

PROJECT PREPARATORY TECHNICAL ASSISTANCE

A. Justification

1. The project preparatory technical assistance (PPTA) is necessary to: (i) review the technical, economic and financial viability of the sub-projects and ascertain the project rationale, scope, cost, schedule, implementation arrangements, risks and mitigation measures; (ii) ensure the compliance with ADB's *Safeguard Policy Statement* (2009) and identify mitigation measures; and (iii) assist the project executing agency in the IPP solicitation and selection process, PC-I approval and procurement of contractor and project implementation consultant.

B. Major Outputs and Activities

2. Under the PPTA, ADB will employ consulting firms to (i) update the capacity assessment of the executing agency; (ii) conduct technical, economic, financial due diligence; (iii) help the executing agency prepare Environmental Impact Assessment report, Land Acquisition and Resettlement Plan, Environmental Assessment Review Framework and Land Acquisition Resettlement Framework; (iv) provide inputs to ADB's Report and Recommendation of the President (RRP); and (v) assist the executing agency in the preparation of bidding documents, IPP solicitation, and selection process. An individual national consultant will be hired to assess social development and gender aspects of the project and to support the executing agency to recruit project implementation consultant. The major outputs and activities are summarized in Table A3.1.

Table A3.1: Summary of Major Outputs and Activities

Major Activities	Major Outputs	Expected Completion Date
I. Sector Review and Risk Assessment		
A. Review sector policy, institutional capacity arrangements, regulatory framework, investment and development plan, four MFF constituents.	• Sector assessment report	March 2017
B. Assess procurement capacity	• PCA report	
C. Assess sector and project risk and recommend mitigation measures	• Risk assessment and management report	
II. Engineering Design and Cost Estimates		
A. Review FS report	• Inception report	April 2017
B. Conduct technical due diligence: scope, design, specifications, schedule and cost estimate	• Technical due diligence report	
C. Updated FS report	• FS report	
D. Preparation of PC-I	• PC-I	
III. Compliance with Environmental Safeguards		
A. Review and assess the environmental section of FS and project preparedness	• Environmental audit report	April 2017
B. Prepare EIA and conduct public consultation meetings during the preparation of EIA	• EIA report	
C. Prepare EARF for the MFF	• EARF	
IV. Social Safeguards		
A. Conduct rapid social and poverty analysis (including gender analysis)	• Social and Poverty analysis report	March 2017
B. Draft SPRSS and GAP	• Draft SPRSS/GAP	
C. Draft LARP for Tranche 1 and LARF for MFF	• LARP and LARF	
D. Climate change and vulnerability assessment	• CCV assessment report	

V. Economic and Financial Analysis		May 2017
A. Conduct economic and financial analyses: estimate WACC, WTP and LRMC, least cost analysis	<ul style="list-style-type: none"> • Economic analysis report • Financial analysis report 	
B. Prepare FMA for PEDO and financial projection	<ul style="list-style-type: none"> • FMA report (PEDO) 	
C. Prepare financial structure, assess and propose fund flow and disbursement mechanism	<ul style="list-style-type: none"> • Financial structure report 	
VI. Preparatory Work for Procurement		May 2017
A. Prepare specifications and bidding documents for the turnkey contract	<ul style="list-style-type: none"> • Draft bidding documents 	
B. Assist recruitment of project implementation consultant (individual consultant)	<ul style="list-style-type: none"> • Draft Submission documents (1-4) 	Throughout the process
VII. Capacity Building		
A. Assist the evaluation of IPP solicitation	<ul style="list-style-type: none"> • Advisory 	When needed
B. Assist preparation of invitation and RFP for IPP	<ul style="list-style-type: none"> • RFP 	December 2016

CCV = climate change and vulnerability assessment report, EARF = environmental assessment review framework, EIA = environmental impact assessment, FMA = financial management assessment, FS = feasibility study, GAP = gender action plan, IPP = independent power producer, LARF = land acquisition resettlement framework, LARP = land acquisition and resettlement plan, LRMC = long run marginal cost, MFF = multitranches financing facility, PCA = procurement capacity assessment, PEDO = Pakhtunkhwa Energy Development Organization, RFP = request for proposals, SPRSS = summary of poverty reduction and social strategy, WACC = weighted average cost of capital, WTP = willingness to pay.

Source: Asian Development Bank.

C. Cost Estimate and Proposed Financing Arrangement

3. The technical assistance is estimated to cost \$2 million equivalent of which \$1.75 million equivalent will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-V). All disbursements under the PPTA will be made in accordance with the Technical Assistance Disbursement Handbook (2010, as amended from time to time). The government will provide support in the form of counterpart staff, provision of office space and furniture. The detailed cost estimate is in Table A3.2.

Table A3.2: Cost Estimates and Financing Plan
(\$'000)

Item	Total Cost
Asian Development Bank^a	
1. Consultants	
a. Remuneration and per diem	
i. International consultants (35 person-months)	950.0
ii. National consultants (70 person-months)	450.0
b. International and local travel	150.0
c. Reports and communications	20.0
2. Workshops, training, seminars, and conferences ^b	70.0
3. Vehicle ^c	10.0
4. Surveys ^d	30.0
5. Contingencies	70.0
Total	1,750.0

^a Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF-V).

^b Workshops, training, seminars, and conferences

Purpose	Venue
EIA safeguards stakeholder consultation	KPK
Road shows and Investor's forum	TBD

^c Vehicle: Rental vehicles required during fielding in KPK and for site survey 6 months

^d Surveys: Environmental modelling analysis, willingness to pay \$30,000

Source: Asian Development Bank.

D. Consulting Services

4. A total of 35 international person-months and 73 national person-months of consulting services will be required under the PPTA (Table A3.3). Two consulting firms will undertake project due diligence, prepare feasibility reports required by the government, and draft bidding documents. One of the consulting firms will be recruited using the quality- and cost-based selection method using 90:10 technical/financial weighing to ensure high level quality outputs for this large and important investment. The proposal will be a standard technical proposal. Another consulting firm will be hired to prepare the environmental impact assessment report and social safeguard documents, using quality-based selection.

Table A3.3: Summary of Consulting Services Requirement

Positions	Person-Months	Positions	Person-Months
International	35	National	73
Hydropower Planning Engineer/Team Leader	6	Energy Sector Expert	2
Mechanical Engineer/Deputy Leader	4	Economic Expert	3
Electrical Engineer	4	Private Public Partnership Expert	3
Control & Instrumentation Engineer	2	Social Safeguard Expert	6
Civil Engineer (Hydro)	4	Gender Expert	2
Hydrological Engineer	2	Hydropower Expert (individual)	8
Financial Management Expert	3	Legal and Contracts Expert (Individual)	6
Procurement Expert	4	Financial Evaluation Expert (Individual)	6
		Project Coordination Expert (Individual)	15
Senior Environmental Expert	6	Private Public Partnership Expert	3
		Biodiversity Expert	4
		Senior Environmental Engineer	4
		Senior Environmental Engineer	3
		Climate Change Expert	2
		Social Development Specialist	3
		Project Finance Expert (Individual)	3

EIA = environmental impact assessment.

Source: Asian Development Bank.

5. The outline terms of reference for the consulting firms are described in Appendix 5.

E. Implementation Arrangements

6. Pakhtunkhwa Energy Development Organization (PEDO) will be the executing agency. A project management unit (PMU) will be established under PEDO. PEDO has allocated and will continue to allocate sufficient resources and qualified personnel as required for the project. The PMU will closely work with the PPTA consultants. The proposed PPTA processing and implementation schedule is listed in Table A3.4.

Table A3.4: Technical Assistance Processing and Implementation Schedule

Major Milestones	Expected Completion Date
Reconnaissance mission	May 2016
PPTA Approval	August 2016
PPTA Commencement	August 2016
Individual consultant recruitment	September–December 2016
Consulting firm recruitment	January 2017
Physical completion	May 2018
Financial closure	August 2018

PPTA = project preparatory technical assistance.

Source: Asian Development Bank

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS TO BE HIRED UNDER THE PROJECT PREPARATORY TECHNICAL ASSISTANCE

A. Firm for Preparation of the Investment Program

1. **Hydropower Planning Engineer/Team Leader** (International, 6 person-months). The Team Leader shall have a bachelor's or higher degree in engineering and has at least 5 year experience of leading a team. The consultant should have at least 20 years of professional experience in the design and management of major hydropower projects. The consultant is preferred to have previous experience in procurement, engineering, business administration; knowledge of international organizations/agencies; donor-funded projects particularly by ADB. The consultant will manage the team, serving as lead consultant and Hydropower Planning Engineer all at the same time. Previous experience in developing countries in CWRD region is desirable. The Team Leader/Hydropower Planning Engineer will undertake the following tasks:

- (i) Coordinate with other members the development of a detailed work plan and implementation schedule.
- (ii) Review and prepare project scope, capital and operating cost estimates, implementation schedule, contracting, and implementation arrangements.
- (iii) Ensure quality reports are delivered on time.
- (iv) Review the feasibility studies and update data necessary to estimate construction costs based on the latest market prices.
- (v) Examine construction methods for civil works in consideration of the site conditions, and conduct geological and geotechnical assessments for new HPP subprojects. Incorporate risks and mitigation measures.
- (vi) Ensure to apply technically feasible climate change adaptation solutions in the project design to address projected climate vulnerability.
- (vii) Review the sedimentation study carried out by the hydrological engineer to identify the least-cost solution with minimum environmental impacts.
- (viii) Reflect the optimal design in the cost estimates and tender documents.
- (ix) 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)).
- (x) Prepare any disaster risk management plan including local flood control and early warning systems, with the hydrological engineer.
- (xi) Revise and finalize a generation scheme based on the reservoir sedimentation study with the hydrological engineer.
- (xii) Assist in preparing PC-1 and relevant sections of the ADB's Report and Recommendation of the President and all supporting reports.
- (xiii) Supervise the procurement process of turn-key contract.

2. **Mechanical Engineer** (International, 4 person-months each). Qualified expert with a bachelor or higher degree in mechanical or related engineering field, and at least 15 years of relevant working experience in major hydropower projects. The consultant is preferred to have previous experience in procurement and business administration; knowledge of international organizations/agencies; donor-funded projects particularly by ADB. Previous experience in developing countries in CWRD region is desirable. The key tasks are to:

- (i) Review the feasibility study and finalize the design for the mechanical equipment for rehabilitation subprojects prepared by EA for the detailed engineering study.
- (ii) Prepare technical specifications for the hydro mechanical equipment for bidding documents in the tender documents.

- (iii) Finalize optimal project cost estimates of mechanical equipment based on the construction schedule and provide input for economic/financial analysis.
- (iv) Prepare the implementation schedule for design, transportation, and installation works of mechanical equipment.
- (v) Coordinate with other experts concerned to prepare all the tender documents for turnkey contracts for rehabilitation subprojects.
- (vi) Support the executing and implementing agencies and/or ADB evaluate the bids.
- (vii) Support executing agency in reviewing technical sections of IPP proposals.

3. **Electrical Engineer** (International, 4 person-months each). Qualified expert with a bachelor or higher degree in mechanical or related engineering field, and at least 15 years of relevant working experience in major hydropower projects. The consultant is preferred to have previous experience in procurement and business administration; knowledge of international organizations/agencies; donor-funded projects particularly by ADB. Previous experience in developing countries in CWRD region is desirable. The key tasks are to:

- (i) Review the feasibility studies and finalize the design of the electrical equipment and transmission lines. 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 a schedule for design, transportation, and installation works for the electrical equipment and transmission lines.
- (v) Finalize construction cost estimates for electrical equipment and transmission lines based on the construction schedule.
- (vi) Coordinate with other experts concerned to prepare all the tender documents.
- (vii) Support the executing and implementing agencies and/or ADB evaluate the bids.
- (viii) Support executing agency in reviewing technical sections of IPP proposals.

4. **Control and Instrument Engineer** (International, 2 person-months each). Qualified expert with a bachelor or higher degree in mechanical or related engineering field, and at least 15 years of relevant working experience in major hydropower projects. The consultant is preferred to have previous experience in procurement and business administration; knowledge of international organizations/agencies; donor-funded projects particularly by ADB. Previous experience in developing countries in CWRD region is desirable. The key tasks are to:

- (i) Review the feasibility studies and finalize the design of the control and instrument equipment and transmission lines. Incorporate risks and mitigation measures.
- (ii) Examine methods of equipment installation works, considering the site conditions.
- (iii) Prepare the implementation schedule for installation works of C&I equipment.
- (iv) Prepare a schedule for design, transportation, and installation works for the C&I equipment.
- (v) Finalize construction cost estimates for electrical equipment and transmission lines based on the construction schedule.
- (vi) Coordinate with other experts concerned to prepare all the tender documents.
- (vii) Support the executing and implementing agencies and/or ADB evaluate the bids.
- (viii) Support executing agency in reviewing technical sections of IPP proposals.

5. **Civil Engineer (Hydro)** (International, 4 person-months each). Qualified expert with a bachelor or higher degree in mechanical or related engineering field, and at least 15 years of

relevant working experience in major hydropower projects. The consultant is preferred to have previous experience in procurement and business administration; knowledge of international organizations/agencies; donor-funded projects particularly by ADB. Previous experience in developing countries in CWRD region is desirable. The key tasks are to:

- (i) Review the feasibility studies and update data necessary to estimate construction costs for the civil works based on the latest market prices.
- (ii) Conduct feasibility studies for the new HPP subprojects.
- (iii) Examine construction methods for civil works in consideration of the site conditions, and conduct geological and geotechnical assessments. Incorporate risks and mitigation measures.
- (iv) Prepare a construction schedule for civil works and finalize construction optimal least-cost estimates of civil works based on the construction methods and schedule.
- (v) Review the reservoir sedimentation study carried out by the hydrological engineer to identify the least-cost solution with minimum environmental impacts.
- (vi) 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)).
- (vii) Prepare any disaster risk management plan including local flood control and early warning systems, in coordination with the hydrological engineer.
- (viii) Prepare general and technical parts of civil works in the tender documents in the procurement process, incorporating clear evaluation criteria.
- (ix) Prepare tender documents for turnkey contracts for rehabilitation subprojects in accordance with the ADB Procurement Guidelines for components financed by ADB.
- (x) Assist in identifying all benefits of the climate change adaptation options for subprojects and their costs for the project.
- (xi) Prepare technical documentation, including project design and specifications with climate change adaptation considerations.
- (xii) Support executing agency in reviewing technical sections of IPP proposals.

6. **Hydrological Engineer** (International, 2 person-months). Qualified expert with a bachelor or higher degree in related field, and at least 10 years of relevant working experience in major hydropower projects. The consultant is preferred to have previous experience in developing countries in the CWRD region is desirable. The key tasks are to:

- (i) Undertake hydrological and sedimentological assessment under various climate change scenarios for each of subprojects.
- (ii) Update 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.
- (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 and early warning systems.

- (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.
- (viii) Provide recommendations for climate change adaptation interventions.

7. **Economic Expert** (National, 3 person-months each). Qualified expert with a master or higher degree in economics or related field, and at least 10 years of relevant working experience. Extensive experience in economic cost benefit analysis of projects is required, as well as experience in the power sector and projects financed by international financial organizations. The expert will preferably have experience in projects financed by international financial institutions such as ADB and World Bank, and experience in one or more of ADB's CWRD countries, especially Pakistan. The skill in the Russian language is an advantage. The key tasks are to:

- (i) Undertake demand analysis of the power sector in general and the subprojects, based on historical data and future forecast for 25 years (2016-2040). Take into consideration power generation development (decommissioning) plans, both the domestic and export demands, economic growth, income and price elasticity of demand, among other variables.
- (ii) Undertake electricity tariff analysis based on historical data and assess the level of direct and indirect subsidies. Estimate the willingness to pay for incremental electricity consumed, long run marginal cost of power generation, and unit value of power exports, and the unit value of energy savings.
- (iii) Undertake least cost analysis for power generation by comparing alternative investments and measures within the current country and sector context.
- (iv) Undertake economic evaluation of the project by providing the project's economic rationale and determining the key economic costs and benefits and the economic rate of return of the project following ADB guidelines. Also identify the project's direct and indirect costs and benefits that are not used in the quantitative model.
- (v) Estimate the greenhouse gas emission reduction (ton equivalent CO₂ per year).
- (vi) Undertake sensitivity and risk analysis of key variables and identify the switching values and assess the likelihood of key risks.
- (vii) Provide inputs to reports and relevant sections of RRP, including an economic analysis attachment.
- (viii) Assist ADB missions, and provide inputs as required.

8. **Financial Management Expert** (International, 3 person-months). Qualified expert with a master or higher degree in finance or related field, preferably recognized professional qualifications (e.g. ACCA, CFA, CIMA), and at least 10 years of relevant working experience in financial analysis of projects (including financial due diligence and modelling), financial management assessment (including financial projections of a corporate entity), and financial management reforms. Previous experience in the power sector in developing countries is required. The expert preferably has experience in projects financed by international financial institutions such as ADB and World Bank, and experience in one or more of ADB's CWRD countries, especially Pakistan. The key tasks are to:

- (i) Prepare the EA and IA's financial management assessment, including (a) evaluate results of financial management assessments conducted by ADB or/and other agencies; (b) assess capacity for planning and budgeting, management and financial accounting, reporting, auditing, internal controls, and information systems; (c) develop disbursement and funds-flow arrangements; and (d) conclude on the

- (ii) financial management risk rating, and guidelines,⁹ and technical guidance note on financial management assessment.¹⁰
- (iii) Assess and recommend the financial management reforms and tariff needed for advancing the commercial operation of the subprojects.
- (iv) Based on the financial management assessment, recommend a capacity development program to strengthen the EA/IA's financial management, and mitigate other risks identified in the analysis.
- (v) Prepare an entity financial analysis by building a financial forecasting model. Outputs should comprise income statements, balance sheets, cash flow statements, and analysis of key financial ratios. Key risks should be identified, and relevant sensitivity analysis should be modeled and conducted. Future tariff levels needed to ensure project sustainability should be identified and selected as assurances or covenants following ADB guidelines (footnote 3) and methodology.¹¹
- (vi) Prepare project cost estimates following ADB methodology (footnote 5) and guidelines,¹² and in close coordination with technical experts of the team.
- (vii) Conduct financial valuation (financial cost-benefit analyses) using FIRR and WACC computations in order to evaluate the financial viability of the project following ADB's guidelines.
- (viii) Identify key risks to the project's financial viability, and conduct relevant sensitivity analyses. Where significant risks are identified, propose relevant financial performance indicators to be incorporated in the project's financial covenants.
- (ix) Develop the details of financial reporting, auditing and public disclosure arrangements for the project in close coordination with the EA/IA based on ADB's requirements.
- (x) Prepare relevant reports and estimates backed with detailed justification with source information and models. These include (a) cost estimates and fund flow analysis based on ADB's template for project administration manual, (b) financial analysis, (c) financial management assessment, and (d) financial projection and analysis.
- (xi) Assist ADB missions, and provide inputs as required.

9. **Procurement Expert** (International, 4 person-months). Qualified expert with a bachelor or higher degree in engineering and at least 10 years of relevant experience in procurement roles of major energy projects. The specialist shall have advance knowledge of international organizations/agencies and national public procurement regulations and procedures, especially associated knowledge of ADB procurement. The specialist should also have previous work experience in procurements and should have worked on projects financed by the international financial organization, especially ADB funded projects. Direct experience of public sector procurement (legislation, institutional framework, systems and training) are added advantages. Previous experience in developing countries in the region is desirable. The specialist will undertake the following tasks:

- (i) Prepare and update procurement capacity assessment report for EA and IA.
- (ii) Assist EA and IA in creating procurement committee, evaluating bid and preparing bid evaluation report (BER), and in monitoring and evaluating procurement progress, procedures compliance and BER preparation.
- (iii) Ensure that due diligence is conducted on potential contractors and subcontractors.

⁹ ADB. 2005. *Guidelines on the Financial Management and Analysis of Projects*. Manila.

¹⁰ ADB. 2015. *Technical Guidance Note on Financial Management Assessment*. Manila.

¹¹ ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.

¹² ADB. 2014. *Preparing and Presenting Cost Estimates for Projects and Programs Financed by the Asian Development Bank*. Manila.

- (iv) Prepare bidding documents for the procurement of turnkey contract for the rehabilitation sub-projects and bid evaluation reports following ADB procurement guideline.

10. **Energy Sector Expert** (National, 2 person-months). The key tasks are:

- (i) Provide an overall assessment of the KPK energy sector and hydropower developments in the province.
- (ii) Prepare sector assessment report including ongoing reforms in KPK and an analysis of PEDO capacity and improvements required to implement such complex projects.
- (iii) Conduct government assessment of PEDO and KPK energy department.

11. **Private Public Partnership Expert** (National, 3 person-months). To explore how the MFF program can be used to attract private sector investments, commercial cofinancing and climate financing to the sector undertaking viability gap analysis for appropriate modality of financing.

B. Firm to conduct Social Safeguards and Environmental Assessment

1. **Senior Environmental Expert and Team Leader** (International, 6 person-months). Qualified expert with masters or PhD in environmental, chemical, civil or environmental engineering, or a related field such as environmental science or ecology. The expert must have experience of having conducted EIA studies in sensitive habitats, including river systems, with particular experience of having conducted EIA studies for hydropower or water resources development projects. The expert must have at least 18 years of experience in EIA and environmental project design and management. The key tasks are:

- (i) Supervise, manage, compile and analyze the physical and socio economic environmental baselines.
- (ii) Undertake impact assessments of above mentioned parameters (physical and socio-economic environments) in the project area, covering the direct, indirect and cumulative impacts of the project.
- (iii) Coordinate with the technical feasibility team and perform an assessment of technological and location alternatives for the proposed HPP, proposing the environmentally and socially best alternative.
- (iv) Analyze and prepare the environmental mitigation and management plans for the Project, after obtaining the results of holistic EFlow modeling from the biodiversity and water resources team.
- (v) Overall management of the EIA study including QA/QC.
- (vi) Supervise and manage the community level consultations and approve the socio economic survey methodology. Supervise the preparation of the communications and consultation strategy for the project. Ensure that consultations are carried out with all affected communities, both men and women and key local and national institutional stakeholders.
- (vii) Follow-up on the EIA with the KP Environment Protection Agency (KPEPA) after submission of the EIA report.
- (viii) Presentation of the EIA at the Environment Community of Practice at ADB when the project is to be presented for board consideration.

2. **Biodiversity Expert** (National, Aquatic Fauna Specialist, 4 person-months) Qualified expert with master's or Ph.D in biology, ecology, or a related relevant field, with a specialization or specific experience in fresh river ecology and fauna with at least 10 years of experience and specific experience of having conducted species level surveys in river basins. The key tasks are:

- (i) Supervise the scoping exercise, and preparation of survey methodologies to identify the presence and distribution of key sensitive aquatic species in the river.
- (ii) Undertake seasonal field visits to acquire the relevant data on aquatic life in the river.
- (iii) Prepare data sets and information sheets for the biodiversity species of interest to be fed into the holistic EFlow model for the HPP.
- (iv) After the holistic EFlow modeling has been conducted by the team, prepare the relevant baseline and impact assessments sections of the report
- (v) After the EFlow modeling results are clear preparation of the environmental mitigation and management plan for the Project.
- (vi) Prepare all relevant data sets, tables and maps relating this output.
Prepare the biodiversity component of the presentation for community consultations, public hearing and ADB Environmental COP meeting.

3. **Senior Environmental Engineer** (National, water quality, air dispersion, noise and vibration modeling, 4 person-months). Qualified experts with a master's degree in: environmental, chemical, civil or environmental engineering, or a related field such as environmental science or ecology. The expert must have experience of having conducted EIA and IEE studies across various types of geographic settings and various types of infrastructure projects. The expert must have at least 10 years of experience in EIA and environmental project design and management. The key tasks are:

- (i) Establish a comprehensive baseline on the Physical environment including: noise, air quality and water quality.
- (ii) Conduct baseline surveys for each parameter to establish the prevalent complete environmental conditions in the area. Specifically, gather the information on: the location and design of the HPP; location and extent of the study area; scope of the assessment; hydrology and sediment dynamics; presence and location of other water-resource developments.
- (iii) Perform noise, vibration, air quality modeling for these physical environmental parameters for the construction and operation phases of the project. Conduct data analyses and provide inputs to the preparation of the baseline and impact assessment sections of the EIA report.
- (iv) Provide inputs to the preparation of the environmental mitigation and management plan for the Project.
- (v) Prepare all relevant data sets, tables and maps relating this output.

4. **Senior Environmental Engineer** (National, Holistic EFlow Modeling, 3 person-months). Qualified expert with a Master's degree in engineering, science, ecology or relevant field with at least 10 years of experience and specific experience of having conducted EFlow modeling in the Indus river basin. The key tasks are:

- (i) Identify the main types of aquatic ecosystems likely to be affected by the proposed HPP and the species sensitivity after conducting preliminary surveys and desk reviews of published data.
- (ii) Select EFlow sites/locations based on preliminary surveys.
- (iii) Perform the EFlows modeling for the proposed HPP and whereby, calculate the minimum residual flow required commensurate to the ecological sensitivity of the river.

5. **Climate Change Expert** (National, 2 person-months). Qualified expert with a bachelor or higher degree in related field, and at least 10 years of relevant working experience in climate change modeling, hydrological modeling, and in climate change risk assessment in hydropower projects. The consultant is preferred to have previous experience in developing countries in the CWRD region is desirable. The key tasks are to:

- (i) Prepare the climate change impact, vulnerability and adaptation assessment reports for all subprojects following ADB guidelines for climate proofing investment in the energy sector.
- (ii) Identify the climate change parameters to be assessed and the modeling scale (temporal and spatial) to be used in the impact assessment. Identify the goal of the climate change impact assessment in the context of the overall project objectives.
- (iii) Survey the existing information such as relevant climate change projections and local historical climate data available. Prepare an assessment on the reliability of existing climate change projections based on the model's ability to represent past climate conditions.
- (iv) Evaluate the range of climate projections and select projections that would be representative of this entire range (i.e., dry, average, and wet scenarios). Identify any need for further modeling, or where existing modeling is sufficient for the project, prepare a short synthesis report.
- (v) Identify the probabilities of occurrence of specific climate changes from taking place and the level of certainty. Identify assumptions and limitations in terms of the use of the projections for influencing project design.
- (vi) Formulate downscaled climate change scenarios for the relevant time horizon of the project, specifying the technique used for downscaling as necessary.
- (vii) Identify possible technical gaps, in country and generally, for improving capabilities for climate change projections in the country.
- (viii) Submit for review and approval a draft outline of the analysis to be undertaken, including recommended methodology for impact assessment (i.e., hydrological modeling, the climate scenarios to be used in the analysis, the impact models, and a justification for their choice).
- (ix) Provide an expert opinion on the probability of further climate change research potentially altering project design protocols or operations requirements.

6. **Social Development Specialist** (National, 3 person-months). Qualified expert with a masters in sociology, anthropology or a related relevant field with at least 7 years of experience and specific experience of having conducted community level consultations in Northern and North Western areas of Pakistan. The key tasks are:

- (i) Design, prepare survey methodology and conduct all socio economic surveys required to establish a representative socio-economic baseline of the area in relating to the proposed project.

- (ii) Conduct surveys at the village and household levels covering male, female and vulnerable groups.
- (iii) Based on surveys establish the social baseline and socio- economic vulnerability.
- (iv) Perform a socioeconomic impact assessment of the project.
- (v) Perform community level consultations at least twice during the EAI process, more consultations may be conducted should communities raise concerns that require changes in the project or ancillary operations.
- (vi) Design and implement the grievance redress mechanism of the project, and install it on site at the early stage of project design. Such as identify community representatives and sensitize them to the steps and stages of the GRM.

7. **Social Safeguards Expert** (National, Involuntary Resettlement, 6 person-months). Qualified expert with a masters in sociology, anthropology or a related relevant field and at least 10 years of relevant working experience. In addition, the expert must demonstrate evidence of preparing and implementing resettlement instruments and monitoring resettlement plan implementation. The key tasks are to:

- (i) Review of the initial social impact assessment for the 300 MW Balakot hydropower plant.
- (ii) Assessment of social impact of other potential investments under the MFF.
- (iii) Preparation of a Land Acquisition and Resettlement Framework (LARF) for the MFF.
- (iv) Preparation of a draft land acquisition and resettlement plan (LARP) in compliance with national laws and regulations and ADB Safeguard Policy Statement.
- (v) Consultations with displaced persons and key stakeholders.
- (vi) Assessment of EA capacity and capacity building on LAR issues.
- (vii) Coordination and orientation of agencies involved in LAR implementation for the MFF.

8. **Gender Expert** (National, 2 person-months). The key tasks are:

- (i) Social baseline study and social (including gender) impact assessments.
- (ii) Preparation of gender action plans/strategies related to infrastructure projects.
- (iii) Due diligence on core labor standards of the executing agency/implementing agency.

C. Individual Experts

1. **Legal and Contracts Expert** (National, 6 person-months). The key tasks are:

- (i) Conduct legal review of the submitted IPP proposals.
- (ii) Evaluate and advice on all processes and contractual solutions required for IPP procurement, including preparation for contract negotiation.
- (iii) Assist in the clarification and fine-tuning of legal issues that arise during evaluation and post-evaluation stages.

2. **Financial Evaluation Expert** (National, 6 person-months). The key tasks are:

- (i) Conduct financial due diligence on the submitted IPP proposals.
- (ii) Evaluate financial submission and prepare evaluation report.
- (iii) Provide training to PEDO in financial due diligence and evaluation.

3. **Project Finance Expert** (National, 3 person-months). The key tasks are:
 - (i) Review legal, financial, economic and other information and prepare presentations for private debt and equity investors including but not limited to project cost estimates, profitability and other investment ratios.
 - (ii) Prepare financing plan that will include PEDO's credit analysis and recommendations regarding funding requirements (debt and equity).
 - (iii) Arrange international roadshows for selected investment projects in international financial hubs.

4. **Project Coordination Expert** (National, 15 person-months). The key tasks are:
 - (i) Coordinate all project activities.
 - (ii) Support executing agency and ADB in delivering project on time.
 - (iii) Coordinate activities between different consultants hired under the PPTA.
 - (iv) Follow-up with government on required information and project document approvals.
 - (v) Provide technical guidance to executing agency on all project matters.

5. **Hydropower Expert** (National, 8 person-months). The key tasks are:
 - (i) Support executing agency and the ADB in reviewing the technical reports under the project and advising on key technical parameters of the project.
 - (ii) Review project design and technical specifications and provide comments.
 - (iii) Review bidding document's technical section and assist executing agency and ADB in ensuring that technical sections of the bidding document are complete and as per project requirements.