

# Hydropower Criteria

## The Hydropower Criteria for the Climate Bonds Standard & Certification Scheme

March 2021

Version 1.0

Version	Date	Description
1.0	25 March 2021	Initial publication



Climate  
Bond  
Certified

## Definitions

**Accredited Assessor:** An accredited assessor is an individual who has 1) Completed a programme of training authorised by the Hydropower Sustainability Assessment Council, 2) Obtained a License which represents an agreement between the Accredited Assessor and the Hydropower Sustainability Assessment Protocol governance council regarding the terms and conditions of their accreditation, and 3) Adopted a code of conduct and compliance with all the terms of that License. The Climate Bonds Initiative is not engaged with this accreditation process.

**Approved Verifiers:** Organisations approved by the Climate Bonds Initiative to provide assurance services to issuers of Certified Climate Bonds. The duties of Approved Verifiers include providing assurance that the requirements of the Climate Bonds Standard (including these and other sector specific Criteria) are met.

**Certified Climate Bond:** A Climate Bond that is certified by the Climate Bonds Standard Board as meeting the requirements of the Climate Bonds Standard, as attested through independent verification.

**Climate Bond:** A climate bond is a bond used to finance – or refinance - projects needed to address climate change. They range from wind farms and hydropower plants, to rail transport and building sea walls in cities threatened by rising sea levels. Only a small portion of these bonds have been labelled as Green or Climate Bonds by their issuers.

**Climate Bonds Initiative (CBI):** An investor-focused not-for-profit organisation, promoting large-scale investments that will deliver a global low carbon and climate resilient economy. The Initiative seeks to develop mechanisms to better align the interests of investors, industry and government so as 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 where they can be confident that the funds 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 (Climate Bonds Standard V3.0) 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 Initiative 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 Climate Bonds Standard, including the adoption of additional sector Criteria, ii) Approved Verifiers, and iii) Applications for Certification of a bond under the Climate Bonds Standard. The CBSB is constituted, appointed and supported in line with the governance arrangements and processes as published on the Climate Bonds Initiative website.

**Climate Bond Certification:** allows the issuer to use the Climate Bond Certification Mark in relation to that bond. Climate Bond Certification is provided once the independent Climate Bonds Standard Board is satisfied the bond conforms with the Climate Bonds Standard.

**Green Bond:** A Green Bond is a bond the proceeds of which are allocated to environmental projects. 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, but in practice they have mostly been the same as Climate Bonds, with proceeds going to climate change projects.

**Hydropower assets and projects:** Assets and projects relating to the construction, acquisition and / or management of hydropower facilities and dedicated infrastructure. These facilities might include run-of-river, impoundment hydropower and pumped storage. Marine applications using similar technology are not within the scope of the document.

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

**Technical Working Group (TWG):** A group of key experts from academia, international agencies, industry and NGOs convened by the Climate Bonds Initiative. 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. Its draft recommendations are refined through engagement with finance industry experts in convened Industry Working Groups and through public consultation. Final approval of Sector Criteria is given by the CBSB.

## Table of Contents

Definitions .....	1
Table of Contents .....	2
<b>1 Introduction .....</b>	<b>3</b>
1.1 The Climate Bonds Standard .....	3
1.2 The need for Hydropower Criteria .....	3
1.3 Assets and projects in scope for the Criteria .....	3
1.4 Key elements of the Criteria .....	4
1.5 This document and supplementary information available .....	4
1.6 Revisions to these Criteria .....	4
<b>2 Potentially eligible use of proceeds.....</b>	<b>5</b>
<b>3 Eligibility Criteria .....</b>	<b>6</b>
3.1 Overview.....	6
3.2 Mitigation Criteria for hydropower facilities (including pumped storage) .....	6
3.3 Mitigation Criteria for supporting infrastructure.....	8
3.4 Climate Adaptation and Resilience Criteria .....	8
<b>4 Reporting requirements .....</b>	<b>10</b>
Appendix 1: Technical Working Group (TWG) and Industry Working Group (IWG) .....	11
TWG Members & Observers .....	11
IWG Members .....	11

The Climate Bonds Initiative gratefully acknowledges the Technical and Industry Working Group members who supported the development of these Criteria. Proposals were agreed by consensus in the Technical Working Group, noting a variety of views on specific issues, and taking into account the feedback from the Industry Working Group.

Technical and Industry Working Group Members are listed in Appendix 1.

# 1 Introduction

## 1.1 The Climate Bonds Standard

Investor demand for Green Bonds and Climate Bonds is strong and will 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 and certification are essential to improve confidence and transparency, which in turn will enable further strong growth in the market.

The Climate Bonds Standard & 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.

A key part of the Standard is a suite of sector-specific eligibility Criteria. Each set of Sector Criteria sets climate change benchmarks for that sector that are used to screen assets and capital projects 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. Where a bond encompasses a mixed portfolio of assets across several sectors, each sub-category of assets will be subject to the relevant Sector Criteria for those assets.

The Sector Criteria are determined through a multi-stakeholder engagement process, including Technical and Industry Working Groups (TWG and IWG, respectively), convened and managed by the Climate Bonds Initiative (CBI), 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 is the overarching Climate Bonds Standard document. This provides the common fund management and reporting requirements that all Certified Climate Bonds must meet, in addition to meeting the specific Sector Criteria.

## 1.2 The need for Hydropower Criteria

A number of bond issuers are already issuing Green Bonds to finance or refinance hydropower projects and assets. Not all of these Green Bonds have been well received in the market, due to concerns over actual or potential negative impacts of the specific assets and projects linked to those Green Bonds.

To ensure consistency and credibility for those wishing to issue or invest in Green Bonds linked to hydropower, it is therefore necessary to determine robust and transparent screening Criteria, which will ensure that any hydropower projects and assets that meet those Criteria are ‘climate compatible’ (i.e. are sufficiently low carbon and enabling greater climate adaptation and resilience in a world of unavoidable climate change, in line with the goals of the Paris Agreement), and are not causing significant negative impacts in respect of a number of wider environmental or social issues.

These Criteria are intended to provide such robust and transparent screening for the Green Bonds market.

## 1.3 Assets and projects in scope for the Criteria

These Criteria apply to use of proceeds relating to:

- Power stations:
  - Run-of-river
  - Impoundment
  - Pumped storage
- Applications of in-stream technology.
- Existing infrastructure dedicated to eligible facilities, such as dedicated transmission lines.

The scope of these Criteria are assets and projects:

- That are already operational; or
- Are in an advanced state of planning.

Further details of the scope of these Criteria are in Section 2, Table 1.

## 1.4 Key elements of the Criteria

As a general principle, bonds will meet the requirements of the Climate Bonds Standard if the associated use of proceeds:

- Promotes low GHG infrastructure, and
- Promotes adaptation to climate change and facilitate increased climate resilience in the systems in which they are located.

Complete details of the reporting requirements for the Hydropower Criteria are in Section 3 of this document.

## 1.5 This document and supplementary information available

This document details:

- The current scope of hydropower assets and projects eligible for certification under the Climate Bonds Standard – Section 2;
- The specific eligibility Criteria under which these assets and projects can be certified – Section 3;
- Reporting requirements for issuers – Section 4
- List of TWG and IWG members – Appendix 1

Supporting information is available at as follows:

1. [The Hydropower Criteria Background Document](#): for the full background to the process of determining Criteria relating to hydropower assets and use of proceeds, including the rationale for the approaches and decisions taken.
2. [Hydropower FAQs](#): answering the most commonly asked questions regarding the Hydropower Criteria.
3. [The Climate Bonds Standard V3.0](#): contains the requirements of the overarching Climate Bonds Standard
4. [The Climate Bonds Standard & Certification Scheme Brochure](#): provides an overview of the Climate Bonds Standard & Certification Scheme, of which these Criteria are a part.

For more information on the Climate Bonds Initiative and the Climate Bonds Standard & Certification Scheme, see [www.climatebonds.net](http://www.climatebonds.net). For the hydropower homepage see <http://www.climatebonds.net/hydropower>.

## 1.6 Revisions to these Criteria

These Criteria will be reviewed no more than 36 months after launch, earlier if the need arises, at which point the TWG will take stock of issuances that arise in the early stages and any developments in improved methodologies and data that can increase the climate integrity of future bond issuances. More specifically, in respect of decarbonisation pathways for the power sector, CBI will review the emissions intensity thresholds for all renewable energy sector criteria within 2 years of the launch of these Criteria.

As a result, the Criteria are subject to revision over time. However, certification will not be withdrawn retroactively from bonds certified under earlier versions of the Criteria.

## 2 Potentially eligible use of proceeds

Table 1 presents use of proceeds that might be included in a Certified Climate Bond, subject to meeting the Criteria described in Section 3. Table 1 is provided for illustrative purposes and is not an exhaustive list of every possible asset or project that would be eligible.

The assets in Table 1 are eligible for inclusion in a Certified Climate Bond if they meet:

- The Mitigation requirements (see Sections 3.2., 3.3 and 3.4 for details); AND
- The Adaptation and Resilience requirements (see Section 3.5 for details).

Bonds financing multiple projects will be required to prove compliance with other Sector Criteria to be eligible for Climate Bonds Certification. For example, if a bond includes both wind projects and hydropower projects it would be necessary for the issuer to prove compliance with both the Wind Criteria and the Hydropower Criteria for those projects, respectively.

Table 1 provides signposting as follows:

- A green circle indicates these assets, when fully described and documented, automatically meet the Criteria requirements, with no further disclosure or documentation required.
- An amber square indicates that the eligibility of these assets is conditional on meeting specific requirements.

*Table 1: Illustrative use of bond proceeds eligible for Climate Bonds Certification under the Hydropower Criteria*

Assets	Example use of proceeds	Mitigation	Adaptation & resilience
<b>Power generation</b>			
Power generation facilities (with and without storage, including run-of-river, impoundment and pumped storage)	Land acquisition for the purpose of establishing hydropower facilities, including land acquired for the purpose of creating or adapting of water courses, reservoirs, etc.	See Section 3.2, and for pumped storage also Section 3.3	See Section 3.5
	Equipment and resources for establishing and operating hydropower facilities, including reservoirs and dams.	See Section 3.2, and for pumped storage also Section 3.3	See Section 3.5
Supporting infrastructure	Dedicated transmission lines from an eligible hydropower facility to the main grid	See Section 3.4	See Section 3.5

*Table 2: Assets and projects not eligible for Certification under the Hydropower Criteria*

Assets	Explanation for exclusion
Vehicles	If an issuer wishes to use a portion of the proceeds to (re)finance any vehicles, the vehicles must comply with the Climate Bonds Standard Transport Criteria.
Hydropower-like assets in a marine environment	Marine-based, hydropower-like assets are not covered by these Criteria. If an issuer wishes to use a portion of the proceeds to (re)finance hydropower-like assets or projects in a marine environment, those assets or projects must comply with the Climate Bonds Standard Marine Renewable Energy Criteria.

## 3 Eligibility Criteria

### 3.1 Overview

The Hydropower Criteria has two components:

1. Mitigation component – details in Section 3.2 (hydropower facilities and pumped storage) and Section 3.3 (supporting infrastructure and components)
2. Adaptation and resilience component – details in Section 3.4.

### 3.2 Mitigation Criteria for hydropower facilities (including pumped storage)

The following Criteria apply to all hydropower facilities: run-of-river, impoundment and pumped storage. They are summarised in Figure 1 below.

A hydropower facility **in operation before 2020** is eligible if it has either:

- A power density<sup>1</sup> > 5W/m<sup>2</sup>; OR
- GHG emissions intensity < 100g CO<sub>2</sub>e/kWh.

A hydropower facility **commencing operation in 2020 or after**<sup>2</sup> is eligible if it has either:

- A power density > 10W/m<sup>2</sup>; OR
- GHG emissions intensity < 50g CO<sub>2</sub>e/kWh.

The power density criterion is referred to below as the ‘GHG Risk Predictive Screen’. The GHG emissions intensity criterion is referred to below as the ‘Low GHG Compatibility Test’.

In addition, pumped storage facilities must also meet one of the following criteria:

1. The facility is demonstrably purposefully built in conjunction with intermittent renewables, as in the Hatta Dam project in the United Arab Emirates, for example.  
AND / OR
2. The facility is contributing to a grid which already has a share of intermittent renewables deployment of at least 20% OR has credible evidence of programmes in place that increase the share of intermittent renewables to this level within the next 10 years. Evidence of such programmes might be the current development of renewable energy facilities that are due to come online in the near term, or the auction of PPAs for renewables.  
AND / OR
3. The facility can credibly demonstrate that the pumped storage will not be charged with an off-peak grid intensity that is higher than the intensity of the electricity that it will displace when it is discharged. For example, demonstrating that there is no combination of the following in the merit order: (i) mid-merit coal and (ii) gas used at times of peak demand.

#### Clarification Note 1: Calculating GHG emissions intensity

The GHG emissions intensity is the average GHG emissions intensity, including emissions associated with the reservoir only and allocated to hydropower only, averaged over an estimated 100-year life of the facility. This can be estimated in one of two ways:

- Using the [G-res tool](#) developed by the International Hydropower Association in collaboration with the UNESCO Chair for Global Environment Change (see [here](#)). The issuer will provide a validated result to the Approved Verifier for the verifier to confirm compliance with these Criteria.

<sup>1</sup> Power density is defined as the nameplate capacity of the facility divided by the surface area of the reservoir.

<sup>2</sup> It is noted that TWG member Richard Taylor was not in agreement with the establishment of 10W / 50g thresholds for facilities becoming operational in 2020 or thereafter.

## Climate Bonds Initiative Hydropower Criteria

- Site-specific assessments carried out by the issuer or its appointed consultant, so long as the assessment follows the guidelines laid out in the IEA Hydro Framework as described in the ‘Guidelines for the Quantitative Analysis of Net GHG Emissions from Reservoirs’.<sup>3</sup> In this instance, the CBI-Approved Verifier must review the site-specific assessment carried out to confirm that i) these guidelines have been followed; and ii) the resulting estimated emissions intensity is below the relevant threshold.

### Clarification Note 2: Only allocated emissions count

A hydropower facility should be deemed to meet the GHG emissions intensity threshold so long as the emissions apportioned or *allocated to hydropower* fall below the relevant threshold (even if the full, unallocated emissions do not).

When calculating GHG emissions allocated to hydropower, the following should be *excluded*:

- The GHG emissions associated with any pre-existing natural water body, and
- The GHG emissions associated with the broader range of services that the facility might provide.

Regarding exclusion of emissions associated with any pre-existing natural water body, this is automatic in the design of the G-res tool. Regarding exclusion of emissions associated with a broader range of services that the facility might provide, an allocation methodology is needed to determine the relative importance of different reservoir services and apportion emissions to them proportionally. The G-res tool includes such an allocation mechanism, and given the proposed use of the G-res tool for assessing GHG emissions in total, for simplicity and consistency it is proposed that the allocation methodology using the operating regime approach in G-res be used to determine the allocated emissions for a hydropower facility for the purposes of the Low GHG-Compatibility Test.

For issuers undertaking an on-site GHG assessment, the methodology of the Allocation Module in the G-res tool (using the Operating Regime variant), should be replicated to allocate the estimated unallocated emissions to the multiple services that the reservoir may provide.

### Clarification Note 3: Geographic scope of the assessment

The GHG assessment for the Climate Bonds Standard needs to estimate the GHG footprint of the hydropower facility as a whole, including the reservoir and upstream and downstream impact, and not just the incremental footprint of any specific investment (see Box 1).

For the purposes of clarification, this means that in the case of a retrofit or the addition of a new turbine to an existing facility, the GHG assessment would need to account for not just the incremental impact of the retrofit or new turbine, but the adjusted footprint of the whole facility post-retrofit or upgrade, to see if post-retrofit, the facility is producing sufficiently ‘low carbon power’ to qualify for certification under the Climate Bonds Standard.

#### Box 1: Defining the scope of the facility, its footprint and the GHG assessment

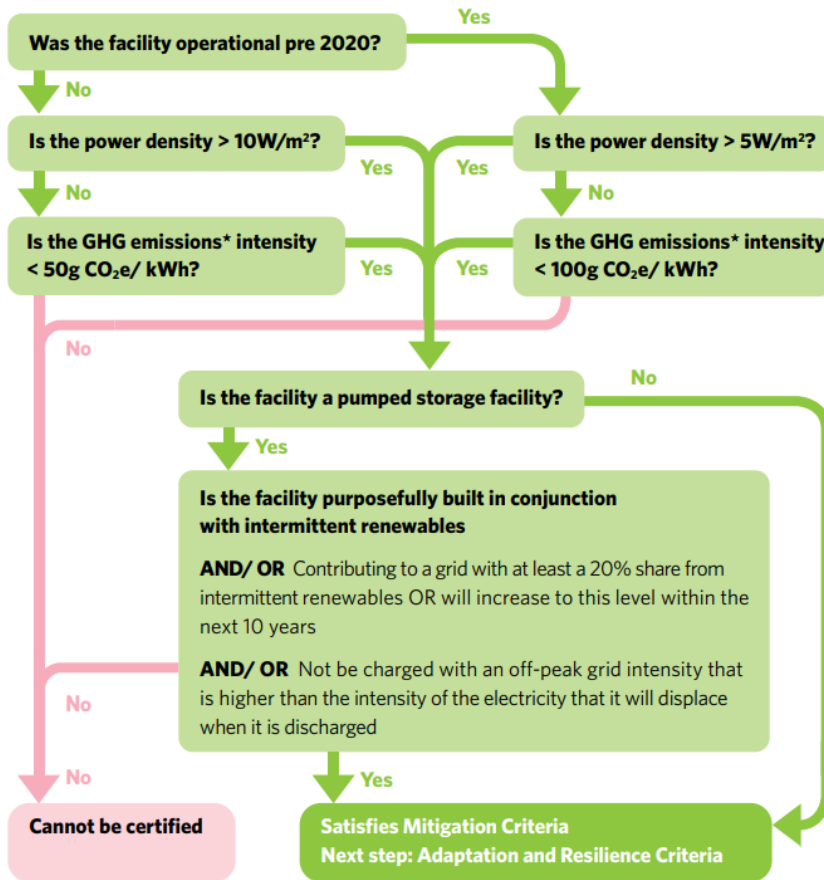
There are two distinct concepts in determining the scope of the application of these criteria:

1. The facility boundary: we take this here to mean the “unit of development” where the investment takes place: any dam, reservoirs, engineered structures, engineered changes to watercourses, equipment for the generation of electricity and transmission lines.
2. The facility footprint refers to the set of impacts which the facility may have, including within the facility boundary, upstream or downstream impacts.

<sup>3</sup> These guidelines have been issued in two volumes: Volume 1: Measurement Programmes and Data Analysis. These guidelines provide best practice that aims to assist the reader to measure, analyze data and model net GHG emissions from multipurpose reservoirs. Volume 2 – Modelling: Guidelines for Quantitative Analysis of Net GHG Emissions from Reservoirs. This defines procedures and best practices for the modelling of Greenhouse Gas (GHG) Emissions from Freshwater Reservoirs. From this framework, readers can undertake sufficient analysis and study to understand the process of GHG emissions from an existing or planned reservoir correspondent to long-term horizons. For further information see: <http://www.ieahydro.org/annex-xii-hydropower-and-the-environment>



Figure 1: Decision tree showing steps that determine whether a facility passes or fails the Mitigation Component of the Hydropower Criteria



### 3.3 Mitigation Criteria for supporting infrastructure

Very simply, the following infrastructure is automatically eligible for inclusion in a Certified Climate Bond *if the hydropower projects and assets to which is it dedicated meets the Criteria described in Sections 3.2 and 3.4:*

- Dedicated transmission lines linking the eligible hydropower facility with the main grid.

### 3.4 Climate Adaptation and Resilience Criteria

The requirements below apply to all hydropower facilities seeking inclusion in a Certified Climate Bond. All must be met for the facility to pass the Adaptation and Resilience Component of the Hydropower Criteria and be eligible for inclusion in a Certified Climate Bond.

- The facility seeking inclusion in a Certified Climate Bond must have undergone an assessment under the [ESG Gap Analysis Tool](#). This analysis must have been carried out by an [Accredited Assessor](#). This assessment will identify any significant gaps that the facility demonstrates against international good practice. If any significant gaps are identified, an Environmental and Social Action Plan (ESAP) must be established to address those gaps including details on how and when these gaps will be closed.

## Climate Bonds Initiative Hydropower Criteria

AND

- The Approved Verifier must verify that this assessment demonstrates:
  - No more than 10 significant gaps have been found in total across the assessment. *N.B. If some section(s) are not deemed applicable for a particular facility, and no assessment is made for that section(s) then this maximum gap threshold will be reduced proportionally accordingly;*
  - AND
  - No more than 2 significant gaps in each section assessed;
  - AND
  - None of those gaps would mean that the Mitigation Criteria above are not met (see Clarification Note 4) or relate to FPIC (see Clarification Note 5).

AND

- Where an ESAP has been necessary to address any significant gaps, the Approved Verifier must verify that the ESAP demonstrates:
  - The majority (i.e., > 50%) of significant gaps identified will be closed within 12 months;
  - AND
  - All remaining significant gaps will be closed within 24 months

AND

- The issuer commits to re-engage the Accredited Assessor to confirm that these gaps have indeed been closed within the timeframe(s) specified in the ESAP.

Of course, however credible the plans to close any identified gaps, there is always a risk that issuers may not be able to close them in the stated timeframes. If an issuer is unable to close any identified gaps within the stated timeframes, certification under the Climate Bonds Standard will be withdrawn.

### Clarification Note 4: The GHG assessment within the ESG Gap Analysis

As described in Section 3.2, for any facility to be included in a Certified Climate Bond, it must meet the Mitigation Component requirement of a power density threshold of greater than 5 or 10W/m<sup>2</sup>, or an emissions intensity threshold of less than 50 or 100g CO<sub>2</sub>e/kWh. There is no flexibility in this requirement. Therefore, if the ESG assessment identifies 10 significant gaps or fewer, but one of these gaps is that the facility does not meet the requirements of the Mitigation Component, then that facility cannot be included in a Certified Climate Bond. In essence, it is a 'deal-breaker' gap.

### Clarification Note 5: The FPIC assessment within the ESG Gap Analysis

The requirement for Free, Prior and Informed Consent is addressed within the ESG Gap Analysis Tool. There is no flexibility in this requirement. That is, if the ESG assessment identifies 10 significant gaps or fewer, but one of these gaps is that the FPIC has not been received, then that facility cannot be included in a Certified Climate Bond. In essence, it is a 'deal-breaker' gap.

### Clarification Note 6: Multiple facilities under one assessment

Where an issuer is seeking to include a number of facilities in a single Certified Climate Bond, it may be possible to assess these in a single assessment under the ESG Gap Analysis Tool. This is at the discretion of the Accredited Assessor. It is understood that in some circumstances (for example the close location of two facilities in a single watershed and ecosystem), this may be possible, but would need to be determined on a case-by-case basis by the Accredited Assessor.

### Clarification Note 7: Facilities already assessed under the HSAP

If a facility has already undergone assessment under the full Hydropower Sustainability Assessment Protocol ('HSAP'), then the results of that can be translated into the necessary scoring methodology given the closeness of the ESG Gap Analysis Tool and the HSAP. Therefore, there is no additional requirement for that facility to also undergo an assessment under the ESG Gap Analysis Tool.

## 4 Reporting requirements

In accordance with the Climate Bonds Standard, it is the issuer's responsibility to provide to the Approved Verifier the information necessary to demonstrate compliance with each component of the Criteria. Per the requirements outlined above, it is therefore necessary for the issuer to provide the Approved Verifier with:

- Either:
  - Evidence that the power density of the facility is  $> 5$  or  $10\text{W}/\text{m}^2$  (depending on the operational start date of the facility); OR
  - The validated results of the G-res assessment, with as much supporting information as is necessary for the verifier to confirm the emissions intensity is  $< 50$  or  $100\text{g CO}_2\text{e}/\text{kWh}$  (depending on the operational start date of the facility); OR
  - The results of the appropriate on-site assessment with as much supporting information as is necessary for the verifier to confirm the emissions intensity is  $< 50$  or  $100\text{g CO}_2\text{e}/\text{kWh}$  (depending on the operational start date of the facility).
- Any additional information required in the case of pumped storage as detailed in Section 3.3.
- The accredited assessors' report on the assessment carried out under the ESG Gap Analysis Tool, and the associated ESAP (if significant gaps were identified);
- Assurance that the Accredited Assessor will be re-engaged within the immediately following 24-month period to assess whether all significant gaps identified have indeed been closed;
- Information on whether FPIC has been received.

Furthermore, it is required that the issuer publicly disclose the Accredited Assessor's report on the assessment carried out under the ESG Gap Analysis Tool (and associated ESAP if required). Climate Bonds Initiative will provide links to these documents on the Certification page of its website. If not explicitly noted in those documents, the issuer should also separately publicly disclose the power density and/ or GHG emissions intensity of the facility, whichever has been used to comply with the mitigation component of these criteria.

It is also encouraged that disclosure be made of any identified impacts on protected areas such as Ramsar and UNESCO World Heritage sites not already covered by the requirements of the ESG Gap Analysis Tool.

In accordance with the overarching reporting requirements as laid out in the Climate Bonds Standard V3.0, issuers are required to provide this information once the proceeds have been allocated to specific hydropower projects and assets. In the majority of cases, this will be pre-issuance of the bond, particularly in the case of refinancing. However, where a portion of the proceeds is allocated to specific projects or assets post-issuance of the bond, or proceeds are reallocated to different hydropower projects and assets, then this information is required either at the post-issuance reporting stage or the next annual report, whichever is sooner.

## Appendix 1: Technical Working Group (TWG) and Industry Working Group (IWG)

### TWG Members & Observers

#### **TWG members:**

Alliance for Global Water Adaptation - John Matthews  
IEA Technology Collaboration Program on Hydropower – Niels Nielsen  
IHE Delft - Miroslav Marenc  
IIED - Jamie Skinner  
Independent Consultant and IHA accredited assessor - Joerg Hartmann  
International Hydropower Association – Eddie Rich and formerly Richard Taylor and Cameron Ironside  
IUCN - James Dalton  
(Former Commissioner) National Planning Commission, South Africa - Mike Muller  
Norwegian Ministry of Petroleum & Energy - Oivind Johansen  
RMT Renewables Consulting Ltd – Richard Taylor  
State Secretariat for Economic Affairs (SECO) – Daniel Menebhi  
TNC - Jorge Gastelmundi - David Harrison  
Water Power & Law Group PC - Richard Roos-Collins  
WWF - Jian-hua Meng

#### **TWG observers:**

Pravin Karki, Rickard Liden, Diego Rodriguez of World Bank Group – acting in a personal capacity

#### **CBI Technical Advisor:**

Independent Consultant - Helen Jackson

### IWG Members

Hydro Tasmania - Alex Beckitt  
Brookfield Renewable (Brazil) - A Fonseca dos Santos  
Amec Foster Wheeler - Murray Simpson  
Hindustan Electric Power Ltd - Awadh Gir  
Eletrobras - Pedro Luiz de Oliveira Jatoba  
EDF - Alexandre Marty, Jean Copreaux  
Mott McDonald - Bruno Trouille  
CECEP (China) - Chang He, Wenqin Lu  
EBRD - Christian Carraretto  
FMASE (Brazil) - Philip Hauser  
S&P Trucost - Derek Ip  
ERM - Duncan Russell, Sarah Fee  
M&G Investment - David Kemp  
Citi - Courtney Lawrence  
NAB - David Jenkins  
JP Morgan - Charles Gooderham  
DNV-GL - Mark Robinson  
PwC (Canada) - David Greenall  
EY (China) - Judy Li  
Zhongcai Green Finance - Yang Yeo  
EY (Aus) - Pip Best  
Emergent Ventures India - Atul Sanghal  
Kestrel Consulting - Monica Reid  
Lianhe - Jingyun Liu  
TUV Nord - Tahsin Choudhury