

Partners:



# CREATING CLIMATE RESILIENCE GUIDELINES FOR THE HYDROPOWER SECTOR

## Rationale

Extreme weather events and changes in hydrological patterns can be expected in a world altered by climate change.

Hydropower systems are characterised by their longevity and are traditionally designed on the basis of historical hydrological data.

Planning hydropower systems from a long-term, climate-resilient perspective will ensure that future generations inherit infrastructure that will not be compromised by climate change.

## Background

In 2013, the International Development Association at its IDA17 Replenishment Meeting called for screening all new operations for short- and long-term climate change and disaster risks, and where risks exist, to integrate appropriate resilience measures.

The World Bank Group (WBG) thereafter published the Decision Tree Framework in 2015 to outline a pragmatic process for robust risk assessment and decision making of water resource projects under vulnerabilities to climate and other uncertainties.

The International Hydropower Association (IHA) also carried out a survey of members in 2015 to receive insights on climate-related risks and actions. The respondent hydropower organisations agreed that climate change would impact their

operations and pointed out that guidance to become more resilient would be useful.

Joining forces, the World Bank and IHA organised a workshop at the end of 2015 to engage with other international financial institutions (IFIs) such as the European Bank for Reconstruction and Development (EBRD) and hydropower organisations that were incorporating resilience assessments in their proposals and projects.

## The project

With increasing awareness of the need to develop guidance to build hydropower infrastructure which can cope with the risks of variable climatic conditions, the World Bank took the initiative to develop a set of guidelines relevant to the hydropower sector on industry good practice in building climate resilience into new and existing projects.

The beta version of the Hydropower Sector Climate Resilience Guidelines was released in September 2017 after multiple consultations and engagement with key stakeholders ranging from IFIs, major hydropower developers, owners and operators, intergovernmental and not-for-profit organisations, to international consultancies and independent experts.

The guidelines will assist hydropower companies to consider climate-related risks in project design and operations and address the needs of the wider financial community, policy-makers and local communities.

Climate resilience is the capacity of a hydropower project or system to absorb the stresses imposed by climate change, and in the process to evolve into greater robustness.

**Climate Resilience Secretariat**  
c/o International Hydropower Association

Chancery House, St Nicholas Way,  
Sutton, London  
SM1 1JB, United Kingdom

**T:** +44 20 8652 5290

**F:** +44 20 8643 5600

**E:** [iha@hydropower.org](mailto:iha@hydropower.org)

[hydropower.org](http://hydropower.org)

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## 1 STAKEHOLDER ENGAGEMENT

**Developers and owners**  
 China Three Gorges (China)  
 EDF (France)  
 Engie (Brazil)  
 Hydro Quebec (Canada)  
 Hydro Tasmania (Australia)  
 Joule Africa (Sierra Leone)  
 Landsvirkjun (Iceland)  
 Manitoba Hydro (Canada)

**International financing institutions**  
 African Development Bank  
 Asian Development Bank  
 Asian Infrastructure Investment Bank  
**European Bank for Reconstruction & Development**  
 European Investment Bank  
 FMO N.V.  
 Inter-American Development Bank  
 Inter-American Investment Corporation  
 International Financing Corporation  
**World Bank Group**

**Consultancies**  
 King & Spalding    Artelia  
 Lahmeyer            DAI  
 Mott MacDonald    Fichtner  
 Ouranos             H2GO  
                              Pöyry             Hatch  
 RAND Corporation   HDR  
                              Stantec          ICF Int.

**International and development organisations**  
 Alliance for Global Water Adaptation  
 Climate Bonds Initiative  
 French Agency for Development  
 International Commission on Large Dams  
**International Hydropower Association**  
 NORAD  
 The Nature Conservancy  
 UN Economic Commission for Africa

**Academic institutions**  
 Carnegie Mellon University (USA)  
 Institute of Engineering (Nepal)  
 University of Cambridge (UK)  
 University of Cincinnati (USA)  
 University of Manchester (UK)  
 University of Massachusetts (USA)

## 2 PROJECT PHASES



**SECTOR ASSESSMENT**  
 Sector survey to identify stakeholders preparedness and main issues



**PROJECT CONCEPTION**  
 Face-to-face meetings to refine needs and programme of work



**PREPARATION OF BETA VERSION**  
 Selection of consultant, with regular status meetings



**STAKEHOLDER ENGAGEMENT**  
 Outreach, consultation and feedback from operators & developers



**RELEASE OF BETA VERSION**  
 First viable version prepared by a consultancy



**TESTING CAMPAIGN (2018)**  
 Apply guidelines and receive feedback from operators around the world

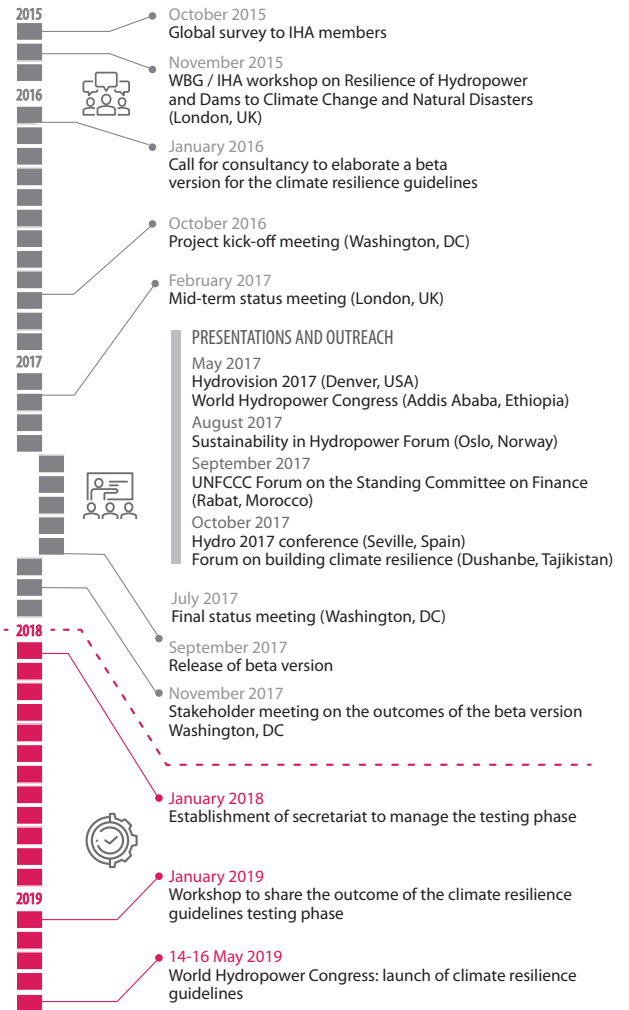


**REFINEMENT**  
 Analyse feedback and update the guidelines as required.



**GUIDELINES LAUNCH**  
 Launch of tested guidelines at the 2019 World Hydropower Congress in Paris

## 3 ACTIVITIES TO DATE



## Next steps

The aim of the Hydropower Sector Climate Resilience Guidelines is to provide practical and workable international good practice guidance for project owners, governments, financial institutions and private developers. The guidelines will incorporate climate change resilience and hydrological risk management into hydropower project appraisal, design, construction and operation, resulting in more robust and resilient projects.

Following the workshop in November 2017, the stakeholders agreed to test the guidelines on pilot projects during 2018. The objective is to apply the guidelines to real projects worldwide to gather useful feedback and ensure their applicability and viability.

The World Bank and EBRD are supporting IHA as the Secretariat for the coordination of the testing and the updated version of the Hydropower Sector Climate Resilience Guidelines that must reflect the results from the feedback and recommendations of the testing phase. The finalised version will be launched at the World Hydropower Congress, the leading hydropower sector event, in Paris in May 2019.

Hydropower is susceptible to the expected impacts of climate change due to its dependency on precipitation and runoff, and its exposure and vulnerability to natural disasters. Hydropower adaptability and resilience to climate change will be key to enable the development of greenfield projects and the evaluation of existing

plants. Achieving a major consensus around climate resilience guidelines would be valuable for the hydropower sector worldwide.

If you want to be engaged with the Hydropower Sector Climate Resilience Guidelines, please contact María Ubierna ([mu@hydropower.org](mailto:mu@hydropower.org)), secretariat project manager.

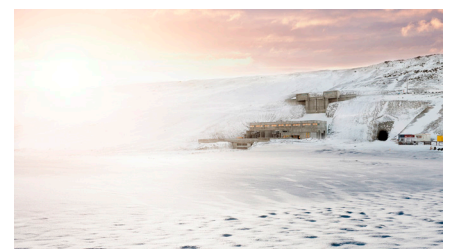


Photo: Búðarháls Power Station, Iceland, Courtesy of Voith Hydro