Annex N

Review of ESIA against the WCD and IHA Guidelines & background on the World Commission on Dams & International Hydropower Association's Sustainability Guidelines & Hydropower Sustainability Assessment Protocol

N1 REVIEW OF IMPACTS ASSESSED AGAINST THE WCD AND IHA GUIDELINES

This Annex reviews the proposed BGHES ESIA report against the Guidelines for Good Practice from the *World Commission on Dams November 2000 Report "Dams and Development – A New Framework for Decision-Making" (Final Version of 17 November 2008)* and the International Hydropower Association's Sustainability Guidelines (SGs).

Serving as an advisory tool, the WCD guidelines provide an overview of how to assess options and plan and implement dam projects to meet the Commission's criteria. The IHA Sustainability Guidelines promote greater consideration of environment, social, and economic sustainability in the assessment of new hydropower projects to assist with the evaluation and management of often competing environmental, social and economic issues that arise in the assessment, operation and management of hydropower projects. The Sustainability Guidelines suggest a number of environmental and social strategies to optimise environmental and social outcomes for Hydropower Schemes.

The WCD Guidelines and IHA's environmental and social strategies to optimise environmental and social outcomes for Hydropower Schemes are outlined in *Table N1.1, Table 3.2* and *Table 3.3*, respectively. The tables then refer the reader to where the issue/ topic are addressed in the ESIA report. If the issue / topic is not applicable at the ESIA stage it is denoted as 'N/A'.

Table N1.1 Guidelines for Good Practice

Guidelines	Reference in this ESIA
Strategic Priority 1: Gaining Public Acceptance	
Stakeholder Analysis	Refer to: • Chapter 7 – Public Participation Process • Annex B – Stakeholder Engagement Plan • Annex C – Public Participation Documentation • Annex E – Grievance Mechanism
Negotiated Decision-Making Processes	Refer to: • Chapter 7 – Public Participation Process • Annex B – Stakeholder Engagement Plan • Annex C – Public Participation Documentation • Annex E – Grievance Mechanism
Free, Prior and Informed Consent	Refer to: • Chapter 7 – Public Participation Process • Annex B – Stakeholder Engagement Plan • Annex C – Public Participation Documentation • Annex E – Grievance Mechanism
Strategic Priority 2: Comprehensive Options Assessment	
Strategic Impact Assessment for Environmental, Social, Health and Cultural	Refer to: • Chapter 6 – Analysis of Alternatives • Chapter 10 - Biophysical Environment Impact Assessment • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment
Heritage Issues	Refer to: • Chapter 9 – Socio-economic Environment Baseline • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment • Annex L - Cultural Heritage Report, Zimbabwe • Annex M - Cultural Heritage Report, Zambia
Project-Level Impact Assessment for Environmental, Social, Health and Cultural Heritage Issues	Refer to: • Chapter 10 - Biophysical Environment Impact Assessment • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment
Multi-Criteria Analysis	N/A
Life Cycle Assessment	N/A

Guidelines	Reference in this ESIA
Greenhouse Gas Emissions	Refer to: • Chapter 10 - Biophysical Environment Impact Assessment • Annex H - Climate Change Risk Review
Distributional Analysis of Projects	N/A
Valuation of Social and Environmental Impacts	• Annex K - Economic Assessment Specialist Studies
Improving Economic Risk Assessment	N/A
Strategic Priority 3: Addressing Existing Dams	
Ensuring Operating Rules Reflect Social and Environmental Concerns	Refer to: • Chapter 10 - Biophysical Environment Impact Assessment • Annex J - Environmental Flow Assessment Specialist Study
Improving Reservoir Operations	Refer to: • Annex I - Reservoir Water Quality Modelling Study • Annex J - Environmental Flow Assessment Specialist Study
Strategic Priority 4: Sustaining Rivers and Livelihoods	
Baseline Ecosystem Surveys	Refer to: • Chapter 8 – Biophysical Environment Baseline
Environmental Flow Assessment	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex J - Environmental Flow Assessment Specialist Study
Maintaining Productive Fisheries	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex J - Environmental Flow Assessment Specialist Study
Strategic Priority 5: Recognising Entitlements and Sharing Benefit	
Baseline Social Conditions	Refer to: • Chapter 9 – Socio-economic Environment Baseline • Annex K - Economic Assessment Specialist Studies • Annex L - Cultural Heritage Report, Zimbabwe • Annex M - Cultural Heritage Report, Zambia
Impoverishment Risk Analysis	Refer to: • N/A
Implementation of the Mitigation, Resettlement and Development Action Plan	Refer to: • Chapter 9 – Socio-economic Environment Baseline • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment • *Please note - Resettlement Action Plan for the Dam Footprint and Resettlement Policy Framework for the Transmission Lines and Access Roads are forthcoming.*

Guidelines	Reference in this ESIA
Project Benefit-Sharing Mechanisms	Refer to: • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment • *Please note - Resettlement Action Plan for the Dam Footprint and Resettlement Policy Framework for the Transmission Lines and Access Roads are forthcoming.*
Strategic Priority 6: Ensuring Compliance	
Compliance Plans	N/A
Independent Review Panels for Social and Environmental Matters	N/A
Performance Bonds	N/A
Trust Funds	N/A
Integrity Pacts	N/A
Strategic Priority 7: Sharing Rivers for Peace, Development, and Security	
Procedures for Shared Rivers	Refer to: • Chapter 4 - Administrative Framework

Table N1.2 Optimising Environmental Outcomes for Hydropower Schemes

Issue for Management Consideration	Mitigation Options/Strategies	Reference in this ESIA
1. Water quality Changes in water quality are likely to occur within and downstream of the development as a result of flow regime changes. The residence time of water within a reservoir is a major influence on the scale of these changes, along with bathymetry, climate and catchment activities. Major issues include o reduced oxygenation, o temperature, o stratification potential, o pollutant inflow, o propensity for disease proliferation, o nutrient capture, o algal bloom potential; and o the release of toxicants from inundated	• Adequate data collection and an ESIA process that identifies potential problems prior to design are critical. • Design and operational systems that minimise as much as possible the negative impacts within the storage and downstream; examples include multilevel off-takes, air injection facilities, aerating turbines, and destratification capability. • While removal of vegetation from proposed impoundments is expensive, the potential benefits for water quality means that at least some removal should be considered. • Working with local communities and regulatory authorities in improving catchment management practices can have significant water quality benefits for hydro reservoirs.	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex I - Reservoir Water Quality Modelling Study • Annex J - Environmental Flow Assessment Specialist Study

Issue for Management Consideration	Mitigation Options/Strategies	Reference in this ESIA
sediments. Many water quality problems relate to activities within the catchment beyond the control of the proponent.		
2. Sediment transport and erosion The creation of a reservoir changes the hydraulic and sediment transport characteristics of the river, causing increased potential sedimentation within the storage and depriving the river downstream of material. Sedimentation is an important sustainability issue for some reservoirs and may reduce the long-term viability of developments. Reduction in the sediment load to the river downstream can change geomorphic processes (eg. erosion and river form modification).	• Development proposals need to be considered within the context of existing catchment activities, especially those contributing to sediment inflow to the storage. • Reducing reservoir sedimentation through cooperation with local communities and regulatory authorities in improving catchment management practices is an option. Specific actions, such as terracing or reforestation, may need to be considered. • In some cases sediment by-passes, flushing systems or dredging should be investigated. • Operational or physical mitigation measures to reduce erosion of downstream should be considered for both proposed and existing developments and appropriate objectives set.	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex J - Environmental Flow Assessment Specialist Study
3. Downstream hydrology and environmental flows Changes to downstream hydrology impact on river hydraulics, instream and streamside habitat, and can affect local biodiversity. Operating rules should not only consider the requirements for power supply, but also be formulated, where necessary and practicable, to reduce downstream impacts on aquatic species and human activities.	• Operating schedules should, where necessary and practicable, incorporate environmental water release patterns (including environmental flows) within the operational framework for the supply of power. • Downstream regulating ponds and other engineering solutions may provide cost-effective alternatives to environmental flow releases directly from power stations. • It is important that the environmental objectives of any flow release are identified in a clear and transparent manner. These releases need to be developed within the context of environmental sustainability and also take into account local and regional socio-economic factors. It is desirable that the environmental	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex J - Environmental Flow Assessment Specialist Study

Issue for Management Consideration	Mitigation Options/Strategies	Reference in this ESIA
	flow objectives be agreed with local communities.	
4. Rare and endangered species The loss of rare and threatened species may be a significant issue arising from dam construction. This can be caused by the loss or changes to habitat during construction disturbance, or from reservoir creation, altered downstream flow patterns, or the mixing of aquatic faunas in inter-basin water transfers. Hydropower developments modify existing terrestrial and aquatic habitats, and when significant changes cannot be avoided, mechanisms to protect remaining habitats at the local and regional scale should be considered in a compensatory manner.	• Plans to manage this issue need to be developed prior to construction and options for mitigation identified and assessed. • Habitats of critical importance should be identified (within a wider regional context) and impacts to these avoided or minimised as much as possible during the design phase. • Targeted management plans need to be developed for species of conservation significance. Translocations or habitat rehabilitation may be options, along with identification of suitable habitat for 'reserve' management.	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex F – Biophysical Baseline Data
5. Passage of fish species Many fish species require passage along the length of rivers during at least short periods of their life-cycle. In many places the migration of fish is an annual event and dams and other instream structures constitute major barriers to their movement. In some cases the long-term sustainability of fish populations depend on this migration and in developing countries local economies can be heavily reliant on this as a source of income.	• The passage of fish is an issue that must beconsidered during the design and planning stage of proposed developments (dam site selection) and adequate consideration should be given to appropriate mechanisms for their transfer (eg. fish ladders, mechanical elevators, guidance devices and translocation programs). • Large-scale downstream migration of some species may require mitigation measures to reduce mortality by passage through turbines. • Appropriate and feasible options for facilitating passage are also an issue for existing developments.	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex F – Biophysical Baseline Data
6. Pest species within the reservoir (flora & fauna) In some regions a significant long-term issue with reservoirs, irrespective of their use, is the introduction of exotic or native pest species. The change in environment caused by storage	• Identifying the risk of infestation prior to development should also help identify potential options for future management or mitigation. Shorter residence time of water is one viable mechanism for reducing risk. • Downstream water uses must also be considered when examining potential options	Refer to: • Chapter 8 – Biophysical Environment Baseline • Chapter 10 - Biophysical Environment Impact Assessment • Annex F – Biophysical Baseline Data

Issue for Management Consideration	Mitigation Options/Strategies	Reference in this ESIA
creation often results in advantageous colonisation by species that are suited to the new conditions, and these are likely to result in additional biological impacts. In some instances, proliferation may interfere with power generation (eg. clogging of intake structures) or downstream water use through changes in the quality of discharge water (eg algal bloom toxins, deoxygenated water).	for control.	
7. Health issues The changes brought about by hydropower developments have the capacity to affect human health. Issues relating to the transmission of disease, human health risks associated with flow regulation downstream and the consumption of contaminated food sources (eg, raised mercury levels in fish) need to be considered. The potential health benefits of the development should also be identified.	• Public health and emergency response plans should be developed in conjunction with local authorities. These plans, and their associated monitoring programs, should be relevant to the levels of risk and uncertainty. • The health benefits due to improved water supply, economic improvements and flood control should be recognised. Proper reservoir management can be highly effective in eliminating mosquito-borne illnesses such as malaria.	Refer to: • Chapter 9 – Socio-economic Environment Baseline • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment
8. Construction activities Construction needs to be carried out so as to minimise impacts on the terrestrial and aquatic environment. Where a new development is planned, there are a range of activities that can result in environmental impacts, both terrestrial and aquatic. Noise and dust may also be issues where the development is close to human habitation.	• These issues should be adequately addressed during the EA stage and plans developed to manage these issues. Plans to manage specific issues may be required; e.g., rehabilitation of borrow pits, management of construction site drainage, storage and handling of chemicals. Similar plans to manage disturbance to terrestrial and aquatic fauna may also be required.	Refer to: • Chapter 10 - Biophysical Environment Impact Assessment • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment
9. Environmental management systems It is recommended that all hydropower schemes implement an independently audited environmental management system.	• An environmental management system should allow for effective management of the range of environmental issues associated with the on-going operation of the hydropower scheme. • The associated monitoring programs and • environmental plans should ensure a program	Refer to : • *Please note an Environmental and Social Management Plan is forthcoming.*

Issue for Management Consideration	Mitigation Options/Strategies	Reference in this ESIA
	• of continuous improvement in environmental management over the life of the project.	

Table N1.3 Optimising Social Outcomes for Hydropower Schemes

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes	Reference in this ESIA
1. Changes to resource use and biodiversity in the area of the proposed project and the impacts this may have on the local community.	• Providing affected communities with improved living conditions.	The project proponent should ensure that: • the community and environmental resources are managed in a sustainable way, and on-going monitoring and liaison with local community groups continues through the life of the project. • the proposed project is the best alternative, following the consideration of relevant stakeholders concerns; • adequate consultation is undertaken, with relevant local, regional and national agencies consulted, and any legislation, regulations, codes of practice or guidelines of government agencies complied with; and • impacts on the community, stakeholders and the environment are identified and that stakeholders are informed about the project and the implications for them, as well as being regularly consulted throughout the planning and implementation phases.	Refer to: • Chapter 7 – Public Participation Process • Chapter 9 – Socio-economic Environment Baseline • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment • Annex B – Stakeholder Engagement Plan • Annex C – Public Participation Documentation • Annex E – Grievance Mechanism

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes	Reference in this ESIA
2. Distribution of benefits among affected parties.	• Ensuring equitable distribution of the benefits of the project, particularly to affected and vulnerable communities, through processes such as revenue sharing, training programmes and educational outreach. • Supporting additional community infrastructure associated with the project, particularly water and electricity connection, where positive benefits to the community will result.	The project proponent should ensure that: • stakeholders who may be affected by the project are provided with the opportunity to be represented during the different phases of project development.	Refer to: • Chapter 9 – Socio-economic Environment Baseline • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment • Annex B – Stakeholder Engagement Plan • Annex C – Public Participation Documentation • Annex E – Grievance Mechanism
3. Effectiveness and on-going performance of compensatory and benefits programmes.	• Ensuring that the local knowledge of communities and stakeholders is utilised in project planning.	The project proponent should ensure that: • those communities or individuals affected by the project are compensated for impacts caused by the project.	Refer to: • Chapter 7 – Public Participation Process • Annex B – Stakeholder Engagement Plan • Annex E – Grievance Mechanism • *Please note - Resettlement Action Plan for the Dam Footprint and Resettlement Policy Framework for the Transmission Lines and Access Roads are forthcoming.*
4. Public health issues that can result from the modification of hydrological systems, especially in tropical and sub-tropical areas, where water-borne diseases can be a significant issue. In some reservoirs, a further concern is the management of the temporary rise of mercury levels in fish.	• Improving public health conditions for impacted communities.	The project proponent should ensure that: • the community and environmental resources are managed in a sustainable way, and on-going monitoring and liaison with local community groups continues through the life of the project.	Refer to: • Chapter 9 – Socio-economic Environment Baseline • Chapter 11 – Socio-Economic, Health and Cultural Heritage Impact Assessment • Annex B – Stakeholder Engagement Plan • Annex E – Grievance Mechanism • *Please note an Environmental and Social Management Plan is forthcoming*

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes	Reference in this ESIA
5. The impacts of displacement on individuals and communities. These impacts may include: o the physical loss of homes and lands; o the transition to alternative means of earning a livelihood, particularly for populations that rely heavily on local land and resources for their way of life or that have a traditional existence; o disruption of established community networks and loss of cultural identity.	Ensuring that displacement is dealt with in a fair and equitable manner. The broad guidelines required to address displacement are: o to investigate all possible project alternatives to ensure that displacement is avoided or minimised where feasible; o to plan the resettlement thoroughly, where displacement is necessary, ensuring that adequate resources are available to enable the displaced groups to share in the benefits of the project; o to ensure adequate and on-going consultation with those groups or individuals that will be displaced, so that they have input into both the planning and the implementation of the resettlement program; o to provide displaced groups with sufficient assistance to ensure that their livelihoods are improved or, as a minimum, to ensure that they are re-established at no disadvantage; and o to improve standards of living for both the	The project proponent should ensure that: • a negotiated and agreed outcome is achieved wherever possible.	Refer to: • Chapter 6 - Project Alternatives • Annex B – Stakeholder Engagement Plan • Annex E – Grievance Mechanism • *Please note - Resettlement Action Plan for the Dam Footprint and Resettlement Policy Framework for the Transmission Lines and Access Roads are forthcoming.*

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes	Reference in this ESIA
	displaced communities as well as the host community, where applicable.		

N2 WORLD COMMISSION ON DAMS (WCD)

Please note that the text on the World Commission on Dams (WCD) contained within this Annex was compiled from two key sources: Dams and Development: A New Framework for Decision-Making, Earthscan Publications Ltd, November 2000; and Dams and development: A new framework for decision-making, Overview of the report by the World Commission on Dams, December 2001. Issue Paper 108, Drylands Programme, IIED.

N2.1 INTRODUCTION

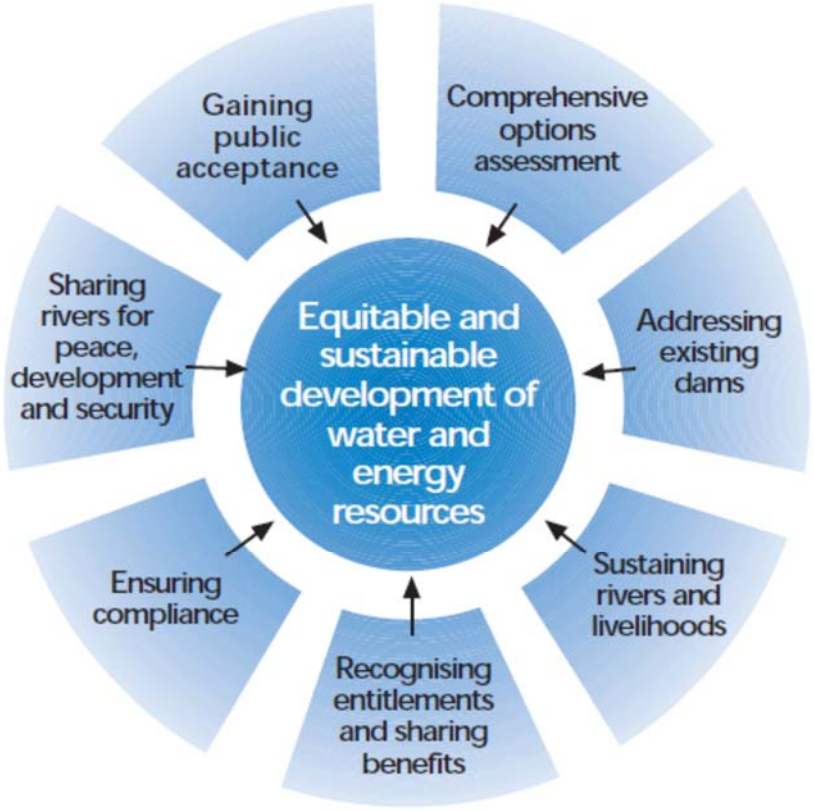
The Dams and Development: A New framework for Decision-Making report is the product of over two years of intense study, dialogue and reflection by the WCD, the WCD Stakeholders' Forum (1) and hundreds of individual experts on all aspects of dams. The report addresses key issues at the heart of the debate on dams, and recommends fundamental changes in the way in which water development options are assessed and project cycles planned, implemented, monitored and evaluated. As discussed in *Chapter 4* of the ESIA, to support this new framework for decision-making, the Commission outlines seven strategic priorities and related policy principles, criteria and a set of 26 guidelines that should enable stakeholders at all levels to find and achieve the most appropriate means of exploiting and protecting water and energy resources.

N2.2 STRATEGIC PRIORITIES AND POLICY PRINCIPLES

The seven strategic priorities for future decision-making developed by the Commission (see *Box 2.1*) set out to advocate significant innovations in assessing options, managing existing dams, gaining public acceptance and negotiating and sharing benefits. A key message and a set of policy principles underpin each of the priorities which are expressed in the form of achieved outcomes (*Table 2.1*).

(1) Comprised of 68 members, the WCD Stakeholders' Forum served as a sounding board and advisory group through which WCD achieved a reconciliation of positions, interests and opinions previously held to be irreconcilable (Source http://www.unep.org/dams/documents/default.asp?documentid=512 accessed on 18 November 2015).

Box 2.1 The WCD's Seven Strategic Priorities



Source: World Commission on Dams, 2000a.

Table 2.1 Strategic Priorities and Policy Principles

Strategic Priority 1 - Gaining Public Acceptance	
Key Message	
Public acceptance of key decisions is essential for equitable and sustainable water and energy resources development. Acceptance emerges from recognising rights, addressing risks, and safeguarding the entitlements of all groups of affected people, particularly indigenous and tribal peoples, women and other vulnerable groups. Decision-making processes and mechanisms are used that enable informed participation by all groups of people, and result in the demonstrable acceptance of key decisions. Where projects affect indigenous and tribal peoples, such processes are guided by their free, prior and informed consent.	
Effective implementation of this strategic priority depends on applying these policy principles:	
1.1 Recognition of rights and assessment of risks are the basis for the identification and inclusion of stakeholders in decision-making on energy and water resources development.	1.3 Demonstrable public acceptance of all key decisions is achieved through agreements negotiated in an open and transparent process conducted in good faith and with the informed participation of all stakeholders.
1.2 Access to information, legal and other support is available to all stakeholders, particularly indigenous and tribal peoples, women and other vulnerable groups, to enable their informed participation in decision-making processes.	1.4 Decisions on projects affecting indigenous and tribal peoples are guided by their free, prior and informed consent achieved through formal and informal representative bodies.

Strategic Priority 2 - Comprehensive Options Assessment	
Key Message	
Alternatives to dams do often exist. To explore these alternatives, needs for water, food and energy are assessed and objectives clearly defined. The appropriate development response is identified from a range of possible options. The selection is based on a comprehensive and participatory assessment of the full range of policy, institutional, and technical options. In the assessment process social and environmental aspects have the same significance as economic and financial factors. The options assessment process continues through all stages of planning, project development and operations.	
Effective implementation of this strategic priority depends on applying these policy principles:	
2.1 Development needs and objectives are clearly formulated through an open and participatory process before the identification and assessment of options for water and energy resource development.	2.4 Increasing the effectiveness and sustainability of existing water, irrigation, and energy systems are given priority in the options assessment process.
2.2 Planning approaches that take into account the full range of development objectives are used to assess all policy, institutional, management, and technical options before the decision is made to proceed with any programme or project.	2.5 If a dam is selected through such a comprehensive options assessment process, social and environmental principles are applied in the review and selection of options throughout the detailed planning, design, construction, and operation phases.
2.3 Social and environmental aspects are given the same significance as technical, economic and financial factors in assessing options.	

Strategic Priority 3 - Addressing Existing Dams
Key Message
Opportunities exist to optimise benefits from many existing dams, address outstanding social issues and strengthen environmental mitigation and restoration measures. Dams and the context in which they operate are not seen as static over time. Benefits and impacts may be transformed by changes in water use priorities, physical and land use changes in the river basin, technological developments, and changes in public policy expressed in environment, safety, economic and technical regulations. Management and operation practices must adapt continuously to changing circumstances over the project's life and must address outstanding social issues.

Effective implementation of this strategic priority depends on applying these policy principles:

3.1 A comprehensive post-project monitoring and evaluation process, and a system of longer-term periodic reviews of the performance, benefits, and impacts for all existing large dams are introduced.

3.2 Programmes to restore, improve and optimise benefits from existing large dams are identified and implemented. Options to consider include rehabilitate, modernise and upgrade equipment and facilities, optimise reservoir operations and introduce non-structural measures to improve the efficiency of delivery and use of services.

3.3 Outstanding social issues associated with existing large dams are identified and assessed; processes and mechanisms are developed with affected communities to remedy them.

3.4 The effectiveness of existing environmental mitigation measures is assessed and unanticipated impacts identified; opportunities for mitigation, restoration and enhancement are recognised, identified and acted on.

3.5 All large dams have formalised operating agreements with time-bound licence periods; where re-planning or relicensing processes indicate that major physical changes to facilities or decommissioning, may be advantageous, a full feasibility study and environmental and social impact assessment is undertaken.

Strategic Priority 4 - Sustaining Rivers and Livelihoods

Key Message

Rivers, watersheds and aquatic ecosystems are the biological engines of the planet. They are the basis for life and the livelihoods of local communities. Dams transform landscapes and create risks of irreversible impacts. Understanding, protecting and restoring ecosystems at river basin level is essential to foster equitable human development and the welfare of all species. Options assessment and decision-making around river development prioritises the avoidance of impacts, followed by the minimisation and mitigation of harm to the health and integrity of the river system. Avoiding impacts through good site selection and project design is a priority. Releasing tailor-made environmental flows can help maintain downstream ecosystems and the communities that depend on them.

Effective implementation of this strategic priority depends on applying these policy principles:

4.1 A basin-wide understanding of the ecosystem's functions, values and requirements, and how community livelihoods depend on and influence them, is required before decisions on development options are made.

4.2 Decisions value ecosystems, social and health issues as an integral part of project and river basin development and prioritise avoidance of impacts in accordance with a precautionary approach.

4.4 Project options are selected that avoid significant impacts on threatened and endangered species. When impacts cannot be avoided viable compensation measures are put in place that will result in a net gain for the species within the region.

4.5 Large dams provide for releasing environmental flows to help maintain downstream ecosystem integrity and community livelihoods and are designed, modified and operated accordingly.

4.3 A national policy is developed for maintaining selected rivers with high ecosystem functions and values in their natural state. When reviewing alternative locations for dams on undeveloped rivers, priority is given to locations on tributaries.

Strategic Priority 5 - Recognising Entitlements and Sharing Benefits

Key Message

Joint negotiations with adversely affected people result in mutually agreed and legally enforceable mitigation and development provisions. These provisions recognise entitlements that improve livelihoods and quality of life, and affected people are beneficiaries of the project. Successful mitigation, resettlement and development are fundamental commitments and responsibilities of the State and the developer. They bear the onus to satisfy all affected people that moving from their current context and resources will improve their livelihoods. Accountability of responsible parties to agreed mitigation, resettlement and development provisions is ensured through legal means, such as contracts, and through accessible legal recourse at national and international level.

Effective implementation of this strategic priority depends on applying these policy principles:

5.1 Recognition of rights and assessment of risks is the basis for identification and inclusion of adversely affected stakeholders in joint negotiations on mitigation, resettlement and development related decision-making.

5.2 Impact assessment includes all people in the reservoir, upstream, downstream and in catchment areas whose properties, livelihoods and non-material resources are affected. It also includes those affected by dam related infrastructure such as canals, transmission lines and resettlement developments.

5.3 All recognised adversely affected people negotiate mutually agreed, formal and legally enforceable mitigation, resettlement and development entitlements.

5.4 Adversely affected people are recognised as first among the beneficiaries of the project. Mutually agreed and legally protected benefit sharing mechanisms are negotiated to ensure implementation.

Strategic Priority 6 - Ensuring Compliance

Key Message

Ensuring public trust and confidence requires that governments, developers, regulators and operators meet all commitments made for the planning, implementation and operation of dams. Compliance with applicable regulations, criteria and guidelines, and project-specific negotiated agreements is secured at all critical stages in project planning and implementation. A set of mutually reinforcing incentives and mechanisms is required for social, environmental and technical measures. These should involve an appropriate mix of regulatory and non-regulatory measures, incorporating incentives and sanctions. Regulatory and compliance frameworks use incentives and sanctions to ensure effectiveness where flexibility is needed to accommodate changing circumstances.

Effective implementation of this strategic priority depends on applying these policy principles:	
6.1 A clear, consistent and common set of criteria and guidelines to ensure compliance is adopted by sponsoring, contracting and financing institutions and compliance is subject to independent and transparent review.	6.4 Corrupt practices are avoided through enforcement of legislation, voluntary integrity pacts, debarment and other instruments.
6.2 A Compliance Plan is prepared for each project prior to commencement, spelling out how compliance will be achieved with relevant criteria and guidelines and specifying binding arrangements for project-specific technical, social and environmental commitments.	6.5 Incentives that reward project proponents for abiding by criteria and guidelines are developed by public and private financial institutions.
6.3 Costs for establishing compliance mechanisms and related institutional capacity, and their effective application, are built into the project budget.	

Strategic Priority 7 - Sharing Rivers for Peace, Development and Security

Key Message
Storage and diversion of water on transboundary rivers (1) has been a source of considerable tension between countries and within countries. As specific interventions for diverting water, dams require constructive co-operation. Consequently, the use and management of resources increasingly becomes the subject of agreement between States to promote mutual self-interest for regional co-operation and peaceful collaboration. This leads to a shift in focus from the narrow approach of allocating a finite resource to the sharing of rivers and their associated benefits in which States are innovative in defining the scope of issues for discussion. External financing agencies support the principles of good faith negotiations between riparian States.
Effective implementation of this strategic priority depends on applying these policy principles:

7.1 National water policies make specific provision for basin agreements in shared river basins. Agreements are negotiated on the basis of good faith among riparian States (2). They are based on principles of *equitable and reasonable utilisation, no significant harm, prior information* and the Commission's strategic priorities.	7.4 For the development of projects on rivers shared between political units within countries, the necessary legislative provision is made at national and sub-national levels to embody the Commission's strategic priorities of 'gaining public acceptance', 'recognising entitlements' and 'sustaining rivers and livelihoods'.

(1) 'Rivers' is used here as a general term. The strategic priority and policy principles relate equally to all types of waters which are or might be impacted by dams.

(2) The terms 'riparian State' is used to mean any State through which a transboundary river flows or forms part of its boundary, or which includes part of the catchment area of a transboundary river.

7.2	Riparian States go beyond looking at water as a finite commodity to be divided and embrace an approach that equitably allocates not the water, but the benefits that can be derived from it. Where appropriate, negotiations include benefits outside the river basin and other sectors of mutual interest.	7.5	Where a government agency plans or facilitates the construction of a dam on a shared river in contravention of the principle of good faith negotiations between riparians, external financing bodies withdraw their support for projects and programmes promoted by that agency.
7.3	Dams on shared rivers are not built in cases where riparian States raise an objection that is upheld by an independent panel. Intractable disputes between countries are resolved through various means of dispute resolution including, in the last instance, the International Court of Justice.		

N2.3 FIVE KEY DECISION POINTS: THE WCD CRITERIA

In order to apply the strategic priorities and their respective policy principles into planning and project cycles, the Commission identified five key stages and associated decision points that have a strong influence in the way water and energy management plans are developed and projects are designed and implemented. The first two decision points relate to water and energy planning, leading to decisions on a preferred development plan:

1) Needs assessment: validating the needs for water and energy services.

2) Selecting alternatives: identifying the preferred development plan from among the full range of options.

Where a dam emerges from this process as a preferred development alternative, three subsequent decision points occur:

3) Project preparation: verifying that agreements are in place before tender of the construction contract.

4) Project implementation: confirming compliance before commissioning.

5) Project operation: adapting to changing contexts.

The five decision points are supported by a set of criteria that describe the processes required for compliance. The criteria are set out in the form of checklists for each decision point that illustrates a transparent and open mechanism for determining if the Commission's recommendations have been followed and the processes can proceed to the next level of planning or implementation.

The most fundamental of the decision points is the selection of the preferred development plan. This determines the path for what options will be pursued to meet needs and whether or not a dam is to be built. This decision is only made after the needs and available options to meet those needs have been fully assessed. Each of the five stages requires a commitment to agreed procedures culminating in a decision point that governs the course of future action and allocation of resources (see *Figure 2.1*). At each decision point it is essential to test compliance with preceding processes before giving authority to proceed to the next stage. These points are not exhaustive, and within each stage many other decisions are taken and agreements made. The five key stages and associated decision points are generic and must be interpreted within the overall planning context of individual countries.

1) *Needs assessment: validating the needs for water and energy services.* Confirmation is required that plans for water and energy development reflect local and national needs adequately. An appropriate decentralized consultation process is used to validate the needs assessment and modify it where necessary.

2) *Selecting alternatives: identifying the preferred development plan from among the full range of options.* The preferred development plan is selected through a participatory multi-criteria assessment that gives the same significance to social and environmental aspects as to technical, economic and financial aspects and covers the full range of policy, programme, and project options. Within this process, investigations and studies are commissioned on individual options to inform decision-making as required; for example, demand-side management studies or feasibility studies.

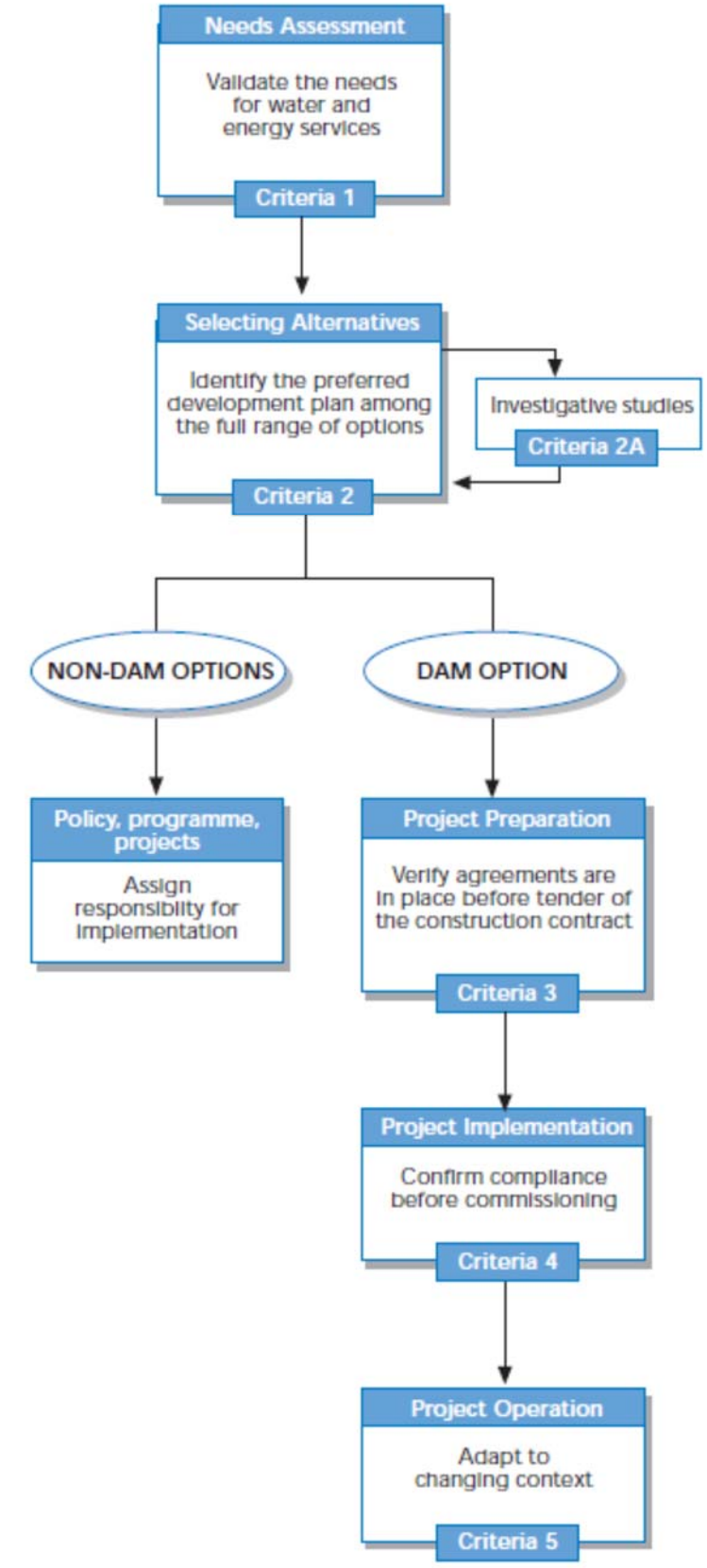
Where a dam emerges as a preferred option, the following key decision points occur for project preparation, implementation and operation.

3) *Project preparation: verifying agreements are in place before tender of the construction contract.* The preparation stage covers detailed planning and design. Licences issued for development of a project incorporate any conditions that emerge from the options assessment process. Tendering the construction contract is conditional upon reaching negotiated agreements for benefit sharing mechanisms and for mitigation, compensation, development and compliance measures, in addition to technical requirements.

4) *Project implementation: confirming compliance before commissioning.* The implementation stage covers procurement and construction. Issuing the licence to operate is contingent on implementation of specific benefit sharing and mitigation measures at various stages through the implementation period. Compliance with all relevant time-bound commitments is required before commissioning the project.

5) *Project operation: adapting to changing contexts.* Any decisions to modify facilities, operating rules, and licence conditions to meet changing contexts are based on a participatory review of project performance and impacts.

Figure 2.1 Five Key Decision Points in Planning and Project Development



The five key stages and decision points provide a framework within which decision makers and stakeholder groups can be assured of compliance with agreed procedures and commitments.

The following *Figure 2.2* provides a related list of criteria for checking compliance for each of the five key stages.

Figure 2.2 Criteria Checklist

Stage 1 Criteria Checklist				
Needs Assessment	**Selecting Alternatives**	**Project Preparation**	**Project Implementation**	**Project Operation**
Needs assessments may have been conducted through a range of processes including national, regional, sector-specific, or basin-wide plans. The verification process to be applied will need to be tailored to suit the particular circumstances.				
Gaining Public Acceptance ■ A consultation plan was developed using a stakeholder analysis to define the groups involved. The plan defines mechanisms for verifying needs at the local, sub-national and national level (Guideline 1 - *Figure 2.3*). ■ Verification of the needs for water and energy services was achieved through a process of public consultation and the results of public consultation were disseminated to stakeholders. ■ Development objectives reflect a river basin-wide understanding of relevant social, economic, and environmental values, requirements, functions, and impacts that identifies synergies and potential areas of conflict. ■ An appropriate process was established to address any disparities between the needs expressed through the public consultations and the stated development objectives.		**Comprehensive Options Assessment** ■ Legal, policy and institutional frameworks were reviewed and any bias against resource conservation, efficiency and decentralised options, and any provisions that hindered an open and participatory assessment of needs and options were addressed. **Addressing Existing Dams** ■ Outstanding social and environmental impacts from past projects were evaluated and incorporated into the needs assessment (policy principle 3.3 - *Table 2.1*). **Sustaining Rivers and Livelihoods** ■ Ecosystem baseline studies and maintenance needs were assessed at a strategic level (Guidelines 14, 15 - *Figure 2.3*).		
Stage 2 Criteria Checklist				
Needs Assessment	**Selecting Alternatives**	**Project Preparation**	**Project Implementation**	**Project Operation**
Gaining Public Acceptance ■ Stakeholders participated in creating the inventory of options, assessing options, and in negotiating those outcomes that may affect them (Guidelines 1, 2 - *Figure 2.3*). ■ An agreed dispute resolution mechanism for negotiated processes was established with the participation and agreement of stakeholders (Guideline 2 - *Figure 2.3*). ■ Indigenous and tribal peoples gave their free, prior and informed consent to the		■ Approval to proceed with any project-level investigations was informed by a comprehensive assessment of options (see Criteria Checklist 2A). ■ Rejection of any options was explained in an open and timely manner. **Addressing Existing Dams** ■ Provisions were made for resolving outstanding social and environmental impacts (policy principle 3.3 *Table 2.1*) **Sustaining Rivers and Livelihoods** ■ An established policy exists to maintain		

inclusion in the development plan of any planned option that would potentially affect them (Guideline 3 - *Figure 2.3*).

Comprehensive Options Assessment

- Strategic impact assessments and life cycle analysis were integrated and undertaken as an initial step in the process (Guidelines 4, 7, 8, 14, 17 - *Figure 2.3*).

- A multi-criteria assessment was used to screen and select preferred options from the full range of identified alternatives (Guideline 6 - *Figure 2.3*).

- The screening of options:
  - covered all policy, programme, and project alternatives;
  - gave social and environmental aspects the same significance as technical, economic and financial factors;
  - gave demand-side options the same significance as supply options;
  - prioritised consideration of improving performance of existing systems;
  - considered river-basin-wide aspects and cumulative impacts;
  - took account of potential changes in climate; and
  - reflected the precautionary approach.

- Distributional and risk analyses were conducted at an appropriate level (Guidelines 9, 11 - *Figure 2.3*) and environmental and social impacts were valued where appropriate (Guideline 10 - *Figure 2.3*).

selected rivers with high ecosystem functions and values in their natural state.

- Consideration of options took into account: avoiding dams on the main-stem of rivers wherever possible; avoiding or minimising negative impacts on endangered species, ecosystems, livelihoods, human health and cultural resources; and respecting the provisions and guidance of relevant international treaties.

Recognising Entitlements and Sharing Benefits

- For any project option, stakeholders negotiated the guiding principles and criteria for: benefit sharing, mitigation, resettlement, development and compensation measures (Guidelines 2, 18, 20 - *Figure 2.3*).

Ensuring Compliance

- Sufficient institutional capacity exists, or will be enhanced, to monitor and enforce commitments for social and environmental components.

Sharing Rivers for Peace, Development and Security

- Any objections from riparian states were resolved through good faith negotiations or independent dispute resolution procedures (Guideline 26 - *Figure 2.3*).

Stage 2A Criteria Checklist

Needs Assessment	Selecting Alternatives	Project Preparation	Project Implementation	Project Operation

Project-related pre-feasibility and feasibility studies need to meet the following criteria. Policy and programme related studies may also be required, and are covered in Criteria Checklist 2.

Gaining Public Acceptance

- Stakeholders participated in baseline, impact and investigative studies and the negotiation of outcomes that potentially affect them (Guidelines 1, 2, 14, 17 - *Figure 2.3*).

- The studies and impact assessments were open and independent, and were preceded by a participatory scoping phase (Guideline 5 - *Figure 2.3*).

Comprehensive Options Assessment

- The investigations were analysed on a

- Impacts on fish have been assessed and measures to avoid or minimise impacts were considered, including an effective fish pass where feasible (Guideline 16 - *Figure 2.3*).

Recognising Entitlements and Sharing Benefits

- Stakeholders negotiated agreements for compensation, mitigation, resettlement, development and monitoring measures affecting them, including draft contracts where necessary (Guideline 19 - *Figure 2.3*).

- Effective benefit-sharing strategies were

river basin-wide understanding of social, economic, and environmental values, requirements, functions, and impacts including cumulative impacts, and the precautionary approach was applied. (Guideline 5 - *Figure 2.3*).

- The recommendations of studies undertaken on resource conservation measures, demand-side management, local supply-side options and improvement of existing systems were reflected in the demand forecast for the sector.

- Within-project alternatives were assessed using a multi-criteria approach (Guideline 6 - *Figure 2.3*).

Addressing Existing Dams

- Studies examined possible synergies from interactive operation of related water resource infrastructure in the basin.

Sustaining Rivers and Livelihoods

- An environmental flow requirement to maintain downstream species, ecosystems and livelihoods was defined (Guideline 15 - *Figure 2.3*).

identified and agreed with people adversely affected by the project (Guideline 20 - *Figure 2.3*).

Ensuring Compliance

- Institutional capacity to monitor and enforce commitments for social and environmental components of the project was analysed and measures to strengthen capacity identified.

- An independent panel reviewed the assessment of impacts and the planning of social and environmental mitigation plans (Guideline 22 - *Figure 2.3*).

Sharing Rivers for Peace Development and Security

- Riparian states were notified of options affecting them and agreed procedures for impact assessments. Objections were addressed through good faith negotiations and agreed dispute resolution procedures (Guideline 26 - *Figure 2.3*).

Stage 3 Criteria Checklist

Needs Assessment	Selecting Alternatives	Project Preparation	Project Implementation	Project Operation

Gaining Public Acceptance

- Stakeholders participated in the project design and the negotiation of outcomes that affect them (Guidelines 1, 2 - *Figure 2.3*).

- Indigenous and tribal peoples gave their free, prior, and informed consent to the project as designed (Guideline 3 - *Figure 2.3*).

Comprehensive Options Assessment

- The stakeholder forum participated in assessing alternatives for the detailed layout of the dam, associated infrastructure, and its operation.

Addressing Existing Dams

- Cumulative and interactive impacts of existing infrastructure were addressed in the design of the dam and agreements reached with stakeholders and operators to modify operating rules of existing dams where needed.

Sustaining Rivers and Livelihoods

- Acceptable rules were developed for reservoir filling, commissioning and

- Detailed benefit sharing mechanisms, and the means to deliver them, have been agreed and set in place with affected groups (Guideline 20 - *Figure 2.3*).

Ensuring Compliance

- Independent panels reviewed and endorsed mitigation plans (Guideline 22- *Figure 2.3*).

- Provisional sums for mitigation are included in the tender, and their financing has been confirmed.

- A Compliance Plan was prepared, presented to the stakeholder forum and formalised. Individual compliance measures include mechanisms for dispute resolution (Guideline 21 - *Figure 2.3*).

- The developer has allocated funds for an effective monitoring and evaluation system covering project performance, safety and impacts. Institutional capacity exists to monitor and enforce agreements effectively.

- A transparent process for short-listing contractors and selecting tenders is in place

operation.

- The final design includes provisions for emergency drawdown and decommissioning and is sufficiently flexible to accommodate changing future needs and values, including ecosystem needs and ecosystem restoration (Guideline 12 - *Figure 2.3*).

- An environmental management plan incorporating environmental flows and other mitigation and enhancement measures was agreed with stakeholders and defines monitoring and evaluation programmes.

- The developer provided sufficient evidence to demonstrate that proposed mitigation and development measures will be effective in meeting their objectives.

Recognising Entitlements and Sharing Benefits

- Mitigation, resettlement, monitoring, and development plans were agreed with affected groups, and relevant contracts signed (Guideline 19 - *Figure 2.3*).

and contractors with a record of under-performance or corruption on past projects were identified and debarred where appropriate.

- Relevant performance bonds have been secured, trust funds established and integrity pacts signed (Guidelines 23, 24, 25 - *Figure 2.3*).

- The licence for project development defines the responsibility and mechanisms for financing decommissioning costs.

Sharing Rivers for Peace Development and Security

- Resolution was achieved where affected riparian states had outstanding objections (Guideline 26 - *Figure 2.3*).

Stage 4 Criteria Checklist

Needs Assessment	Selecting Alternatives	Project Preparation	Project Implementation	Project Operation

Gaining Public Acceptance

- Stakeholders participated in monitoring mitigation measures and in negotiating outcomes that affect them (Guidelines 1, 2 - *Figure 2.3*).

- Consultation mechanisms were agreed in advance with stakeholders for any technical, social, environmental, or other problems that may be encountered during reservoir filling and commissioning.

- Contingency plans for emergency drawdown of the reservoir were agreed with stakeholders before commissioning and were widely disseminated.

Comprehensive Options Assessment

- Affected stakeholders have reviewed any changes proposed to the tender design that substantially affect impacts, mitigation measures, benefit sharing, operational practices, or the monitoring programme.

Addressing Existing Dams

Institutional co-ordination mechanisms

Recognising Entitlements and Sharing Benefits

- The mitigation, resettlement and development action plan has been implemented and disputes resolved (Guideline 19 - *Figure 2.3*).

Ensuring Compliance

- An independent panel reviewed and endorsed implementation of social, environmental, health and cultural heritage mitigation measures (Guideline 22 - *Figure 2.3*).

- Preparations have been made to implement licence conditions for operations, implement continuing mitigation measures, undertake monitoring and regular evaluation, and disseminate information.

- Monitoring of social, environmental and technical aspects includes an intensive phase to cover the rapid changes that occur in the impoundment and commissioning period.

- The developer has complied with pre-commissioning commitments as defined in the Compliance Plan (Guideline 21 - *Figure*

- that recognise interactive effects and cumulative impacts are in place to adjust operation of existing dams.

Sustaining Rivers and Livelihoods

- Required environmental mitigation measures were implemented.

2.3).

Sharing Rivers for Peace Development and Security

- Mechanisms were initiated for sharing monitoring information with riparian provinces or States (Guideline 26 - *Figure 2.3*).

Stage 5 Criteria Checklist

Needs Assessment	Selecting Alternatives	Project Preparation	Project Implementation	Project Operation

These criteria are relevant to both existing dams (Strategic Priority No.3) and the operational stages of future dams.

Gaining Public Acceptance

- Stakeholders are identified for consideration of operational issues and any proposed changes that impact on them or the environment (Guideline 1 - *Figure 2.3*).

Comprehensive Options Assessment

- Periodic evaluations of all aspects of project operation and performance are undertaken with the involvement of the stakeholder forum every 5 to 10 years and agreements renegotiated as necessary.

- Modernisation programmes and alternative operational regimes are considered as part of periodic reviews, replanning, or relicensing exercises through a participatory multi-criteria approach (Guideline 13 - *Figure 2.3*).

- Monitoring and evaluation programmes should explicitly consider the influence of climate change (namely increasing and decreasing rainfall and flows) on benefits and dam safety.

- A full feasibility study, including analysis of alternatives and impact assessment, is undertaken for any proposal for any major physical change, including decommissioning.

- **Sustaining Rivers and Livelihoods** Operations take account of environmental flow requirements (quantity and quality) and ecosystem and social impacts are monitored (Guideline 15 - *Figure 2.3*).

Recognising Entitlements and Sharing Benefits

- Detailed benefit-sharing mechanisms are modified as necessary with the agreement of affected groups (Guideline 20).

Ensuring Compliance

- Adverse social and environmental impacts and reparations issues are referred to the appropriate recourse body (Guideline 19).

- Annual reports of project monitoring programmes, including social and environmental aspects, are issued promptly and corrective measures are initiated to address issues raised in the reports.

- The requirements of remaining performance bonds or trust funds outlined in the Compliance Plan are periodically reviewed, and financial guarantees are released on satisfactory compliance with agreed milestones (Guideline 23).

- Dam safety and inspection programmes are implemented.

Sharing Rivers for Peace Development and Security

- Mechanisms exist to share monitoring information and resolve issues as they arise.

N2.4 GUIDELINES

The guidelines outlined below in *Figure 2.3* provide an overview of how to assess options and plan and implement dam projects to meet the Commission's criteria. The guidelines serve as advisory tools which assist in

decision making and need to be considered within the framework of existing international guidance and current good practice. The guidelines are presented under the same sub-headings as the Commission's seven strategic priorities. There are apparent linkages between individual guidelines and cross references to them are given in the criteria checklists for the key decision points of the planning and project cycles in *Figure 2.2*.

Figure 2.3 Guidelines for Good Practice

	Strategic Priority 1: Gaining Public Acceptance		**Strategic Priority 4: Sustaining Rivers and Livelihoods**
1	Stakeholder Analysis	14	Baseline Ecosystem Surveys
2	Negotiated Decision-Making Processes	15	Environmental Flow Assessment
3	Free, Prior and Informed Consent	16	Maintaining Productive Fisheries
	Strategic Priority 2: Comprehensive Options Assessment		**Strategic Priority 5: Recognising Entitlements and Sharing Benefits**
4	Strategic Impact Assessment for Environmental, Social, Health and Cultural Heritage Issues	17	Baseline Social Conditions
		18	Impoverishment Risk Analysis
		19	Implementation of the Mitigation, Resettlement and Development Action Plan
5	Project-Level Impact Assessment for Environmental, Social, Health and Cultural Heritage Issues	20	Project Benefit-Sharing Mechanisms
6	Multi-Criteria Analysis		
7	Life Cycle Assessment		**Strategic Priority 6: Ensuring Compliance**
8	Greenhouse Gas Emissions		
9	Distributional Analysis of Projects	21	Compliance Plans
10	Valuation of Social and Environmental Impacts	22	Independent Review Panels for Social and Environmental Matters
11	Improving Economic Risk Assessment	23	Performance Bonds
		24	Trust Funds
	Strategic Priority 3: Addressing Existing Dams	25	Integrity Pacts
12	Ensuring Operating Rules Reflect Social and Environmental Concerns		**Strategic Priority 7: Sharing Rivers for Peace, Development, and Security**
13	Improving Reservoir Operations	26	Procedures for Shared Rivers

N3 INTERNATIONAL HYDROPOWER ASSOCIATION (IHA) SUSTAINABILITY GUIDELINES AND HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL

Please note that the text on the IHA Sustainability Guidelines and Assessment Protocol contained within this Annex was compiled from two key sources: IHA Sustainability Guideline, February (2004); and IHA Hydropower Sustainability Assessment Protocol, November 2010.

N3.1 IHA SUSTAINABILITY GUIDELINES

N3.1.1 Purpose of the Guidelines

The IHA published the Sustainability Guidelines (SGs) in order to promote greater consideration of environment, social, and economic sustainability in the assessment of:

- new energy projects;
- new hydro projects; and
- the management and operation of existing hydropower facilities.

The principles encompassed in the SGs, which are directly applicable to the Baynes Project include the following elements:

- The role of governments;
- Decision making processes;
- Hydropower - environmental aspects of sustainability;
- Hydropower - social aspects of sustainability; and
- Hydropower - economic aspects of sustainability.

The principles have been drafted by the IHA to assist hydropower developers and operators with the evaluation and management of often competing environmental, social and economic issues that arise in the assessment, operation and management of hydropower projects.

N3.1.2 The Role of Governments

The social, environmental and economic trade-offs required to establish national and regional development plans are the responsibility of governments. IHA encourages countries to have in place national and/or regional energy policies. These should:

- Clearly set out energy development strategies.

- Include a Strategic Assessment (SA) process that involves an assessment of cumulative impacts, determination of land use and environmental priorities, as well as goals for poverty alleviation and economic growth.

- Be framed in the context of the global need to reduce greenhouse emissions.

- Incorporate the three elements of sustainability -- economic, social and environmental -- in energy planning.

- Be a participatory, streamlined process, focused on major issues, using common sense and readily available information, and with short and definite time limits for its completion.

N3.1.3 Decision Making Processes

Alternatives Hydropower Options

According to the IHA, sustainability criteria should be utilised in order to provide an effective comparison of hydropower project alternatives. Such criteria are required in order to eliminate unsustainable hydropower projects early in the project planning phase. *Table 3.1* below focuses on hydro-electric alternatives and their prioritisation based on sustainability criteria.

Table 3.1 Key Criteria that should be used in Comparing Hydro-electric Project Alternatives

Key Criteria	Discussion
1. Prioritise upgrading of existing facilities.	• Refurbishment and modification of operational regimes, particularly of older power stations, can often result
2. Prioritise alternatives that have multiple-use benefits.	• Hydro-electric projects normally have a variety of other uses and benefits. These can include: o Irrigation, o water supply, o fishing, o flood mitigation, o water-based transport, o tourism and recreation.
3. Prioritise alternatives on already developed river basins.	• While consideration of cumulative and other environmental impacts is necessary it is often preferable to develop new hydro-electric projects on already regulated river systems.
4. Prioritise alternatives that minimise the area flooded per unit of energy (GWh) produced.	• The selected site and project design should tend towards minimising the flooded area per unit of energy produced (square kilometres per gigawatt hour)
5. Prioritise alternatives that maximise opportunities for, and do not pose significant unsolvable threats to, vulnerable social	• Where vulnerable social groups will be affected, projects should include comprehensive social and cultural enhancement programs.

Key Criteria	Discussion
groups.	
6. Prioritise alternatives that enhance public health and / or minimise public health risks.	• Hydropower developments can often provide significant new public health benefits to poorly developed areas. • Projects can also pose risks, such as increases in waterborne diseases and a temporary rise of mercury levels in fish.
7. Prioritise alternatives that minimise population displacement.	• Where population displacement is necessary, comprehensive resettlement and rehabilitation plans need to be developed and implemented in consultation with the affected population.
8. Prioritise alternatives that avoid exceptional natural and human heritage sites.	• Developers should make every effort to avoid, or reduce to a minimum, alterations to sites of exceptional national and international value.
9. Prioritise alternatives that have lower impacts on rare, vulnerable or threatened species, maximise habitat restoration and protect high quality habitats.	• Potential impacts on rare, vulnerable or threatened species should be carefully assessed as part of the decision-making process. • Consideration of the creation of alternative habitats or the protection of adjacent areas should be considered as part of any mitigation program. • Significant damage to areas of high conservation value (including critical habitat for endangered species) should be avoided when adequate mitigation or compensation is not feasible.
10. Prioritise alternatives that can achieve or complement community-supported objectives in downstream areas.	• Regulation of a river, or its diversion, creates environmental change in the downstream reaches. Environmental flow regimes should be developed on the basis of community-supported objectives.
11. Prioritise alternatives that have associated catchment management benefits and lower sedimentation and erosion risks.	• Sites and options should be assessed for sedimentation and erosion risks, both within the reservoir and downstream. • Catchment management strategies can reduce sediment load entering reservoirs. Developers need to assess the need for the creation of catchment reserves or other management strategies to reduce erosion and sediment transport. • Construction programs should be geared to ensuring minimum disturbance and appropriate rehabilitation of disturbed sites.

Source: IHA, Sustainability Guidelines, 2004

Environmental Impact Assessment Principles

IHA's policy position is that Environmental Assessments (EAs) should be applied at the project level. These EAs should:

- take account of higher-level national and/or regional policies and strategic assessments, including assessments already completed for the relevant river basin(s).

- conduct initial screening to determine if a project is likely to have significant effects on the environment by virtue of its nature, size or location.

- be conducted for all hydro-electric projects that have the potential for significant impacts on the environment.

- be based on good science and factual information.

- be relevant to the scale and nature of the project in question and factor in existing information.

- apply appropriate procedures or codes of practice regarding stakeholder participation and environmental protection.

IHA acknowledges that an EA for a large infrastructure project, such as a hydro-electric power scheme, takes place in a broad political, social and economic context. It is one step in a wider decision making process, and should thus generally be written to provide authorities with the following information:

- A full description of the project;

- A statement of objectives, including clear targets and proposed indicators of success;

- A description of the existing environment in the area where the project is to be developed;

- Project justification, including evaluation of project alternatives;

- Economic, social and environmental considerations, including the consequences of not undertaking the project;

- Any mitigation measures that will be implemented to minimise environmental harm and / or enhance the environment; and

- A description of the stakeholder communication / consultation process.

In addition, the IHA recommends post-construction auditing to measure performance against objectives, targets and proposed indicators of success detailed in the project EA.

Safety

According to the IHA guidelines, the first priority for dam designers, builders, owners and operators is dam safety and the protection of life, property and the environment from the consequences of dam failure. Potential dam and reservoir sites thus need to be thoroughly assessed from a safety perspective.

IHA stipulates that comprehensive dam safety risk assessments should be completed for selected sites in any proposed schemes. Design and construction practices should ensure that defined safety requirements, as identified in the risk assessment and agreed with appropriate regulatory authorities, are met.

The guidelines stipulate that, all operating dams should have a dam safety management plan. This should define the scale, frequency and nature of monitoring requirements, including types of instrumentation required and levels of expertise needed to implement the plan. In addition dam safety programs need to include emergency response plans. These should be developed in conjunction with relevant regulatory authorities and stakeholders – particularly downstream residents. They should clearly specify responsibilities for action and be supported by appropriate awareness and training programs.

Managing Existing Hydropower Schemes

IHA encourages appropriate management of environmental and social issues throughout the life of the project.

Legal and Institutional Arrangements

Operators of hydro-electric schemes should ensure that they have processes in place to ensure compliance with all relevant laws, policies, permits, agreements and codes of practice for the jurisdictions in which they operate.

These may include, but are not limited to:

- Electricity supply industry legislation;
- Water management legislation and policies, including licences, water management plans and water quality standards;
- Environment protection legislation and associated regulatory standards and permits;
- Conservation and threatened species legislation;
- Cultural heritage and indigenous rights legislation;
- Resettlement and compensation regulations and/or agreements;
- Occupational health and safety legislation;
- National, regional and local government policies;
- International agreements and protocols;
- Corporate law requiring financial and environmental reporting;

- Relevant international laws, conventions and protocols; and

- Voluntary commitments and signed agreements.

Environmental Management Systems

IHA believes hydro-power operators should adopt internationally recognised environmental management systems (such as ISO 14001). According to the SGs, the components of an environmental management system should include the following:

- Management Commitment;
- Environmental Policy;
- Environmental Aspects and Impacts;
- Objectives and Targets;
- Roles and Responsibilities;
- Planning and Programs;
- Regulatory Compliance;
- Document Control;
- Operational and Emergency Procedures;
- Training;
- Monitoring and Measuring; and
- Review (including environmental audits) and Improvement.

N3.1.4 *Hydropower – Environmental Aspects of Sustainability*

Optimising Environmental Outcomes for hydropower schemes

In line with improvements in the understanding of the impacts of dams on riverine environments, the management of environmental issues arising from hydropower is undergoing rapid improvement. Targeted studies and monitoring programs have identified viable mitigation options and provided long-term assessments of their effectiveness. Strategies suggested by the SGs to maximise positive outcomes and reduce the severity or avoidance of negative impacts is outlined in *Table 3.2*, below.

Table 3.2 Optimising Environmental Outcomes for Hydropower Schemes

Issue for Management Consideration	Mitigation Options/Strategies
1. Water quality Changes in water quality are likely to occur within and downstream of the development as a result of impoundment. The residence time of water within a reservoir is a major influence on the scale of these changes, along with bathymetry, climate and catchment activities. Major issues include o reduced oxygenation, o temperature, o stratification potential,	• Adequate data collection and an EIA process that identifies potential problems prior to dam design are critical. • Design and operational systems that minimise as much as possible the negative impacts within the storage and downstream; examples include multilevel off-takes, air injection facilities, aerating turbines, and destratification capability. • While removal of vegetation from proposed impoundments is expensive, the potential benefits for water quality means that at least some removal should be

Issue for Management Consideration	Mitigation Options/Strategies
o pollutant inflow, o propensity for disease proliferation, o nutrient capture, o algal bloom potential; and o the release of toxicants from inundated sediments. Many water quality problems relate to activities within the catchment beyond the control of the proponent.	considered. • Working with local communities and regulatory authorities in improving catchment management practices can have significant water quality benefits for hydro reservoirs.
2. Sediment transport and erosion The creation of a reservoir changes the hydraulic and sediment transport characteristics of the river, causing increased potential sedimentation within the storage and depriving the river downstream of material. Sedimentation is an important sustainability issue for some reservoirs and may reduce the long-term viability of developments. Reduction in the sediment load to the river downstream can change geomorphic processes (eg. erosion and river form modification).	• Development proposals need to be considered within the context of existing catchment activities, especially those contributing to sediment inflow to the storage. • Reducing reservoir sedimentation through cooperation with local communities and regulatory authorities in improving catchment management practices is an option. Specific actions, such as terracing or reforestation, may need to be considered. • In some cases sediment by-passes, flushing systems or dredging should be investigated. • Operational or physical mitigation measures to reduce erosion of downstream should be considered for both proposed and existing developments and appropriate objectives set.
3. Downstream hydrology and environmental flows Changes to downstream hydrology impact on river hydraulics, instream and streamside habitat, and can affect local biodiversity. Operating rules should not only consider the requirements for power supply, but also be formulated, where necessary and practicable, to reduce downstream impacts on aquatic species and human activities.	• Operating schedules should, where necessary and practicable, incorporate environmental water release patterns (including environmental flows) within the operational framework for the supply of power. • Downstream regulating ponds and other engineering solutions may provide cost-effective alternatives to environmental flow releases directly from power stations. • It is important that the environmental objectives of any flow release are identified in a clear and transparent manner. These releases need to be developed within the context of environmental sustainability and also take into account local and regional socio-economic factors. It is desirable that the environmental flow objectives be agreed with local communities.
4. Rare and endangered species The loss of rare and threatened species may be a significant issue arising from dam construction. This can be caused by the loss or changes to habitat during construction	• Plans to manage this issue need to be developed prior to construction and options for mitigation identified and assessed. • Habitats of critical importance should be identified (within a wider regional

Issue for Management Consideration	Mitigation Options/Strategies
disturbance, or from reservoir creation, altered downstream flow patterns, or the mixing of aquatic faunas in inter-basin water transfers. Hydropower developments modify existing terrestrial and aquatic habitats, and when significant changes cannot be avoided, mechanisms to protect remaining habitats at the local and regional scale should be considered in a compensatory manner.	context) and impacts to these avoided or minimised as much as possible during the design phase. • Targeted management plans need to be developed for species of conservation significance. Translocations or habitat rehabilitation may be options, along with identification of suitable habitat for 'reserve' management.
5. Passage of fish species Many fish species require passage along the length of rivers during at least short periods of their life-cycle. In many places the migration of fish is an annual event and dams and other instream structures constitute major barriers to their movement. In some cases the long-term sustainability of fish populations depend on this migration and in developing countries local economies can be heavily reliant on this as a source of income.	• The passage of fish is an issue that must be • considered during the design and planning stage of proposed developments (dam site selection) and adequate consideration should be given to appropriate mechanisms for their transfer (eg. fish ladders, mechanical elevators, guidance devices and translocation programs). • Large-scale downstream migration of some species may require mitigation measures to reduce mortality by passage through turbines. • Appropriate and feasible options for facilitating passage are also an issue for existing developments.
6. Pest species within the reservoir (flora & fauna) In some regions a significant long-term issue with reservoirs, irrespective of their use, is the introduction of exotic or native pest species. The change in environment caused by storage creation often results in advantageous colonisation by species that are suited to the new conditions, and these are likely to result in additional biological impacts. In some instances, proliferation may interfere with power generation (eg. clogging of intake structures) or downstream water use through changes in the quality of discharge water (eg algal bloom toxins, deoxygenated water).	• Identifying the risk of infestation prior to development should also help identify potential options for future management or mitigation. Shorter residence time of water is one viable mechanism for reducing risk. • Downstream water uses must also be considered when examining potential options for control.
7. Health issues The changes brought about by hydropower developments have the capacity to affect human health. Issues relating to the transmission of disease, human health risks associated with flow regulation downstream and the consumption of contaminated food sources (eg, raised mercury levels in fish) need to be considered. The potential health benefits of the development should also be identified.	• Public health and emergency response plans should be developed in conjunction with local authorities. These plans, and their associated monitoring programs, should be relevant to the levels of risk and uncertainty. • The health benefits due to improved water supply, economic improvements and flood control should be recognised. Proper reservoir management can be highly effective in eliminating mosquito-borne illnesses such as malaria.
8. Construction activities	• These issues should be adequately addressed during the EA stage and plans

Issue for Management Consideration	Mitigation Options/Strategies
Construction needs to be carried out so as to minimise impacts on the terrestrial and aquatic environment. Where a new development is planned, there are a range of activities that can result in environmental impacts, both terrestrial and aquatic. Noise and dust may also be issues where the development is close to human habitation.	developed to manage these issues. Plans to manage specific issues may be required; e.g., rehabilitation of borrow pits, management of construction site drainage, storage and handling of chemicals. Similar plans to manage disturbance to terrestrial and aquatic fauna may also be required.
9. Environmental management systems It is recommended that all hydropower schemes implement an independently audited environmental management system.	• An environmental management system should allow for effective management of the range of environmental issues associated with the on-going operation of the hydropower scheme. • The associated monitoring programs and • environmental plans should ensure a program • of continuous improvement in environmental management over the life of the project.

N3.1.5 Hydropower Social - Aspects of Sustainability

Managing Social Impacts

There are various issues that require management to ensure that change affecting communities and individuals is effectively managed during the planning, construction and operation of hydropower facilities. The IHA SGs have identified possible social impacts/issues that would require consideration and have set outcome aims and strategies to achieve this. These are detailed in *Table 3.3*.

Table 3.3 Optimising Social Outcomes for Hydropower Schemes

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes
6. Changes to resource use and biodiversity in the area of the proposed project and the impacts this may have on the local community.	• Providing affected communities with improved living conditions.	The project proponent should ensure that: • the community and environmental resources are managed in a sustainable way, and on-going monitoring and liaison with local community groups continues through the life of the project. • the proposed project is the best alternative, following the consideration of relevant stakeholders concerns; • adequate consultation is undertaken, with relevant local, regional and

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes
		national agencies consulted, and any legislation, regulations, codes of practice or guidelines of government agencies complied with; and • impacts on the community, stakeholders and the environment are identified and that stakeholders are informed about the project and the implications for them, as well as being regularly consulted throughout the planning and implementation phases.
7. Distribution of benefits among affected parties.	• Ensuring equitable distribution of the benefits of the project, particularly to affected and vulnerable communities, through processes such as revenue sharing, training programmes and educational outreach. • Supporting additional community infrastructure associated with the project, particularly water and electricity connection, where positive benefits to the community will result.	The project proponent should ensure that: • stakeholders who may be affected by the project are provided with the opportunity to be represented during the different phases of project development.
8. Effectiveness and on-going performance of compensatory and benefits programmes.	• Ensuring that the local knowledge of communities and stakeholders is utilised in project planning.	The project proponent should ensure that: • those communities or individuals affected by the project are compensated for impacts caused by the project.
9. Public health issues that can result from the modification of hydrological systems, especially in tropical and sub-tropical areas, where water-borne diseases can be a significant issue. In some reservoirs, a further concern is the management of the temporary rise of mercury levels in fish.	• Improving public health conditions for impacted communities.	The project proponent should ensure that: • the community and environmental resources are managed in a sustainable way, and on-going monitoring and liaison with local community groups continues through the life of the project.

Issue for Management Consideration	Outcome Aims	Strategies to achieve proposed outcomes
10. The impacts of displacement on individuals and communities. These impacts may include: o the physical loss of homes and lands; o the transition to alternative means of earning a livelihood, particularly for populations that rely heavily on local land and resources for their way of life or that have a traditional existence; o disruption of established community networks and loss of cultural identity.	Ensuring that displacement is dealt with in a fair and equitable manner. The broad guidelines required to address displacement are: o to investigate all possible project alternatives to ensure that displacement is avoided or minimised where feasible; o to plan the resettlement thoroughly, where displacement is necessary, ensuring that adequate resources are available to enable the displaced groups to share in the benefits of the project; o to ensure adequate and on-going consultation with those groups or individuals that will be displaced, so that they have input into both the planning and the implementation of the resettlement program; o to provide displaced groups with sufficient assistance to ensure that their livelihoods are improved or, as a minimum, to ensure that they are re-established at no disadvantage; and o to improve standards of living for both the displaced communities as well as the host community, where applicable.	The project proponent should ensure that: • a negotiated and agreed outcome is achieved wherever possible.

Community acceptance of a project, particularly in its early phases, will greatly assist in the successful implementation of that project. To achieve community acceptance, the IHA has developed a list of recommendations (

Box 3.1) and suggests that these recommendations be undertaken by the proponent and /or regulatory authorities.

Box 3.1 Strategies to Achieve Proposed Outcomes

1. Ensure that benefits and costs of the project, including environmental, social and economic, are clearly identified, documented and disseminated to stakeholders.
2. Identify stakeholders and impacted communities and provide them with the opportunity to have informed input into the decision making process. The community must view the process as being open, fair and inclusive.
3. Affected stakeholders should participate in the development and implementation of mitigation measures, including the formulation of a Resettlement Plan or Policy.
4. A process for addressing future concerns or risks from the project needs to be outlined to stakeholders at the start of the project.
5. Specifically identify any minority and / or vulnerable groups and ensure that they are adequately represented in any consultation process and are not adversely impacted by the project.
6. Communities and / or groups that are impacted by a project should be the first to benefit. These groups should also participate in the identification, planning and distribution of benefits.
7. Communities that will be affected should be compensated for their loss. This will include those persons or groups displaced by associated infrastructure developments, such as roads, those communities both upstream and downstream who experience loss of livelihood, and those who depend on common resources such as forests and agricultural land that might be altered by the project.
8. Where compensation is to be paid, this is undertaken in a timely manner to ensure that the displaced persons are not disadvantaged.
9. Where involuntary displacement is necessary, following consideration of all other alternatives, the same compensation and support standards should apply to all groups whether they have agreed to relocation arrangements or not.
10. All displaced persons should be informed about their rights and options in relation to resettlement.
11. Local and regional resources (particularly labour) should be utilised in the development and operation of the project. Local communities will then more readily see the benefits of the scheme to their community.
12. Social compensation projects (such as new roads) should undergo appropriate environmental assessment.

N3.1.6 Hydropower – Economic Aspects of Sustainability

Institutional Framework

Governments need to establish a suitable investment climate and communicate this widely, in the process making known their project priorities. In particular, governments should ensure that:

1. The legislative framework for decision making is one in which an investor can have confidence in terms of clarity, the impartiality of the legal process, and the ability to resolve disputes without undue costs or delay.

2. An efficient institutional framework is in place to ensure that all parties concerned with the development of any project are fully aware of the factors of interest to themselves and that, as far as possible, unnecessary delay and conflict of interest are avoided.

3. In determining project priorities, the long-term interests of the state should be taken into account, in terms of the selection of the preferred project and the finalisation of its ultimate configuration.

4. Economic and financial analysis should take account of the effects of assumed interest rates, and some allowance taken of the needs for price escalation.

5. Wherever possible mechanisms should be implemented to reconcile the gap between short-term price competitiveness and long term wealth creation. Multilateral development banks should be encouraged to play their full part in this process.

Identifying Costs and Benefits

Economic sustainability decisions should be based on a comprehensive evaluation of resources affected and project costs and benefits, some of which will be difficult to quantify in precise terms. As far as possible the following elements should be taken into account:

Costs

1. Construction, operations and maintenance costs should be fully detailed, recognising the split between foreign and local currency, financing options and the anticipated exposure that these might give in terms of exchange rate variation.

2. Land acquisition costs should be evaluated in terms of actual economic value of land, as opposed to arbitrary valuations based on little substance.

3. The full capital and recurrent costs of environmental and social mitigation plans should be included.

4. Allowance should be made for the replacement of the main items of equipment after a defined period, and for the rehabilitation of civil works where this becomes necessary.

Benefits

1. Allowance should be made of the accrued benefits at a national or regional level, including any additional taxes, industrial development and improved infrastructure or multiple use benefits that could be attributed to the project.

2. Recognition of savings on greenhouse gas emissions, and improved local air quality, to the extent that this can be quantified.

3. Where feasible, allowance should be made for benefits that accrue to local communities including job creation, local industry, recreation, training, improved health care and sanitation, or environmental benefits.

4. Full quantification of the energy and power benefits (generally measured in terms of the displaced alternative) and ancillary benefits such as spinning reserve, system regulation and improved thermal efficiency.

5. Multi-purpose / multiple use benefits to downstream users and other riparian interests, including irrigation, water supply, flood mitigation, water-based transport, and the improved regulation of other hydropower stations downstream.

Allocation of Benefits

In most countries water resources belong to the State, and this is generally also the case for the land on which the project is built. A hydro project, particularly one with reservoir storage, can affect a large number of people, some of whom are remote from the site itself. These facts raise some important issues regarding the sharing of benefits arising from a project. The most fundamental point is that some of the benefit must accrue, either directly or indirectly, to the State.

For internal projects supplying domestic electricity demand, this might take the form of stable energy prices and other benefits to the utility in the form of ancillary services; but for an export project where power is being used in another country, a more explicit system of payment is needed.

The principal stakeholders in any project are the developer, the electricity user/supplier (if different), governments, financing agencies, communities and individuals directly affected by the scheme (for example, traditional resource users). These stakeholders should be identified early in the planning and development approval process and their legitimate interests acknowledged and taken into account in the financial and economic evaluation processes.

The above objectives imply the need for the following:

- Balanced commercial agreements in the case of privately funded projects;
- Reasonable returns on equity, consistent with the risk profile and international norms;
- Transparency in procurement processes;
- Directly negotiated contracts to be subject to independent audit; and
- Ongoing auditing/monitoring of economic performance against projected benefits.

To support the Sustainability Guidelines the IHA has also developed the Hydropower Sustainability Assessment Protocol to assist in assessing performance against criteria described in the IHA Sustainability Guidelines.

N3.2 INTERNATIONAL HYDROPOWER ASSOCIATION (IHA) - HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL

N3.2.1 *The Hydropower Sustainability Assessment Forum*

The IHA in close collaboration with a range of partners launched the Hydropower Sustainability Assessment Forum (HSAF) in March 2008. The HSAF comprised representatives of organisations from a diversity of sectors, with differing views and policies on sustainability issues related to hydropower development and operation. The aim of the HSAF's was to develop an enhanced sustainability assessment tool to measure and guide performance in the hydropower sector and to provide more consistency in the approach to assessment of hydropower project sustainability. The HSAF built on the IHA"s Sustainability Assessment Protocol 2006 and in November 2010, released a revised, updated and expanded Protocol.

N3.2.2 *Purpose and Target Users*

The Hydropower Sustainability Assessment Protocol (the Protocol) is a sustainability assessment framework for hydropower development and operation. It enables the production of a sustainability profile for a project through the assessment of performance within important sustainability topics.

To reflect the different stages of hydropower development, the Protocol includes four sections, which have been designed to be used as standalone documents. Through an evaluation of basic and advanced expectations, the Early Stage tool may be used for risk assessment and for dialogue prior to advancing into detailed planning. The remaining three documents, Preparation, Implementation and Operation, set out a graded spectrum of practice calibrated against statements of basic good practice and proven best practice.

Assessments rely on objective evidence to support a score for each topic, which is factual, reproducible, objective and verifiable. Assessment results may be used to inform decisions, to prioritize future work and/or to assist in external dialogue.

The development and evaluation of a hydropower project will involve many actors with different roles and responsibilities. It is recognized that both development and operation may involve public entities, private companies or combined partnerships, and responsibilities may change as the project progresses through its life cycle. It is intended that the organisation with the primary responsibility for a project at its particular life-cycle stage will have a central role in any Protocol assessment.

N3.2.3 *Principles Underpinning the Protocol*

The principles underlying the Protocol stipulate that:

- Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

- Sustainable development embodies reducing poverty, respecting human rights, changing unsustainable patterns of production and consumption, long-term economic viability, protecting and managing the natural resource base, and responsible environmental management.

- Sustainable development calls for considering 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 innovation.

- Social responsibility, transparency, and accountability are core sustainability principles.

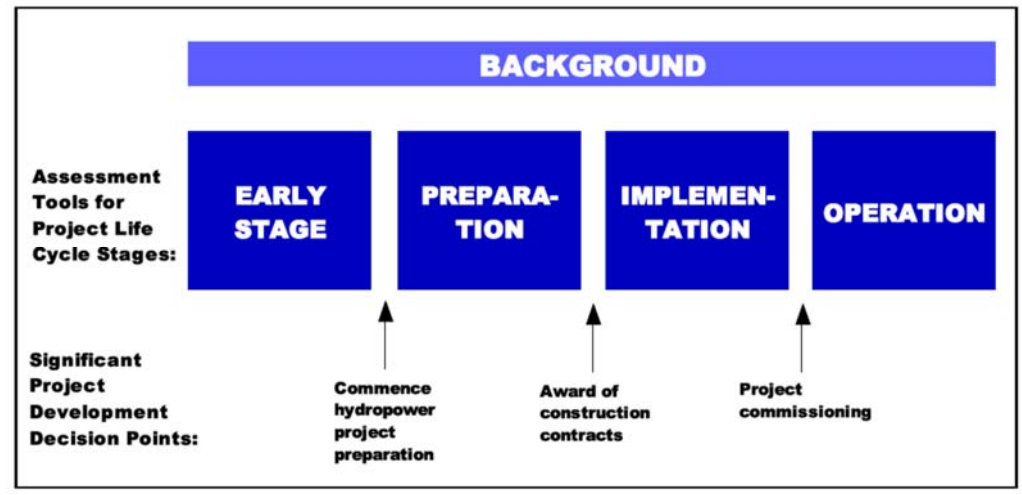
- Hydropower, developed and managed sustainably, can provide national, regional, and local benefits, and has the potential to play an important role in enabling communities to meet sustainable development objectives.

N3.2.4 Protocol Structure

Assessment Tools

The Protocol comprises four assessment tools for the different stages of the project life cycle, as shown in *Figure 3.1*.

Figure 3.1 Protocol Assessment Tools and Major Decision Points



The four Protocol assessment tools – Early Stage, Preparation, Implementation, and Operation – are designed to be stand-alone assessments applied at particular stages of the project life cycle. An assessment with one tool does not depend on earlier stage assessments to have been undertaken.

The **Early Stage** assessment tool is a preliminary screening tool to assess the strategic environment from which proposals for hydropower projects emerge. It identifies project risks and opportunities at an early stage, in order to identify the challenges and management responses to proceed with a more detailed project investigation. The Early Stage assessment tool differs from the other three assessment tools in that it is an assessment guide but not a scoring protocol. This is because there is not a clearly formulated project at this stage, nor a strong basis of information from which to derive sustainability scores. In addition, project specifics at this stage may be of a confidential nature. As soon as detailed technical, environmental, social and financial feasibility studies are undertaken, often under a strict governmental process, the use of the Preparation assessment tool will be appropriate.

The **Preparation** assessment tool assesses the preparation stage of a hydropower project, during which investigations, planning and design are undertaken for all aspects of the project. This project stage is normally subject to national regulatory processes regarding project-specific Environmental and Social Impact Assessment (ESIA) requirements as well as project management processes. Following project preparation, there is a critical decision point in the decision to award the construction contracts. An assessment conducted at this point in time would assess whether all preparatory requirements have been met, management plans are in place, and commitments are appropriate and binding. This Protocol assessment tool can be used prior to, and to inform, the decision to move forward with project implementation. This decision is governed by national regulatory processes to obtaining a construction permit and an operating license based on the ESIA and project specific governmental requirements. Following this point, construction commences along with relevant elements of environmental and social management plans.

The **Implementation** assessment tool assesses the implementation stage of a hydropower project, during which construction, resettlement, environmental and other management plans and commitments are implemented.

The **Operation** assessment tool assesses the operation of a hydropower facility. This Protocol assessment tool can be used to inform the view that the facility is operating on a sustainable basis with active measures in place towards monitoring, compliance and continuous improvement.

Protocol Topics

Within each Protocol assessment tool is a set of topics important to forming a view on the overall sustainability of that project at that point in its life cycle. Topics, when taken together, provide the list of issues that must be considered to confidently form a view on the overall sustainability of a hydropower project at a particular point in its life cycle.

Table 3.4 provides a list of topics for each assessment tool. Not every topic will be relevant to every project, and so at the front of the Preparation, Implementation and Operation documents is a Topic Relevance Guide to

assist in determining relevant topics. For example, if there is no Resettlement the Resettlement topic does not need to be assessed.

Assessment Criteria

There are six criteria that may be utilised for the scoring statements on each topic – Assessment, Management, Stakeholder Engagement, Stakeholder Support, Conformance/Compliance, and Outcomes. These provide an ability to assess both the processes in place to ensure sustainability of the project or operation, and the performance of that project or operation on that particular sustainability topic.

Table 3.4 Hydropower Sustainability Assessment Protocol Topics by Section

ES - Early Stage	P - Preparation	I - Implementation	O - Operation
ES-1 Demonstrated Need	P-1 Communications & Consultation	I-1 Communications & Consultation	O-1 Communications & Consultation
ES-2 Options Assessment	P-2 Governance	I-2 Governance	O-2 Governance
ES-3 Policies & Plans	P-3 Demonstrated Need & Strategic Fit		
ES-4 Political Risks	P-4 Siting & Design		
ES-5 Institutional Capacity	P-5 Environmental & Social Impact Assessment & Mgmt	I-3 Environmental & Social Issues Mgmt	O-3 Environmental & Social Issues Mgmt
ES-6 Technical Issues & Risks	P-6 Integrated Project Management	I-4 Integrated Project Management	ES-6 Technical Issues & Risks
ES-7 Social Issues & Risks	P-7 Hydrological Resource	O-4 Hydrological Resource	ES-7 Social Issues & Risks
ES-8 Environmental Issues & Risks	O-5 Asset	ES-8 Environmental Issues & Risks	O-5 Asset Reliability & Efficiency
ES-9 Economic & Financial Issues & Risks	P-8 Infrastructure Safety	I-5 Infrastructure Safety	O-6 Infrastructure Safety
P-9 Financial Viability	I-6 Financial Viability	O-7 Financial Viability	P-9 Financial Viability
P-10 Project Benefits	I-7 Project Benefits	O-8 Project Benefits	P-10 Project Benefits
	P-11 Economic Viability		
	P-12 Procurement	I-8 Procurement	
	P-13 Project Affected Communities & Livelihoods	I-9 Project Affected Communities & Livelihoods	O-9 Project Affected Communities & Livelihoods
	P-14 Resettlement	I-10 Resettlement	O-10 Resettlement

ES - Early Stage	P - Preparation	I - Implementation	O - Operation
	P-15 Indigenous Peoples	I-11 Indigenous Peoples	O-11 Indigenous Peoples
	P-16 Labour & Working Conditions	I-12 Labour & Working Conditions	O-12 Labour
	P-17 Cultural Heritage	I-13 Cultural Heritage	O-13 Cultural Heritage
	P-18 Public Health	I-14 Public Health	O-14 Public Health
	P-19 Biodiversity & Invasive Species	I-15 Biodiversity & Invasive Species	O-15 Biodiversity & Invasive Species
	P-20 Erosion & Sedimentation	I-16 Erosion & Sedimentation	O-16 Erosion & Sedimentation
	P-21 Water Quality	I-17 Water Quality	O-17 Water Quality
		I-18 Waste, Noise & Air Quality	
	P-22 Reservoir Planning	I-19 Reservoir Preparation & Filling	O-18 Reservoir Management
	P-23 Downstream Flow Regimes	I-20 Downstream Flow Regimes	O-19 Downstream Flow Regime

N3.2.5 Understanding the Protocol's Gradational Assessment Approach

The gradational approach undertaken in the Preparation, Implementation and Operation assessments tools can be understood by examination of *Table B3.5.* This table provides general guidance on characteristics that are likely to be exhibited for these different criteria at the five different scoring levels. The scoring statements found in the Preparation, Implementation and Operation assessment tools have been guided by the approach shown in *Table B3.5.*. This table is not intended to be the basis for assigning of scores, however, this table can be referred to during an assessment if there is insufficient information in the topic scoring statements and in the topic-specific assessment guidance to help the assessor to determine a score.

N3.2.6 Assigning Scores and Presenting Results

The Preparation, Implementation and Operation assessment tools enable development of a sustainability profile for the project under assessment. For each topic, scoring statements describe what should be exhibited by the project to address that important sustainability issue. It is recognised that different organisations may have the primary responsibility for different sustainability topics. Because it is likely that these responsibilities vary amongst countries and at project life cycle stages, no specification on organisational responsibilities is made in the Protocol scoring statements. It would be expected in the assessment reports to indicate where organisational responsibilities lie.

Scoring Levels

In the Preparation, Implementation and Operation assessment tools, each topic is scored from Level 1 to 5. The Level 3 and Level 5 statements provide meaningful and recognisable levels of performance against which the other scores are calibrated.

Level 3 describes **basic good practice** on a particular sustainability topic. Level 3 statements have been designed with the idea that projects in all contexts should be working toward such practice, even in regions with minimal resources or capacities or with projects of smaller scales and complexities. Note that the Protocol does not state that Level 3 is a standard that must be achieved; expectations on performance levels are defined by organisations that make decisions or form views based on Protocol assessments.

Level 5 describes **proven best practice** on a particular sustainability issue that is demonstrable in multiple country contexts. Level 5 statements have been designed with the idea that they are goals that are not easy to reach. However, they have been proven that they can be attained in multiple country contexts, and not onlyby the largest projects with the most resources at their disposal. 5s on all topics would be very difficult to reach, because practical decisions need to be made on priorities for corporate/project objectives and availability/allocation of resources (time, money, personnel) and effort.

On the topic pages, the Level 3 statements are provided in full, and the Level 5 statements provide what is exhibited in addition to that described in the Level 3 statement. Consequently, the Level 5 statements are meant to be read in conjunction with the Level 3 statements.

The other scoring levels are represented by standard statements which use basic good and proven best practice as reference points:

Level 1 - There are significant gaps relative to basic good practice.

Level 2 - Most relevant elements of basic good practice have been undertaken, but there is a significant gap.

Level 4 - All elements of basic good practice have been undertaken and in one or more cases exceeded, but there are one or more significant gaps in the requirements for proven best practice.

Methodology for Assigning Scores

The Protocol has been designed so a score can be readily assigned for each sustainability topic in the Preparation, Implementation and Operation assessment tools. The following steps are involved in the assignment of a score for each Protocol topic:

1. The assessor evaluates if the scoring statements for each of the criteria specified at Level 3 are met by the project.

2. If there is a significant gap relative to the Level 3 statements (all or part of a criterion is not fulfilled), then a score of 2 is assigned to the topic.

3. If there is more than one significant gap relative to the Level 3 statements, then a score of 1 is assigned to the topic.

4. If all of the Level 3 statements are met, then the assessor evaluates if the scoring statements for each of the criteria specified at Level 5 are met by the project.

5. If there are one or more significant gaps relative to the Level 5 statements, then a score of 4 is assigned to the topic.

6. If all of the Level 5 statements are met, then a score of 5 is assigned to the topic.

"Significant" means important in effect or consequence, or relatively large. If there are minor gaps, these will not affect the score. That is to say, if there are minor gaps in meeting the requirements specified in the Level 3 statements, a score of 3 is still assigned. The significance of any gap is tested by the assessor through inquiry about the importance or magnitude of the effect or consequence of that gap.

The assessment guidance for each topic is provided to assist the assessor in understanding what is meant by different terms or phrases in the scoring statements. These are not absolute lists of requirements that must be met, but rather are often expressed as examples. The Glossary of Terms is also found in each assessment tool document, and contains many of the commonly used terms throughout the Protocol. The table entitled "Understanding the Protocol's Gradational Assessment Approach" is also included in each assessment tool document; if the assessor is having difficulties assigning scores based only on the topic page information, this table could be referred to as a form of assistance in determining scores.

There is the potential to assign scores for each of the topic criteria appearing on a topic page, in the interests of eliciting greater insights from the assessment.

Table B3.5 Understanding the Protocol's Gradational Approach

Level	Assessment	Management	Stakeholder Engagement	Stakeholder Support	Outcomes	Conformance / Compliance
5	• Suitable, adequate and effective assessment with no significant opportunities for improvement. • In addition to basic good practice (Level 3), the assessment are likely to take a relatively broader, external or regional view or perspective; emphasise opportunities; and show a high level of examination of interrelationships amongst relevant sustainability issues.	• Suitable, adequate and effective management processes with no significant opportunities for improvement. • In addition to basic good practice (Level 3), management plans and processes are likely to show excellent anticipation of and response to emerging issues or opportunities; senior management and/or executive decisions are likely to be timely, efficient and effective in response to monitoring data, investigations and issues arising; and in cases commitments in plans are public, formal and legally enforceable.	• Suitable, adequate and effective stakeholder engagement processes with no significant opportunities for improvement. • In addition to basic good practice (Level 3), the engagement is likely to be inclusive and participatory with the directly affected stakeholders. • Thorough feedback is likely to be available on how directly affected stakeholder issues are taken into consideration; • In cases there is likely to be directly affected stakeholder involvement in decision-making; and • Information identified through engagement processes to be of high interest to stakeholders is released publicly in a timely and easily accessible manner.	• There is support of nearly all directly affected stakeholder groups for the assessment, planning or implementation measures for that topic, or no opposition by these stakeholders • In cases formal agreements or consent with the directly affected stakeholder groups have been reached for management measures for that topic	• In addition to basic good practice (Level 3), there may be exhibited enhancements to pre-project conditions; contributions to addressing issues beyond those impacts caused by the project; leveraging of opportunities; or significant contribution to capacity building.	• No non-compliances or non-conformances.
4	• Suitable, adequate and effective assessment with only a few minor gaps. • In addition to basic good practice (Level 3), the assessment is likely to exhibit some recognition of broader, external or regional issues; opportunities; and interrelationships amongst relevant sustainability issues.	• Suitable, adequate and effective management processes with only a few minor gaps • In addition to basic good practice (Level 3), management plans and processes are likely to exhibit good anticipation of and response to emerging issues or opportunities; and in cases commitments in plans are public and formal.	• Suitable, adequate and effective stakeholder engagement processes with only a few minor gaps. • In addition to basic good practice (Level 3), there is likely to be good feedback on how directly affected stakeholder issues have taken into consideration; and information on sustainability topics understood to be of high interest to stakeholders is voluntarily released publicly.	• There is support of a large majority of directly affected stakeholder groups for the assessment, planning or implementation measures for that topic, or only very low opposition by these stakeholders.	• In addition to basic good practice (Level 3), there may be exhibited full compensation of negative impacts; some positive enhancements; or evidence of capacity building associated with the project .	• Very few minor non-compliances and non-conformances that can be readily remedied.
3	• Suitable, adequate and effective assessment with no significant gaps. This would typically encompass (as appropriate to the topic and life cycle stage) identification of the baseline condition including relevant issues, appropriate geographic coverage, and appropriate data collection and analytical methodologies; identification of relevant organisational roles and responsibilities, and legal, policy and other requirements; appropriate utilisation of expertise and local knowledge; and appropriate budget and time span. At level 3 the assessment encompasses the considerations most relevant to that topic, but tends to have a predominantly project-focused view or perspective and to give stronger	• Suitable, adequate and effective management processes with no significant gaps. These would typically encompass (as appropriate to the topic and life cycle stage) development and implementation of plans that: • integrate relevant assessment or monitoring findings; • are underpinned by policies; • describe measures that will be taken to address the considerations most relevant to that topic; • establish objectives and targets ; • assign roles, responsibilities and accountabilities; • utilise expertise appropriate to that topic; • allocate finances to cover implementation requirements with some contingency; • outline processes for monitoring, review, and reporting; and	• Suitable, adequate and effective stakeholder engagement processes with no significant gaps. These would typically encompass (as appropriate to the topic and life cycle stage): • identification of directly affected stakeholders; • appropriate forms, timing, frequency and locations of stakeholder engagement, often two-way; • freedom for affected stakeholders to participate; • attention to special stakeholder engagement considerations relating to gender, minorities, cultural sensitivities, level of literacy, and those who might require particular assistance; • mechanisms by which stakeholders can see that their issues are recognised and acknowledged, and how they have been or are being responded to; and • disclosure of information on significant sustainability topics (in cases this may be on	• There is general support amongst directly affected stakeholder groups for the assessment, planning or implementation measures for that topic,or no significant ongoing opposition by these stakeholders.	• As appropriate to the topic and the life cycle stage, there may be exhibited avoidance of harm; minimisation and mitigation of negative impacts; fair and just compensation; fulfilment of obligations; or effectiveness of implementation of plans.	• No significant non-compliances and non-conformances.

Level	Assessment	Management	Stakeholder Engagement	Stakeholder Support	Outcomes	Conformance / Compliance
	emphasis to impacts and risks than it does to	• are periodically reviewed and improved as required.	request).			
2	• A significant gap in assessment processes relative to basic good practice (Level 3).	• A significant gap in management processes relative to basic good practice (Level 3).	• A significant gap in stakeholder engagement processes relative to basic good practice (Level 3).	• There is support amongst some directly affected stakeholder groups for the assessment, planning or implementation measures for that topic, with some opposition.	• •A significant gap relative to basic good practice (Level 3), for example some deterioration in baseline condition.	• A significant non-compliance or non-conformance.
1	• Significant gaps in assessment processes relative to basic good practice (Level 3).	• There are significant gaps in management processes relative to basic good practice (Level 3).	• There are significant gaps in stakeholder engagement processes relative to basic good practice (Level 3).	• There is low support amongst directly affected stakeholder groups for the assessment, planning or implementation measures for that topic, or a majority oppose.	• Significant gaps relative to basic good practice (Level 3), for example deterioration in baseline condition with delay or difficulties in addressing negative impacts.	• Significant non-compliances and non-conformances.

N3.2.7 Relationship of Scores to Compliance with Regulatory Obligations

The preparation, implementation and operating phase of a hydropower project are framed by national regulations. First and foremost, a project is expected to comply with the laws and concessions/permits of the government. The Protocol offers a complementary tool, on a voluntary basis and in the spirit of continuous improvement, that identifies opportunities for improvement with respect to sustainability criteria relevant to an international context.

Compliance with relevant regulatory requirements is expected for all projects, and is an essential component of good practice. National or state requirements may be more or less stringent than the Level 3 statements in the Protocol. The Protocol is a globally applicable assessment tool, and makes no judgements on national requirements which are set for reasons of relevance to that country. There may in fact be cases where local law sets out, for example, compensation measures that a proponent should not legally go above or below.

Compliance with regulatory requirements does not equate to a particular scoring level in the Protocol, but should be recorded by the assessor if it is a substantive issue for the assessment.

If a conflict between regulatory requirements and the level of statements in the Protocol arises as a point of issue in the assessment, the assessor should note if the project has met the regulatory requirements for a particular criterion and what these regulatory requirements are with respect to the Protocol specifications, in addition to assigning a scoring level based on the Protocol specifications. Decision-makers will then be able to determine their own views on this information.

Presenting the Results

Based on the Protocol assessment, a report is developed. A formal template for reporting and presentation of results will be developed in the future, based on review of application experience as well as better understanding of the needs and interests of utilising organisations. Analysis of areas of strength, weakness and opportunity, and recommendations for the project, could be included if this has been specifically requested for the assessment report.

The emphasis is not on an overall single score or a pass/fail for a project, but rather on provision of a sustainability profile for the project accompanied by information that assists in systematically analysing and understanding the strengths, weaknesses and pathways towards improvement.

In provision of a summary table and diagram, the scores are presented to show topic by topic performance and are not aggregated. If a topic is Not Relevant or is Not Scored, it is shown as such in the report, summary table and summary figure. A simple bar chart, histogram or webgram could work well for a summary figure. Averaging, totalling, or calculating percentages

with scores is not intended, as it will mask areas of low performance and hence diminish credibility in the Protocol assessment as an aid to advancing project sustain