



Environmental and Social Issues Management

This guideline expands on what is expected by the criteria statements in the Hydropower Sustainability Tools (HST) for the Environmental and Social Issues Management topic, relating to assessment, management, conformance/compliance, stakeholder engagement and outcomes. The good practice criteria are expressed for different life cycle stages.

In the Hydropower Sustainability Assessment Protocol (HSAP), this topic is addressed in P-5 for the preparation stage, I-3 for the implementation stage and O-3 for the operation stage. In the Hydropower Sustainability ESG Gap Analysis Tool (HESG), this topic is addressed in Section 1.

Hydropower projects can have a number of environmental and social impacts if these are not carefully assessed and managed. Fortunately, there is considerable global experience available to help identify potential impacts and to mitigate these impacts. Hydropower projects are quite individual due to their varied technological specifications and environmental and socio-

economic settings, so care needs to be taken to determine what environmental and social risks are applicable to any given project.

This guideline outlines steps that must be demonstrated to meet good practice, which may go beyond national requirements. The international expectations are based on global hydropower experience and ensure that risks that could have been avoided at the impact assessment stage do not later emerge. The intent for environmental and social issues management of hydropower is that:

- environmental and social impacts are identified and assessed;
- appropriate avoidance, minimisation, mitigation, compensation and enhancement measures are designed, implemented, monitored, and demonstrated to be effective;
- negative environmental and social impacts associated with the hydropower facility are managed; and
- environmental and social commitments are fulfilled.
- ‘Avoid, minimise, mitigate and compensate’ is a concise expression for what is understood to be a sequential process. Measures to avoid or prevent negative or adverse impacts are always prioritised, and where avoidance is not practicable then minimisation of adverse

impacts is sought. Where avoidance and minimisation are not practicable, mitigation and compensation measures are identified and undertaken commensurate with the project's risks and impacts.

Assessment

Assessment criterion - Preparation Stage: Assessments of project environmental and social impacts have been undertaken for project implementation and operation, including evaluation of associated facilities, scoping of cumulative impacts, role and capacity of third parties, and impacts associated with primary suppliers, using appropriate expertise and with no significant gaps; and a baseline has been established and well-documented for the pre-project condition against which post-project changes can be compared.

During project preparation, assessment of potential environmental and social impacts, and the planning of measures to address these impacts, are as fundamental as engineering feasibility studies. The Environmental and Social Impact Assessment (ESIA) report is a critical step taken alongside project feasibility studies and informing detailed design. An ESIA identifies, predicts, evaluates and proposes mitigation for the biophysical, social, and other relevant effects and consequences of development proposals prior to major decisions being taken and commitments made.

To meet good practice, an ESIA report should contain at a minimum:

- a description of the proposed hydropower project;
- the hydropower project rationale and alternatives;
- a description of the existing environment sufficient to establish the pre-project baseline;
- relevant legal and policy requirements;
- a summary of stakeholder consultation undertaken during the impact assessment (see the Stakeholder Engagement criterion for this topic);
- identification and assessment of potential positive and negative project impacts, including ratings of their likelihood, and the magnitude and severity of consequences;

- a scope including the hydrological resource, terrestrial and aquatic biodiversity, waste, noise, air quality, water quality, erosion and sedimentation, downstream flows, project affected communities (including a focus on resettlement and on indigenous peoples if relevant), climate change, cultural heritage, public health, and labour and working conditions (individual guidelines provide further details on each of these topics);
- distinct evaluation of the above areas for the pre-construction, construction and operation stages of the project;
- proposed mitigation measures and management plans linked to each identified impact, with each measure clearly stating the objective and indicators of effectiveness;
- identification of **residual impacts**, i.e. those remaining after mitigation measures are implemented;
- management plan implementation arrangements, including responsibilities, timing, resources and budget; and
- a monitoring programme that addresses all potential impacts and will demonstrate if mitigation measures are effective or not.

Defining the project affected area is a critical step in the impact assessment process. This should be done at the scoping stage so that more detailed impact assessment and consultation is comprehensive. The project affected area is the project's area of influence in terms of direct and indirect effects. The assessment should not be limited by jurisdictional boundaries; i.e. an impact assessment should not stop at a national or state border unless a credible assessment determines that there will be no impacts outside of this area. Surrounding communities, activities along roads, quarries, disposal areas, and downstream areas subject to project influence must be included.

Spatially, the scope of impact assessment and management must cover direct and indirect impacts. **Direct impacts** are those under the control of or caused by the project, such as: changes in land ownership and/or land use; changes in environmental quality; and changes in quality of life for directly affected people. **Indirect impacts** are those outside the control of the project, such as: induced changes in regional demographics, employment, business and tax revenues, property values, and supply chain effects. The establishment of a project

affected area should also ascertain if there are any transboundary aspects of the project. This will allow early and careful consideration of how transboundary issues will be addressed when assessing impacts, engaging with stakeholders, and defining mitigation measures.

The ESIA should include impacts arising from facilities associated with the project. **Associated facilities** are those facilities that would not be constructed if the project did not exist, and where the project would not be viable without the other facility. These facilities may be funded, owned, constructed, and/or operated separately from the project, in some cases by third parties. Examples pertinent to a hydropower project could include roads, transmission lines, buildings, quarries and waste disposal sites.

The ESIA should include evaluation of the role and capacities of relevant **third parties**, such as local and national governments, contractors, and suppliers. An effective assessment should identify the different entities involved and the roles they play, as well as any corresponding risks that need to be managed with respect to achieving environmental and social outcomes. This should specifically include primary suppliers, i.e. first-tier suppliers which are providing goods or materials essential for the project and which may incur environmental and social impacts in this supply activity (such as a quarry or a factory).

While a full cumulative impact assessment is beyond the expectation of good practice, the ESIA should include scoping of relevant cumulative impacts. **Cumulative impacts** are those impacts that result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions or trends. At a minimum, the ESIA should contain a Cumulative Impacts section which seeks to ensure that: potential areas for which cumulative impacts may arise have been identified; the nature of these potential cumulative impacts has been considered; liaison with key stakeholders has been undertaken; and initial agreements have been made on avoidance, monitoring and response mechanisms.

An essential requirement of the ESIA is to establish baseline information against which

the changes brought by the project can be compared. The impact assessment documents should explain and justify the data collection and analysis processes for different types of data to show that they are systematic and rigorous. Requirements for baseline information for each focal area of the ESIA include the following:

- appropriate expertise is used for the sampling design, data collection, data analysis and interpretation;
- all available sources of secondary data are identified and included, including previous studies, national databases, and all relevant institutions;
- local knowledge and information is included, including from communities in the project affected areas (local anecdotal information can often provide a good guide for primary data collection design);
- primary data (i.e. sampling by the ESIA consultant) is collected from locations meaningful to project risks, including in areas of direct and indirect effects, including as far downstream as the project significantly affects flows;
- sampling data is collected over a time period and at intervals that reflect important seasonal cycles for the topic being investigated;
- sampling results are described according to relevant national standards, and if national standards are not available, then international standards are adopted;
- sampling results are linked to other factors (e.g. seasonality, climate, flows, land uses, other activities) in order to explain pre-project trends and issues;
- the methodology used for primary and secondary data capture is well-described;
- the implications of limitations in data availability, analysis and interpretation are discussed; and
- wherever practical, sampling results are reported back to relevant national databases.

Baseline information should be supported by a good quality set of maps in the ESIA report, following a standard format designed to ensure easy readability. The scale of each map should be appropriate to the project context, the size of the impact area, and the information intended to be conveyed, with the emphasis being on ensuring that the reader can discern the intended information easily.

Impacts, mitigation measures, management, and monitoring plans should be considered separately for the project construction and operation stages. Predicted impacts should be described using recognised descriptive terms to characterise the impacts, such as: type of impact (positive, negative); nature of impact (direct, indirect, cumulative, potential if trigger conditions are met); magnitude or severity of impact (low, moderate, high); extent of impact in terms of geographic area (small, medium, large); timing of impact (short-term, long-term, intermittent, continuous, seasonal); duration of impact (temporary, permanent); reversibility of impact (reversible, irreversible); and significance of impact (local, regional, global). Descriptive terms should be explained for the different types of impacts as needed.

Every attempt should be made to quantify the impacts. Predictions of impacts are normally based on commonly used qualitative and quantitative methods and models. The sophistication of the predictive models should be proportional to the significance of the issue to which it is being applied.

The assessment should include researching appropriate mitigation approaches for all identified impacts. Some hydropower impact mitigation measures are well-known and often applied (e.g. speed limits for vehicle related risks), whereas others require considerably more evaluation due to questions of cost and likely effectiveness (e.g. multi-level offtakes for reservoirs at risk of developing stratification, re-regulation weirs or storages to dampen flow fluctuations, downstream flow releases, fish passage technologies, fish hatcheries, livelihood improvement options, and project benefits). There may well be other measures that would merit further analysis for the proposed project based on conflicting views among stakeholders and the benefits that closer analysis and justification would bring. The effectiveness of a mitigation approach for one hydropower project may not be achievable for another project, so the feasibility of alternative approaches needs to be tested. The feasibility of each mitigation approach should be carefully considered with respect to factors such as likeliness of achieving its objectives, cost effectiveness, understanding of the relevant technology or policy approach, capacity to deliver, experience in application, stakeholder views, and risks.

Throughout the impact assessment process and identification of ongoing and emerging issues, appropriate expertise should be used. This is especially the case for specialist issues. Appropriate expertise refers to specialists with experience in the key identifiable topical areas of the assessment and management plans, giving particular attention to the differences between environmental areas and social impact areas. Impact assessment reports should document the expertise used.

Assessment

Assessment criterion - Implementation Stage: Environmental and social issues relevant to project implementation and operation have been identified through an assessment process, including evaluation of associated facilities, scoping of cumulative impacts, role and capacity of third parties, and impacts associated with primary suppliers, using appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.

During project implementation, there is a need to monitor:

- waste, noise, dust, air quality, water quality, erosion, sediments, and hazardous materials arising from construction activities;
- secondary effects of construction and implementation activities on receptors (e.g. environmental receptors such as habitats and wildlife, and social receptors such as workers, communities and livelihoods); and
- the quality of implementation of environmental, health and safety, and social programmes within the ESMP (resettlement, cultural heritage, occupational and public health, etc. as relevant).

The purpose of monitoring is to ensure impacts are mitigated, to verify achievement of objectives, and to identify any issues arising. Monitoring commitments should be integrally embedded within the ESMP so that the reasons for monitoring are clearly apparent. Monitoring information within the various ESMP sections should clearly identify, with reasons given: parameters, locations, timing, sample analysis and data reporting methods, standards for results comparison, and responsible parties.

Assessment

Assessment criterion - Operation Stage: Systematic processes are in place to identify any ongoing or emerging environmental and social issues associated with the operating hydropower facility, utilising appropriate expertise; and monitoring programs are in place for identified issues.

Hydropower projects developed prior to the 1960s are unlikely to have had a pre-development ESIA. In such cases, environmental and social issues identification and management planning should be conducted in an appropriately tailored manner during the operational stage.

During operations, the project should establish systematic processes to identify ongoing and emerging issues that may or may not have been predicted in earlier stages. A range of methods may be used to identify issues, including: corporate environmental management systems; monitoring programmes (either internal or government); periodic risk assessments; mechanisms by which stakeholders can raise issues; and internal monitoring programmes used for other purposes such as maintenance or safety.

Management

Management criterion - Preparation Stage: Environmental and social issues management plans and processes have been developed with appropriate expertise (internal and external) for project implementation and operation with no significant gaps; in addition to key social and environmental issues relating to the hydropower project, plans address construction related waste, noise, air quality, land disturbance and rehabilitation; the environmental and social impact assessment and key associated management plans are publicly disclosed.

The impact assessment process should result in the identification of measures to avoid, minimise, mitigate and compensate impacts. Measures should be set out in an Environmental and Social Management Plan (ESMP). An ESMP details the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental impacts, or to reduce them to acceptable levels, and the actions needed to implement these measures. The ESMP may be a large consolidated plan or a number of

specific plans for different impacts or mitigation activities. The objectives of an ESMP are:

- to document commitments to mitigation measures;
- to establish systems and procedures for implementation;
- to assign budgets, time schedules and responsible parties for implementation;
- to monitor the effectiveness of mitigation measures and, if necessary, update the mitigation commitments;
- to ensure compliance with relevant laws, regulations, conditions and standards; and
- to take necessary actions when unforeseen impacts occur.

The alternatives analysis in the ESIA can often provide good evidence of avoidance or minimisation measures. Where both avoidance and minimisation are impracticable, mitigation and compensation measures are identified and undertaken commensurate with the project's risks and impacts. Residual impacts are those impacts that remain after all avoidance, minimisation and mitigation measures have been applied, and it is for these that compensation measures are often considered to "offset" the impact or loss. Projects should aim for:

- all significant impacts to have clear measures defined that avoid, minimise, mitigate and compensate;
- all significant residual impacts to be well-understood by those who bear the consequences of those impacts;
- improvement of living standards and livelihoods for project affected communities compared to pre-project conditions; and
- ideally, net gain of biodiversity and environmental quality compared to pre-project conditions.

Mitigation measures can be classified into structural and non-structural measures. Structural measures include design or location changes, engineering modifications and construction changes, landscape or site treatment, mechanisation and automation, etc. For hydropower projects these may include, for example: sediment settling basins; erosion

protection works; wastewater treatment plants; fish passage; re-regulation structures; and safety barriers. Non-structural measures include, for example: economic incentives; legal, institutional and policy instruments; reservoir and power station operating rules (e.g. ramp-up and ramp-down rates, minimum and maximum reservoir levels); water release rules for downstream flow commitments; information signage; warning sirens; provision of community services; and training and capacity building. Non-structural measures are increasingly being used to reinforce or supplement structural measures and to address specific impacts.

The ESMP needs to be structured to distinctly cover construction and operation. Sections of an ESMP for hydropower projects will reflect the individual project context and issues. Examples of focal areas that may be within the ESMP are: catchment area treatment and protection; the Resettlement Action Plan; principles and guidance relating to indigenous peoples; spoil (excavated waste soil) dump management; compensatory afforestation; downstream (or “environmental”) flows; integrated water resources management; emergency management; terrestrial biodiversity conservation and wildlife management; green belt development; quarry restoration; aquatic biodiversity conservation and fisheries management; air quality management; noise management; labour management; worker occupational health and safety; land management; land disturbance rehabilitation; water quality management; water use and water supply management; reservoir rim treatment; erosion and sedimentation management; wastewater treatment; solid waste management; public health management; stakeholder engagement; grievance management; community development; project benefits; livelihood improvement; community safety; road safety; energy conservation; and traffic management.

Each component of the ESMP must outline impacts, mitigation measures, mitigation objectives and indicators of success, responsibilities, budget including contingency, time schedule, and monitoring. It is essential that all items on the above list are included or else the ESMP actions risk not achieving their intended

objectives. Ideally, the ESMP would also include adaptive management measures. This would identify what issues might be identified through the monitoring and surveillance and what the response would be (including responsible parties and contingency budget set aside).

The ESIA and ESMP should be made available to the public. This is often achieved by making hard copies available in public venues, for example at the regulator’s office and at local municipal offices; by posting the documents on a publicly accessible website; and by providing summaries on paper and verbally in local public meetings. International good practice requires making the ESIA and ESMP fully available on an easily accessible public website so that it can be accessible to a broad group of interested stakeholders, as well as ensuring local availability through well-considered means (see the Communications and Consultation guideline).

Management

Management criterion - Implementation Stage: Processes are in place to ensure management of identified environmental and social issues utilising appropriate expertise (internal and external), and to meet any environmental and social commitments, relevant to the project implementation stage; plans are in place for the operation stage for ongoing environmental and social issues management; and the environmental and social impact assessment and key associated management plans are publicly disclosed.

Management criterion - Operation Stage: An environmental and social management system is in place to manage measures to address identified environmental and social issues, and is implemented utilising appropriate expertise (internal and external).

Identification and associated management arrangements should be updated in response to changes in the project, findings from monitoring programmes, changes in community expectations, and changes in compliance requirements that may occur during implementation and operation. An environmental and social management system provides a systematic approach to

the management of social and environmental issues during the operations stage. More detailed guidance can be found in international standard ISO14001. The issues managed should reflect problems identified in the preparation and implementation stage and should at a minimum be consistent with the legal obligations of the project. A compliance register or comparable mechanism can be used to document environmental and social compliance requirements, and actions taken in relation to them. A systematic process should include ongoing assessment of issues and monitoring of the effectiveness of management measures, and changes and improvements to management approaches over time as new information becomes available. A process of evaluation, and improvement where warranted, should be evident.

Stakeholder Engagement

Stakeholder Engagement criterion - Preparation Stage: The environmental and social impact assessment and management planning process has involved appropriately timed, and often two-way, engagement with directly affected stakeholders; ongoing processes are in place for stakeholders to raise issues and get feedback.

Stakeholder Engagement criterion - Implementation and Operation Stages: Ongoing processes are in place for stakeholders to raise issues and get feedback.

Good practice requires that a process of stakeholder engagement has been followed in the assessment and planning for environmental and social issues management for hydropower projects. The identification and assessment of impacts during preparation should be based on stakeholder engagement. The impact assessment is often the main stakeholder engagement process during preparation. In addition, there should be ongoing processes for stakeholders to make their views on impacts heard. Full details on stakeholder engagement are provided in the guideline on Communications and Consultation.

Conformance/Compliance

Conformance/Compliance criterion - Implementation and Operation Stages: Processes and objectives in the environmental and social management plans have been and are on track to be met with no major non-compliances or non-conformances, and environmental and social commitments have been or are on track to be met.

During implementation and operation, the project should be in conformance with the objectives and commitments set out in the management plans, and any broader corporate commitments (for example as set out in a corporate sustainability policy) or commitments made to stakeholders (such as financiers). The project should be in compliance with all legal requirements, which should have been identified during the impact assessment process and through ongoing systematic monitoring, including any legally-enforceable conditions associated with permitting. Variations to commitments should be well-justified and approved by relevant authorities, with appropriate stakeholder liaison.

The significance of not meeting a commitment is based on the magnitude and consequence of that omission and will be context-specific. For example, a failure to demonstrate delivery of an essential environmental impact mitigation commitment is a significant non-compliance, whereas a slight delay in delivery of a monitoring report could be a non-significant non-conformance.

Outcomes

Outcomes criterion - Preparation Stage: Environmental and social plans avoid, minimise and mitigate negative impacts with no significant gaps.

Outcomes criterion - Implementation Stage: Negative environmental and social impacts of the project are avoided, minimised and mitigated with no significant gaps.

Outcomes criterion - Operation Stage: Negative environmental and social impacts associated with hydropower facility operations are avoided, minimised and mitigated with no significant gaps; and land disturbance associated with development of the hydropower project is rehabilitated or mitigated.



To show that plans avoid, minimise, mitigate and compensate negative environmental and social impacts from project activities, mitigation measures in the plans should be directly linked to all identified environmental and social issues and risks. The assessment and planning should be informed by appropriate expertise. The assignment of responsibilities and resource allocation for implementation, monitoring and evaluation should be appropriate to the planned actions.

An evidence-based approach should demonstrate that negative environmental and social impacts arising from project implementation and operation activities are avoided, minimised, mitigated and compensated with no significant gaps. The developer, owner and operator should

demonstrate that responsibilities and budgets have been allocated to implement ESMP plans and commitments. Monitoring reports and data in the implementation and operation stages should clearly track performance against commitments and objectives and capture environmental and social impacts. It should be possible to provide examples to show how identified risks from the ESIA have been avoided or minimised. It should also be possible to table evidence to show that mitigation plans have been implemented and are being monitored. Implementation of measures for environmental and social mitigation should be evident and monitoring should show how they are achieving their stated objectives.