OUTLINE TERMS OF REFERENCE AND COST ESTIMATES
FOR THE TECHNICAL ASSISTANCE
(Nepal: Detailed Engineering Study for the Upper Seti Hydropower Project)

Project Preparatory Technical Assistance
for Preparing Hydropower Development for Energy Crisis

A. Impact and Outcome
1. The impact of the project preparatory technical assistance (TA) will be increased generation capacity in the country—essential for inclusive economic growth. Additional power generation capacity of 127 megawatts will help alleviate the nation's power crisis and thus impact the economy and standards of living, particularly for the poor. The delivery of the ensuing project is expected to promote development of clean hydropower eligible for Clean Development Mechanism credits. The impact will be achieved by financing and implementing the ensuing physical project for Upper Seti hydropower development. This will be the result of sufficient project preparation, which includes effective engineering design and overall project structuring acceptable to the government of Nepal, ADB, and/or other development partners. The design and monitoring framework is in Appendix 1 of the report and recommendation of the President.

B. Methodology and Key Activities
2. The TA key outputs will include (i) financial and economic viability assessment, (ii) project institutional and financial arrangements, (iii) environmental and social safeguard planning and advance actions, and (iv) technical bid documents. A phased approach will be taken in developing, financing, consulting, and implementing the ensuing project for Upper Seti hydropower development.

3. Development phase. The TA consultants will undertake due diligence on the feasibility studies. Based on the cost estimates available, financial viability will be reviewed and the TA consultant will study institutional setup options for the ensuing project including establishment of a special purpose company through a public–private partnership. Based on reviews of the existing social data, a full-scale social and socioeconomic survey will be conducted to assess impacts on resettlement; indigenous peoples; and vulnerable people including women, the poor, and the socially excluded. A full resettlement plan and indigenous people development plan will be prepared if necessary. The TA consultants will collect profiles of each affected household and their asset valuation for compensation through a transparent mechanism in consultation with local government officials and communities. The environmental impact assessments prepared by the Nepal Electricity Authority (NEA) will be reviewed and strengthened in accordance with the Asian Development Bank (ADB) Safeguard Policy Statement and guidelines.

4. Financing and consulting phase. The TA consultant will take the lead in negotiating cofinancing with public and private development partners. Credit enhancement and carbon finance will also be explored. The TA consultant will assess financial viability, finding an appropriate balance of allocation of risks, responsibilities, and benefits among the stakeholders. National and local economic impacts will also be assessed. A package of community development plans and activities will be prepared using a participatory approach, and social and

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1 The initial poverty and social analysis is in Linked Document 11.
environmental action programs will be developed through partnerships with nongovernment organizations (NGOs) and/or civil society. Effective public consultation and communication will be undertaken with affected people, central and local government officials, media, NGOs, and civil society. Safeguard documents will be finalized and disclosed under the TA.

5. **Implementation phase.** The TA consultant will prepare the bid documents to be floated, and to support the initial procurement process. While NEA and the Japan International Cooperation Agency have conducted more than 10 public consultations in various timings and locations, the TA consultant will further conduct effective communication and advance actions for asset valuation for compensation rates and modes to be agreed with the affected people prior to financial closure. The TA consultant will work closely with NEA as well as central and local government officials to promote advance implementation and smooth implementation. These activities will ensure project preparedness that can reach financial closure. The TA will include NEA’s capacity development of an effective safeguard implementation plan and compliance.

C. **Cost and Financing**

6. The total cost of the TA is estimated at $2,360,000 equivalent. ADB will provide $2,000,000 on a grant basis from the Japan Fund for Poverty Reduction, funded by the Government of Japan and administered by ADB. The Government of Nepal will finance the remaining $360,000 equivalent of local currency costs through in-kind contributions, including office accommodation and facilities, counterpart staff, data, and other information. The detailed cost estimates and a financing plan are in the attached Table 1.

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2 Social action programs plan to include rural electrification, irrigation, health and sanitation, watershed management, education, vocational training, and social and gender action plans for affected communities and persons including woman, children, and the socially excluded.
Table 1: Cost Estimates and Financing Plan
($'000)

<table>
<thead>
<tr>
<th>Item</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Asian Development Bank Financing</strong>a</td>
<td></td>
</tr>
<tr>
<td>1. Consultants</td>
<td></td>
</tr>
<tr>
<td>a. Remuneration and Per Diem</td>
<td></td>
</tr>
<tr>
<td>i. International Consultants (48 person-months)</td>
<td>1,318.90</td>
</tr>
<tr>
<td>ii. National Consultants (35 person-months)</td>
<td>140.00</td>
</tr>
<tr>
<td>2. Equipmentb</td>
<td>13.40</td>
</tr>
<tr>
<td>3. Workshops, Resource Persons, Seminars, and Conferencesc</td>
<td>40.50</td>
</tr>
<tr>
<td>4. Vehicle Rentald</td>
<td>41.00</td>
</tr>
<tr>
<td>5. Surveyst</td>
<td>91.50</td>
</tr>
<tr>
<td>6. Miscellaneous Administration and Supportf</td>
<td>21.60</td>
</tr>
<tr>
<td>7. Contingencies</td>
<td>185.10</td>
</tr>
<tr>
<td><strong>Subtotal (A)</strong></td>
<td>2,000.00</td>
</tr>
<tr>
<td><strong>B. Government Financing</strong></td>
<td></td>
</tr>
<tr>
<td>1. Office Accommodationg and Transportgh</td>
<td>30.00</td>
</tr>
<tr>
<td>2. Remuneration and Per Diem of Counterpart Staff</td>
<td>320.00</td>
</tr>
<tr>
<td>3. Others</td>
<td>10.00</td>
</tr>
<tr>
<td><strong>Subtotal (B)</strong></td>
<td>360.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,360.00</td>
</tr>
</tbody>
</table>

a From the Japan Fund for Poverty Reduction funded by the government of Japan and administered by ADB.
b The equipment will become the property of the executing agency at the end of the technical assistance. The equipment will include 1 computer, 1 printer, 1 scanner, 1 fax machine, 5 digital cameras, 5 global positioning systems, and 1 copy machine.
c Includes costs of translation, printing, and presentation tools for the meetings with the stakeholders including community members, the executing agency and government officials, intellectuals, civil society, media, and NGOs in Kathmandu and project areas.
d Vehicle rentals are justified because of the need for project site reviews, surveys, data gathering, and commuting to the offices.
e Includes surveys for asset valuation, and environmental and social and socioeconomic data.
f Includes office support staff and utilities.
g Includes office space, installation of two telephone lines for fax machine, 2 internet connections, air conditioners in the consultant's office, electricity, and water charges.
h Includes transport of counterpart staff.

Source: Asian Development Bank estimates.

D. Implementation Arrangements

7. NEA will be the executing agency. If a special project company is established, it will be an implementing agency. A project management unit has been set up within NEA. NEA's general manager for Engineering Services is the project director and will oversee day-to-day TA implementation by the project management unit. NEA has also established a counterpart project team and appointed its project manager and members to work with the consultants, help them liaise with other stakeholders, and obtain data and documentation. To facilitate any policy and
high level actions required by ADB during implementation of the TA, an oversight body has been set up as the steering committee.\(^3\) NEA will provide office space, furniture, and support facilities to the TA consultants.

8. The TA will require 83 person-months of consulting services (48 international and 35 national). The consultant team will include extensive expertise in terms of power sector management, engineering, finance, economics, social and environmental safeguards, communication, and community development. The outline terms of reference are paras 10–23. The TA is expected to be implemented over 24 months, from October 2010 to September 2012. ADB will engage a consulting firm or consortium of firms using quality- and cost-based selection procedures in accordance with ADB’s Guidelines on the Use of Consultants (2010, as amended from time to time). The TA-financed equipment will be procured under ADB’s Procurement Guidelines (2010, as amended from time to time). The disbursements will be made under ADB’s Technical Assistance Disbursement Handbook.\(^4\)

9. The consultant will submit to NEA and ADB an inception report focusing on the work program no later than 1 month after commencing the consultancy services; interim reports 7 months and 15 months after the start of the services; and a draft final report 22 months after incorporating all of the deliverables and the performance evaluation achieved under the TA. Tripartite meetings will be held in Nepal to discuss the inception, interim, and draft final reports among the consultant, NEA, and the ADB mission. Every 3 months, the consultant will prepare progress reports highlighting any achievements and issues that are critical for timely TA completion. Within 2 months of the tripartite meeting, the consultants will submit a final report in a format acceptable to ADB after addressing all comments received from NEA and ADB.

E. Outline Terms of Reference for Consultants

10. The TA consultant team will include 13 areas of expertise: (i) power sector management, (ii) financial analysis and structuring, (iii) economic analysis and evaluation, (iv) environmental assessment and management, (v) social development and safeguards, (vi) legal and contractual aspects, (vii) communication development, (viii) community development, (ix) hydropower planning, (x) hydrological engineering, (xi) construction planning, (xii) electrical engineering, and (xiii) mechanical engineering. The team leader will be an international expert in power sector management or hydropower planning. The team leader will coordinate the inputs of all the other consultants, provide quality control on all outputs, harmonize proposals and recommendations, and ensure that the consultation process is adequate in terms of stakeholder participation and ownership. The national experts will be supervised by the counterpart international experts. The international experts will supervise the consultant team for the detailed engineering study for the Upper Seti Hydropower Project when necessary. The experts will collaborate with executing and implementing agency staff as well as central and local government officials to enhance their capacity building. The consultants’ outline terms of reference will include, but not necessarily be limited to, the following tasks.

1. **Power Sector Management Specialist** (international, 6.5 person-months)

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\(^3\) The steering committee is chaired by the secretary, Ministry of Energy; members include the joint secretary, Ministry of Finance; the managing director, NEA; the general manager, Engineering Services, NEA; and the general manager, Generation, NEA.

11. The expert will develop the institutional setup and its process, sector road map, and management actions including institutional policy actions to strengthen the hydropower sector and accelerate hydropower development projects. The expert will do the following:

(i) Review the feasibility studies prepared by the Japan International Cooperation Agency.
(ii) Review the existing regulations, policies, and plans for hydropower development; and assess legal regulatory constraints for hydropower development in Nepal.
(iii) Assess overall mitigation measures to improve the investment climate in hydropower development in Nepal. Incorporate their requirements and impacts in the overall project design.
(iv) Group potential hydropower projects into generic categories such as domestic or export, run-of-river or storage, or small or large capacity. For each category, evaluate options for ownership, structures, governance, pricing, returns, risks, and incentives of private participation; and recommend options.
(v) Assess power sector performance and reforms, key challenges and opportunities, and barriers and risks associated with hydropower projects.
(vi) Assess options of possible ensuing project structure (e.g., public–private partnership. Identify advantages and disadvantages, and propose the best structure for the ensuing investment project.
(vii) Promote private sector involvement and support strategic communications among stakeholders such as government ministries and agencies, and potential private enterprises for strategic partnerships. Prepare documents that establish the organizational and procedural framework if any.
(viii) Assess and formulate benefit sharing among the project stakeholders.
(ix) Develop a strategy for hydropower development, and formulate a time-bound sector road map for policy actions as well as a long-term investment plan.
(x) Assess NEA’s institutional capacity and governance system to manage hydropower development projects. Prepare ADB’s checklists including (a) Peace Filter for Project Design and Implementation of Project, (b) Disaster and Climate Change Risks Screening Tool, and (c) Governance Risk Assessment and Management Plan. Identify priorities for institutional capacity building with time-bound action plans.
(xi) Prepare a problem-tree analysis. Specify indicators to monitor benefits from the ensuing physical project, and establish procedures and provide a benefit monitoring and evaluation framework in terms of ADB’s Guidelines for Benefit Monitoring and Evaluation and a design and monitoring framework including impacts, outcomes, outputs, inputs, and activities and milestones.
(xii) Prepare and disseminate the project findings on the project development process for knowledge management, in a final report at the end of the TA.

2. Financial Specialist (international, 4.0 person-months; national, 2.0 person-months)

12. The experts will analyze project financial viability and coordinate the financing structuring. The experts will review NEA’s financial management using ADB’s Financial Management Guidelines (2005) and Financial Due Diligence Methodology Note (2009) as guides. The international expert will supervise the national expert. In accordance with ADB’s Financial Management and Analysis of Projects, the experts will do the following:
(i) Review the feasibility studies and analyze the financial viability of the ensuing physical project. Identify all risks for revenues and costs based on sensitivity analyses, and evaluate financial internal rates of return. Include risk mitigation and risk transfer plans as necessary. Evaluate the financial attractiveness and availability of the ADB Future Carbon Fund and/or other similar products in collaboration with ADB's technical support facility for the Clean Development Mechanism.

(ii) Help engineers prepare the project cost estimates, including physical and price contingencies, and interest and charges during construction (including other financing charges, if any).

(iii) Promote financial structuring with the public and private development partners. Simulate and evaluate optimal financial structuring and modeling in terms of profits, costs, and risks through all measures such as equity, loans, or an insurance (guarantee) mechanism from private investors and lenders, export credit agencies, multilateral development banks, and bilateral donors. Incorporate a risk mitigation mechanism or a sufficient security package as applicable. Help the executing and implementing agencies arrange counterpart funds.

(iv) Review and assess the executing and implementing agencies’ financial management of corporate planning and budgetary control, financial and management accounting, cost accounting, internal control and audit system, and data processing; and assess capacity-building needs (refer to ADB’s financial management guidelines).

(v) Develop financial projection models comprising financial statements and financial ratios for the next 10 years to assess the project and its institutional financial viability and impacts using key performance indicators.

(vi) Help the community development specialist assess financial implications for social action programs, including benefit-sharing arrangements with affected communities.

3. **Economist** (international, 1.0 person-months; national, 2.0 person-months)

13. In accordance with ADB guidelines for *the Guidance of Economic Analysis* and *the Financial Management and Analysis of Projects*, the experts will analyze demand, supply, and economic viability; and assess tariff pricing. They will assess the government’s fiscal condition and impacts on the ensuing physical project, and undertake the following:

(i) Review the feasibility studies and analyze the economic viability of the ensuing physical project. Identify all economic costs and benefits based on sensitivity analyses and evaluate economic internal rates of return. Analyze determinants and elasticity of demand for electricity, and quantify economic benefits estimated on willingness-to-pay data (demand and affordability) from the socioeconomic survey.

(ii) Analyze forecasted load growth and the sector's function-wise revenues and costs in relation to tariffs, cost recovery, and cross-subsidy among customer groups and in the power sector's value-chain process. Determine future sustainable tariffs to support the ensuing loan project.

(iii) Review and assess the impacts of the government’s fiscal position and debt sustainability on nonconcessional term loans if applicable. Simulate the government’s revenues (e.g., taxes, dividends, and royalties), expenditures, and borrowing capacity for various scenarios for the financing plans, using a debt
sustainability model that is consistent with International Development Association and International Monetary Fund guidelines.

(iv) Identify stakeholders and conduct a distribution analysis in accordance with ADB’s Handbook for Integrating Poverty Impact in Economic Analysis for Projects (2001). Calculate the poverty impact ratio and undertake risk and sensitivity analyses.

(v) Help the community development specialist assess economic implications for social action programs.

4. **Environment Specialist** (international, 3.5 person-months; national, 4.0 person-months)

14. In accordance with relevant policies and guidelines of the government and ADB, in particular, the ADB Safeguard Policy Statement and its guidelines, the experts will do the following:

(i) Review the feasibility studies and available environmental impact assessments (EIA) reports. Interact with the consultant conducting the detailed engineering study and assess a design suitable for the environment and climate change through hydraulic model tests. Improve and report on initial environmental examinations (IEE) and/or EIA. Pay special attention to safety, water quality, cultural and ecological impacts to set up the baseline information for monitoring. Conduct additional surveys if applicable.

(ii) Prepare an environmental management plan (EMP) for the project-affected area and the river catchments including upstream and downstream areas. Include a monitoring program (indicators, frequency, and reporting), and recommend mitigating measures, and budgets and institutional arrangements to implement them. Assess environmental benefits. Prepare livelihood restoration programs in the environmental management plan with the community development specialist.

(iii) Coordinate with ADB’s technical facility for the Clean Development Mechanism to prepare the project design document for its application.

(iv) Assess environmental safety of the relocation sites for physically displaced persons.

(v) Assess and incorporate design and management to adapt to climate change (e.g., riverbank protection and early warning systems) and improve safety measures. Assess any climate change risks (e.g., flash floods and glacial lake outburst floods) and their mitigation measures if any.

(vi) Document and organize public consultations at least once in representative project sites, and invite local stakeholders. In case of environment category A, carry out at least two public consultations (once during the early stages, and once when the draft EIA report is available and before loan appraisal).

(vii) Support communications with stakeholders including donors, civil society, NGOs, and media with a help desk function, in collaboration with the communication development specialist.

5. **Social Development Specialist** (international, 4.5 person-months; national, 6.0 person-months)

15. The experts will prepare documents for a resettlement plan and indigenous peoples development plan, with special attention to vulnerable people including women, children, and
the poor and socially excluded. In accordance with the ADB Safeguard Policy Statement and its relevant guidelines, the experts will do the following:

(i) Review the feasibility studies and design the ensuing physical project to minimize resettlement effects, in collaboration with engineers and environmental specialists. Analyze alternatives to minimize adverse impacts and maximize positive social effects. Compare selected routes with rejected routes and locations; map the impact corridors; identify stakeholders and their involvement, through further consultation in identifying the alternatives.

(ii) Identify permanent and temporary socioeconomic impacts arising from land acquisition, changes in land use, and restrictions of access, due to changes of river flow and project facilities. Include measures to minimize the number of affected land users within the river catchments including upstream and downstream areas.

(iii) Prepare a resettlement plan, and an indigenous peoples development plan if required, with full participation of stakeholders. The plans should be based on
(a) socioeconomic profiles (including local ethnic minority profiles) of the project-affected communities, including resettlement sites;
(b) a full census and inventory of lost assets (permanent or a temporary), indicating the scope and magnitude of likely resettlement effects, and list likely losses of households, agricultural lands, business and income opportunities, as well as affected communal assets and public buildings;
(c) an entitlement matrix, listing all likely effects, such as permanent and or temporary land acquisition, and a study to determine the replacement costs of all categories of losses based on the asset valuation process, with particular attention to vulnerable groups including indigenous peoples, women, children, and the poor and socially excluded;
(d) exact cost estimates and clear budgets for land acquisition and resettlement costs with a specific sourcing and approval process;
(e) an implementation schedule consistent with all the resettlement plan requirements, making sure that all compensation is carried out before the civil works (the compensation framework should be agreed with affected people in advance, at least during TA implementation);
(f) compensation determination committees with affected people and government officials (particularly in local district offices);
(g) a grievance mechanism and appeal procedures and mechanisms for disclosing the resettlement plan to affected persons;
(h) social action programs; and
(i) a monitoring framework including monitoring indicators to ensure safeguard implementation.

(iv) Prepare and implement public consultations and disclosure to ensure that the executing and implementing agencies have consulted all affected people and obtained their views about the ensuing project and resettlement effects, entitlements, schedule, and options for compensation and assistance in a form and language they can understand.

(v) Review activities for local ethnic minorities and the poor in implementing other hydropower projects; and assess lessons, issues, and action plans. Develop an independent monitoring mechanism and indicators for resettlement, and ethnic minority-related activities.

(vi) Set up the resettlement-related committees (e.g., the compensation determination and resettlement coordination committees, resettlement steering
committee, grievance redress committee) and develop an agreement on the compensation framework including compensation packages, compensation rates, replacement cost, resettlement assistance, and asset verification.

(vii) Develop detailed implementation plans for land purchase and acquisition, payment of compensation, livelihood restoration programs, and community development plans.

(viii) Assess the capacity of the executing and implementing agencies to plan, manage, implement, finance, and monitor, and prepare capacity-building measures and training workshops for stakeholders.

(ix) Collect willingness-to-pay data used for economic analysis to estimate benefits in conducting the socioeconomic survey. Compile and analyze the data in the database using global positioning system (GPS) and geographic information system (GIS). Develop a checklist for a stakeholder analysis.

(x) Prepare a summary poverty reduction and social strategy, including a social analysis, social impact assessment, and gender development and other relevant documents according to ADB guidelines and format. Social and gender analysis includes pro-poor design, benefits, and other mitigation measures for social risks such as sexually transmitted infections, labor, affordability, or human trafficking.

(xi) In consultation with local communities and government, and with the community development specialist, develop a project-specific social and gender action plan including rehabilitation of rural infrastructure, livelihood-related activities, and any specific training or awareness programs for local communities and vulnerable people such as women and the socially excluded. Include the cost and the checklist for monitoring the baseline data in the plan.

(xii) Coordinate social action programs and community development plans, using a participatory approach with the community development specialist. Explore partnerships with host communities, grassroots NGOs, and civil society for planning and implementation.

(xiii) Assess measures to ensure compliance with national labor laws (e.g., minimum wages, equal pay, safe working conditions, or social security contributions) and international core labor standards (e.g., nondiscrimination, prohibition of child labor), to improve employment opportunities for vulnerable persons.

(xiv) Consult with labor unions or any beneficiary groups as needed.

6. **Legal and Contractual Specialist** (international, 1.5 person-months)

16. The expert will prepare and/or review any legal and contractual documents. The expert will do the following:

(i) Assess legal regulatory constraints for hydropower development in Nepal.

(ii) Support the institutional setup for the ensuing physical project (e.g., articles of incorporation of a special project company) and public–private partnership arrangements if applicable.

(iii) Support any commercial arrangements (e.g., power purchase agreement) if applicable.

(iv) Support the contractual process with stakeholders in tendering, procurement, negotiation, and financial arrangements and agreements as necessary.

7. **Communication Development Specialist** (international, 3.0 person-months; national, 5.0 person-months)
17. In collaboration with the social development specialists, the environment specialists, and the community development specialist, the expert will do the following:

(i) Develop safeguard enhancement programs to improve and facilitate public awareness among affected people. Focus on separate consultation programs designed for each group, gender, peoples, and social classes; eliminating barriers to their participation.

(ii) Provide capacity development to the executing and implementing agencies to facilitate corrective actions of safeguard measures and planning. Assess success and failure of past communication with stakeholders or during ongoing similar projects in Nepal and other countries, and identify lessons.

(iii) Organize local facilitators to enhance effective communication with affected people including political leaders, women, children, school teachers, and socially vulnerable groups.

(iv) Lead and support constructive discussions or negotiations on safeguard issues including resettlement procedures and community development plans, among internal stakeholders including affected people, executing and implementing agencies, and central and local government officials.

(v) Develop effective consultation materials (in local language if necessary) to support a participatory approach to meet the expectations of each stakeholder group on resettlement procedures and community development plans.

(vi) Lead and support effective communications on safeguard and other social issues with external stakeholders including academia and civil society, NGOs, media, and other development partners. Conduct effective measures to disseminate factual information to each of the stakeholders, to sort out any negative reactions or concerns.

(vii) Establish an information help desk with executing and implementing agencies, and provide responses and solutions to questions on safeguard documents raised by affected people to the executing and implementing agencies and the government.

(viii) Organize a single association that represents affected people for each of the project areas, by preparing an article of association to improve and coordinate an effective and constructive communication and negotiation framework.

(ix) Help the association or affected people classify and summarize their demands to the executing and implementing agencies and/or central and local governments to facilitate communications among the stakeholders.

(x) Organize and coordinate discussion forums and stakeholder meetings among the executing and implementing agencies, affected people, and other stakeholders.

8. Community Development Specialist (national, 4.0 person-months)

18. In collaboration with the environment specialists, the social development specialists, and the communication development specialist, the expert will do the following:

(i) Review the feasibility studies and assess social action programs for rural electrification, irrigation, health and sanitation, watershed management, education, vocational training, woman and vulnerable people development in affected communities including the host communities. Focus on sustainable livelihood programs for affected areas.

(ii) Provide consultations on suitable social action programs with the affected people, local government officials, and resettlement host communities, along with
the resettlement plan and indigenous people development plan if required. Take
a participatory approach, and explore partnerships with host communities,
grassroots NGOs, and civil society for planning and implementation.

(iii) Conduct detailed surveys to assess the exact cost estimate for each social action
program. Compile and analyze the data collected (e.g., by ethnic group, sex,
other social factors) in the database using GPS and GIS if applicable.

(iv) Prepare detailed implementation plans (e.g., schedule and implementation
mechanism, procurement, consulting services) for the social action programs.

(v) Assess financial and economic impacts in collaboration with the financial
specialists and economists.

(vi) Prepare and implement a public consultation and disclosure plan in a form and
language community members can understand.

(vii) Set up a monitoring framework including monitoring indicators for the
implementation plan, based on the data collected.

(viii) Assess the capacity of the executing and implementing agencies to plan,
manage, implement, finance, monitor, and prepare capacity-building measures
and training workshops for stakeholders.

9. **Hydropower Planning Engineer** (international, 6.5 person-months; national,
6.0 person-months)

19. The experts will coordinate all outputs from other engineers in the project team and
consultants conducting the detailed engineering study. In collaboration with other experts
including the power sector management specialist, the financial specialist, the environmental
specialist, and social development specialist, the experts will do the following:

(i) Review the feasibility studies from the viewpoint of overall engineering aspects in
accordance with international best practices.

(ii) Review past and ongoing hydropower projects in terms of engineering design
and cost. Assess the cost compared with other projects in neighboring countries.

(iii) Review the reservoir sedimentation study carried out by the hydrological
engineer to identify the least-cost solution with minimum environmental impacts.
Reflect the optimal design in the cost estimates and tender documents.

(iv) Help plan a hydraulic model test on sediment flushing facilities that will be
conducted by the consultant team for the detailed engineering study (in particular
hydraulic model test experts and civil design engineers (head works). Review
and supervise activities of the counterpart specialists in the consulting team of
the detailed engineering study, if any.

(v) Prepare any disaster risk management plan including local flood control and
early warning systems, with the hydrological engineer.

(vi) Revise and finalize a generation scheme based on the reservoir sedimentation
study with the hydrological engineer.

(vii) Finalize the overall cost estimates and implementation schedule.

(viii) Plan design works for the ensuing physical project with the consultant team of
the detailed engineering study, and supervise all the consultants’ activities and
outputs for the overall design works, if any.

(ix) Assess advantages and disadvantages of conventional construction contracts
and engineering, procurement, and construction (EPC) contracts scheme; and
finalize the suitable scheme for procurement and implementation.

(x) Prepare general and technical parts of civil works in the tender documents in the
procurement process, incorporating clear evaluation criteria.
(xi) Prepare tender documents for the construction works in accordance with the ADB Procurement Guidelines for components financed by ADB. Coordinate with other development partners with other procurement guidelines.

(xii) Coordinate with other experts concerned to prepare the tender documents. Support the executing and implementing agencies and/or ADB in evaluating the bids if applicable.

10. **Hydrological Engineer** (international, 4.5 person-months)

20. The expert will coordinate activities and outputs from other engineers in the project team and consultants conducting the detailed engineering study. The expert will do the following:

   (i) Review and simulate hydrological and sedimentological data in the feasibility studies.
   (ii) Review and finalize a suitable option from hydrological assessment reports updated from the consultant team of the detailed engineering study.
   (iii) Revise inflow data at the dam site, if necessary, to be used for revision of the generation scheme.
   (iv) Prepare input data used for the reservoir sedimentation simulation, and plan the simulation under discussion with the hydropower planning engineers to optimize the sediment flushing operation.
   (v) Prepare a final assessment on reservoir sedimentation and sediment flushing operation.
   (vi) Prepare any disaster risk management plan including local flood control.
   (vii) Revise the generation scheme based on the reservoir sedimentation study and recalculate the installed capacity and annual generating energy for the project in coordination with hydropower planning engineers.

11. **Construction Planning Engineer** (international, 4.5 person-months; national, 6.0 person-months)

21. The experts will coordinate activities and outputs from other project team engineers and consultants conducting the detailed engineering study. The experts will do the following:

   (i) Review the feasibility studies and update data necessary to estimate unit prices of construction costs for the civil works based on the latest market prices.
   (ii) Examine construction methods for civil works in consideration of the site conditions, and geological and geotechnical assessments from the detailed engineering study. Incorporate risks and mitigation measures.
   (iii) Prepare a construction schedule for civil works.
   (iv) Coordinate between civil works and other works with relevant engineers in the consultant team if any, and prepare overall construction schedule compiling a schedule for equipment and transmission line works.
   (v) Finalize construction optimal least-cost estimates of civil works based on the construction methods and schedule.
   (vi) Assess the executing and implementing agencies’ implementation capacity for construction and operation, and recommend any mitigation measures to improve their management capacity (e.g., any implementation support, EPC contracts, operation and maintenance contracts).
(vii) Compile the cost of all works and environmental and social safeguards, and social action programs; and estimate the project cost including administration end engineering fee, management fee, and contingency.

(viii) Help the hydropower planning engineers prepare general and technical parts of civil works in the tender documents for the procurement process, incorporating clear evaluation criteria.

(ix) Coordinate with other experts concerned to prepare all the tender documents. Support the executing and implementing agencies and/or ADB evaluate the bids if applicable.

12. Electrical Engineer (international, 4.5 person-months)

22. The expert will coordinate activities and outputs from other project team engineers and consultants conducting the detailed engineering study. The expert will do the following:

(i) Review the feasibility studies and finalize the design of the electrical equipment and transmission lines prepared by the consultant team for the detailed engineering study. Incorporate risks and mitigation measures.

(ii) Examine methods of electric equipment installation works, considering the site conditions.

(iii) Prepare the implementation schedule for installation works of electric equipment and transmission lines.

(iv) Prepare the technical section for the electrical equipment and transmission lines in the tender documents.

(v) Help the hydropower planning engineers prepare a schedule for design, transportation, and installation works for the electrical equipment and transmission lines.

(vi) Finalize construction cost estimates for electrical equipment and transmission lines based on the construction schedule.

(vii) Coordinate with other experts concerned to prepare all the tender documents. Support the executing and implementing agencies and/or ADB evaluate the bids if applicable.

13. Mechanical Engineer (international, 4.0 person-months)

23. The expert will coordinate activities and outputs from other engineers in the project team and consultants conducting the detailed engineering study. The expert will do the following:

(i) Review the feasibility studies and finalize the design for the mechanical equipment prepared by the consultant team for the detailed engineering study. Incorporate risks and mitigation measures.

(ii) Examine methods of mechanical equipment installation works, considering the site conditions.

(iii) Prepare the implementation schedule for design, transportation, and installation works of mechanical equipment.

(iv) Help the hydropower planning engineers prepare technical sections for the mechanical equipment in the tender documents.

(v) Finalize optimal construction cost estimates of mechanical equipment based on the construction schedule.
(vi) Coordinate with other experts concerned to prepare all the tender documents. Support the executing and implementing agencies and/or ADB evaluate the bids if applicable.