

Understanding the Hydropower Bond Criteria

What is a bond?

A bond is a debt instrument or type of loan or IOU that governments, companies and other entities issue to finance or refinance projects. The issuing entity guarantees to repay the bond over a certain time period, plus either a fixed or variable rate of return to the bond buyer. A bond is a financial instrument that allows the issuer to borrow funds with the promise to pay them back with interest by a certain date.

What is a Green Bond?

Green Bonds are a fast-growing type of debt instrument similar in financial structure to a 'vanilla' bond outlined above. They are an instrument for earmarking private financing to fund projects that deliver environmental benefits. Most Green Bonds are use of proceeds bonds, with the issuer committing to investors that all funds raised will go only to specified projects with positive environmental outcomes.

What is a Climate Bond?

Climate Bonds are a subset of Green Bonds. Proceeds must be invested in assets compatible with a low carbon future in which infrastructure or management projects are adaptable and resilient to current and future climate change. A Climate Bond is used by governments, companies, municipalities, and commercial and development banks to finance, (or refinance) projects that address climate change, such as wind farms, solar and hydropower plants, and rail transport and sea walls in cities threatened by rising sea levels.

What is the Climate Bonds Initiative (CBI)?

Climate Bonds Initiative (CBI) is an international investor-focused and not-for-profit organisation working solely to mobilize the \$100 trillion bond market for climate change solutions. We promote investment in projects and assets necessary for a rapid transition to a low carbon and climate resilient economy. The strategy is to develop a large and liquid Green and Climate Bonds market that will help drive down the cost of capital for climate projects in developed and emerging markets; to grow aggregation mechanisms for fragmented sectors; and to support governments seeking to tap debt capital markets. Our work falls into three workstreams: market intelligence, developing a trusted standard and providing policy models and advice.

Why is hydropower important in the context of climate change?

Hydropower has a prominent position in many of the world's major power grids. According to the World Energy Council, hydropower generated about 71% of the world's renewable electricity in 2016 (1,064GW), and its capacity is expected to double by 2050, as only 8% of hydroelectric potential has been tapped in Africa, and only 20% in Asia. In 2019, 15.9% of the world's electricity was generated from hydropower, making it one of the most significant technologies of the global energy market. Hydropower accounts for nearly half of Paris Agreement-participating countries' additional renewable capacity.

Further, upwards of 90% of energy storage globally is via pumped storage.

Sustainable hydropower projects can contribute to addressing climate adaptation needs as defined by the Paris Agreement, but stakeholders must be able to verify their credentials. The hydropower Climate Bond Criteria supports investors' decision-making process on which projects are eligible to help reduce emissions,

adapt to climate change, and secure climate resilience. The Criteria also includes metrics, methodologies, and tools to measure and monitor compliance.

Given its potential as a renewable resource and its already prominent place in the energy market, investment in Hydropower as a green alternative to fossil fuels is taking place in various areas of the world. In response, CBI has introduced the Hydropower Criteria to enable investors to support projects that truly support the objectives of the Paris Agreement and mitigate environmental and social risks upfront.

What is a hydropower Climate Bond?

This is shorthand for a Climate Bond where the proceeds are used for hydropower related assets and projects, and those assets and projects contribute to climate mitigation and adaptation goals.

As examples, hydropower Climate Bonds can be used for run-of-river facilities, impoundment facilities, pumped storage facilities and associated infrastructure for these facilities.

Like vanilla bonds, hydropower Climate Bonds can be issued by governments, municipalities, multinational banks or corporations.

Why do we need Criteria for hydropower projects and assets?

The Criteria take a bold new approach by defining rigorous standards for both the reduction of greenhouse gas (GHG) emissions and resilience to climate change. We build on existing protocols, tools and best practice for good environmental and social performance. There is presently no set standard for these bonds; some are not aligned with the objectives of the Paris Agreement, whereas others that may contribute to fighting climate change are not labelled 'green'. CBI aims to develop standards that allow investors to identify bonds aligned to the objectives of the Paris Agreement on climate change.

A number of bond issuers are using Green Bonds to finance or refinance hydropower projects and assets; however, not all of these Green Bonds have been well received in the market due to investor concerns over climate change-related risks.

CBI is providing a solution by introducing the new Climate Bond Criteria for hydropower. These Climate Bonds will be subject to robust and transparent screening criteria that will ensure that any hydropower (or other) projects or assets are in line with the goals of the Paris Agreement and adhere to good international and industry practices by aiming to reduce environmental and social impacts.

Climate Bonds offer investors and stakeholders a way to verify a project's environmental credentials and seek to define the gold standard for projects and assets that advance the goals of the Paris Agreement while reducing negative impacts on local environments and societies.

What kinds of projects and assets are eligible and under what conditions?

Climate Bonds can finance the construction, acquisition, and management of inland hydropower facilities and related infrastructure (e.g., transmission lines), as well as the production of components for these assets. Tidal power and other marine applications can also be financed via Climate Bonds, but CBI covers them under the [Marine Renewables Sector Criteria](#).

The process of producing energy from biodegradable municipal solid waste (MSW), including sewage sludge and food waste, is covered by the Water Infrastructure Criteria and the Waste Management Criteria, respectively, under the Climate Bonds Standard. However, wastes such as manure and wet wastes (farm and crop wastes) are in the scope of the Bioenergy Criteria.

Projects and assets that meet the Hydropower Criteria for Climate Bonds should have a low GHG footprint while enabling climate adaptation and resilience in line with the objectives of the Paris Agreement. Additionally, they will not cause significant negative impacts in respect of wider environmental or social issues.

As a general principle, bonds will meet the requirements of the Climate Bonds Standard if the projects/assets financed by the bonds promote low carbon infrastructure as well as adaptation and resilience to climate change in the systems in which they are located. To meet the requirements of the Hydropower Criteria, each hydropower project or asset must undergo a two-part assessment.

The Mitigation Criteria require hydropower facilities operational pre-2020 to have a GHG footprint of less than 100g CO₂e/ kWh or a power density of less than 5W/m², and facilities becoming operational in 2020 or later to have a GHG footprint of less than 50g CO₂e/ kWh or a power density of less than 10W/m². The GHG footprint can be demonstrated either via assessment using the G-res tool (developed by the International Hydropower Association and the UNESCO Chair for Global Environmental Change), or a site-specific assessment in line with the IEA Hydropower Framework.

It should be noted that the G-res tool and the site-specific assessments use identical scientific thresholds to determine low-GHG emissions. Multiple methods of determining GHG levels are offered as a way to ensure that projects/assets that would otherwise meet low-GHG standards or may be able to meet the standards after taking a few mitigating steps, are not unduly barred from approval for a Climate Bond.

Second, facilities seeking inclusion in a Climate Bond must meet strict standards for adaptation and resilience to climate change within their local systems. There is no predictive screen through which facilities can pass the “A&R” portion of the Climate Bond Criteria tests; each site must undergo an assessment, carried out by an accredited assessor, using the ESG Gap Analysis Tool. This tool will identify gaps between the facility’s practices and international best practices regarding environmental and social impacts. If gaps are identified, an Environmental and Social Action Plan must be established and implemented. CBI has set strict limits on the maximum number of gaps allowed and the time frames within which these gaps must be bridged. The Hydropower Criteria also require a re-assessment at the conclusion of each Action Plan to ensure that facilities have bridged the gaps and are in step with international best practices.

Projects and assets will not meet the Hydropower Criteria unless they pass both the Mitigation Criteria and A&R Criteria.

What is certification?

A Climate Bonds Certified hydropower bond is a bond which has been independently verified to see that the proceeds have been or will be spent on hydropower infrastructure assets and projects, in compliance with the terms of the Hydropower Criteria of the Climate Bonds Standard. The Climate Bonds Standard Board will have approved the Certification on that basis.

How is compliance verified?

For an issuer to have its bond qualify as a Certified Climate Bond, an approved third party must verify compliance with CBI’s Climate Bond Standard. Assessments must be carried out by accredited assessors who have expertise in the hydropower industry. The Climate Bond Standards Board is then responsible for approving the certification. For further information: <https://www.climatebonds.net/certification>.

How have these Criteria been developed and what is CBI’s role?

The Hydropower Criteria were drafted through a rigorous science-based process undertaken by a Technical Working Group (TWG) of global hydropower experts to determine the scope and nature of the Criteria through a consensus-based collaborative approach. An Industry Working Group (IWG) was also convened to advise on

the practicality of the Criteria being developed. A list of members of these groups is available at <https://www.climatebonds.net/hydropower>.

In 2016, the Climate Bonds Initiative launched a TWG to develop the 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. Members of the TWG include representatives of WWF, IHE Delft (formerly UNESCO), the Alliance for Global Water Adaptation, the National Planning Commission of South Africa, the Swiss State Secretariat for Economic Affairs (SECO), IUCN, TNC, the International Hydropower Association, the Norwegian Ministry of Petroleum & Energy, Water Power & Law Group PC, IIED, and the IEA Technology Collaboration Program on Hydropower as well as independent experts. A Hydropower IWG made up of potential bond issuers, investors, financial intermediaries and verifiers was also convened to provide input to the recommendations.

The TWG adhered to the Climate Bonds Science Framework, a robust, scientifically grounded analysis on emission mitigation pathways, technology options and impacts.

The Climate Bonds Science Framework is overseen by the CBI Board and implemented by the Climate Bonds Initiative Secretariat and a network of climate research institutions led by the Potsdam Institute for Climate Impact Research.

The Hydropower Criteria were approved by the Climate Bonds Standard Board. The Board provides independent oversight over the implementation and operation of the Climate Bonds Standard & Certification Scheme. The Board members comprise a range of asset owners' civil representatives and NGOs with approximately US\$34tn of assets under management.

How does the Criteria account for environmental and social responsibility?

The Climate Bonds Standard is focused on climate impacts: climate mitigation and climate adaptation and resilience. The working concept of climate resilience is not limited to the resilience of the hydropower facility itself to climate change but also encompasses the facility's impact on the resilience of affected populations and ecosystems. Defining climate adaptation and resilience can, therefore, be challenging. However, it is clear that many topics which have been a part of environmental and social (ES) assessments for a number of years overlap significantly with climate adaptation and resilience: for example, the potential impact of climate change on hydrological conditions, and consequently water supply and local livelihoods; or climate change exacerbating ecological problems such as impaired species migration and algae blooms. Environmental and social impacts such as these, already complex and interconnected, become more so when climate change impacts and risks are taken into account, and there is a logic to addressing all key ES factors, rather than trying to separate them out.

Therefore, the utilisation of the ESG Gap Analysis Tool, with its broad scope of factors assessed, enables a sufficiently broad interpretation of resilience, encompassing a range of environmental and social aspects interconnected with climate change, in addition to those directly identified in its Climate Mitigation and Resilience section. Generally speaking, the Climate Bonds Standard does not usually address primarily social impact issues, but in this case, it has been considered necessary to include them.

Therefore, the Adaptation & Resilience component of the Criteria addresses 12 different aspects of the environmental and social impacts of hydropower projects and assets. These are:

- Environmental and social assessment and management
- Labour and working conditions
- Water quality and sediments
- Community impacts and infrastructure safety
- Resettlement
- Biodiversity and invasive species
- Indigenous peoples

- Cultural heritage
- Governance and procurement
- Communication and consultation
- Hydrological resource
- Climate change mitigation and resilience

Any facility or project that does not adequately adhere to international good practice or fails to bridge practice gaps within the set time frames is disqualified from inclusion in Climate Bonds.

What is not covered by the Criteria?

The Hydropower Criteria do not cover other indirect emissions related to the construction of dams and resulting from activities elsewhere in the value chain, such as fuel and material extraction, manufacture or transport. This choice was made in the interest of keeping the assessment reasonably simple, and because even for large dams, embedded emissions due to construction tend to be low on an emissions intensity basis.

The Criteria also do not cover the economic viability of projects and assets. CBI acknowledges that the Criteria cannot deal with all aspects of hydropower, water management, energy and economic development. They can, however, work with other standards and ethical and policy choices to ensure the most sustainable outcome.

How were the G-Res and ESG tools developed?

The G-res tool is the result of a [joint research project](#) of the International Hydropower Association and UNESCO. If the assessment is carried out on-site, it must comply with the IEA Hydro Framework as described in the 'Guidelines for the Quantitative Analysis of Net GHG Emissions from Reservoirs'.

The HESG is based on the framework of the Hydropower Sustainability Assessment Protocol (HSAP). It addresses the ESG elements addressed under the HSAP, but not other, non-ESG elements addressed in the HSAP.

The HSAP was developed between 2007 and 2010 following a review of the World Commission on Dams' recommendations, the Equator Principles, the World Bank Safeguard Policies and IFC Performance Standards, and IHA's own previous sustainability tools. A multi-stakeholder forum jointly reviewed, enhanced and built consensus on what a sustainable project should look like.

This forum included representatives of environmental NGOs (WWF, The Nature Conservancy), social NGOs (Oxfam, Transparency International), development banks (World Bank), governments (China, Zambia, Iceland, Norway, Germany) and the hydropower sector.

A draft of the HSAP was released in 2009, which was trialed in 16 countries across six continents, resulting in the final version being published in 2010. The HSAP was updated in 2018 to include a topic on climate change resilience and mitigation.

The HESG was developed by the International Hydropower Association (IHA) between February 2017 and June 2018 under the mandate of the Hydropower Sustainability Assessment Council, with the support of the Swiss State Secretariat for Economic Affairs (SECO).

How are the G-Res and ESG tools governed?

The Hydropower Sustainability Tools are governed by a multi-stakeholder body, the [Hydropower Sustainability Assessment Council \(HSAC\)](#) and the [Hydropower Sustainability Governance Committee \(HSGC\)](#).

The HSAC is composed of seven chambers each representing a different segment of hydropower stakeholders. These are:

- Hydropower consultants, contractors or equipment suppliers
- Hydropower operators or developers
- Environment or conservation organisations
- Social impacts, project affected communities, and indigenous peoples' organisations
- Development, public or commercial banks, financial organisations, and private investors/ investment funds
- Emerging and developing economy country governments
- Advanced economy country governments

Each chamber elects a chair and alternate who represent the HSAC in promoting the use and integrity of the tools.

The HSGC is currently independently chaired by Dr Ashok Khosla, and composed of the following members:

- Jian-hua Meng, WWF
- James Dalton, IUCN
- Richard Taylor, RMT Renewables Consulting
- Jürgen Schuol, Voith
- Ruth Tiffer-Sotomayor, World Bank
- Elisa Jianliang Xiao, New Development Bank
- Daniel Menebhi, Swiss State Secretariat for Economic Affairs
- Geir Hermansen, Norwegian Agency for Development Cooperation
- Shi Guoqing, China Hohai University
- Sunil Poudel, Nepal Ministry of Energy
- Lesha Witmer, Women for Water Partnership
- Jiwari Abdullah, Sarawak Energy Berhad
- Roger Gill, Hydrofocus
- Pedro Sirgado, EDP Portugal

Among other responsibilities, the role of the HSGC is to approve the accreditation of assessors, to adjudicate on any breach of the Licence Agreement, and to decide on any rescindment of accreditation as well as to act as arbiter in cases of dispute concerning the outcome of an assessment.

The IHA Sustainability acts as management entity (ME) to the HSAC and is responsible for overseeing training and accreditation and coordinating governance activities.

What assurance is there on the robustness of the assessment?

Assessment under the ESG Gap Analysis tool must be carried out by an [accredited assessor](#) licensed by the International Hydropower Association. Accredited assessors are named individuals.

Accreditation of assessors is defined under clause 8 of the [Terms and Conditions for Use of the HSAP and HESG](#) and accredited assessors are required to:

- Have at least 6 years of relevant experience in the sector;
- Have appropriate auditing qualification or experience (e.g., certification on an IRCA-certified auditing course which includes sufficient content on ISO 19011, such as an EMS Lead Auditor course) and at least 40 hours of IRCA-certified training in EMS, health and safety or social auditing;
- Complete a 40-hour [training course](#) (authorised by the HSAC) and pass a final exam. *At this point they become a Provisionally Accredited Assessor;* and
- Complete practical training by participating in one official HSAP or HESG Assessment and receive positive appraisal by the Accredited Lead Assessor involved in the assessment. *At this point they become a Fully Accredited Assessor.*

Further, to become an accredited Lead Assessor, they are also required to:

- Within any 24-month period, participated in at least three assessments where they are responsible for at least six different HSAP topics, across at least two of the lifecycle stages of the HSAP; and
- Served as a trainee Accredited Lead Assessor on an Official Assessment under the guidance of an Accredited Lead Assessor; and
- Demonstrate proficiency in the key Lead Assessor areas of competence.

All Accredited Assessors abide by a Licence Agreement, that includes the following quality control clauses:

1. The Licensee will not unilaterally modify the relevant Hydropower Sustainability Tool, the Official Report template or the Accredited Assessor Training Manuals without prior written approval of the HSGC. Other HSGC-provided materials can be tailored to individual use, but such tailoring will be subject to good faith requirements.
2. The Licensee will perform the Services with all due skill, care and diligence including good industry practice and in compliance with the Code of Ethics. The Licensee acknowledges and agrees that the exercise of the rights granted to the Licensee under this Agreement is subject to all applicable laws, enactments, regulations and other similar instruments in whichever jurisdiction the Licensee is providing Services.
3. In respect of any Services where claims are made, the HSGC or the ME may at any reasonable time during the Agreement make written request to:
 - (a) Inspect evidence cited by the Licensee in support of conclusions drawn in an Official Assessment Report;
 - (b) Inspect the Terms of Reference, scoping document, interview schedule, list of interviewees, evidence register and site visit plan in relation to the Licensee's delivery of Services;
 - (c) Audit the Licensee's delivery of Services, to establish that the methodology used for the assessment and the conclusions drawn in the Official Assessment Report are objective, credible and replicable; or
 - (d) Receive any such information that the HSGC or ME reasonably feels it requires to make an appropriate assessment of the veracity of the report or claim.

The Licensee will not unreasonably refuse such requests and will provide reasonable assistance to the HSGC in making such inspection or audit. The Licensee will pay the cost incurred by the HSGC for the inspection and audit if a breach of contract that warrants termination of this Agreement is identified.

4. The Licensee will ensure that he/she will only employ, sub-contract or otherwise engage, in delivery of the Services, other Provisionally Accredited Assessors or Accredited Assessors, within noted restrictive requirements.
5. The Licensee will promptly provide to the ME copies of any Official Assessments undertaken by the Licensee for the purposes of quality control and for inclusion in the ME's databases. Unofficial Assessments may also be included in these databases
6. The Licensee will promptly provide to the ME details of any complaints he/she has received relating to the Hydropower Sustainability Tools or the Services together with reports on the manner in which such complaints are being, or have been, dealt with, and will comply with any reasonable directions given by HSGC in respect of such complaints.

Accredited assessors are provided with four reference manuals to develop their ability to use the Protocol in as consistent a manner as possible, so that assessments are objective, credible and replicable, and results can be compared. The focal areas of the manuals are shown in Figure 1. Manuals 2 and 3 provide guidance to assessors for planning and carrying out an assessment.

Training Manual 1 UNDERSTANDING HYDROPOWER	Training Manual 2 UNDERTAKING A PROTOCOL ASSESSMENT	Training Manual 3 WORKING WITH PROTOCOL CONTENT	Training Manual 4 A GUIDE FOR ASSESSMENT PARTICIPANTS
<ul style="list-style-type: none"> • Understanding hydropower • Key hydropower sustainability issues 	<ul style="list-style-type: none"> • The establishment phase • The assessment planning phase • The on-site assessment • Writing the assessment report • Closing the assessment process 	<ul style="list-style-type: none"> • Topics and criteria – Early Stage Assessment Tool • Topics and criteria – Preparation, Implementation and Operation Assessment Tools 	<ul style="list-style-type: none"> • The Protocol structure and methodology • The Protocol assessment process • Advice and checklists for assessment key parties

Figure 1 – Documents and Content of the Protocol Reference manuals

In addition, assessors are provided with:

- ‘[Good Practice Guidelines](#)’: this expands on what is expected by statements on HESG and HSAP scoring criteria and provides detailed explanations of the requirements of that statement in order to achieve good practice, including definitions of terms and relevant examples.
- ‘Hydropower Sustainability Assessment Guidance’ embedded in the [HSAP](#): this includes definitions, examples of evidence and potential interviews.
- [Specific assessment guidance within each topic](#) – currently available for four of the elements tested within the ESG tool.

These documents describe what the assessor will be looking for in the assessment.

The draft final report is published online with a 60 day period for comments.

What are the reporting requirements for certification?

The [Climate Bonds Standard](#) includes reporting requirements both pre- and post-issuance of Climate Bonds.

In the case of hydropower related use of proceeds, issuers of Certified Climate Bonds must publicly disclose the accredited assessor’s report on the assessment carried out under the ESG Gap Analysis Tool, and the associated ESAP (if significant gaps were identified). CBI provides a link to these documents on our website.

CBI also encourages applicants to address the concerns of local communities by undertaking the adaptation and resilience assessment with the [free, prior and informed participation \(FPIC\) of indigenous peoples](#), and disclose any identified impacts on protected areas such as Ramsar and UNESCO World Heritage sites not already covered by the ESG Tool.

Is there any risk that the Criteria are too strict and discourage certification?

It might be difficult for some developers to meet the Criteria. However, the Criteria must be strong enough to ensure the project or asset contributes to the achievement of the [Paris Agreement](#) climate objectives. In developing the Hydropower Criteria, CBI has considered the need for a balance between rigour and practicality. We have built on existing protocols and made the process streamlined and fair to ensure certification is feasible.

Hydropower is a long-term investment, so today's Criteria may be superseded by technology or new scientific findings. Have you taken this into consideration?

The Hydropower Criteria will be reviewed no more than three years after launch, earlier if needed, at which point the TWG will take stock of issues that arise and developments in improved methodologies and data that can increase the climate integrity. As a result, the Criteria are likely to be refined as more information becomes available. However, certification will not be withdrawn retroactively from bonds certified under earlier versions.

Given current climate science, shouldn't all bonds comply with climate standards?

We want to identify bonds that contribute to the achievement of the Paris Agreement, in all relevant sectors. Sector Criteria already developed by CBI include solar energy, wind energy, marine renewable energy, geothermal power, production of biofuels, buildings, land transport, shipping, water infrastructure, waste management, forestry and agriculture. In addition to hydropower, sector criteria currently under development include electricity grids and storage and a number of industrial sectors. We will shortly develop criteria for heavy industry and other key sectors that need to transition to a low carbon economy. We specifically exclude fossil fuels and nuclear energy.

Disclaimer: "The Climate Bonds Standard Board operates legally as an advisory committee of the Climate Bonds Initiative Board and oversees the development of the Climate Bonds Standard. Neither the Climate Bonds Standard Board nor any organisation, individual or other person forming part of, or representing, the Climate Bonds Standard Board (together, "CBSB") accepts or owes any duty, liability or responsibility of any kind whatsoever to any issuer which wishes to apply for any of its bonds to be certified under the Climate Bonds Certification Scheme ("Scheme"), or to any issuer whose bonds may at any time be certified under the Scheme or to any other person or body whatsoever, whether with respect to the award or withdrawal of any certification under the Scheme or otherwise. All advice or recommendations with respect to any certification under the Scheme or otherwise that CBSB provides to the Climate Bonds Initiative Board is provided to it in an advisory capacity only and is not to be treated as provided or offered to any other person."