Hydropower for the green economy: a new approach to capacity building and sustainable resource development

International Hydropower Association

Type of tool: assessment tool
Issue: watersheds, industry
Location: worldwide

Challenges

In many countries there is considerable potential for hydropower to contribute to the emergence of a green economy, as it offers much-needed low-carbon electricity for development. However there remain significant challenges to ensure that hydropower can deliver sustainable developmental benefits locally, regionally, and globally, and meet the expectations of all stakeholders.

A key challenge is the institutional capacity to effectively integrate sustainability into the design, construction and management of hydropower projects, and, prior to the design of a project, to assess alternative options. Sustainability in hydropower is complex, involving a broad range of economic, social and environmental aspects, and often requiring trade-offs between these aspects. Reaching consensus continues to be a challenge – between government and non-governmental stakeholders, nationally and internationally – at all stages of the development of a project. In turn this lessens the willingness of financial institutions to provide essential finance and expertise, thereby reducing prospects for the green economy. The Hydropower Sustainability Assessment Protocol is a response to these challenges.

Objectives

This case study presents the Hydropower Sustainability Assessment Protocol 2010 ('the Protocol')[1], a globally applicable framework for assessing the sustainability of hydropower projects. The Protocol enables project operators to assess the sustainability of projects according to a range of sustainability topics and to get an overview of where current operations meet basic good practice and proven best practice, as well as scope for improvement. It will show that sustainable hydropower plays a significant and growing role in the green economy and that the last decade has provided the sector with insight on lessons learned from previous tools and applications. Moreover, the Protocol has benefitted from significant multi-stakeholder engagement during its Protocol, and these stakeholders continue as members of the committee governing the Protocol.

[1] http://hydrosustainability.org/

In the green economy, hydropower plays a key role in both climate change mitigation (in its function as a low carbon electricity source, as well as an enabler for other renewable energy source) and climate adaptation (for example, reservoirs play a key role in water resources management infrastructure, and often include hydropower, often the primary or only source of funding for the development of this infrastructure).

Drivers of change

The Protocol was developed by the Hydropower Sustainability Assessment Forum, a wide-ranging multi-stakeholder forum convened by the International Hydropower Association, over a period of three years from 2008 to 2010. The range of stakeholders involves was extensive, with government and non-governmental stakeholders, developed and developing country stakeholders, and industry and financial organisations each involved, and convening their own reference groups to discuss and agree on key issues.

The approach: the Hydropower Sustainability Assessment Protocol

a. Protocol principles and structure

The Protocol assesses the four main stages of hydropower development: Early Stage, Preparation, Implementation and Operation. Assessments rely on objective evidence to create a sustainability profile against some 20 topics (Table 1) depending on the relevant stage, and covering all aspects of sustainability.

Table 1. Protocol topics that are typically addressed during an assessment: Sustainable development requires people to look for synergies and trade-offs amongst economic, social and environmental values. This balance should be achieved and ensured in a transparent and accountable manner, taking advantage of expanding knowledge, multiple perspectives, and new ideas and technologies

Cross-cutting	Environmental	Social	Technical	Economic / Financial
Climate Change	Downstream Flow Regimes	Resettlement	Siting and Design	Financial Viability
Human Rights	Erosion and Sedimentation	Indigenous Peoples	Hydrological Resource	Economic Viability
Gender	Water Quality	Public Health	Infrastructure Safety	Project Benefits
Livelihoods	Biodiversity and Invasive Species	Cultural Heritage	Asset Reliability and Efficiency	Procurement

It is important to emphasise that a Protocol assessment will provide a sustainability profile (Figure 1) of a particular hydropower project/facility at a specific stage of its development, but not a 'pass' or 'fail' result. There is a common view across a diversity of sectors (e.g. governments, NGOs, civil society, industry, banks) on the important sustainability considerations that need to be taken into account to form a view on hydropower project sustainability. The Protocol itself however makes no specification on requirements for acceptable performance. Instead, it aims to provide an analysis of the various sustainability topics being assessed. As is presented in Figure 1, scores are allocated in a range from 1-5, with a 3 score 'basic good practice' and a 5 'proven best practice'. Thus, the scoring system highlights areas for improvement and provides an incentive for continuous improvement of the operations.

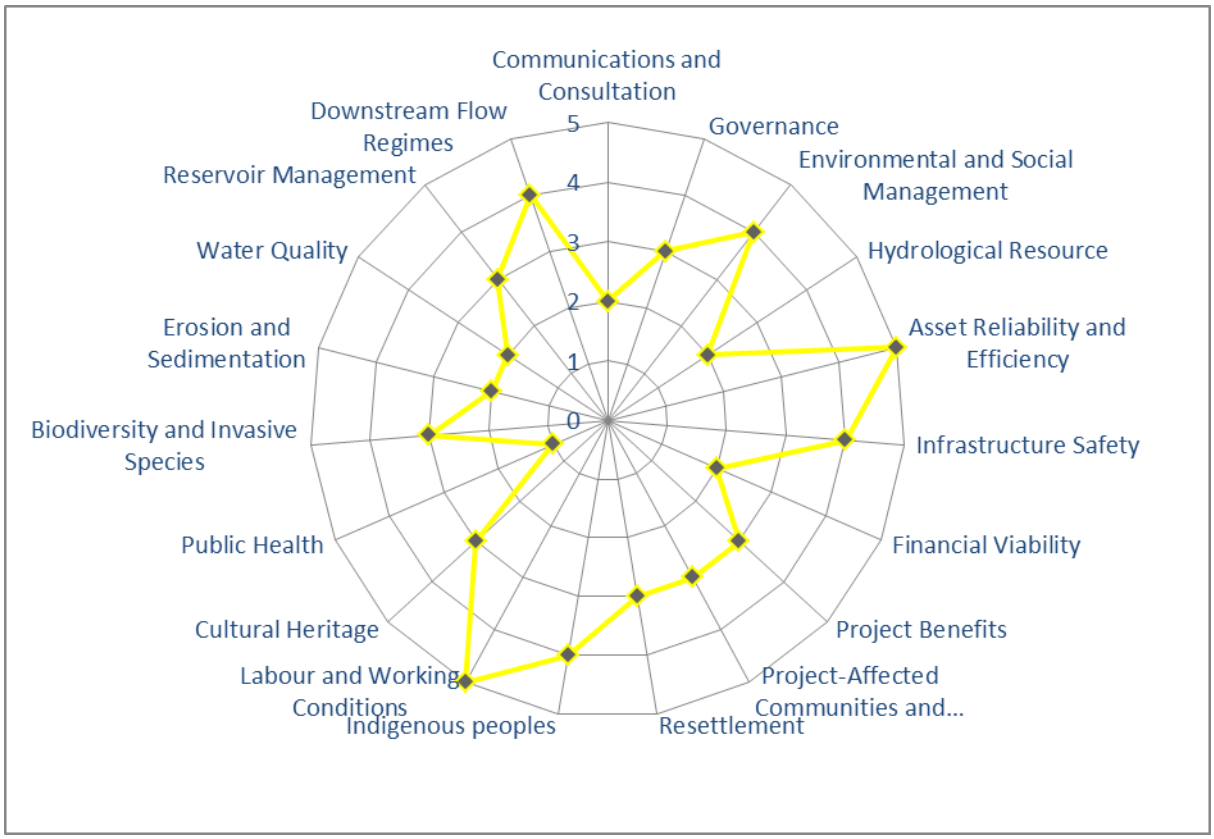

Figure 1. Sustainability Profile: For each sustainability topic, performance is scored from 1 to 5, with 5 being proven best-practice, and presented in an easy-to-read profile

b. Protocol development

The Protocol is the result of intensive work from 2008 to 2010 by the Hydropower Sustainability Assessment Forum, a multi-stakeholder body with representatives from social and environmental NGOs (Oxfam, The Nature Conservancy, Transparency International, WWF); governments (China, Germany, Iceland, Norway, Zambia); commercial and development banks (Equator Principles Financial Institutions, The World Bank); and the hydropower sector, represented by IHA[2]. Further to the variety of stakeholders within the Forum, the development and review process of the Protocol was substantial, with four drafts developed over a period of two and a half years, 20 field trials in 16 countries across 6 continents, and overall stakeholder engagement

[2] http://hydrosustainability.org/Hydropower-Sustainablility-Assessment-Protocol/Phase-1--Protocol-development-%282007-2010%29/About-the-Forum.aspx

with 1,933 individuals in 28 countries (Figure 2). Several of these trial reports are available on the internet[3].

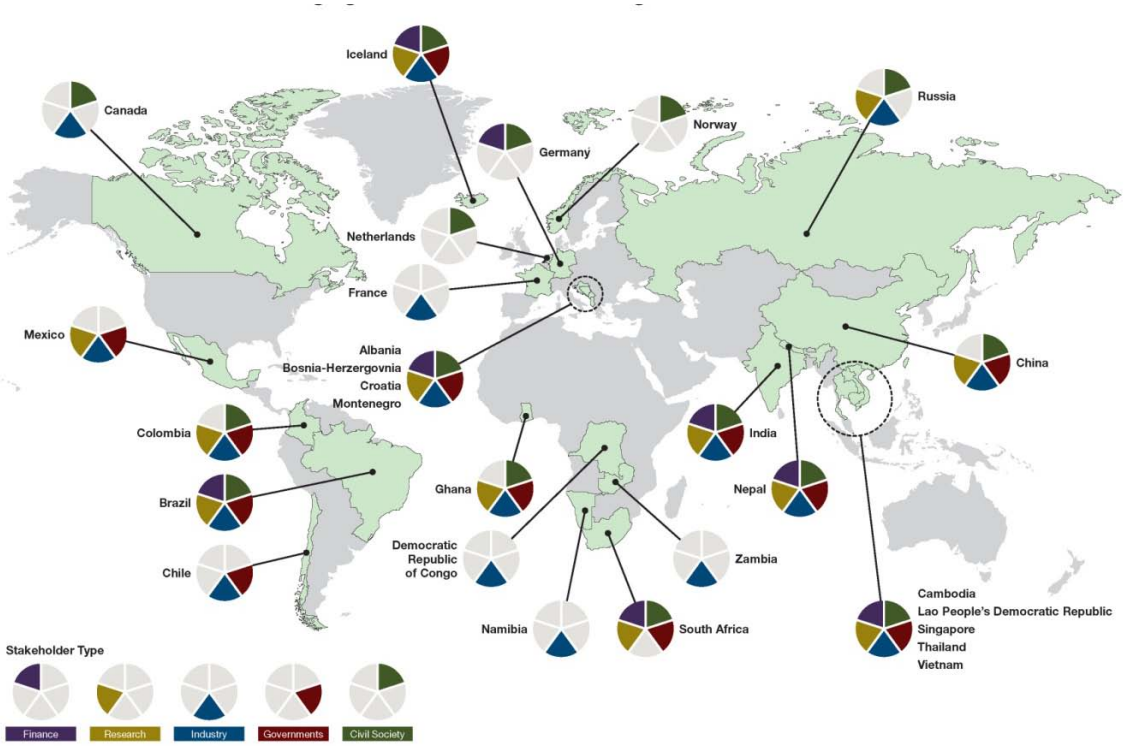

Figure 2. Extent of HSAF Engagement Activities during Consultation Phases

The Hydropower Sustainability Assessment Forum completed its work in November 2010. Between November 2010 and June 2011, an interim governance committee developed both the Terms and conditions for use of the Protocol[4] and a Charter for the Hydropower Sustainability Assessment Council[5]. The latter document outlines the permanent multi-stakeholder governance framework for the Protocol. This Council comprises several chambers representing environment or conservation organisations, social impacts and indigenous peoples' organisations, and project affected communities, development, public or commercial banks, financial organisations, and private investors/ investment funds, emerging and developing economy country governments,

[3] Hydropower Sustainability Assessment Protocol 2011, http://www.hydrosustainability.org/
[4] http://hydrosustainability.org/Hydropower-Sustainablility-Assessment-Protocol/Phase-2--Protocol-implementation-%282007-2010%29/T-C.aspx
[5] http://hydrosustainability.org/Hydropower-Sustainablility-Assessment-Protocol/Phase-2--Protocol-implementation-%282007-2010%29/Interim-Governance-Committee.aspx

advanced economy country governments, hydropower consultants, contractors or equipment suppliers, and hydropower operators or developers.

These chambers will elect representatives to a governance committee tasked, among other things, with ensuring that assessments constitute appropriate applications of the Protocol and with considering and approving formal training material for use with the Protocol. Dr Joerg Hartmann, Water Security Leader, WWF International, is the first chair of the Protocol Council's Governance Committee.

In addition to the governance committee, a management entity exists to manage the day-to-day operations relating to the Protocol, including ensuring compliance with the terms and conditions for use. The management entity currently resides within the International Hydropower Association's Central Office in London.

c. Protocol application

The core strength of the Protocol is that it provides decision-makers, both internal and external, to a project in development or a facility in operation, with a powerful tool to guide informed decision-making. An assessment using the Protocol provides a clear snapshot of a project's strengths and weaknesses, based on a rigorous analysis of a wide variety of verbal, visual and documentary evidence. It also allows the decision-maker in question to overlay their own regulatory or financing requirements over the results.

i. Sustainability Partners

In initial discussions with potential Protocol stakeholders, it became clear that a 'package' of Protocol activity would be most beneficial to potential participants so that they could clearly see the process of continued improvement which occurs from multiple Protocol applications. Accordingly, a package was developed whereby project participants would work with IHA as Sustainability Partners and receive the following:

- Pre-assessment visit and training

This is a workshop for participant organisations and nominated external representatives (e.g. from NGOs or relevant regulators) to ensure that participating staff are sufficiently prepared for the Protocol assessments, and that the unofficial Protocol assessment can be conducted in accordance with guidelines for official assessment. The intent of including external representatives is to both communicate information on the project to a wider range of stakeholders, and to demonstrate the participating organisations' sustainability commitment to organisations such as external stakeholders, agencies or regulators and assist in the building of

on-going relationships. It is also intended to embed Protocol systems into participating organisations.

- Unofficial Protocol assessment

This is, in essence, a 'training run' Protocol assessment on a specific hydropower facility. Engagement around this assessment will enable staff of the participating organisation not only to conduct further internal Protocol assessments, but also to prepare for official assessments, understand project sustainability weaknesses and strengths and address them, and to promote the incorporation of sustainability criteria into management and reporting systems. This assessment provides a valuable opportunity to implement the learning developed through the in-country training and capacity building phase of the partnership.

- Official Protocol assessment

Subsequent to the unofficial assessment, an official Protocol assessment of the project will be conducted. An official Protocol assessment is defined in the Protocol Terms and Conditions[6] and must meet key conditions. These include that the assessment is carried out by an accredited assessor and with the written support of the project developer or owner. At the partner organisation's discretion, this assessment can include the participation of regulators to demonstrate broader regulatory compliance. This engagement is intended to increase knowledge and capacity around the Protocol and hydropower sustainability more generally. Publicising the results of this assessment is encouraged as it can serve as a powerful indicator of commitment to sustainability, and will promote more informed dialogue and decision-making.

ii. *Life+*

In 2010, the European Parliament approved substantial funds to enable application of the Protocol. This project is called Hydro4LIFE[7] and comprises a €1.2 million investment over three years (2010-2013), 50% co-funded by the European Commission's Life+ Environment Policy and Governance programme, and 50% by IHA, focusing on implementing the Protocol within the European Union. Sustainability Partners operating within the European Union will participate in Hydro4LIFE.

d. Development of a database based on past assessments on basic good and proven best practices

[6] http://hydrosustainability.org/Hydropower-Sustainablility-Assessment-Protocol/Phase-2--Protocol-implementation-%282007-2010%29/T-C.aspx
[7] http://hydrosustainability.org/Hydro4Life.aspx

In order to share experiences and knowledge of good and best practices, an assessment database is being developed. This database will be available online and capture the results of all official Protocol assessments. The intent of the database is to present the results of Protocol assessments and provide information to allow the Protocol and its implementation to be improved over time. This database will also enable operators to learn from lessons at other projects and to liaise with the operators on potential impact mitigation and benefit maximisation opportunities.

Further to the database, which will be an on-going tool for practice sharing, past findings on sustainable hydropower are presented online[8] as a guidance and learning tool for operators, researchers, practitioners, policy makers and regulators.

Evaluation: economic, social and environmental benefits

a. The protocol from a sustainability perspective

The sustainability principles upon which the Protocol is founded include the critical concept of considering synergies and trade-offs between economic, social and environmental values. The balance between these trade-offs should be achieved and ensured in a transparent and accountable manner, taking advantage of expanding knowledge, multiple perspectives, and innovation. The approach of the Protocol can be considered a 'hard sustainability' approach as it calls for key natural and social assets, such as biodiversity or cultural heritage to be addressed, and not considered convertible to physical or financial capital vis-à-vis 'soft sustainability'. Other core sustainability principles include social responsibility, transparency and accountability. It is also notable that the Protocol takes an integrative approach, prompting consideration of aspects of hydropower that cannot be easily categorised as one of economic, social or environmental.

It is critical to assess the sustainability of hydropower, because if it is developed and managed in a sustainable manner, it can provide national, regional, and local benefits, and has the potential to play an important role in enabling communities to meet sustainable development objectives.

The Protocol allows consideration of hydropower under the traditional sustainability perspectives. With regard to environmental considerations, the Protocol promotes improved performance in environmental and social assessment and management, hydrological and sedimentation management, and water quality and biodiversity for example. Social and poverty alleviation impacts are addressed through improved performance in a wide range of social issues, e.g. project-affected communities, resettlement, indigenous people, working conditions and cultural heritage. From an economic point of view, the Protocol promotes improved performance

[8] Sustainable Hydropower Website, http://www.sustainablehydropower.org/

in financial and economic viability of hydropower projects, as well as sharing of project benefits. By providing a common platform for dialogue on sustainable hydropower, the Protocol promotes the contribution that sustainably developed hydropower will make to economic development.

All countries and organisations adopting and supporting this Protocol respect the need for institutions to have their own policies and positions on acceptable performance for a hydropower project. All organisations expressing support for the Protocol recognise that a Protocol assessment can make a substantial contribution towards understanding and achieving sustainable projects. In producing a sustainability profile, the Protocol can help inform decision-making on projects, which can be done by individual institutions and organisations or even country governments.

b. The protocol for capacity building

There are three aspects related to the use of the Protocol and capacity building.

Firstly, any Protocol assessment is accompanied by training on sustainable hydropower, which is provided to industry partners, local NGOs as well as relevant regulators. This is being done under the Sustainability Partnership model, which has been developed as part of Protocol implementation. The training builds capacity of the participants and thus enables them to apply the Protocol to other projects and also enables the operator as well as local regulators and civil society to understand requirements a sustainable hydropower project would be required to meet. Sustainability considerations can thus be incorporated in a broad range of stakeholder activities.

Secondly, it is an integral part of the requirement for an official protocol assessment that the assessor is officially accredited to carry out Protocol assessments. The Protocol governance committee is currently developing a system to qualify and accredit assessors. There will be an incentive for existing assessors with relevant experience to receive training to become accredited to carry out Protocol assessments on a variety of sustainability considerations.

Thirdly, since the Protocol is freely available and written in accessible language, it has the added value that it can be used to provide general guidance. For example it may be used in training, in internal objective-setting, or to provide inspiration for hydropower sectoral guidelines for environmental impact assessment. Thus the Protocol provides guidance to operators and regulators beyond the immediate projects that are assessed.

c. Context of hydropower in the green economy

If well managed, hydropower provides many solutions for energy and water management in a green economy. With regard to climate change mitigation, hydropower as a clean, renewable energy source contributes directly to global low carbon energy goals, and therefore to climate

change mitigation. Hydropower's capacity to enable the further development and use of other renewable energy sources, such as wind and solar, means that it has a vital further mitigation role to play.

Climate adaptation, on the other hand, is now increasingly considered on a par with climate change mitigation as critical to the success of international efforts to deal with climate change. It is often acknowledged that extreme weather events will become more frequent. World economies will be increasingly vulnerable to the devastating consequences of droughts and floods if their development agendas exclude investment in water management.

Hydropower offers a number of benefits by enabling current and future adaptation to the effects of climate change. A reservoir, as part of hydropower infrastructure, has the advantage of offering multiple services. As well as offering clean, renewable energy, a hydropower reservoir can enhance water security and management, providing flood mitigation, storage for irrigation and other purposes, and the stabilisation of downstream flow regimes. Other facilities a hydropower reservoir offers include tourism and recreational facilities, habitats for biodiversity, and increases in income generation options for example through fisheries.

Lessons learnt from implementation

The single most important lesson from the development of the Protocol is that consensus on sometimes controversial sustainability challenges *can* be achieved, with some persistence and a willingness to engage on the part of all. The diversity and breadth of stakeholders – some with highly divergent views and previously entrenched positions – agreeing to the detailed content of the Protocol documents (and the terms and conditions for its use, and governance mechanisms) is unprecedented. Only one area of non-consensus remains, in the issue of consent of project-affected communities, displaced people, and indigenous peoples.

Since agreement on the Protocol document was reached in late 2010, one Protocol assessment has been carried out, offering useful lessons for protocol implementation. The assessment of the Shardara multi-purpose project in Kazakhstan (in support of the GTZ programme *Transboundary Water Management in Central Asia*) Programme provided important experience in the practicalities of Protocol assessment, confirming the need for clearly-defined roles during Protocol assessment, detailed preparation which is critical to evidence-gathering, and the importance of carefully scheduling consultations with local communities. These lessons have been used in the compilation of a series of training and reference manuals which guide the lead assessor, assessment team and project developer/operators (and others) during a Protocol assessment. These lessons and manuals will be drawn upon in up-coming Protocol assessments scheduled in the near future in Australia, Southeast Asia, Europe and Latin America.

Global application and relevance for developing and transition countries

The Protocol as a globally-applicable framework; indeed it was actively designed to be globally-applicable, and applicable to all types and sizes of project. The application of the Protocol is particularly important in developing countries in Asia and Africa, where there is significant un-tapped hydropower potential and yet there are highly significant sustainability risks and weaker institutional capacity to manage and deliver sustainable outcomes. IHA is looking for Sustainability Partners to implement the Protocol in developing countries and elsewhere. Sustainability Partners are organisations that are keen to take a take on the challenge of continuously improving hydropower sustainability performance. Sustainability Partners receive training and capacity building on the Protocol, an unofficial assessment of a chosen project/facility and finally an official assessment of the same project.

Conclusion

Sustainable water resources development will be crucial for implementation of the green economy in all countries. Hydropower development or review of existing practices will be an important consideration in many countries. The Hydropower Sustainable Development Protocol provides a means to build capacity, learn from past lessons and implement future hydropower with a consideration of local communities, maximising benefits from multi-purpose development as well as the broader sustainability topic.