



# Financial Viability

*This guideline expands on what is expected by the criteria statements in the Hydropower Sustainability Tools (HST) for the Financial Viability topic, relating to assessment, management, conformance/compliance 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-9 for the preparation stage, I-6 for the implementation stage and O-7 for the operation stage. In the Hydropower Sustainability ESG Gap Analysis Tool (HESG), this topic is addressed in Section 1.*

This guideline addresses project financial management, the funding of measures aimed at ensuring project sustainability, and the ability of the project to generate the necessary financial returns to meet project funding requirements. The intent is that the project is proceeding with a sound financial basis that covers all project funding requirements, including social and environmental measures and commitments,

resettlement and livelihood enhancement, benefits to project affected communities, and commitments to shareholders and investors.

**Financial viability**, in this context, is the ability of an entity to continue to achieve its operating objectives and fulfil its mission from a financial perspective over the long-term. It would be expected that a financially viable project generates sufficient cash flow to deliver an appropriate risk-adjusted return on the capital invested. However, some projects may be multi-purpose ventures in which hydropower is not the primary purpose, and therefore the financial objective of the hydropower component may be to support the delivery of the other purposes of the scheme (e.g. water supply, irrigation water, etc.). For some projects the financial contribution is measured from the perspective of the system within which it operates; for example, some pump storage projects may run at a loss but enable a greater profit to be made from other power stations within the system because of the greater efficiencies gained. Consequently, it is important to consider the project context and purpose in relation to its financial objectives.

## Assessment

*Assessment criterion - Preparation Stage: An assessment of corporate financial viability, including potential project costs and likely revenue streams, has been undertaken using recognised models with no significant gaps; analyses include risk assessment, scenario testing and sensitivity analyses.*

Financial assessments at the project preparation stage have a number of aspects, including project costs, revenue estimates, project funding mechanisms, and financial risks. All of these inputs inform financial modelling, which provides a determination on overall financial viability and allows different scenarios and assumptions to be tested.

## Project costs

Cost estimates need to be developed on an itemised basis using a logical structured approach, with well-considered contingencies added to each cost item based on an evaluation of risk. The reference year for costs should be clearly stated and annual escalation costs applied as appropriate. All assumptions behind each cost estimate need to be clearly stated (e.g. tunnelling rates linked to geology, currency exchange rates as applicable, materials sources, transport requirements). Cost estimates should be updated once the main construction contracts are awarded based on the outcomes of further field investigations and studies and the approach to contracting. An example of a logical structured breakdown for project cost estimates is:

- pre-construction costs (e.g. feasibility studies, detailed design, tendering)
- civil works (including temporary and permanent project structures)
- hydro-mechanical equipment
- electro-mechanical equipment
- switchyard equipment
- transmission infrastructure
- environmental and social costs, including land acquisition
- construction supervision and administration
- interest during construction
- other costs (e.g. taxes and duties, insurance)

The approach to estimating unit prices should be well-justified, such as for how much concrete or steel is required. This may take place through estimation of unit prices (e.g. by weight, volume, length) from records of actual prices used in similar projects, through published lists, or through detailed analyses. Lump-sum price estimates for specific project components also rely on professional experience and on any accessible information from previous projects. Equipment price estimates may also be informed by previous projects or indications from potential suppliers, noting that major electro-mechanical equipment can be subject to very wide fluctuations due to market conditions or workloads of the different suppliers. The requirements for the transmission system, and who bears these costs, needs clarification as there may need to be cost-sharing agreements with other projects.

Operation and maintenance (O&M) costs should also be identified at the preparation stage. They should take into account the costs of labour, consumables, spare parts replacement, routine maintenance, exceptional maintenance requirements, replacement of major equipment, insurance, and generation costs of the operator. The reference year for these cost estimates should be clearly stated and annual escalations included. Ideally, O&M cost estimations should involve the future operator and should include appropriate contingencies.

Costs for environmental and social components should be derived from the Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP), as addressed under the Environmental and Social Issues Management guideline. Example costs include conservation measures, building of a health clinic, resettlement community and livelihood re-establishment activities, drainage works and sediment settling ponds, etc. If borne by the project proponents, these costs would typically be internalised as part of the capital and operational costs of the project for the appropriate timeframe and to the appropriate standard. If some or all costs of social and environmental measures are funded from outside the project, this needs to be explicitly explained. Contingencies for environmental and social costs need to be well-considered.

## Revenue estimates

Estimates of revenue are based on estimates of electricity generation and other services provided (e.g. firm capacity, ancillary services), corresponding tariffs, and any revenue associated with investment drivers for new market entrants such as carbon finance, renewable energy certificates, etc.

Revenue estimates need to be based on a clear understanding of the inflows and the operational plans for the power house and reservoir. Calculations should take into account hydrological risk, operations of upstream reservoirs, irrigation schemes, diversions, etc., if any, and any operational constraints on reservoir management or downstream flow releases (see the Hydrological Resource guideline). Estimated energy generation should be expressed in association with an inflow probability based on hydrological modelling, for example 3,000 GWh in a 90% dependable year.

The approach to estimation of the tariff, i.e. the electricity pricing, will depend on the market context for the project. Tariffs may need to be differentiated, for example for local and export energy, for peak or base load energy, and by season. The **levelised tariff** should be calculated, referring to the average fixed and variable tariff over the project life, or the entire term of the Power Purchase Agreement, adjusted for inflation. For tariff calculations, it is important to clearly document the tariff calculation method used, the assumed tariffs for **firm energy** (i.e. energy guaranteed to be available) and excess energy, the expected firm and excess energy each year, and applicable annual escalation factors.

The market situation can be highly variable depending on the project, and market research and an understanding of how the market is evolving is critical to making forward revenue estimates. **Market**, in this context, refers to the situation of supply and demand for electricity, water and ancillary services in which the hydropower project operates. An open electricity market is a system for purchases and sales of electricity through bids and offers at relatively short-term time intervals, usually managed by an independent market operator responsible for generation and load balance. At the other end of the spectrum are **Power Purchase Agreements**

(PPAs), which are typically private long-term electricity contracts between a generator and an off-taker (i.e. power purchaser). Markets also exist to varying degrees for power-related commodities known as ancillary services.

**Ancillary services**, in this context, refer to operations provided by hydroelectric plants that ensure stable electricity delivery and optimise transmission system efficiency, including the provision of reactive power, frequency control and load following. The status of the electricity market is evolving in many parts of the world. There is a general trend towards more open wholesale and retail electricity markets through deregulation and promotion of competition, including at regional (transboundary) levels, to better fund ancillary services and incentivise energy efficiency and green energy.

## Project funding mechanisms

Assessment of project funding options is a major focal area during the preparation stage. Large utilities with a steady cash flow may choose to self-finance major parts of project costs. With regards to external funding, the terms “project funding” and “project financing” are often used interchangeably, but in fact project financing is a specialised form of funding. There are broadly three approaches to funding major infrastructure projects: government funding, corporate or on-balance sheet finance, and project finance.

Government funding is where the government chooses to fund some or all of the capital investment into a project, primarily in the case of publicly owned utilities and projects. There are also many models for public-private partnerships, often designed in response to particular needs of the government and the private developer regarding energy master planning, the timing required to have the infrastructure commissioned, available expertise, and allocations of risk. Governments may provide direct support, such as through subsidies, grants, equity investment and loans (i.e. debt). Funding support may also be provided through indirect methods which lower the overall project cost, such as waiving fees, costs and other payments that a private company would normally make to the government. The government may also provide subsidies and guarantees to power off-takers to help them meet the electricity tariffs and/or reduce demand risk to the project company.

With corporate finance (or “on-balance sheet” finance), the developer obtains finance for the project based on the balance sheet of the company rather than the project. This typically enables a lower cost of funding and is less complicated. There are limits to its use in that a company can only raise a limited amount of finance against its equity to stay within its target debt-equity ratio, and this approach may constrain how many projects the company can invest in. There are also “off-balance sheet” approaches that can be taken by a corporation, such as leases and partnerships.

Project financing is a common and relatively efficient approach to project funding, but the level of risk is relatively higher because it is solely tied to the project’s financial viability. Project finance relies on the future cash flow of a project as the primary source of repayment and holds the project’s assets, rights and interests as collateral security. Lenders typically carry out extensive due diligence on the project’s viability, and on how risks have been identified, analysed and will be mitigated.

Investor options need to be well-researched. There are a range of potential investors, with the accessibility of these depending greatly on the project location, characteristics and risks. Examples of potential investors include commercial banks, capital markets, equity funds, export credit agencies, development finance institutions, bilateral agencies, multilateral development banks and sovereign wealth funds. Preferential funding options may be available if projects can demonstrate meeting certain requirements, for example by qualifying for development bank loans or for certified green and climate bonds.

Regardless of the funding mechanism, the financial model will need to include information on:

- other pre-COD financial costs, such as charges and fees; and
- loans grace and repayment periods and amounts.

The cash flow modelling during project implementation needs to link very closely to procurement planning (see the Procurement guideline).

## Financial risks

The financial risk assessment is an additional significant requirement at the preparation stage. Financial issues and risk examples include: higher than estimated project costs; inability to meet required costs; overestimation of revenue streams; later than estimated COD; currency exchange fluctuations; difficulties in access to project finance; non-acceptance into renewable incentive or other comparable schemes; market access and changes; major inflation or depreciation; and loss of financial viability of the principal power off-takers.

A financial risk assessment needs to be centred around the financial objectives for the project. The financial risk assessment typically considers the probability and consequences of potential scenarios, changes, incidents or failures that could affect the financial viability of the project. Because hydropower projects are complex and site-specific, a high proportion of them experience schedule and budget overruns and consequently the probability of such events should be carefully considered. Reference class forecasting, which uses empirical data about the schedule and budget performance of similar projects, can be useful for this purpose. The definition of scenarios should inform financial policies and processes and should clarify the range of factors that would be tested in the financial model as sensitivity analyses.

Sensitivity analysis should be carried out on the financial results taking into account the risks identified for the project. These typically include tests of sensitivity to implementation costs, implementation time, energy production, tariffs, the discount rate, and financing costs.

- the portion of the total costs up to the **Commercial Operations Date (COD)** expected to be covered by **equity** (i.e. the amount of funds contributed by the owners, and any grants) and by **debt** (i.e. loans and bonds);
- interest rates (foreign and local currency components);

## Financial modelling

Financial modelling is used to ensure that a project can deliver a sustainable financial return under a range of credible scenarios (or other stated financial objectives specific to the project's purpose and context). In addition to the inputs identified above, parameters for the financial modelling should include the project economic life period (e.g. 30 years), key project implementation dates (notably including the COD), and the **discount rate** for the project. The discount rate is the percentage rate used to compute the value of future income, given that the value of money and hence its purchasing power tends to decrease over time. The discount rate is often calculated from the **Weighted Average Cost of Capital (WACC)** and should be less than the cost of debt. The **cost of debt** is the interest a company pays on its borrowings.

There are a number of approaches that can be taken to financial modelling. A quick "back of the envelope" method of analysis is **payback analysis**. A payback analysis calculates how long it will take to recover an investment into a project by dividing the initial investment by the average yearly cash inflow to determine the payback period. This method is not particularly accurate but can be useful for considering the relative merits of a project or group of projects regarding the likelihood of achieving a desired result.

Capital budgeting methods for financial modelling have more rigour and use of one or more of these methods should be demonstrated by the project. Because the amount of capital for a new project will be limited at any given time, capital budgeting techniques are used to determine which investment scenario will yield the most financial return over a period of time. Three examples of widely recognised methods of financial modelling using capital budgeting – Net Present Value, Internal Rate of Return, and Discounted Cash Flow – are listed below.

**Net Present Value (NPV)** – NPV is a common financial modelling approach. The NPV formula calculates the difference between the present value of cash inflows and the present value of cash outflows over a period of time. A positive NPV ( $NPV > 0$ ) indicates that the investment will be profitable because the projected earnings (in present value) is greater than the anticipated

costs (in present value). NPV is often used by companies to make decisions on investments because it provides an equivalent method of comparing both internal and external investments of a company where there are different values and profits over time.

**Internal Rate of Return (IRR)** – IRR is also a useful tool to compare potential investments or potential scenarios for investment. IRR is frequently used to rank multiple potential projects or scenarios for projects, with the highest IRR indicating the best likely financial result. The IRR is the discount rate that makes the NPV of all cash flows from a project equal to zero. The term "internal" is used because external factors, such as the cost of capital and inflation, are omitted from the calculation. The IRR is calculated based on the NPV formula with the NPV set to zero and the calculations used to determine the discount rate, which is here the IRR.

**Discounted Cash Flow (DCF)** – DCF is very similar to NPV, relies on the same formula, and takes into account calculations of both NPV and IRR. The difference is that DCF looks at how valuable an investment will be in the future, and therefore the focus of attention is on the discounted future cash flow. DCF is of high interest to investors because it helps calculate the returns that would be obtained for the investment and how long it would take to get the returns.

There are other financial indicators that developers and lenders are likely to be closely tracking. Lenders often have thresholds on financial ratios specified in financial agreements, with measures to be employed if target ratios are breached. Examples of commonly tracked financial ratios include:

- **Debt to Equity Ratio.** The debt to equity ratio is calculated as long-term debt divided by shareholders' equity. A high debt to equity ratio decreases the amount shareholders need to supply but poses risks to the lenders in terms of what can be recovered in case of project financial difficulties.
- **Loan Life Cover Ratio (LLCR).** The LLCR represents the number of times the cash flow over the life of the loan can repay the outstanding debt balance. It is calculated as the NPV of available cash for debt service up to the maturity of the loan, divided by the principal

outstanding. Lenders often specify a minimum LLCR to provide reassurance about loan repayments.

- Debt Service Cover Ratio (DSCR).** The DSCR measures the amount of cash flow available to meet periodic interest and principal payments on debt. The DSCR is similar to the LLCR in that it indicates the ability to repay debt, but it focusses on specific periods in time rather than the overall life of the loan. **Debt service** is the amount of payment due to the lenders by the project company in any given period, and **servicing debt** refers to making loan repayments. The DSCR calculates the ratio of the total revenues available for debt service during a period (e.g. net of operating costs, insurance premia, taxes, etc., but before equity distributions) and compares this to the amount of debt service owed.
- Rate of Return (ROR) or Return on investment (ROI).** The ROR or ROI (or “return”) refers to the ratio of money gained or lost on an investment (including both debt and equity) relative to the amount of money invested, usually on an annual basis. **Internal rate of return (IRR)** as discussed above is the discount rate that results in an NPV of zero for revenues over the project period; this shows the annualised effective compounded ROR which can be earned on the invested capital (both debt and equity). **Return on Equity (ROE)** removes the return committed to debt servicing, which provides equity investors with an indication of their return over the project economic life.

The quality of a financial model, and hence its outputs, depends on a number of factors, including the robustness of assumptions made, the accuracy of cost and revenue estimates, and the type and range of scenarios that are considered for the project. All should be well-researched and justified. Financial modelling should be undertaken utilising appropriate expertise.

## Assessment

*Assessment criterion - Implementation Stage: An assessment has been undertaken of project financial viability, including project costs and revenue streams, using recognised models and including risk assessment, scenario testing and sensitivity analyses; and monitoring of the financial situation during project implementation is being undertaken on a regular basis.*

*Assessment criterion - Operation Stage: Routine monitoring of the operating hydropower facility's finances is being undertaken to identify risks and assess the effectiveness of management measures; and ongoing or emerging financial management issues have been identified.*

Although implementation and operation stage financial assessment requirements have many of the same elements as the preparation stage, they are focussed on following up on the substantial assessment work already done. A large focus at the implementation stage, during which loan disbursements are made and major expenditure is undertaken, is on recording and evaluating project costs, monitoring cash flows in relation to disbursements, ensuring all necessary payments will be able to be made on time, and monitoring implementation of financial plans and risks. A large focus at the operations stage is on revenue forecasting, financial model updates, cost management, and business cases for major refurbishment requirements.

Financial risk assessment and management are essential components of all stages and need to consider both internal risks (e.g. effectiveness of internal controls, budget exceedances, effectiveness of financial systems, processes and software) and external risks (e.g. market trends, hydrological risk, exchange rates, regulatory developments, new technologies, operating constraints).

## Management

*Management criterion - Preparation Stage: Financial management plans and processes have been developed for project implementation and operation with no significant gaps, and opportunities for project financing have been evaluated and pursued.*

*Management criterion - Implementation Stage: Measures are in place for financial management of project implementation; plans are in place for financial management of the future operating hydropower facility.*

*Management criterion - Operation Stage: Measures are in place for financial management of the operating hydropower facility.*

The assessment work undertaken during the preparation stage needs to result in the development of financial management plans. Plans should be developed at the preparation stage for both the implementation and (at a preliminary level) the operation stage. Financial management plans should address staffing, resourcing, systems, policies, procedures, internal controls, risk, compliance, monitoring, reporting, and independent review. Plans should clearly document financial objectives, such as Key Performance Indicators (KPIs), important financial ratios, and their target levels.

Financial management processes should be clearly documented and typically include:

- **Internal controls and approvals** – Role responsibilities for financial approvals should be defined in a delegations policy or manual and authorisation processes should be built into the financial management system. Duties should be segregated to ensure control and individuals should be given authorisations, for example to clear master data, manage depreciations, and run the payroll system. Systems of checks and balances should be evident, such as monthly bank reconciliations and automatic detection systems for irregular transactions.
- **Budgeting and expenditure** – The financial management plans need to outline allocations for expenditure for each financial year, in line with the progression of works during the implementation stage and the various management plans at both the implementation and operations stages. Processes should define formats, timing and approvals processes for annual budgets. Budgets should include appropriate contingencies. All management plans should be included (e.g. asset management, environmental and social, occupational health and safety), with care taken that one focal area does not take funds away from other areas of commitment (see the Integrated Project Management guideline). Processes for cost control should be defined and closely linked to procurement processes (see the Procurement guideline). Processes should also be defined for managing budget variations and allocation of contingency budgets.
- **Financial risk management** – Financial risks should be managed by applying the same mitigation hierarchy as for other types of risks, namely through avoidance, minimisation,

mitigation and compensation. Financial risk management measures should be well-researched and re-evaluated on a regular basis. Examples of financial risk mitigation approaches include investments in risk prevention and minimisation, risk monitoring, insurances, performance guarantees, contingency budgets, and funding commitments that can be called upon in the case of cost overruns. Some risks may be transferred to other parties (government, contractors, off-takers, insurers, etc.) through contractual arrangements.

- **Accounting** – Processes and systems should be in place to manage accounting needs, including budgets, expenditure, payroll, tax, materials management, asset valuations, etc.
- **Auditing** – An annual schedule of both internal and external auditing should be in place with clearly defined processes.
- **Financial reporting** – Processes should be defined leading to the generation of regular financial reports, following standard accounting practices, and tailored to meet the needs of decision-makers.

Starting with test operations and COD, additional financial management processes will come into play related to market research, sales, billing, and revenue management. Market conditions will change over time and depending on marketing arrangements there may be constant or periodic opportunities to increase revenues or a need to respond to adverse developments. Some of these may require significant investments for expansion, rehabilitation, or reoperation.

Other options that may be considered at certain points in the project life cycle include: sales of the entire project, certain assets or shares; refinancing of debt; re-negotiation of joint venture, power purchase, concession and other agreements; securitisation of revenue; and/or mergers or acquisitions.

## Conformance/Compliance

*Conformance/Compliance criterion - Implementation and Operation Stages: Processes and objectives relating to financial management have been and are on track to be met with no major non-compliances or non-conformances, and funding commitments have been or are on track to be met.*

Good practice requires evidence that financial management measures are compliant with the relevant government requirements, which may be expressed in licence or permit conditions, or captured in relevant legislation, or in the case of public utilities be subject to public financial administration regulations. Lenders will also have their own requirements that need to be met.

Compliance requirements may relate to, for example, accounting, reporting and auditing standards to be met, debt repayment schedules, tax requirements, audit schedules, and financial reporting to be submitted to government and/or made public.

Conformance refers to delivering what is in the corporate or project-level financial plans. These planning inclusions should go beyond budgetary allocations and should include planning for financial management roles and role expectations, funding for and adherence to internal controls (e.g. auditing, delegations, financial approvals), delivery of audit and reporting schedules, and ensuring appropriate financial management capacity, for instance through financial management software and staff training.

Financial commitments may be expressed in regulatory requirements, government or developer policies, or in any relevant company statements made publicly or within management plans. Many financial commitments are embedded within contracts and loan agreements. Evidence of adherence to funding commitments could be provided through, for example, inspections, monitoring, reports, and independent review.

The significance of not meeting a financial requirement is based on the magnitude and consequence of that omission and will be context-specific. A minor non-conformance might be a slightly late internal monitoring report. A major non-conformance might be a significant overspend that impacts on the financial viability of the project and requires significant replanning and refinancing. A major non-compliance could be failure to pay taxes owed to the government or to follow legal requirements in meeting financial obligations.

## Outcomes

*Outcomes criterion - Preparation Stage: The project can manage financial issues under a range of scenarios, can service its debt, can pay for all plans and commitments including social and environmental, and access to capital can be demonstrated.*

*Outcomes criterion - Implementation and Operation Stages: The project or the corporate entity to which it belongs can manage financial issues under a range of scenarios, can service its debt, and can pay for all plans and commitments including social and environmental.*

To be considered financially viable, the project should (during the preparation and implementation stages) be projected to and (during the operation stage) demonstrably generating sufficient cash flow to deliver an appropriate risk-adjusted return on the capital invested. The expectations on the return to be generated should be well-stated in financial plans and modelling. As noted above, there may be exceptions to the expectation that a project will be profitable on a standalone basis, such as the case of multi-purpose projects or pump storage projects within an energy asset portfolio. Of importance is that the financial objectives are clearly documented, and financial modelling, plans, analyses and status reports show that these objectives are achievable.

Financial modelling, plans, analyses and status reports should be consistently focussed on selected financial indicators, as discussed under the assessment criterion. Financial modelling should have tested a set of reasonably identified scenarios and included sensitivity testing on key assumptions in the model. The financial reporting should show how indicators are being met and, where risks and adverse trends are emerging, how management interventions have effectively achieved the outcomes sought.

A range of documents should be readily accessible relating to the financial policies, practices and results of the developer or owner/operator. Financial information should be well-documented due to the commercial and legal



implications of financial activities. Policies and procedures should be available that address the range of issues described in this guideline. Financial status reports should include:

- cash flow statement – tracks the money flowing in and out of the business and shows payment cycles or seasonal trends that require additional cash to cover payments;
- profit and loss statement (also known as an income statement) – lists income and expenses and enables determination of profit or loss over a given time period;
- balance sheet – provides a snapshot of the business at a particular date, listing all of the business' assets and liabilities, and enables determination of net assets (i.e. equity);
- monitoring of key financial ratios to help analyse the business' financial health; and
- monitoring of key financial risks, and actions taken to address ongoing and emerging risks.

Other documentation that can demonstrate this criterion is met includes market research reports, analysis of financing options, financial modelling reports, financial risk analysis, financial plans, and third party review and advisory reports.

Access to capital to deliver the financial plans should be clearly demonstrable. The total capital committed to the project (via equity, grants, loans, bonds) should correspond to the estimated total cost of the project, taking into account interest rates and costs of finance. The financial model should include all sources of capital, take into account any conditions or thresholds in relation to the various sources, and should demonstrate that the cash flows over time will match the project construction and operation plans. Appropriately closed financial agreements should be in place for all sources of capital.

The Environmental and Social Management Plan (ESMP) budget should be a clear line item in all financial planning and reporting. At the preparation stage, financial planning for the environmental and social measures should include a well-considered budget contingency for this area. Despite the best researched and detailed ESMP, issues always arise during implementation that cannot be fully foreseen ahead of time. The contingency budget needs to be sufficient and well-considered, with appropriate controls on its use. The developer and owner/operator should be able to demonstrate that:

- the main elements of the ESMP have each been considered with regards to their individual risks of not achieving successful long-term outcomes;
- contingencies for funding have been calculated or estimated that would enable implementation of alternative or enhanced measures in the case that mitigation measures are not successful;
- ESMP-related management plans identify what would be shown by the monitoring to indicate that contingency measures need to be implemented (e.g. exceedance of a threshold value over a certain time period), thus supporting the case when contingency funds are sought; and
- contingency budgets have been well-utilised to ensure successful outcomes from the environmental and social programmes (i.e. not diverted to other purposes and then unavailable for their initial purpose).