SUSTAINABLE HYDROPOWER -- GUIDELINES, COMPLIANCE STANDARDS AND CERTIFICATION

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Abstract: Sustainably developed and managed hydropower has enormous potential to contribute to global sustainablility goals. The industry is focussing its efforts on ensuring that the benefits of new developments are maximised and that negative environmental, social and economic impacts are avoided, mitigated or compensated.

To achieve this, the International Hydropower Association has developed Sustainability Guidelines and an associated Compliance Protocol. This provides a clear framework for good practice. A certification process is also under consideration.

With a well developed framework for compliance and certification in place, the hydropower industry can ensure new projects meet agreed sustainability standards.

Keywords: Sustainability, guidelines, compliance, protocol, standards, certification.

1 Introduction

The International Hydropower Association has been developing sustainability standards for the hydropower industry. This paper outlines three phases of that process: the IHA *Sustainability Guidelines*, a draft *Compliance Protocol,* and a proposed certification scheme.

2 Background

The past few decades have seen significant attacks on the social and environmental costs of the hydropower industry. Most countries with hydropower would have experienced recent controversy over the development and operation of hydropower schemes. Campaigns by organisations such as the International Rivers Network and WWF International have painted the industry in a negative light.

> Social issues, particularly related to resettlement and compensation, and a range of environmental issues associated with changes brought about by the creation of large reservoirs have been the focus of these attacks. What has not been highlighted are the many good examples of well-managed hydropower developments or the additional benefits associated with such schemes.

3 Hydropower – A Cornerstone of Sustainable Energy Systems

In Johannesburg, the World Summit on Sustainable Development (WSSD, 2002) stipulated in its Implementation Plan that hydropower of all scales should be included in the drive to increase the contribution of renewable energy throughout the world.

The recent Bonn Renewables Conference (June, 2004) recognised that hydropower, together with solar, wind, biomass/fuel and geothermal energy, "can significantly contribute to sustainable development; to providing access to energy, especially to the poor; to mitigating greenhouse gas emissions, reducing harmful air pollutants, thereby creating new economic opportunities; and enhancing energy security through cooperation and collaboration."
Done well, hydropower can be a cornerstone of sustainable energy systems. It:

- Allows greater utilisation of other renewable energy options;
- Is reliable, flexible and efficient;
- Does not consume finite resources;
- Has a high energy payback ratio;
- Produces only low levels of greenhouse gas emissions;
- Has long-lasting infrastructure; and
- Often provides multiple use benefits, including water supply and flood mitigation.

Environmental issues need to be well managed, with benefits enhanced and impacts avoided, mitigated or compensated. Directly affected people also need to be treated equitably and share in benefits.

3.1 World Commission on Dams

In 2000, the World Commission on Dams (WCD) published its final report. The report concluded that water infrastructure projects, including hydropower schemes, had “too often” been developed at an environmentally or socially unacceptable cost. This WCD process has put the spotlight on the hydropower and the dam-building industry. There is disagreement on aspects of the detailed recommendations in the WCD report but members of the hydropower industry can agree with its Core Values and Strategic Priorities. Those Core Values are equity, efficiency, participatory decision-making, sustainability, and accountability.

4 IHA Sustainability Guidelines

The International Hydropower Association (IHA) has developed Sustainability Guidelines and an associated Compliance Protocol that provide a framework for good practice. The Guidelines were adopted by the membership of the IHA during the Hydro 2003 conference in Croatia last November.

The Guidelines are aimed at creating a hydropower industry that is more sustainable. This is achieved by hydropower developers and operators giving due and equal consideration to social, environmental and economic aspects of the industry at all life-cycle stages of a hydro scheme.

The industry needs to recognise the inter-relationships and mutual dependencies of the social, environmental and economic aspects of sustainability at an early stage. There are good economic reasons to manage social and environmental aspects up front. The initial outlay can avoid much greater outlays needed to reactively address problems. It would be far smarter to design a multi-level offtake structure for a reservoir prone to stratification and releases of de-oxygenated water, than to later try to retrofit one. In a world increasingly concerned about greenhouse gas emissions, there are good economic incentives to have community acceptance as “green” and sustainable.

The IHA Sustainability Guidelines set out basic principles that promote greater consideration of social responsibility, economic development and environmental protection. These span six elements – policy framework, the role of governments, decision-making processes, environmental aspects of sustainability, social aspects of sustainability and economic aspects of sustainability.

The Guidelines outline the need for a commitment to sustainable development, good governance, eco-efficiency, and life-cycle analysis of alternative energy options. They highlight the need for hydropower development to occur within national energy policies informed by strategic assessment processes.

The Guidelines describe the key criteria needed to evaluate alternative energy supply and hydropower development options. These include:

- Demonstrated need measured against supply-side and demand-side efficiency measures.
- Resource depletion.
- Energy payback ratio.
- Economic viability over the life of the facility.
- Availability and cost of resources over the projected life of the facility.
- Appropriateness of the technology, levels of efficiency and service required.
- Additional or multiple use benefits.
- Poverty reduction through flow on benefits to local communities via employment, skills development and technology transfer.
- Carbon intensity and greenhouse gas emissions.
- Area affected (environmental footprint) and associated aquatic and terrestrial ecological impact.
- Waste products (emissions or discharges to air, water and land).

Criteria for evaluating alternative hydropower development options include:

- Consideration of upgrading existing facilities.
- Maximising multiple-use benefits.
- Consideration of prioritising already developed river basins.
- Minimising the area flooded per unit of energy (GWh) produced.
- Maximising opportunities for, not posing significant unsolvable threats to, vulnerable social groups.
- Enhancing public health and / or minimising public health risks.
- Minimising population displacement.
- Avoiding exceptional natural and human heritage sites.
- Minimising impacts on rare, vulnerable or threatened species, maximising habitat restoration and protecting high quality habitats.
- Achieving or complementing community-supported objectives in downstream areas.
- Prioritising alternatives that have associated catchment management benefits and lower sedimentation and erosion risks.

The section on decision-making also outlines Environmental Assessment principles, safety requirements, and the importance of environmental management systems.

The last three sections focus on environmental, social, and economic aspects of sustainability respectively.

4.1 Hydropower - Environmental Aspects of Sustainability

The Guidelines address environmental aspects of sustainability in terms of key considerations and mitigation options and strategies. Issues addressed include:

- Water quality;
- Sediment transport and erosion;
- Downstream hydrology and environmental flows;

- Rare and endangered species;
- Passage of fish species;
- Pest species within the reservoir (flora & fauna);
- Health issues;
- Construction activities; and
- Environmental management systems.

4.2 Hydropower - Social Aspects of Sustainability

Hydropower schemes have the ability to significantly reduce poverty and enhance quality of life in the communities they serve. Access to electricity promotes new economic activity, empowers women by reducing domestic and repetitive chores such as firewood collection, improves health and education services, and provides a cleaner and healthier home environment. Hydropower infrastructure, such as reservoirs, also provides multiple-use benefits, particularly through increased availability, reliability and quality of fresh water supplies and reduced flood risks.

Local communities are impacted by the change associated with new hydro projects. To be sustainable these schemes need to recognize entitlements and share benefits with directly affected people. The goal should be to ensure that all individuals and communities affected by developments gain sustainable benefits.

This section of the Guideline details key considerations in managing social impacts, defines appropriate social outcomes for new hydropower projects, and discusses strategies to achieve those outcomes.

4.3 Hydropower - Economic Aspects of Sustainability

There can be no sustainable development without the demonstration of sound and equitable distribution of economic benefits. For this reason economic considerations are a central plank in the decision-making processes associated with hydropower projects. The efficient use of economic resources requires that the best options are selected, that alternatives have been carefully evaluated, and that there are no hidden and unforeseen costs that could emerge in the future. This is the basis for sound economic practice.

Governments need to ensure that the longer-term and less direct benefits of hydropower projects are not overlooked in the planning process or penalized by short-term financing or tax regime requirements. With new developments, capital and operating costs should be taken into account over the lifetime of a project with a life-cycle assessment of project alternatives forming an integral component of assessment processes. Direct and indirect costs and benefits should be identified, and where possible quantified in monetary terms.

5 Compliance Protocol

To support the implementation of the IHA's Sustainability Guidelines, a Compliance Protocol has also been developed. The Protocol provides an assessment process to measure sustainability performance of new power developments and existing hydropower operations. It presently contains three separate sustainability assessments.

- Options Assessment – comparing the sustainability of alternative energy supply options at the early stages of new energy supply developments.
- Evaluation of Hydropower Projects – comparing the sustainability of alternative hydropower projects at the siting and design stage of a development proposal; and

- Appraisal of Hydropower Operation and Management – assessing the sustainability of existing hydropower schemes.

The Protocol relies on obtaining objective evidence to derive sustainability scores. It is intended to be a simple and easy-to-use approach.
An overall summary table of aspects and their scores is completed as an outcome of each assessment. Such a table can be used as a basis for comparative assessment.

The Compliance Protocol is being trialled and evaluated on a number of projects around the world. To date, trials have been completed on six projects - Chilime, Nepal; Palmiet, South Africa; Waskwatim, Canada; King River, Australia; and Freudenau and Leoben, in Austria. Trials are underway on a number of others.

Some feedback from the trials has already been incorporated in the present version of the Protocol. Additional feedback will be used to finalise the document by early 2005.

The Compliance Protocol will provide a useful vehicle for assessing the sustainability of new and existing projects.

6 Certification

The IHA's Sustainability Guidelines and Compliance Protocol are effectively two significant components of what could be considered a three-part sustainability process. The third component would be a certification program for those schemes that have undergone a sustainability assessment using the Compliance Protocol.

Such a sustainability certification scheme would assist industry in demonstrating that a certain standard of sustainability performance has been met.

6.1 Requirements of a Certification Program

A hydropower certification program would assure owners, investors, insurance providers and potential consumers that a planned or operational hydropower scheme meets a range of environmental, social, and economic sustainability criteria. It should aim to create a product that is differentiated in the marketplace.

There has been a proliferation of certification programs in recent years, some of which have been questioned regarding their validity and credibility. The introduction of any new and successful certification program, including for hydropower, will depend heavily on its independence and transparency. It would introduce independent monitoring and provide assurances to potential investors that a project is being developed sustainably and is therefore less of a risk.

6.2 Main elements of a Certification Scheme1

There are three clear elements for certification schemes:

Standards: These are documents (such as standards associated with the IHA Compliance Protocol) that set out the requirements that must be met and against which certification assessments are made.
Certification: The process of establishing whether or not a standard has been met, and the issue of a certificate if those standards have been met.

[1] Ozinga S & Krul L (2004) *Footprints in the Forest: Current practices and future challenges in forest certification,* www.fern.org, p.9.

Accreditation: The mechanism for ensuring that the organizations that undertake certification (certification bodies) are competent and can produce credible results. This process 'certifies the certifiers'.
A fourth element, (tracking), is needed if a scheme is to be used as a basis for making a product claim. In this case, a system for tracking to guarantee that the output of a hydropower project comes from a certified hydropower dam could be implemented to ensure that claims are clear and credible.

6.3 Hydropower Certification

In the case of the proposed IHA Certification Scheme, it is envisaged that certification would involve the inspection of planned or operational hydropower projects by a third party. This would verify that the project and its associated impacts have been identified, and are being managed, minimised and/or mitigated in accordance with an agreed standard. It is further proposed that this standard address social, environmental and economic aspects of sustainability and be based on the IHA Compliance Protocol.

This assessment against the agreed standard would lead to the issue of a certificate which verifies that the planning and approvals process of a hydropower project incorporates clear sustainability outcomes to the defined standard; or that an operational hydropower facility is sustainably managed to the defined standard.

6.4 The Benefits of Hydropower Certification

Certification brings with it a number of clear benefits for hydropower projects. The benefits of certification could include, but are not limited to:

- Evidence that environmental, social, and economic objectives are being met;
- Access to financing from financial institutions with clear sustainability criteria;
- Facilitating liaison with government;
- Facilitating (green power) market access for the output from hydropower dams in countries where a premium green power market exists; and
- Developing and improving a company's public image and worker satisfaction.

6.5 Creating a Credible and Accepted Certification Scheme

The creation of a credible and accepted standard for the intended audience must be a key goal of the Certification Scheme. For a certification scheme to be credible it needs to:

- Have clearly defined and objective standards developed in consultation with stakeholders that will enhance the environmental, social and economic outcomes of hydropower developments;
- Be administered in a fair and efficient manner;
- Allow access and representation to interested stakeholders;
- Ensure the certification process entails a field visit as well as desktop review of documents and plans (based on objective evidence);
- Allow transparency in governance procedures.2

[2] Forest Certification Resource Center, www.certifiedwood.org, accessed 31 July 2004

6.6 Certification Phases

It is envisaged the IHA Certification would offer certification at two stages of a project life, the most important focus being the first phase which would certify a project at the planning and approvals stage. Certification would be valid until project commissioning, at which stage 'as-built' certification would be required to verify that all aspects of the planning and approvals stage of the project had been incorporated.

As-built certification would verify compliance with the approved project and ensure the project is managed sustainably on an ongoing basis. Certification would be based on the relevant sections of the Compliance Protocol.

IHA Certification for operational projects would be valid for a specified period (5 years for example) and may be renewed at the end of that term provided the project remains compliant with the criteria, including any that have been added. Projects could be required to confirm their compliance with the criteria on an annual basis, and spot checks could be conducted. Certification could be suspended or revoked for violations at any stage.

6.7 Governance

A Steering Committee/Advisory Panel should be established as an oversight and arbitration body, and to be responsible for the overall management of the affairs of the program.

The most credible and rigorous certification systems are likely to evolve from governance structures that embrace a broad spectrum of stakeholders. As such, the Steering Committee could include representatives of independent stakeholder organizations.

The Steering Committee's role could be to:

- Facilitate the operation of the Program in keeping with its stated aims;
- Ensure the standards evolve over time to maintain the program's relevance and credibility according the changing regulatory, market, industry and other conditions;
- Address and resolve strategic and policy issues as they arise;
- Accredit certifying organisations or individuals;
- Ensure the certification of projects is handled in a transparent and credible manner;
- Determine the removal of certification in cases of violation; and
- Resolve any disputes or appeals that arise through the certification process.

7 Conclusion

Sustainably developed and managed hydropower has enormous potential to contribute to global sustainable development goals. The hydropower industry is focussing its efforts on ensuring that the benefits of new developments are maximised and that the negative environmental, social and economic impacts are avoided, mitigated or compensated.

To achieve this, the International Hydropower Association has developed Sustainability Guidelines and an associated Compliance Protocol to ensure a clear framework for good practice is in place. A third element of the sustainability process is currently under consideration by the IHA is the development of a certification scheme for hydropower projects. A credible and transparent certification scheme would assist the industry in demonstrating that a certain standard of sustainability performance has been met.

With a well developed framework for compliance and certification in place, the hydropower industry will be well placed to ensure new projects deliver on a range of sustainability indicators.

References

[1] IHA Sustainability Guidelines and draft Compliance Protocol available at www.hydropower.org
[2] Forest Certification Resource Center, www.certifiedwood.org
[3] Ozinga S and Krul L (2004) Footprints in the Forest: Current practices and future challenges in forest certification, www.fern.org.

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