



# Integrated Project Management

*This guideline expands on what is expected by the criteria statements in the Hydropower Sustainability Tools (HST) for the Integrated Project Management topic, relating to assessment, management, conformance/compliance and outcomes. The good practice criteria are expressed for the preparation and implementation stages.*

*In the Hydropower Sustainability Assessment Protocol (HSAP), this topic is addressed in P-6 for the preparation stage and I-4 for the implementation stage.*

An effective integrated project management process is fundamental to the success of a project. Major infrastructure project developments typically involve many contractors and sub-contractors and multiple work sites. Overall coordination of these multiple considerations is essential. This guideline addresses the developer's capacity to coordinate and manage all project components, taking into account project construction and future operation activities at the project affected areas. The intent is that the project meets milestones across all components, delays in any component can be managed, and

one component does not progress at the expense of another.

**Project components** in this context refer to components of the overall hydropower development programme that need to be scheduled and managed. These may include, and are not limited to, design, construction, environmental, social, resettlement, finance, safety, human resources, communications, and procurement.

## Assessment

*Assessment criterion - Implementation Stage: Monitoring of project progress, milestones, budget and interface issues, and of the effectiveness of management of implementation stage plans including construction management, is being undertaken on a regular basis during project implementation.*

While there is no Assessment criterion in the Protocol's preparation stage and this stage starts with development of the integrated management plan (see below under the Management criterion), there are assessment activities necessary to develop this plan. These start with understanding all aspects of the project development needs and the associated objectives and risks.

Once developed, the integrated management plan forms the basis for the implementation stage monitoring programme. Responsibilities, scope, timing, methods and reporting for monitoring of project construction and integrated project management plans should be clear for all aspects of project implementation. The logic of the design of monitoring programmes should be clearly documented and linked to objectives and risks. Monitoring reports should have a hierarchical design in which information is provided at the appropriate timing and level of detail for the uses and users of that information. Monitoring should also be regularly consolidated into reports for higher management, at a minimum addressing construction progress, environment, health, safety, labour and quality statistics, and identifying risks and interface issues. Higher level reports for supervisory board members should consolidate progress on engineering, environmental, financial and institutional activities guided by Key Performance Indicators (KPIs) set by the board of directors. Reports should clearly inform meetings and decision-making and guide continuous improvement measures.

Interface issues present risks to the project in terms of the potential to have a major impact on cost, timing or result in dispute. On sites with multiple major contractors and suppliers, each is appointed separately and gaps in responsibility can arise. Interface issues can arise between different contractors, for example with access to and timing of works in a particular work area or with use of resources and supplies. Further examples of interface issues include: starting to fill the reservoir before the resettlement plan is fully implemented; construction activities impinge on significant cultural heritage sites that should have received prior protective measures; or noise and dust from construction activities limit the effectiveness of biodiversity management measures. An overall project management office, and interface mapping and management, are key mitigation measures. Good practice requires a thorough analysis of potential interface issues, as well as monitoring throughout project implementation to determine how well these issues are being avoided and managed and if new issues are arising.

## Management

*Management criterion - Preparation and Implementation Stages: An integrated project management plan and processes have been developed and are in place that takes into account all project components and activities with no significant gaps; and a construction management plan has been developed and is in place that identifies construction risks and describes processes that contractors and others are required to follow to manage these risks.*

The preparation stage assessment activities will have established the project needs through the feasibility studies, detailed design report, and Environmental and Social Impact Assessment (ESIA). Plans produced during preparation should clarify objectives, establish necessary resources for implementation, identify roles and responsibilities, establish critical paths, assess risks and risk management measures, and evaluate potential interface issues. A frequent cause of project cost over-runs and delays is poor planning in relation to project activity scheduling. Many activities depend on the completion of others prior to commencement, and the critical path needs to be well-understood. Individual plans for particular project focal areas (many of which form the basis for contracts) must fit into an overall integrated project management plan.

The **integrated project management plan** should address the major project components and the hierarchy of relevant plans and responsibilities. There will always be a construction management plan, but these construction activities need to be implemented alongside the Environmental and Social Management Plan (ESMP) and component sub-plans, which may include plans relating to resettlement and project benefits and may also exist alongside plans relating to transmission line development and upgrades to the national road network to enable supplies to come into the project. The integrated project management plan should encompass the activities necessary for successful delivery of the project, whether they are the direct responsibility of the developer or not, and ensure that the parties involved understand their respective roles, responsibilities, scheduling, resources, significant path analysis, interface targets, risks, communications and coordination mechanisms, procedures, and controls.

The model for project delivery will depend on the choices made by the developer with regards to contractual arrangements, costs, and how risk is allocated and managed. Under any model, a project management office should be established with the central responsibility for project coordination and tracking against the overall integrated project management plan.

The construction management plan sits at a level under the integrated project management plan. It outlines activities required for construction of the hydropower infrastructure and specifies the layout and zones for the construction site activities. Locations of permanent project features (including the dam, reservoir, penstock, power house, tailrace, and transmission line) and temporary project features (including access roads, labour camps, workshops, offices, storage areas, waste disposal areas, and topsoil stockpiles) should be specified. The detailed construction schedule, critical path, and interfaces should be specified. These may include permits, inspections and approvals for various steps. Construction stage resource requirements and sources should be outlined with management measures, including:

- major supplies and equipment (e.g. cement, concrete aggregate, steel, explosives, pipework, turbines, and other electromechanical equipment);
- quarries, borrow pits, spoil, and topsoil stockpile areas;
- labour (permanent, contracted, sub-contracted, third parties);
- temporary storage areas;
- temporary access roads;
- construction stage water uses, quantities, quality, sources, treatment, and disposal;
- construction stage energy uses, types, quantities and sources;
- solid, liquid and hazardous waste quantities, treatment, drainage plans, transport needs, and disposal; and
- temporary camps, workshops, offices.

The construction schedule should address requirements from pre-construction site preparation (e.g. land acquisition and permits, site clearing, early access roads, temporary structures, energy and water access); site development

(e.g. camps, offices, internal roads, storage, workshops); major project construction (e.g. river diversion, intake structure, outlet works, dam construction, spillway, power house); reservoir filling and project commissioning; and site demobilisation and land rehabilitation.

The construction management plan should establish relevant policies and processes that will guide the work. These should include but not be limited to: project management; occupational health and safety; procurement; communications; reporting; labour management; environmental management; quality assurance/quality control; security; risk; compliance; budgets; insurance; permits; and audits. Alignment of policies and processes through work areas and contracts and sub-contracts should be ensured by clearly including expectations in contracts.

Construction risks should be well-analysed with proposed avoidance, minimisation and mitigation measures in the construction management plan. Major construction risks relate to impacts on time, cost and quality. Further and more specific construction risk examples could be in relation to safety, air, noise and water pollution, land contamination, land disturbance, water management, waste management, introduced species, health, the workforce, the supply chain, quality, weather, and worker-community conflicts. Many of these factors may be identified and evaluated in the feasibility studies, detailed design report and the ESIA, hence the need for close coordination between the construction project managers and the environmental and social managers.

An important element to be included in the integrated project management plan is the handover from construction to operation. There are many aspects that need to be built into this planning, including document management, engagement with the owner/operator during the design and construction stage so that future operations and maintenance (O&M) needs are built into the design, and training of the future O&M staff on the equipment and operations.

## Conformance/Compliance

*Conformance/Compliance criterion - Implementation Stage: Processes and objectives in the integrated project management plan and the construction management plan have been and are on track to be met with no major non-compliances or non-conformances.*

The integrated project management plan and the construction management plan represent a shared view of how the project will proceed. Approvals for project development and/or for project finance are likely to be given on the expectation that measures outlined in these plans will be delivered as per the plan. Compliance with terms of approvals is essential in development of the project.

The significance of any non-compliance is linked to magnitude, consequence, or repetition. Major non-compliance examples could include: not providing accommodation facilities for labourers in line with national standards; not reporting hazardous chemical spills; not using an independent panel of experts for dam safety as specified in the approvals and in the construction management plan; clearing a substantial area of vegetation without receiving the appropriate permit; or repeatedly dumping waste spoil in areas not officially designated to receive it. A significant non-conformance with the integrated project management plan might be commencing reservoir filling before resettlement preparations have been completed. A minor non-compliance might relate to, for example, a slight delay in delivery of a standard monitoring report. Variations to contracts should be well-justified and documented.

In the case of a major project development, compliance with contractual clauses needs close attention, especially when activities and tasks are delivered through sub-contractors or off-site manufacturers and suppliers. Consequences for non-compliances should be clear and delivered, such as fines or stop work actions (e.g. for a safety non-compliance).

Monitoring should include checking that processes in management plans are being followed. These will be specific to individual areas. Spot audits can be useful to randomly check how

different contractors or work areas are adhering to appropriate processes. These may relate to, for example, working conditions, hazardous work spaces, procurement, data management, or quality control measures.

## Outcomes

*Outcomes criterion - Preparation Stage: The project is likely to meet overall budget and timing objectives and targets, and plans avoid, minimise and mitigate construction risks with no significant gaps.*

*Outcomes criterion - Implementation Stage: The project is meeting overall budget and timing objectives and targets; interface issues are managed effectively; and construction risks are avoided, minimised and mitigated with no significant gaps.*

Overall budget and timing objectives and targets should be clearly identified in relevant plans and in major contracts. At the preparation stage, the content of the plans, the level of risk analysis and mitigation measures, and the capability of the developer, major contractors and third parties, should be at a level of planning that provides confidence in the ability of the project to deliver on its overall budget and timing targets. Contingencies should be well-considered and included.

Data collected and reported during implementation should clearly show project performance against KPIs and demonstrate delivery to targets and corrective actions taken where deviations from targets are evident or a clear risk. In addition to time and cost, KPIs set by the board of directors and possibly by major financial institutions might address other areas such as safety, labour, environment, communications, and quality. KPIs should be strategically set so that emerging issues can be detected, interface issues can be avoided, and risks can be managed early.

Project costs and time requirements may be updated during project implementation as practical issues with project delivery arise. They should remain within the boundaries of financial viability established for the project financial model (see the Financial Viability guideline).