



Technical Assistance

TAR: AFG 39078

# Technical Assistance to the Islamic Republic of Afghanistan for Preparing the Small to Medium-Sized Hydropower Development Project

October 2005

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 21 September 2005)

Currency Unit	–	afghani/s (AF)
AF1.00	=	\$0.0202
\$1.00	=	AF49.59

## ABBREVIATIONS

ADB	–	Asian Development Bank
DABM	–	Da Afghanistan Breshna Moassessa
MEW	–	Ministry of Energy and Water
PSMP	–	Power System Master Plan
TA	–	technical assistance

## WEIGHTS AND MEASURES

GWh	–	gigawatt hour
km	–	kilometer
kW	–	kilowatt
MW	–	megawatt

## TECHNICAL ASSISTANCE CLASSIFICATION

<b>Targeting Classification</b>	–	General intervention
<b>Sector</b>	–	Energy
<b>Subsector</b>	–	Hydropower generation
<b>Theme</b>	–	Sustainable economic growth
<b>Subtheme</b>	–	Promoting economic efficiency and enabling market

## NOTE

In this report, "\$" refers to US dollars.

This report was prepared by P. Abeygunawardena, team leader.

## I. INTRODUCTION

1. During the 2005 Country Program Confirmation Mission of the Asian Development Bank (ADB), the Government of Afghanistan requested technical assistance (TA) for preparing the Small to Medium-Sized Hydropower Development Project.<sup>1</sup> The ADB Fact-Finding Mission visited Afghanistan from 6 to 12 July 2005 and had discussions with the Ministry of Energy and Water (MEW) and other relevant agencies. The Mission also met with a cross section of local residents in the proposed project area. The TA design and monitoring framework is in Appendix 1.

## II. ISSUES

2. Afghanistan's per capita consumption of electricity is one of the lowest in the world. Approximately 10% of the population is connected to public power supply, with only 234,000 customers (207,408 domestic, 23,031 commercial, and 3,335 Government).<sup>2</sup> About 84,000 customers (78,697 domestic, 4,541 commercial, and 673 Government) are in the Kabul area, Afghanistan's major load center. The other provinces have even less access with rural areas being virtually unserved. Of the 475-megawatt (MW) installed generating capacity, only 271 MW is available, and most generating units require overhaul or replacement. The country has only 1,270 kilometers (km) of power transmission lines. The existing facilities provide an unreliable service, and in most places electricity is only for a few hours each day. Substantial reconstruction and expansion of distribution systems, based on modern least-cost design concepts, is required.

3. The first hydropower stations were built at Jabel e Seraj between 1920 and 1949. Five units were installed with initial capacity ranging from 500 to 850 kilowatts (kW). Since that time, more than 10 small to large hydropower projects were installed with the largest being in the Kabul river system serving the Kabul network. These Kabul-oriented projects include Surubi, 22 MW in 1957; Mahipar, 62.5 MW in 1966; Naghlu, 100 MW in 1967; and Darunta, 11.5 MW in 1967. The last power installation was 40 MW of gas turbine generation in Kabul in 1978 to firm up the hydropower generation in the Kabul river system. No new power developments have been installed since; the country has a total installed generation capacity of 475 MW (261 MW hydro, 151 MW gas, and 63 MW diesel). Much was destroyed during the conflict resulting in only 270 MW currently available, all of which is old and dilapidated.

4. The Da Afghanistan Breshna Moassessa (DABM) is responsible for the operation and maintenance of Afghanistan's generation, transmission, and distribution assets, as well as for the sale of electricity they produce. DABM does not have an appropriate structure or the financial resources to improve the country's electricity services. Although DABM is defined in the 1986 Usage of Electricity Act as an autonomous enterprise, it depends heavily on support from the Government for its operation and investment funds. Until 2003, staff salaries were paid from the MEW budget. With almost 7,000 employees and only 234,000 consumers, DABM is overstaffed. Most staff have not been able to acquire knowledge and skills on modern methods of design, construction, and maintenance. The MEW structure, particularly DABM, is under review as part of the restructuring program.

5. At the request of the interim government, ADB and other development partners have started a broad program to support the reconstruction and development of the Afghanistan power sector (as well as all sectors). Four key development partners are assisting MEW: ADB,

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<sup>1</sup> The TA first appeared in *ADB Business Opportunities* (internet edition) on 11 February 2005. The concept paper was approved by Vice-President (Operations 1) on 2 March 2005 since the TA was not included in the Country Strategy and Program/Update for Afghanistan 2004–2006.

<sup>2</sup> World Bank. 2005. *Power System Masterplan*. Kabul.

International Development Association, Germany (through Kredietanstalt fur Wiederauf and the German Agency for International Cooperation and United States (through the United States Agency for International Development). In addition, Iran has financed transmission lines to interconnect the city of Herat, and India is expected to finance the detailed design and construction of the critical missing transmission link between Pul-e Khumri and Kabul. The rehabilitation programs will improve supplies and enhance access to electricity in Kabul and some of the other main cities. This will be achieved by (i) increasing the availability of electricity supplies; (ii) investing in transmission, distribution, and consumer services; and (iii) providing TA and support to MEW, DABM, and other enterprises involved in developing the power sector. The increase in supply will be achieved by (i) rehabilitating existing generating plants, (ii) increasing electricity imports from neighboring countries, and (iii) developing indigenous natural resources (hydropower and natural gas).

6. For longer term development, a Power System Master Plan (PSMP) was prepared by the consultant and submitted to MEW in January 2005. The PSMP, funded by the World Bank, will provide the basis for Afghanistan's power sector decisions including generation, transmission, and distribution systems up to 2019. The study is limited to facilities greater than 1 MW. The PSMP includes the most recent national and regional load forecasts—for each of the seven major load centers/supply regions: Balkh, Ghor, Herat, Kabul, Kandahar, Nangarhar, and Parwan. Forecasts for other lesser load areas (rural forecast) mostly in rural Afghanistan are estimated collectively as a single group. Except for a few, the rural load centers included in the forecasts currently do not have electricity supply from DABM. Some have a limited supply from small diesel generators. Some provincial centers no longer have electricity supply because transmission lines or power plants were destroyed. For the seven major regions, the energy demand is forecast to reach 3,868 gigawatt hours (GWh) in 2020 at an average annual growth rate of 6.6%. For the rural areas, the energy demand is assumed to reach 126 GWh in 2020 at an average annual growth rate of 7.4%.

7. The main purpose of power import from neighboring countries is to meet the fast growing demand in Kabul. According to the PSMP, the increase of power supply to Kabul in the short term (until 2010) has to be based on (i) restoration of original generating capacity of existing hydropower plants, (ii) extension of the northwest thermal power plant with a combined cycle unit, (iii) installation of a gas power plant in Sheberghan, (iv) installation of a new small diesel plant, and (v) importation of power from neighboring countries. Power import is critical to fill the gap because new large hydropower plants can be available only after 2010. The Government has also formulated an electricity sector policy and a power sector road map. Although progress is rather slow, MEW has now finalized the priority reform and restructuring proposal, to be approved by the Ministerial Advisory Committee by end of August. Once the proposal is approved, MEW will be able to recruit new qualified staff with a higher salary scale. The power utility, DABM, will be restructured and corporatized under a World Bank loan. The plan is to split DABM into four business/commercial units based on regions (horizontal unbundling). The process is expected to commence at end-2005.

8. From past studies, about 23,000 MW of hydroelectric generating capacity have been identified in Afghanistan. Of this potential, about 1,900 MW are located in the Kokcha River, 3,100 in the Kabul River basin, and 18,000 MW on the Panj and Amu rivers along the international boundary between Afghanistan, Tajikistan, and Uzbekistan. Only 261 MW have been developed, mostly in the Kabul River basin. Based on the PSMP, the recommended development plan (for the major load centers) envisages the development of an additional 626.5 MW by 2020. Thus, the potential for hydropower development is large. Unfortunately no reliable data is available on the power supply for isolated rural systems. The Government recognizes this,

and has initiated the preparation of such a development plan. The proposed small to medium-sized hydropower project preparation TA will fast track the development of hydropower projects in the range of 1–10 MW, specifically for economic development in nearby areas.

9. The main objective of ADB's strategy and operations in the energy sector is to help the Government with reconstruction and rehabilitation. To achieve this objective, ADB will work with the Government, and closely with Afghan civil society, local communities, private sector, and other development partners. In the energy sector, ADB will support rehabilitation of power transmission and the gas subsectors.<sup>3</sup> ADB supported Afghanistan through two major TA<sup>4</sup>s to (i) build capacity by promoting renewable energy; (ii) undertake pilot projects for solar applications (lighting, potable water systems, solar pumping for community water supply and small-scale irrigation, wind-generated power, and micro-hydropower generation); and (iii) sustainably disseminate and use solar systems in rural areas that cannot be accessed by the national grid in the near and medium term.

10. ADB will also support environmental improvement through the development of cleaner energy sources such as small to medium-sized hydropower development in remote and off-grid areas. The economy will accelerate only if the critical infrastructure constraints are alleviated. Equally, these operations will generate large-scale employment, restore livelihood, and reduce poverty. ADB's operations will focus on physical infrastructure rehabilitation, private sector development, and capacity development. In the current reconstruction stage, capacity development is essential for sustainability of the investments. The capacity gap is serious, which hinders good governance and economic management. ADB will provide assistance to strengthen the capacity of all actors involved directly and indirectly in governance and economic management.<sup>5</sup>

### III. THE TECHNICAL ASSISTANCE

#### A. Impact and Outcome

11. The TA will assist MEW in undertaking feasibility studies on a cross section of small to medium-sized hydropower plants and prepare the analytical work required for the proposed Small to Medium-Sized Hydropower Development Project.<sup>6</sup> The ensuing project aims to provide much-needed electric power to off-grid and isolated areas of rural Afghanistan, and increase the pace of economic development in these regions. The TA will have three main components: (i) preparation of a sector analysis; (ii) undertaking and ranking of prefeasibility and feasibility studies of selected subprojects; and (iii) diagnostic assessment and development of an institutional strengthening and capacity development plan for MEW and other relevant agencies.

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<sup>3</sup> ADB. 2003. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of Afghanistan for the Emergency Infrastructure Rehabilitation and Reconstruction Project*. Manila; ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of Afghanistan for the Power Transmission and Distribution Project*. Manila.

<sup>4</sup> ADB. 2002. *Technical Assistance Cluster to the Republic of Afghanistan for Capacity Building for Reconstruction and Development*. Manila; ADB. 2005. *Technical Assistance to the Islamic Republic of Afghanistan for Poverty Reduction and Rural Renewal Energy Development*. Manila.

<sup>5</sup> ADB. 2003. *Country Strategy and Program 2002–2004 and Country Strategy and Program Update (2003–2005): Afghanistan*. Manila.

<sup>6</sup> MEW categorizes hydropower projects as micro 0–50kW; mini >50kW, ≤500kW; small >500kW, ≤5,000kW (5 MW); medium >5MW, ≤50MW; large >50MW. For this Project, small to medium-sized projects cover the range of 1–10 MW.

## B. Methodology and Key Activities

12. The TA will have the following key activities:

- (i) Undertake a sector review assessment to address issues such as the power shortage in rural and off-grid areas, demand assessment for power in potential subproject areas, marginal cost pricing, tariff and cost recovery, willingness to pay, affordability, subsidization of consumption, regulation, conflict in uses.
- (ii) Prepare a policy brief or matrix to address these issues in off-grid and rural areas, including an assessment of the institutional capabilities for implementing the required policy changes.
- (iii) Review all possible project proposals and carry out prefeasibility studies; and prepare other relevant documents to define the scope of five small to medium-sized hydropower plants including generation, transmission, and distribution as required for financing under an ensuing loan.
- (iv) Undertake technical and engineering assessments of a minimum of three hydropower plants, including geology, geotechnical aspects, civil works, hydrology, and electrical engineering.
- (v) Carry out an initial environmental assessment and environmental impact assessment to ensure that the environmental assessment complies with ADB's *Environment Policy* (2002); suggest environmental mitigation measures if necessary; and prepare environmental assessment summaries.
- (vi) Undertake financial and economic analyses of selected subprojects and the ensuing overall loan project according to ADB policies and guidelines, and other requirements.
- (vii) Prepare a social and poverty reduction impact assessment, resettlement plans, and indigenous people's plans, if warranted, in accordance with ADB's *Involuntary Resettlement Policy* (1995) and ADB's *Policy on Indigenous Peoples* (1998) (Appendix 2 gives the summary initial poverty and social analysis); and prepare draft final report, final report, and all other required reports incorporating comments from the Government, ADB, and other stakeholders as necessary.

13. In developing the capacity development component, the TA will cover two key aspects: (i) a diagnostic analysis of MEW and other relevant agencies including human resource development needs and financial and managerial autonomy of small to medium-sized hydropower development in related business entities, completed in consultation with relevant stakeholders resulting in workable proposals for (a) training of technical and nontechnical staff for effective management, (b) formulating options for institutional efficiencies by recommending rules and procedures for MEW and other agencies concerned, and (c) rationalizing incentives for Government staff for efficient performance; and (ii) a review and analysis of the hydropower sector needs of Afghanistan, to identify opportunities for sector growth and development, taking into account potential environmental and social impacts of small to medium-sized hydropower development, and incorporating appropriate mitigation measures and safeguards under possible changes in subsector policies and business environment.

### C. Cost and Financing

14. The total cost of the TA is estimated at \$860,000 equivalent, comprising \$600,000 in foreign exchange and \$260,000 equivalent in local currency. ADB will provide \$800,000 to finance the entire foreign exchange cost and \$200,000 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB's TA funding program. The Government will finance, in kind, the remaining local currency cost of \$60,000 equivalent. The detailed cost estimates are presented in Appendix 3. The Government has been advised that approval of the TA does not commit ADB to finance any ensuing investment project.

### D. Implementation Arrangements

15. MEW will be the Executing Agency. A senior MEW staff member will be appointed as TA director. A TA management office will be established in MEW and it will be responsible for day-to-day TA management and will coordinate with all stakeholders. A separate project management office will also be established to facilitate the processing of the ensuing loan. The TA will be implemented over 6 months, from 20 November 2005 to 20 May 2006. International consultants will be engaged for a total of 20 person-months and domestic consultants for 25 person-months. The consulting team will be selected and engaged through a firm in accordance with ADB's *Guidelines on the Use of Consultants*, and other procedures acceptable to ADB for the selection and engagement of domestic consultants. The simplified technical proposal format and quality- and cost-based selection will be used. International consultants will procure equipment<sup>7</sup> to be financed under the TA in accordance with ADB's *Guidelines for Procurement*.

16. The consulting team will comprise international experts in (i) hydropower engineering, (ii) geotechnical aspects, (iii) hydrology/hydraulics, (iv) electrical and mechanical engineering, (v) environmental assessment, (vi) social assessment, (vii) financial analysis, (viii) hydropower economics, and (ix) institutional analysis and capacity development. The domestic team will include counterpart consultants for each of the international experts, including a (i) hydropower specialist, (ii) geologist, (iii) hydrologist, (vi) environment specialist, (v) social development specialist, (vi) poverty reduction specialist, (vii) financial analyst, (viii) hydropower economist, and (ix) institutional and capacity development specialist. The hydropower engineer or energy economist will be the team leader and will coordinate the work of all consultants. The outline terms of reference for the consultants are in Appendix 4. The team leader will submit an inception report within 4 weeks after the commencement of services. An interim report and a draft final report will be submitted after 3 and 5 months of TA commencement, respectively. The Government and ADB will provide their comments within 2 weeks of receiving the reports. The draft final report, incorporating Government and ADB comments, will be finalized 6 months after TA commencement.

## IV. THE PRESIDENT'S DECISION

17. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$800,000 on a grant basis to the Government of Afghanistan for preparing the Small to Medium-Sized Hydropower Development Project, and hereby reports this action to the Board.

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<sup>7</sup> At the end of the TA the equipment will be handed over to MEW.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<b>Impact</b> Increased pace of economic development in rural and off-grid areas	Increased economic growth, higher per capita income, number of electricity connections (consumers, industries, etc.), higher employment	Government's annual reports on per capita income, power consumption, and labor employment in project areas	<b>Assumption</b> Continued focus by the Government to reform the power sector and develop infrastructure
<b>Outcome</b> Enhanced use of electric power by rural and off-grid consumers, industry, and commercial users	Increase installed capacity by 50 megawatts (MW)  Increased percentage of population using electricity from 0% to 10% by 2012 in project areas	Ministry of Energy and Water (MEW) data and statistics  System operations report from hydropower entities	<b>Assumption</b> Continued strong power demand  <b>Risk</b> Adequate water flow in streams
<b>Outputs</b> 1. Review subproject proposals. 2. Prepare draft sector assessment report. 3. Prepare prefeasibility study reports. 4. Undertake financial, economic, social, and environmental assessments for subprojects. 5. Undertake institutional diagnostic analysis and prepare capacity development and report. 6. Complete project feasibility reports.	Project prefeasibility reports; feasibility reports; sector assessment report; and social, economic, financial, environmental, resettlement, and capacity development reports submitted to the Government and ADB.  Item 5 will result in (i) training of technical and nontechnical staff for effective management; (ii) formulating options for institutional efficiencies by recommending rules and procedures for the MEW and other agencies concerned; and (iii) rationalizing incentives for the Government staff for efficient performance.  Conduct at least two workshops to disseminate the technical assistance findings,	Government and Asian Development Bank (ADB) confirm the receipt of the reports and provide comments	<b>Assumption</b> Timely implementation of the ensuing loan  Electric power tariff rationalized  <b>Risk</b> Unavailability of counterpart funding for construction as well as operation and maintenance  Unwillingness of hydro units to operate efficiently
<b>Activities with Milestones</b> 1.1 Consultant review subproject proposals/ideas by the Government (4th week Nov 2005)  2.1 Prepare outline sector assessment report (1st week Dec 2005)  3.1 Initiate preparation of prefeasibility study reports for subprojects (3rd week, Dec 2005) 3.2 Complete outline sector assessment report, 3 prefeasibility studies, first tripartite meeting (1st week Jan 2006) 3.3 Complete seven prefeasibility studies and rank them (4th week Jan 2006)  4.1 Complete 3 draft feasibility reports, social, environmental, and resettlement reports (2nd week Feb 2006) 4.2 Complete financial and economic analyses of subprojects (1st week Mar 2006) 4.3 Submit interim report (2nd week Mar 2006)  5.1 Undertake diagnostic analysis for capacity development (4th week Mar 2006) 5.2 Prepare draft capacity development report covering indicators or performance targets given in item 5.1 (1st week Apr 2006)  6.1 Draft sector assessment, capacity development assessment, all project analysis reports including financial, economic, social, and environmental reports (3rd week Apr 2006) 6.2 Submit draft final report (4th week Apr 2006) 6.3 Final tripartite meeting and loan fact-finding mission (2nd week May 2006) 6.4 Submission of final report (4th week May 2006)			<b>Inputs</b> Asian Development Bank: \$800,000 Government/Executing Agency: \$60,000 3 ADB missions: 1 inception and 2 review; International and domestic consulting services of 20 and 25 person-months, respectively.

## INITIAL POVERTY AND SOCIAL ANALYSIS

### A. Linkages to the Country Poverty Analysis

<b>Is the sector identified as a national priority in country poverty analysis?</b>	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No	<b>Is the sector identified as a national priority in country poverty partnership agreement?</b>	<input type="checkbox"/> Yes  <input checked="" type="checkbox"/> No
<b>Contribution of the sector or subsector to reduce poverty in Afghanistan:</b> Support to the energy sector is a major intervention to achieve economic progress through infrastructure development. Both physical investment support and sector reform are necessary so that the benefits from economic growth will accrue to the poor. As a cleaner and renewable form of energy, the development of small and medium hydropower will specifically benefit the poor since they are most adversely affected by indoor pollution (use of poor quality fuel for cooking) and environmental degradation.			

### B. Poverty Analysis

**Targeting Classification:** General intervention

<b>What type of poverty analysis is needed?</b> Consultants will prepare social and poverty impact assessments. A socioeconomic survey will be undertaken to provide a basis for the assessments. The social assessment will include an analysis of resettlement issues, impacts on the workforce in construction work, and impacts on indigenous or tribal people. From the analysis, the consultant will prepare land acquisition and resettlement plans, if required, and incorporate mitigation measures in cost estimates. The poverty impact assessment will include a poverty profile, an assessment of the impact of the proposed Project on the poor, and a quantification of poor beneficiaries.
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### C. Participation Process

<b>Is there a stakeholder analysis?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<b>Is there a participation strategy?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
A participation strategy will be devised during the project preparatory technical assistance. Options will be reviewed to enhance stakeholder participation and local ownership.					

### D. Gender Development

<b>Strategy to maximize impacts on women:</b> Strategy to maximize impacts on women: The poor and women will be carefully considered in participatory activities.		
<b>Has an output been prepared?</b>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
<b>Resettlement</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The proposed Project involves construction of run-of-river hydropower structures and approach roads, with minimal land acquisition. The Project is categorized as B.	<input type="checkbox"/> Full <input checked="" type="checkbox"/> Short <input type="checkbox"/> None
<b>Affordability</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The Project is unlikely to result in increased prices of goods and services accessed by the poor, and project design will maximize beneficial impacts to the poor.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Labor</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	The Project will require construction labor and will result in permanent employment for the operation and maintenance of project facilities.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Indigenous Peoples</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	The Project will not be in, or will avoid passing through, areas of significant tribal people's settlement or use.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Other Risks and/or Vulnerabilities</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Project design will ensure United Nations and other formal security risk mitigation measures will be strictly followed during technical assistance implementation and adequate resources are allocated.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Asian Development Bank Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	400.0	0.0	400.0
ii. Domestic Consultants	0.0	110.0	110.0
b. International and Local Travel	60.0	25.0	85.0
c. Reports and Communications	10.0	5.0	15.0
2. Equipment and Software <sup>b</sup>	20.0	10.0	30.0
3. Training, Consultation, and Conferences	10.0	20.0	30.0
4. Miscellaneous Administrative and Support Costs	30.0	0.0	30.0
5. Representative for Contract Negotiations	5.0	0.0	5.0
6. Contingencies	65.0	30.0	95.0
<b>Subtotal (A)</b>	<b>600.0</b>	<b>200.0</b>	<b>800.0</b>
<b>B. Government Financing</b>			
1. Office Accommodation and Transport	0.0	40.0	40.0
2. Remuneration and Per Diem of Government Staff	0.0	10.0	10.0
3. Others <sup>c</sup>	0.0	10.0	10.0
<b>Subtotal (B)</b>	<b>0.0</b>	<b>60.0</b>	<b>60.0</b>
<b>Total</b>	<b>600.0</b>	<b>260.0</b>	<b>860.0</b>

<sup>a</sup> Financed by the Asian Development Bank's technical assistance funding program.

<sup>b</sup> Includes office hardware (1 photocopier, 1 facsimile machine, 4 desktop computers, 2 printers, 2 global position systems, 2 sets of survey equipment, 2 flow meters, and 3 sets of binoculars) and computer software for word processing, spreadsheet analysis, and internet access.

<sup>c</sup> To provide for unforeseen expenses such as data acquisition, data processing, and map preparation.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The work will have three main components: (i) preparation of a sector analysis; (ii) project studies—ranking, prefeasibility, and feasibility—of selected subprojects; (iii) diagnostic assessment and development of an institutional strengthening plan for the Ministry of Energy and Water (MEW) and other relevant agencies.

### A. International Consultants

#### 1. Team Leader<sup>1</sup> and Hydropower Specialist (5 person-months)

2. The consultant will undertake the following:

- (i) Act as team leader in coordination of all work on the Project, supervise the power sector studies carried out by the hydropower engineer, and lead the reconnaissance survey and desk study to be carried out together with the other team members.
- (ii) Prepare the project design, lead the power studies, supervise the study to determine the optimum balance between load demand and generation for each subproject, and develop contract packaging and outline bidding documents and procurement procedures in accordance with Asian Development Bank (ADB) guidelines.
- (iii) Prepare terms of reference, expertise requirements, and person-month estimates for ensuing project implementation consulting services; prepare a list of time-bound actions required during the procurement and implementation stages of the Project.
- (v) Prepare layout drawings of the alternative subprojects, and lead the preparation of reconnaissance and other reports.

#### 2. Geotechnical Specialist (2 person-months)

3. The consultant will undertake the following:

- (i) Review data and results of testing from previous studies to assess overburden and rock conditions.
- (ii) Supervise geological and geotechnical investigations including surface mapping, trenching, and pitting, to enable identification of overburden and rock types, determination of condition and strength of materials for design of slope stability, foundation, leakage as required for the size of the structures, and selection of construction materials.
- (iii) Supervise geotechnical design of structures for all stages of the work, assess seismicity for each subproject, and ensure that earthquake effects have been adequately addressed in the design of the structures.
- (iv) Assess the Project's technical risks, particularly unknown subsurface conditions associated with foundations and leakage.

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<sup>1</sup> The power economist, if qualified, may be considered for the position of team leader.

**3. Hydrology/Hydraulics Specialist (2 person-months)**

4. The consultant will undertake the following:

- (i) Review hydrological data available from MEW and data collected from neighboring states and other sources.
- (ii) Supervise field investigations and hydrological studies for each subproject based on hydrological and meteorological correlations of in-basin and out-of-basin data including runoff and snow melt flow data.
- (iii) Assess the impact of soil erosion and sediment on the proposed hydropower plants.
- (iv) Provide hydraulic design of structures. Assess likelihood of formation of sediment deposits in the waterways. Designs should inhibit transport and deposit of sediment at the intake, in the canal, and in the tailrace.
- (v) Carry out the power studies, providing stream flow data and computer-generated energy production and available capacity.

**4. Electrical/Mechanical Engineer (1 person-month)**

5. The consultant will undertake the following:

- (i) Review prefeasibility studies and provide an assessment on electrical and mechanical needs of the Project.
- (ii) Provide technical data and cost estimates on electrical and mechanical equipment.

**5. Environmental Assessment Specialist (2 person-months)**

6. The consultant will undertake the following:

- (i) Supervise the domestic environmental specialist in preparing the initial environmental examination for the prefeasibility study and the environmental impact assessment for the feasibility study for each subproject conforming to ADB's *Environment Policy* and *Environmental Assessment Guidelines*. Pay specific attention to catchment area treatment, muck disposal, and impact on water quality.
- (ii) Supervise preparation of an environmental management plan for the subprojects as required by ADB's *Environment Policy (2002)* and *Environmental Assessment Guidelines*.
- (iii) Supervise the environmental assessments of (a) the availability of water for human consumption, irrigation, and other downstream uses; and (b) fish spawning/breeding and nursery grounds or fish migration routes (both upstream and downstream).
- (iv) Determine the recommended minimum flow that should be maintained in the reach of river alongside and downstream of each subproject to maintain an appropriate ecosystem (flora and fauna) at all times.
- (v) Supervise public consultations in accordance with ADB guidelines and prepare a report summarizing the potential for Afghanistan to receive the clean development mechanism (CDM) under the Kyoto Protocol.

- 6. Social Development Specialist**, including resettlement, indigenous peoples (2 person-months)
7. The consultant will undertake the following:
- (i) Supervise the survey of households and industrial/commercial enterprises in the town(s) and village(s) that may be electrified from the subprojects, to assess social issues and provide input into determining load demand.
  - (ii) Supervise the estimation of the number of poor people who will be affected by the Project. Estimate the proportion of net benefits going to the poor and calculate the poverty impact ratio in accordance with ADB's *Handbook on Integrating Poverty Impact in Economic Analysis of Projects*.
  - (iii) Help MEW prepare the land acquisition and resettlement plans in accordance with ADB's *Involuntary Resettlement Policy* (1995), and Operations Manual F2 on Involuntary Resettlement (2003).<sup>2</sup> Assist MEW in consulting with affected persons and in disclosing key resettlement information such as compensation rates, resettlement options, and other assistance during project preparation; and ensure disclosure takes place as required in relevant ADB policies and operations manuals. Assist MEW in ensuring a participatory process for resettlement plan preparation and implementation, and develop a format for documenting consultations. Upon submission to ADB, ensure that the resettlement plan is endorsed by MEW and any recommendations are incorporated and revisions disclosed to those affected. If subprojects are to be appraised after Board consideration of the ensuing loan project, a Government-approved resettlement framework must be submitted to ADB.
  - (iv) Define categories for impact and compensation eligibility of those affected, and prepare an entitlements matrix in consultation with the affected people and MEW that include compensation and other assistance for all types of impacts, to achieve full replacement for lost assets, income, and livelihoods. Conduct an inventory of losses and socioeconomic survey covering 20% of those affected persons. As part of the socioeconomic baseline survey, assess the socioeconomic condition, needs, and priorities of women and identify specific measures to assist them and ensure that land acquisition and resettlement does not disadvantage women.
  - (v) On the basis of the socioeconomic survey, identify and ensure that tribal groups do not experience negative impacts. In the event this is not possible, determine the need for an indigenous people's development plan, and incorporate provisions in the resettlement plan appropriate to the welfare of such indigenous groups consistent with ADB's indigenous peoples policy.
  - (vi) Identify an independent monitoring and evaluation mechanism (to be incorporated in the project structure—NGOs and research institutes may be considered) to ensure that compensation, relocation, and income-restoration measures, among others, are carried through effectively in the resettlement management process.
  - (vii) Collect baseline data on gender relations, gender disparities, gender division of labor, and women's and girls roles and status in the project area.
  - (viii) Analyze the potential direct and indirect impacts of the project on women's livelihood activities, food security, health, land tenure, access to forest and water resources, and access to basic services in the project area.

<sup>2</sup> ADB. 2003. *Involuntary Resettlement Operations Manuals*. Manila (OF2).

- (ix) Analyze access to electricity, affordability, consumption levels, and consumer satisfaction across socioeconomic groups in project areas; assess the determinants and elasticity of demand for power by different socioeconomic groups; and assess the implications on employment generation for the poor especially women.
- (x) Identify risks, opportunities, and specific mitigation measures and activities to address the identified negative impacts on women in the project area.
- (xi) Assess the capacity of communities, civil society groups, and MEW to identify and mitigate gender-related impacts and recommend capacity building needs.
- (xii) Recommend mechanisms to ensure women participate in and benefit from the project and mitigation plans.

**7. Financial Analyst (2 person-months)**

8. The consultant will undertake the following:

- (i) Undertake an analysis of the financial viability of the Project and each subproject in accordance with ADB's *Guidelines for the Preparation and Presentation of Financial Analysis*, using the financial internal rate of return method and comparing it with the relevant weighted average cost of capital.
- (ii) Determine tariffs necessary for project cost recovery; develop an appropriate computer model for calculating the tariff over the project lifetime.
- (iii) Supervise the evaluation of the economic impact of the tariff required for cost recovery and the affordability of different users.
- (iv) Prepare cost estimates at reconnaissance, prefeasibility, and feasibility stages in accordance with ADB guidelines. In addition, (a) prepare a preliminary financing plan taking into account availability of counterpart funds, and (b) complete a financial management assessment of the proposed executing and implementing agencies utilizing ADB's financial management assessment questionnaire.
- (v) Supervise the assessment of the likely financial uncertainties and risks facing the proposed hydropower plants and carry out sensitivity analysis to check the viability of the subprojects under these risks and uncertainties.
- (vi) Supervise the assessment requirements for training and training facilities for accounting and finance professionals in MEW and Da Afghanistan Breshna Moassessa (DABM). This task should be carried out in concert with the assessment of the requirements for sustainable management, operation, and maintenance of the subprojects.

**8. Power Economist (2.5 person-months)**

9. The consultant will undertake the following:

- (i) Supervise provision of macro and sector information, including energy production and consumption by sectors, energy efficiency, and electricity production and consumption by sectors (current and historical).
- (ii) Supervise preparation of the load forecast for each subproject area. The ranking study may base the load forecast on an estimate of the number of households at each subproject. For the prefeasibility and feasibility studies, the forecast will be based on a survey and assessment of the number of households, industries, and commercial establishments, and the electrification ratio of households.

- (iii) Carry out a study to determine the optimum balance between load demand and generation for each subproject, noting that consumption levels per household and new customers will probably increase with time.
- (iv) Take the lead in determining the tariffs for the subprojects in consultation with the financial analyst, institutional specialist, and other team members; develop an appropriate computer model for calculating the tariff over the project lifetime taking into account marginal cost pricing, subsidies required, and cost recovery levels of subprojects.
- (v) Supervise the economic analysis for each subproject at prefeasibility and feasibility stages, providing (a) equalizing discount rate, (b) economic internal rate of return calculation, and (d) sensitivity and risk analysis. Assess quantitative and qualitative project benefits. Discuss alternative methodologies for carrying out the economic analysis of single purpose and multipurpose projects and justify the method(s) chosen. The analysis should be in accordance with ADB's *Guidelines for the Economic Analysis of Projects* and *Handbook for Integrating Risk Analysis in the Economic Analysis of Projects*.

**9. Institutional Specialist (1.5 person-months)**

10. The consultant will undertake the following:

- (i) Supervise the domestic institutional analyst in preparing the description of the power sector structure, particularly with respect to rural electrification; describe the role and responsibilities of the various sector institutions; describe the delegation of authority in key areas (a) as defined in government policy and regulations, and (b) as practiced. Provide a chart showing the power sector institutions and their relationships.
- (ii) Supervise evaluation of the adequacy of the government policy and regulatory framework for implementation of the subprojects.
- (iii) Supervise assessment of the capacity of government institutions (mainly MEW and DABM) in terms of organization structure, corporate governance, power planning, project execution, financial and technical operations, and commercialization.
- (iv) Identify measures ADB could take to facilitate participation by MEW and DABM in management (including operation and maintenance) of the subprojects.
- (v) Define the requirements for sustainable management (including operation and maintenance) of the subprojects, individually and collectively. Assess the capability of MEW and DABM, community groups, or private enterprises to manage the subprojects.

**B. Domestic Consultants**

11. Domestic consultants will include the following experts who will be primarily responsible for assisting the international consultants. The team leader will assign the responsibilities to the domestic consultants. The domestic consultants will include (i) hydropower engineer (5 person-months), (ii) geologist (3 person-months), (iii) hydrologist (3 person-months), (iv) environmental specialist (3 person-months), (v) social compliance specialist (resettlement, indigenous peoples) (3 person-months), (vi) poverty impact assessment consultant (2 person-months), (vii) financial analyst (2 person-months), (viii) economist (2 person-months), and (ix) institutional analyst (2 person-months).