected emissions intensity is 0.491 t CO_2/t cementitious product (0.416 x 1.18). This is the number compared to the pathway thresholds.

[10] https://datis-inc.com/blog/what-is-en-197-1-standard/

Worked example 2 - multiple cement grades produced on site

- A single facility produces several cement products of varying strength grades. In an example year, it produces 4000 tonnes of 42.5 cement, and 6000 tonnes of 52.5 cement.
- The weighted average grade is:
  ((42.5 x 4000) + (52.5 x 6000))/ (4000 + 6000) = 48.5

48.5 is of course not an industry standard grade but is simply for the purposes of working out the expected emissions using the above linear relationship between cement class and emissions.

- This almost linear relationship above assumes that for every increase in megapascals by 1, emissions increase by 0.0099 t CO_2/ t cementitious product.
- The difference in emissions between 42.5 and 48.5 is:
  0.0099 x 6 = 0.0594
- The expected emissions of a 48.5 cement is:
  0.649 + 0.0594 = 0.708t CO_2/ t cementitious product.
- The conversion factor is thus 0.649/ 0.708 = 0.92
- The facility's emissions intensity is 0.416t CO_2/ t cementitious product.
- **The corrected emissions intensity is therefore 0.383t CO_2/t cement (0.416 * 0.92)**

Worked example 3 - non-European Cement Standard

- A single facility produces cement under the Australian Cement Standard of strength class N40.
- This means it has a compressive strength (in mpa) of 40mpa after 28 days of mixing.
- The same process as Worked example 3 then applies.
- The difference in emissions between a cement of 40mpa and 42.5mpa is:
  (40-42.5) x 0.0099 = -0.02475
- The expected emissions of an N40 cement is:
  0.649 - 0.02475 = 0.624t CO_2/ t cementitious product
- The conversion factor is thus 0.649/ 0.624 = 1.04
- The facility's emissions intensity is 0.416t CO_2/ t cementitious product.
- **The corrected emissions intensity is therefore 0.432t CO_2/t cement (0.416 * 1.04)**

4.2.4 Methodological notes

4.2.4.1 Assessment at asset level, not portfolio level

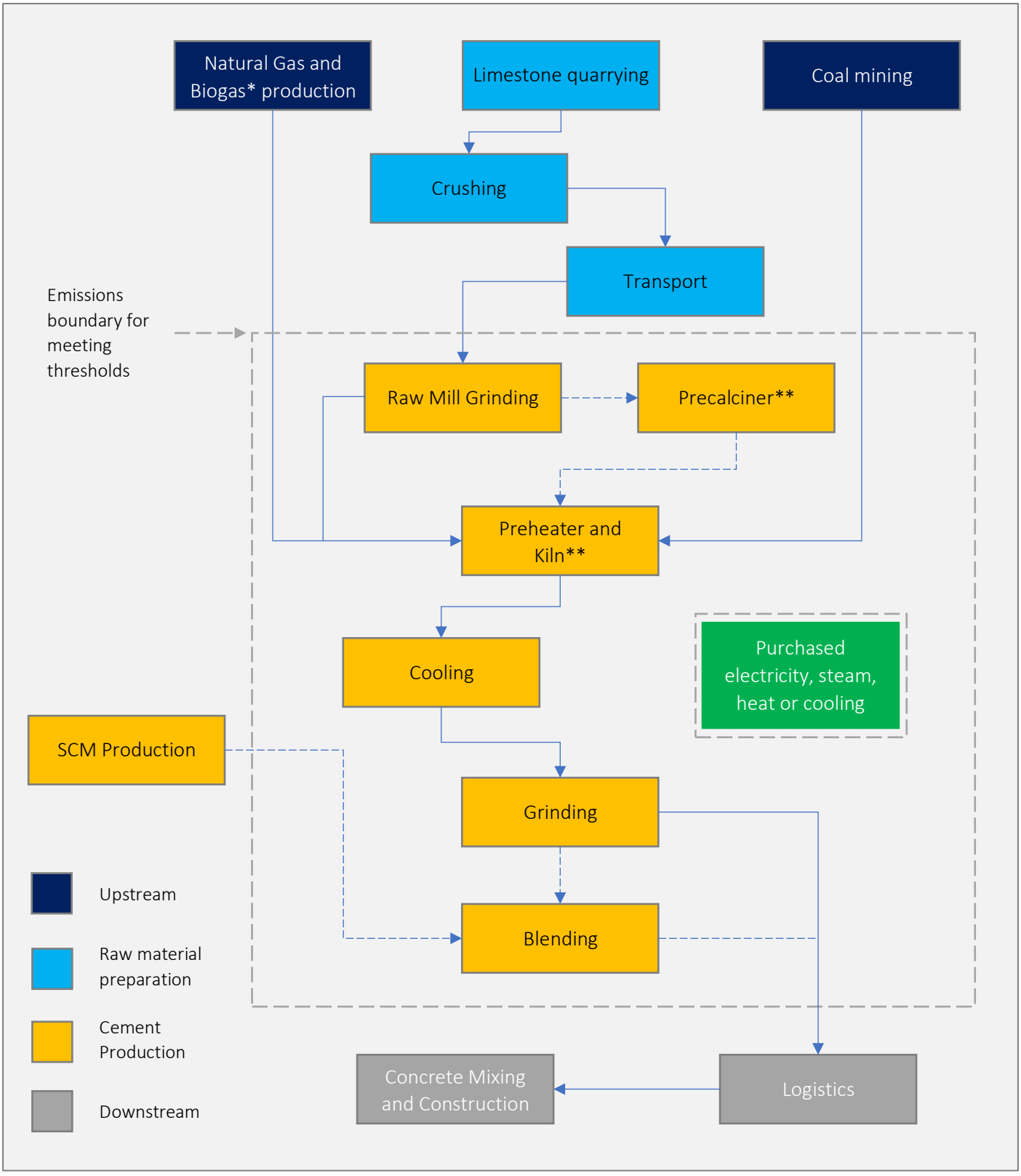
Where a number of production facilities are being assessed, this should be done facility by facility, i.e., not averaged across a portfolio of assets.

4.2.4.2 The scope of emissions used in meeting the pathway

Table 7: Scope of Emissions

Scope Emissions	Cement context
Direct (Scope 1) emissions from cement production	• Burning fossil fuels to heat kilns (thermal emissions) • Calcination emissions (process emissions) • Emissions from alternative fuels and raw materials (AFR) • On-site power generation
Indirect (Scope 2) purchased energy emissions	• Purchase of electricity, steam, heat, or cooling
Off-site (Scope 3) indirect impacts in value chain not owned or controlled by the reporting organisation (upstream)	Because the carbon intensity of the final cement product is the metric, facilities responsible for one specific production stage (for example, grinding facilities) must partially incorporate Scope 3 emissions. However, this is only Scope 3 emissions up to the point of the finished cement, not downstream emissions associated with transporting or using the clinker/cement product. For example, a grinding or blending operation must incorporate upstream scope emissions from clinker production.

Figure 5 below details the cement production activities within scope, at the same time detailing the emissions that must be accounted for when meeting thresholds.



* Biogas production must nonetheless meet the overarching requirements of the Bioenergy Criteria (see ***Section 6.1***).

** All emissions from fuel burning including waste-derived fuels must be accounted.

Figure 5. Methodological note for the scope of emissions when meeting relevant thresholds.

4.2.4.3 *Emissions from alternative fuels and raw materials (AFR), including waste derived fuels*

Emissions from the burning of waste-derived fuels must be included in meeting thresholds and cannot be automatically viewed as zero emissions ('net emissions'). The following guidance/standards may be referred to:

- Cement CO_2 Protocol v3.0 (2011)
- ISO 21644 - Measuring the Biomass Content of Solid Recovered Fuels (SRF) (ISO 2021)

Additional criteria for waste-derived fuels are found in ***Section 6.3***.

4.3 Adaptation & Resilience Criteria

This section describes the Adaptation & Resilience (A&R) Component of the eligibility Criteria for cement production facilities. To demonstrate compliance, all facilities must satisfy the requirements of the checklists detailed below in ***Table 8***.

The checklists are tools to verify that the applicant has implemented sufficient processes and plans in the design, planning and decommissioning phases of a facility/facilities to ensure that the operation and construction of the facility minimises environmental harm and the facility is appropriately adaptive and resilient to climate change and supports the adaptation and resilience of other stakeholders in the surrounding system, if applicable.

All elements of the checklist must be addressed, and appropriate evidence provided that these requirements are being met or are not applicable in respect of the specific facility linked to certification. It is expected that the applicant's evidence will encompass a range of assessment and impact reports and associated data, including but not limited to those reports required to meet national and local licensing and approval processes. This might include Development Consent Orders, planning regulations adhered to, Environmental Impact Assessments, Vulnerability Assessments and associated Adaptation Plans.

It is the applicant's responsibility to provide the relevant information to the verifier. Verifiers must include this information in the scope of verification.

For each question in the scorecard:

- A 'yes' indicates sufficient proof given.
- A 'no' indicates insufficient proof.
- In case of a 'n/a,' please justify why the question is not applicable.

Table 8: Adaptation and Resilience Checklist for cement production facilities

No.	Adaptation and Resilience checklist for Cement Production Facilities (Note, if the facility shares the same site with a quarry, the applicant must consider both the production plant and the quarry in the scope of the assessment)	Proof Given	Overall Assessment
		For verifier to complete	
Area 1: Clear boundaries and critical interdependencies between the facility/facilities and the system it operates within are identified.			
1.1.	Boundaries of the infrastructure are defined using: 1. a listing of all facilities associated with the use of the bond proceeds, 2. a map of their location, and 3. identification of the expected operational life of the facilities.		
1.2.	Critical interdependencies between the facility/facilities and the system within which it/they operate(s) are identified. Identification of these interdependencies should consider the potential for adverse impacts arising from, but not limited to: 1. relationships of the facilities to nearby flood zones; 2. relationships of the facilities to surrounding water bodies and water courses; 3. reduction in pollinating insects and birds; 4. reduction in biodiversity or High Conservation Value[11] habitat; 5. dust and other practices that affect air quality; 6. appropriation of land or economic assets from nearby vulnerable groups[12].		
Area 2: Clear boundaries and critical interdependencies between the infrastructure and the system it operates within are identified.			
2.1	Key physical climate risks and indicators of these risks are identified in line with the following guidelines: • Risks are identified based on (a) a range of climate hazards, and (b) information about risks in the current local context, including reference to any previously identified relevant hazard zones, e.g., flood zones. In order to be confident that cement production facilities are robust and flexible in the face of climate change uncertainties, it is essential that the climate risks being assessed and addressed cover those that are of greatest relevance to industrial facilities and infrastructure such as cement production plants and other infrastructure. The physical characteristics of climate change that must be considered in the risk assessment include: • Temperature rise ○ High temperatures can impact the operation and efficiency of certain types of equipment. • Increasing intense precipitation events ○ Heavy rainfall can result in flash pluvial flooding, which could significantly impact industrial assets[13]. ○ Drought may alter or reduce availability of water with temperature increase. • Changes in cloud cover, wind speed or increasing temperature extremes ○ Poses risks to the availability of reliable energy, both electrical or thermal. • Sea-level rises ○ Potential for flooding of coastal infrastructure and assets at risk from storm surge events. • Increased soil erosion ○ Risks to the availability of raw materials.		

[11] High Conservation Value (HCV) habitat criteria in accordance with www.hcvnetwork.org.

[12] According to IFC Performance Standards

[13] Flood risk and resilience will likely have interdependencies with local and national agencies, for example related to local flood defences, coastal flood risk management, shoreline management plans etc.

No.	Adaptation and Resilience checklist for Cement Production Facilities (Note, if the facility shares the same site with a quarry, the applicant must consider both the production plant and the quarry in the scope of the assessment)	Proof Given	Overall Assessment
		For verifier to complete	
	○ Risk to transport routes for supply chains. **Guidance for carrying out Risk Assessments:** • Users should apply climate scenarios based on representative concentration pathway (RCP) 4.5 and 8.5 or similar/ equivalent to ensure consideration for worst case scenario. • Risk assessments should use both top-down methods and bottom-up methods that look at inherent system vulnerabilities in local context. • A broad range of models can be used to generate climate scenarios • For risk assessment, the TCFD The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities is recommended.		
Area 3: The measures that have or will be taken to address those risks mitigate them to a level such that the infrastructure is suitable to climate change conditions over its operational life.			
3.1	The following are examples of risk management activities that applicants might consider, or that might be adopted as part of regulations (e.g. codes and standards). This list is not exhaustive, and applicants should fully assess the mitigation measures that are relevant to the climate risks and impacts identified in the risk assessment. **Temperature** • Design standards that maintain equipment rating over its lifetime performance in the face of all potential ranges of temperature rise. • Resilience measures that ensure employees can continue to work at more extreme temperatures (e.g., air conditioning). **Rainfall** • Design for resilience to pluvial flooding. • Assessment of site drainage requirements. **Changes in cloud cover, wind speed or increasing temperature extremes** • Reduced reliance on imported energy and storage infrastructure. **Increased flooding** • Flood risk assessment and planning. • Site installations outside of potentially affected zones. • Ensure flood defence systems and coastal management plans are adequate. **Increased coastal/ river erosion** • Shoreline management plans/ coastal erosion assessment **Landslides/ ground movement** • The potential for ground movement and landslides should be taken into account when assessing sites for cement production infrastructure. **General risk mitigation measures:** • Business continuity plans • Production restoration plans • System security standards • Employee capacity building		
3.2	Risk reduction measures must be tolerant to a range of climate hazards and not lock-in conditions that could result in maladaptation.		
Area 4: The facilities do no harm to the climate resilience of the defined system they operate within, as indicated by the boundaries of and critical interdependencies with that system as identified in item 1 in this checklist.			
4.1	The facilities themselves do not pose significant risk of harm to the system they are located within or others' natural, social, or financial assets according to the principle of		

No.	Adaptation and Resilience checklist for Cement Production Facilities (Note, if the facility shares the same site with a quarry, the applicant must consider both the production plant and the quarry in the scope of the assessment)	Proof Given	Overall Assessment
		For verifier to complete	
	best available evidence during the investment period, taking into account the boundaries and critical interdependencies as defined in item 1 in this checklist. Harm is defined as an adverse effect on any of the following items: 1. Adverse effects on local water bodies and water courses; 2. Air pollution from dust and other pollutants; 3. Relationships of the asset/project to nearby flood zones; 4. Reduction in pollinating insects and birds; 5. Reduction in biodiversity or High Conservation Value[14] habitat; 6. Appropriation of land or economic assets from nearby vulnerable groups[15].		
Area 5: Additional requirements for facilities sharing a site with a quarry (facilities without an onsite quarry need not complete this section)			
5.1	Evidence is provided of a viable Quarry Rehabilitation Plan[16] which includes the following details: • Post closure land use • Legal compliance • Progressive rehabilitation • Stakeholder engagement • Baseline conditions have been assessed • Presence of a monitoring plan		
5.2	Evidence is provided of a viable Biodiversity Management Plan[14] which includes the following details: • Post closure land use • Legal compliance • Progressive rehabilitation • Stakeholder engagement • Baseline conditions have been assessed • Presence of a monitoring plan		
Area 6: The applicant is required to demonstrate that there will be ongoing monitoring and evaluation of the relevance of the risks and resilience measures and related adjustments to those measures will be taken as needed (reporting is required based on the term of certification, which depends on the finance instrument or asset being certified).			
6.1	Indicators for risks identified under item 2 in this checklist are provided.		
6.2	Indicators for risk mitigation measures identified under item 3 in this checklist are provided.		
6.3	Indicators for "fit for purpose" resilience benefit measures identified under item 4 in this checklist are provided.		
6.4	Applicants have a viable plan to annually monitor (a) climate risks linked to the infrastructure, (b) climate resilience performance, (c) appropriateness of climate resilience measure(s) and to adjust as necessary to address evolving climate risks.		
6.5	Where production or operation has been interrupted, the extent of disruption (for example in reduction in volume output or revenue) should be measured and reported, together with the cause of the interruption. Any actions taken to reduce the risk of further impacts should also be recorded.		

[14] High Conservation Value (HCV) habitat criteria in accordance with www.hcvnetwork.org

[15] According to IFC Performance Standards

[16] The GCCA provide thorough guidance on developing such plans: https://gccassociation.org/wp-content/uploads/2020/05/GCCA_Guidelines_Sustainability_Biodiversity_Quarry_Rehabilitation_May_2020-1.pdf

5 Cement Criteria for entities and Sustainability-Linked Debt (SLD)

The following sections detail similar, yet distinct, criteria depending on what is being certified:

- A "Certified Entity" (in this case, an integrated cement production company, or a company which produces cement through grinding and blending but purchases the clinker, or a business segment carrying out those activities[17]) - See ***Section 5.1***
- SLD issued by such a company - See ***Section 5.2.***
- ***Section 5.3*** contains methodological notes applicable to these requirements.

See also the Climate Bonds Standard v4.0 for the cross sectoral requirements for Entity and SLD Certification relating to Transition Plans and Disclosure for the Certified Entity and requirements in respect of the Parent Group (if any). These cross sectoral requirements must be met in addition to the cement-specific requirements described here.

NOTE: *Current proposals would allow for the certification of only part of a company or group of companies, or SLD that relates to only part of a company or group of companies. See the Climate Bonds Standard v4.0 for full details. This flexibility enables the certification of the part of a company or group of companies relating to cement production, separate from the certification of other activities of the company or group of companies of which it forms a part.*

5.1 Cement Criteria for Certified Entities

Two levels of entity certification are available, described in ***Table 9***:

Table 9: Two levels of Entity Certification

Certification Level	Entity Certification Requirements
Level 1: "Aligned"	**Climate mitigation criteria** 1. At the time of certification, the Certified Entity's cement production facilities average emissions intensity (with correction factors applied as per ***Section 4.2.3***) meets the entity-level pathway threshold and their future Performance Targets to 2050 continue to meet those declining thresholds (see ***Section 5.3.3***); *and* 2. If the Certified Entity's production facilities use hydrogen, biomass or alternative fuels and raw materials (including municipal solid waste) as a fuel, then those fuels meet the cross-cutting criteria in ***Section 6.1 to 6.3;*** *and* 3. If the Certified Entity's production facilities employ CCS and/or CCUS, that CCS and/or CCUS meets the criteria in ***Sections 6.4 and/or 6.5;*** *and* 4. For any plant becoming operational post certification date, that plant will meet the criteria described in ***Section 4*** from day 1 of commencing operation. Details of this to be provided in the Transition Plan. **Adaptation and Resilience Criteria** 1. All of the Certified Entity's production facilities meet the adaptation and resilience criteria described in ***Section 4.3***, and that is reassessed and reconfirmed every five years.

[17] Companies that only produce clinker, and not cement, cannot be certified. See *section 2.4* for details.

Certification Level	Entity Certification Requirements
Level 2: "Transitioning"	The criteria are the same as for Level 1, except: The Certified Entity's cement production facilities average emissions intensity (with correction factors applied as per ***section 4.2.3***) does not meet the entity-level pathway threshold at the time of certification, but the future Performance Targets align with those entity-level emissions thresholds by 30 December **2030** and will continue to meet them after that date.

5.2 Cement Criteria for Sustainability-Linked Debt (SLD)

Two tiers of SLB certification are available, described in ***Table 10***.

Table 10: SLB Tiered Certifications

Certification Level	SLD Certification Requirements
Level 1: "Aligned"	**Climate mitigation criteria** 1. At the time of certification, the average emissions intensity (with correction factors applied as per ***section 4.2.3***) of the cement production facilities to which the Performance Targets of the SLD are linked meet the entity-level pathway threshold *and* their future Performance Targets to which the debt is linked continue to align with those declining thresholds through to 2050 (see ***Section 5.3.3***); *and* 2. If the Certified Entity's production facilities use hydrogen, biomass or alternative fuels and raw materials (including municipal solid waste) as a fuel, then those fuels meet the cross-cutting criteria in ***Section 6.1 to 6.3;*** *and* 3. If the Certified Entity's production facilities employ CCS and/or CCUS, that CCS and/or CCUS meets the criteria in ***Sections 6.4 and/ or 6.5;*** *and* 4. For any plant becoming operational post certification date, that plant will meet the criteria described in ***Section 4*** from day 1 of commencing operation. Details of this to be provided in the Transition Plan. **Adaptation and Resilience Criteria** 5. All of the Certified Entity's cement production facilities meet the adaptation and resilience criteria described in ***Section 4.3***, and that is reassessed and reconfirmed every five years.
Level 2: "Transitioning"	The criteria are the same as for Level 1, except: At the time of certification, the average emissions intensity (with correction factors applied as per ***section 4.2.3***) of the cement production facilities to which the Performance Targets of the SLD are linked does not meet the entity-level pathway threshold, but the future Performance Targets for those facilities align by 30 December **2030** and continue to align thereafter through to 2050 (see ***Section 5.3.3***).

5.3 Methodological notes

5.3.1 Assessment at portfolio level

Assessment of whether the assessed entity's cement production activities meet the emissions intensity threshold is determined at a portfolio level. That is, the average emissions intensity across all of the cement production facilities is calculated, the correction factor applied, and that correction factor-adjusted average is compared to the emissions intensity thresholds. It is not necessary to assess each facility separately.

5.3.2 Scope of emissions

The scope of emissions to be included is the same as those for individual production facilities. See ***Section 4.2.4.2*** for details.

5.3.3 Entity-level emissions intensity thresholds for the Assessed Entity

The GHG emissions intensity metric is the same as for single or groups of facilities, as described at the start of ***Section 4.2.1***.

The emission intensity thresholds for a cement production company are given in ***Table 11*** and illustrated in ***Figure 6***. To derive the appropriate threshold for the Assessed Entity, these must be adjusted according to the cement grade produced by the Assessed Entity, done by applying the correction factors as described in ***Section 4.2.3***, using the mass-weighted average strength grade produced across the Assessed Entity.

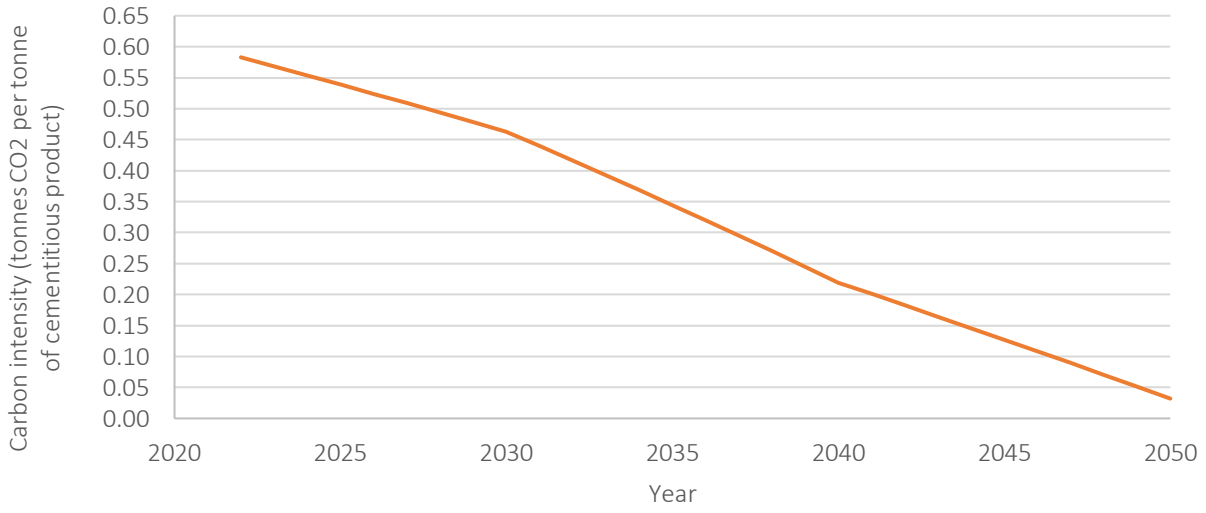


Figure 6: The emissions pathway for all cement production companies (scope 1 & 2 emissions combined)

Table 11: Threshold values forming the emissions pathway for all cement production companies

Year	Carbon intensity ($t CO_2$/ t cementitious product)	Year	Carbon intensity ($t CO_2$/ t cementitious product)	Year	Carbon intensity ($t CO_2$/ t cementitious product)	Year	Carbon intensity ($t CO_2$/ t cementitious product)
2020	0.616	2028	0.494	2036	0.320	2044	0.145
2021	0.597	2029	0.478	2037	0.295	2045	0.127
2022	0.583	2030	0.463	2038	0.270	2046	0.108
2023	0.568	2031	0.440	2039	0.245	2047	0.089
2024	0.554	2032	0.416	2040	0.219	2048	0.070
2025	0.539	2033	0.392	2041	0.201	2049	0.051
2026	0.524	2034	0.368	2042	0.183	2050	0.032
2027	0.509	2035	0.344	2043	0.164		

Note: Based on the Science-Based Targets Initiative 1.5-degree pathway for cement[18]: https://sciencebasedtargets.org/sectors/cement with the methodology accessible at https://sciencebasedtargets.org/resources/files/Cement-guidance-public-consultation.pdf

5.3.4 Thresholds to be met every three years

The emissions intensity thresholds over time describe a smooth curve down over time. In reality, decarbonisation may likely result in step changes in emissions levels. To reflect this, the Performance targets should align with the emission intensity threshold every three years as a minimum, but annual alignment is not required.

6 Cross-cutting Criteria

The following criteria apply in any plant, measure or Certified Entity that is using the following as a fuel source:

- Biomass, including residues, energy crops and lignocellulosic biomass - ***Section 6.1***
- Hydrogen - ***Section 6.2***
- Waste-Derived Fuels, including Municipal Solid Waste (MSW) - ***Section 6.3***

Or is implementing:

- Carbon Capture and Storage (CCS) - ***Section 6.4***

6.1 Additional criteria when using biomass as a fuel

For facilities or equipment using biofuels, the production of the biofuel must be demonstrated to meet the requirements set out in section 3.2 of the Climate Bonds Bioenergy Criteria[19] which includes:

1. Meeting the relevant established GHG emissions threshold; and
2. Reduce the risk of indirect land use impact (iLUC).

[18] Note: Companies cannot use verification by SBTi as demonstration of compliance.

[19] www.climatebonds.net/files/files/standards/Bioenergy/Bioenergy%20Criteria%20Document%20Mar%202021.pdf

This criterion is applicable to first- and second-generation biofuels[20] used as a fuel in kilns. It is not applicable to biogenic components of alternative fuels such as municipal waste streams, criteria for which are in ***Section 6.3***.

6.2 Additional criteria when using hydrogen as a fuel

Facilities using hydrogen are eligible only if the hydrogen used meets the thresholds in ***Table 12***:

Table 12: Carbon intensity thresholds for the life cycle emissions of hydrogen used as a fuel

2022 (t CO2eq/t H2)	2030 (t CO2eq/t H2)	2040 (t CO2eq/t H2)	2050 **t CO2eq/t H2**
3.00	1.90	1.0	0.6

Life Cycle GHG Assessment for hydrogen: Cradle-to-site boundary includes cradle-to-gate emissions plus any transportation emissions to the site where a product is used. In this case, the life cycle assessment should follow ISO standards (ISO 14040 and ISO 14044). The Recommendation 2013/179/EU will be acceptable for assets located in the EU. Results should be verified by an independent third party.

> ***Note:*** *The Climate Bonds Initiative is currently developing criteria for hydrogen. Once the hydrogen criteria are published, it shall supersede the requirements set in this section.*

6.3 Additional criteria when using Waste-Derived Fuels

Any plant or Assessed Entity using waste-derived fuels must demonstrate the following criteria are satisfied:

1. **All waste of recycling potential[21] must be removed prior to burning in line with the waste hierarchy**

   All waste- or refuse-derived fuel to be used must either be:

   - Sourced from a sorting facility that has removed all recyclable waste in line with the Climate Bonds Waste Management Criteria[22].
     - or -
   - Pre-processed on site to remove all recyclable waste in line with the Climate Bonds Waste Management Criteria.

2. **Municipal solid waste will not be eligible as a fuel type after 2035**

   2035 is set ***provisionally*** as the year after which point Municipal Solid Waste will no longer be considered an eligible fuel source for cement production. This does not yet apply to other wastes such as forestry residues and agricultural wastes.
   Note, this will be continuously reviewed in light of technological availability. If alternative fuel technologies have not materialised by this point, the cut-off year may be delayed further. *Vice versa*, if technology advances more rapidly, an earlier point may be considered[23].

[20] Rationale for a feedstock-agnostic approach can be found in the Bioenergy Criteria.

[21] For example, glass, paper, metals, some plastics.

[22] www.climatebonds.net/files/files/standards/Waste%20Management/Crit%20Waste%20Management%20Criteria.pdf

[23] Certification will not be revoked retroactively from applicants already certified who no longer meet updated criteria

6.4 Additional criteria for Carbon Capture & Storage (CCS)

CCS equipment, both as an individual measure and as part of a whole facility being evaluated, is eligible so long as there is evidence[24] that demonstrates the CO_2 will be suitably transported and (if being stored and not utilised) stored in line with the criteria below:

Component	Requirements
Transport	1. The CO_2 transported from the installation where it is captured to the injection point does not lead to CO_2 leakages above 0.5 % of the mass of CO_2 transported. 2. Appropriate leakage detection systems are applied and a monitoring plan is in place, with the report verified by an independent third party.
Storage	1. Characterisation and assessment of the potential storage complex and surrounding area, or exploration[25] is carried out in order to establish whether the geological formation is suitable for use as a CO_2 storage site. 2. For operation of underground geological CO_2 storage sites, including closure and post-closure obligations: a. appropriate leakage detection systems are implemented to prevent release during operation; b. a monitoring plan of the injection facilities, the storage complex, and, where appropriate, the surrounding environment is in place, with the regular reports checked by the competent national authority. 3. For the exploration and operation of storage sites, the activity complies with ISO 27914:2017225[26] for geological storage of CO_2.

Furthermore, the use of any certification scheme would be encouraged. Examples of certification schemes include the U.S. EPA Class VI well certification, which includes Reservoir Characterisation[27]. Another example includes the DNV GL certification framework to verify compliance with the ISO 27914:2017 Carbon dioxide capture, transportation and geological storage - Geological storage[28].

> ***Note:*** *There is no further criteria on capture rate for CCS when the bond is financing a whole facility, group of facilities, or company. Only when the investment is financing CCS as a specific measure as per* ***section 3.1*** *must CCS achieve a minimum capture rate.*

6.5 Additional criteria for Carbon Capture, Utilisation and Storage (CCUS)

CCS equipment, both as an individual measure and as part of a whole facility being evaluated, is eligible when the CO_2 is used in either:

- Curing carbonation of concrete (also known as concrete curing);
- Concrete waste mineralisation (for example, to produce SCM); or
- Production of recyclable products such as PET.

CO_2 should not be used for products that release the CO_2 immediately when these are used (such as in urea, carbonated beverages, or fuels), nor for enhanced oil recovery, and the production of other forms of fossil energy sources.

[24] Either directly from the applicants or through contracts or agreements with a third party

[25] "Exploration' means the assessment of potential storage complexes for the purposes of geologically storing CO_2 by means of activities intruding into the subsurface such as drilling to obtain geological information about strata in the potential storage complex and, as appropriate, carrying out injection tests in order to characterise the storage site

[26] ISO Standard 27914:2017, Carbon dioxide capture, transportation and geological storage - Geological storage: www.iso.org/standard/64148.html)

[27] www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-co2

[28] www.dnv.com/news/dnv-gl-launches-certification-framework-and-recommended-practice-for-carbon-capture-and-storage-ccs--108096

Appendix A: TWG and IWG members

CBI Technical Lead Advisor:	
Cyrille Dunant	Cambridge University, United Kingdom
TWG Observers:	
Estefania Marchan	Rocky Mountain Institute (RMI)

TWG Members			
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Zhi Cao	University of Antwerp, Belgium	**Kira West**	TNO, Netherlands
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Prof Mark Alexander	University of Cape Town, South Africa		

IWG Members			
Adam Gustafsson	UBS Asset Management	**Ken Zhong**	PWC
Asja Hossain	Bayern LB	**Leanne Bloch-Jorgensen**	National Australia Bank
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All TWG and IWG participants were members of these organisations at the time of criteria development. However, some may have since moved organisations.