

**ASIAN DEVELOPMENT BANK**

**TAR:AFG 36289**

**TECHNICAL ASSISTANCE**

**TO**

**AFGHANISTAN**

**FOR THE**

**ENERGY SECTOR REVIEW AND GAS DEVELOPMENT  
MASTER PLAN**

**March 2003**

## CURRENCY EQUIVALENTS

(as of 13 March 2003)

Currency Unit	–	afghani/s (Af/Afs)
Af1.00	=	\$0.0217
\$1.00	=	Afs46.00

## ABBREVIATIONS

ADB	-	Asian Development Bank
TA	-	advisory technical assistance
bcm	-	billion cubic meters
CNG	-	compressed natural gas
DABM	-	Da Afghanistan Breshna Moassesa
MMI	-	Ministry of Mines and Industry
MOWP	-	Ministry of Water and Power
MW	-	megawatt

## NOTES

- (i) The fiscal year (FY) of the Government of Afghanistan begins on 22 March.
- (ii) In this report, "\$" refers to US dollars.

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## I. INTRODUCTION

1. Afghanistan's energy infrastructure has been either destroyed or degraded after more than two decades of war and civil strife, while its human resource base has been severely depleted. Its reconstruction presents considerable challenges for the Islamic Transitional Government of Afghanistan (Government) and for the international community, which has pledged support for the reconstruction effort. The constraints on the design and delivery of an effective and sustainable reconstruction and development program are the weak institutional capacity of the sector entities and lack of well-crafted development plans. The capacity building of the key ministries and departments is ongoing under a technical assistance cluster.<sup>1</sup> The Government needs help to prepare an energy sector development program that will ensure efficient development of the sector. The Government has requested the Asian Development Bank (ADB) to provide an advisory technical assistance (TA) for the review of the energy sector and to prepare a gas development master plan. The TA is included in the initial country strategy and program for 2003. A Fact-Finding Mission was undertaken from 17 to 26 November 2002 and reached an understanding with the Government on the goals, purpose, scope, implementation arrangements, and terms of reference of the TA.<sup>2</sup> The TA complements the reform agenda for the energy sector under the Postconflict Multisector Program for Afghanistan.<sup>3</sup> The TA framework is in Appendix 1.

## II. ISSUES

2. Afghanistan has one of the lowest per capita energy consumptions in the world, estimated at 2,000 kilowatt-hours in 1987 by the United Nations Development Programme. Traditional fuels such as fuel wood, animal dung, and agricultural wastes, meet over 85% of the energy needs, while the remaining requirements are met by commercial energy sources such as oil, gas, coal, and hydropower. Fuel wood accounts for about 75% of total energy supplies, and constitutes the basic source of energy for cooking and heating in rural areas, where the majority of the population live. Fuel wood has long been available in unrestricted quantities to rural consumers. In recent years, a commercial market for it has also developed in urban areas. Natural regeneration has not been able to sustain the forest area due to indiscriminate cutting of trees for fuel, thus creating serious ecological and environmental risks. Petroleum products dominate the use of commercial energy, accounting for more than 50% of that segment.

3. Afghanistan is well endowed with natural gas, coal, and hydropower. The known gas reserves are estimated to be about 120 billion cubic meters (bcm), with the likelihood of additional reserves of about 1,000 bcm at deeper horizons. The discovered gas reserves are spread over eight fields in the northern area of the country, of which three fields have been brought into production. The coal deposits are estimated to be 125 million tons, with nine proven deposits, of which four mines have been harnessed for production. The capacity of hydroelectric plants as installed constituted about 68% of the total generation capacity. The country depends on imports for most of its requirements for petroleum products, which account for half of commercial energy consumption. The domestic crude oil reserves are insignificant, estimated to be about 12 million tons dispersed over six fields in the northern region.

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<sup>1</sup> ADB. 2002. *Technical Assistance Cluster for the Capacity Building for Reconstruction and Development in Afghanistan*. Manila.

<sup>2</sup> The TA first appeared in *ADB Business Opportunities* (Internet edition) in November 2002.

<sup>3</sup> Loan No. 1954-AFG(SF): Postconflict Multisector Program, for SDR113,496 million approved on 4 December 2002.

4. Institutional responsibility for the energy sector is spread over several entities, largely owned and operated through centralized ministries, with some operational functions delegated to government enterprises. The line ministries with specific responsibilities are the Ministry of Water and Power (MOWP; electricity supply), Ministry of Mines and Industries (MMI; oil exploration, gas, coal, and mining), and Ministry of Commerce (oil imports and distribution). The oil, gas, coal, and power subsectors are controlled by the Government, which acts as owner, regulator, and policy maker. As the energy sector utilities are fully integrated with the Government administration, the Government has mixed roles. On one hand it acts as operator of the utilities, and on the other hand, as policy maker and regulator. Attracting sustainable and efficient private participation in the energy infrastructure sectors will require a sound business environment characterized by well-defined property rights, open entry, and the rule of law.

5. MMI is the administrative arm of the Government for the gas and coal subsectors, and is responsible for sector development and coordination. Under MMI, the Department of Petroleum and Gas Exploration undertakes geological surveys and exploration of oil and gas; and Raisal-e-Tasadi (Afghan Gas) is responsible for production, transmission, and distribution of natural gas. Other major departments and enterprises reporting to MMI in the energy sector are the Department of Mines Affairs, Department of Geological Survey and Mineral Resources, Planning Department, Private Sector Department, Geo Engineering and Hydrology Enterprise, Mine Exploitation Enterprise, and North Coal Enterprise. The Department of General Petroleum Products, under the Ministry of Commerce, is responsible for import, storage, and distribution of petroleum products in the country. MOWP is responsible for the power sector, and is also responsible for the development of renewable energy. The Government's Enterprise Act sets out the responsibilities of the various enterprises of the power sector. Da Afghanistan Breshna Moassesa (DABM) is among the five quasi-government enterprises in the power sector, and is responsible for the operation and maintenance of Afghanistan's power sector infrastructure. DABM is responsible for about 80% of the country's electricity production, with the MMI and the Ministry of Light Industry accounting for the remaining generation.

6. The infrastructure of the country's energy sector is in a state of decline, caused by a combination of factors that include the direct effects of the wars that the country has undergone, the shortage of expertise, and the unavailability of spare parts and equipment due to lack of funding. The gas production, transmission, and distribution systems have severe operating problems and are in urgent need of rehabilitation. Gas availability is grossly inadequate to meet current requirements mainly due to loss of production facilities and the high rate of leakages. Gas leakage represents not only a loss of revenue but also a major safety hazard. There is no national power grid in the country. The electricity networks are located around major cities and industrial areas. The countrywide total generating capacity supplying the networks in the early 1990s amounted to 377 megawatts (MW). This capacity has declined to a fragile 200MW. The power subsector is characterized by daily rationing of electricity, high technical losses caused by poorly repaired transmission and distribution lines, and inadequate and outdated generation and substation plants. Coal production facilities have been extensively damaged, most equipment has been looted, and mining structures have been destroyed. Current coal production is less than one third of production in the 1980s. A significant part of the infrastructure for storage, transportation, and distribution of petroleum products has been damaged, while the remaining capacity is in need of rehabilitation. The machinery and equipment available for oil and gas exploration are not functional, and the level of local expertise is limited. There is currently no private sector participation in exploration and development. These factors have contributed to the country's inability to develop its hydrocarbon resources.

7. The most important indigenous primary energy resource in Afghanistan is natural gas. The Government began extensive exploratory surveys for oil and gas at the end of the 1950s with the assistance of the former Soviet Union. Successful drilling revealed considerable gas reserves in the northern part of the country near the city of Shebarghan. Natural gas production began in 1967 when a pipeline was constructed to the Uzbekistan border where it was connected to the main gas transmission line traversing through Turkmenistan to the former Soviet Union. Three gas fields were developed, which have depleted over the years, and the combined remaining reserves of these fields are currently estimated at about 15 bcm. The remaining five fields have not been exploited. A promising area for additional gas reserves is located near the city of Herat in the west region. The current gas production is about 550 thousand cubic meters per day, which is about one fourth the level of production in the late 1980s.

8. The Government has given high priority to the development of natural gas as a significant source of energy in the country. An important aspect of the development program for the gas industry is to increase gas production, and to develop gas transmission and distribution infrastructure so that a higher proportion of the country's energy requirements can be met by natural gas, and dependence on oil can be reduced. The domestic utilization of natural gas has remained at a low level due to inadequate infrastructure facilities for gas production and its transportation to the consumption centers. Natural gas is not transmitted to major parts of the country, in particular the south, where the high-demand centers are located. Essentially, the gas infrastructure is limited, serving a population of less than 300,000 people. The main domestic consumers of natural gas are a fertilizer plant; a gas-fired thermal power plant, the commercial sector (bakeries, textile factory, food processing plant, etc.), and the household consumers for heating and cooking. The potential for increased utilization of natural gas is considered high, as there is a significant gap between demand and supply. In addition, natural gas is a premium fuel, as it has the least negative impact on the environment compared with other fossil fuels.

9. The operational strategy of the Government for the energy sector is aimed at promoting economic growth by removing impediments to modernization and reconstruction, in particular policy, financial, regulatory, and institutional constraints. The Government indicated that it plans to open up the energy sector to private participation, specifically oil and gas exploration, petroleum imports and marketing, and the mining sector. It is recognized that there is a need to establish separate policy and regulatory functions; to undertake sector restructuring; and to improve operation, maintenance, and safety standards. It will, however, take time to formulate new policy frameworks, modify existing legislation and regulations, achieve financial sustainability, and reorganize the sectors. The Government, therefore, favors a parallel approach of using the existing government structures to implement the capacity building and reconstruction work, while exploring options and creating consensus for implementing policy and structural changes appropriate for each sector.

10. Long-term sustainability requires promoting development of energy resources on a least-cost basis in an environmentally sound and socially acceptable way. It is assessed that the country's energy resources, which include natural gas, hydropower, and coal, can be utilized economically. With the known potential, most of the electricity needs can be met from domestic resources. The natural gas transmission system can be extended to Kabul and to other cities to meet industrial, commercial, and household energy requirements. Given the extreme winter conditions, the heating load is substantial. The huge reliance on the use of traditional energy resources, particularly firewood, has an adverse impact on the environment. An expanded

natural gas grid would not only meet the urban and rural energy needs but also assist in reducing environmental degradation by replacing the use of firewood. It can also be utilized to establish community-based decentralized electricity supply in many rural areas. Cement, textile, and food processing industries use primarily coal. The coal mines are favorably located near the industrial areas. Creation of policy framework to enable private investments in the coal sector would facilitate expansion of coal resources in the country.

11. The key issues that relate to the energy sector are (i) strengthening the capacity of key energy institutions to support sector rehabilitation and reconstruction; (ii) undertaking a review of policy, institutional, regulatory, and environmental issues related to the energy sector; (iii) establishing an efficient policy and regulatory framework for the hydrocarbon subsector; (iv) developing policy environment to encourage private sector investment in oil and gas exploration and development; (v) increasing government revenues by phasing out price subsidies and improving collection of payments by the gas and power utilities; (vi) gradually implementing separation of policy making, regulatory and operational functions, (vii) developing a policy on interregional gas trade to facilitate import and export of natural gas through a transmission network among the neighboring countries; (viii) creating institutional capacity for negotiating and monitoring investments in exploration and development of oil and gas; and (ix) establishing appropriate codes and standards for the oil and gas industry, and preparing procedures for its enforcement and monitoring.

### **III. THE TECHNICAL ASSISTANCE**

#### **A. Purpose and Output**

12. The purpose of the TA is to undertake a review of the energy sector and to prepare a comprehensive gas subsector development master plan that will guide and promote the development of Afghanistan's gas infrastructure over the next 10 years. The TA will improve energy supply based on identification of promising potential resources; attract private capital by removing impediments in government policies and strategies; improve sector efficiency through institutional strengthening; and prepare a gas development master plan to meet the expected increased domestic demand for natural gas, reduce the consumption of imported petroleum products, and reduce the environmental impact associated with the use of other fossil fuels.

13. The energy sector review will assess the primary energy resources in the country, review energy policy, determine the potential for increase in energy production, estimate the investment requirements, and identify possible sources of financing. The gas development master plan will lay the foundation for maximizing the economic benefits of the use of indigenous natural gas and provide a blueprint for the development of the physical infrastructure.

#### **B. Methodology and Key Activities**

14. The TA will undertake an assessment of the energy sector and evaluate various options for the development of the gas subsector. The key activities of the TA will include (i) reviewing the Government's policy framework to promote and develop energy resources; (ii) estimating the investment requirements to increase primary energy production to meet the projected demand; (iii) formulating a strategy to encourage private investment in energy sector development; (iv) assessing the potential for increased domestic utilization of natural gas;

(v) prioritizing major gas infrastructure development projects that need to be undertaken to meet the increased demand for natural gas; (vi) assessing the economic and environmental benefits of increased domestic natural gas consumption in place of other fuels; (vii) identifying measures aimed at providing gas to the extent possible to the poor and disadvantaged; (viii) assessing the potential for increasing small-scale use of natural gas; (ix) identifying the changes required to the existing laws, rules, and policies governing the gas sector; and (x) building capacity and training of gas industry personnel.

### **C. Cost and Financing**

15. The total cost of the TA is estimated at \$950,000 equivalent, of which \$870,000 is the foreign exchange cost and \$80,000 equivalent is the local currency cost. ADB will finance the entire foreign and local currency costs. The TA will be financed on a grant basis by ADB's technical assistance funding program. Detailed cost estimates are presented in Appendix 2.

### **D. Implementation Arrangements**

16. The TA will be implemented by a firm of international consultants with expertise in (i) energy planning; (ii) energy economics; (iii) energy policy analysis; (iv) natural gas production, processing, and transmission; (v) gas infrastructure development; and (vi) institutional strengthening. Domestic consultants will be engaged by the international consulting firm, which will have the overall responsibility for the TA. Consultants will be engaged by ADB using the full technical proposal procedure and the quality and cost-based selection method in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB. It is estimated that the TA will require about 22 person-months of international and 40 person-months of domestic consulting services. The international energy sector assessment specialist will act as the team leader and will coordinate the activities of all consultants. The domestic consultants will assist the international consultants in gathering and analyzing pertinent information and data, and in reviewing documents provided by the concerned ministries and energy sector entities. The outline terms of reference of the consultants are provided in Appendix 3.

17. MMI will be the executing agency for the TA and will nominate a minimum of three senior level counterpart staff to assist the consultants in their work. MMI will provide the consultants with adequate office accommodation and office support services. The consultants will hold workshops and consultation meetings to obtain inputs from the various departments and enterprises of MMI and from other relevant ministries. It will be the responsibility of the consultants to develop workshop designs and identify participants in consultation with the core group assigned by MMI. The TA will commence in May 2003, will be implemented over a period of 9 months, and is expected to be completed by February 2004. The consultants will submit (i) an inception report within 1 month, (ii) an interim report within 4 months, and (iii) a draft final report within 6 months of the commencement of the TA. The draft final report will be discussed with MMI; relevant ministries, departments, and enterprises of MMI; ADB; and the consultants at a meeting to be held in Kabul within 1 month of its issuance. The consultant will submit the final report within 1 month of the meeting, incorporating the comments of the government agencies and ADB.

18. The consultants will develop in-house training courses for Afghan Gas as well as identify on-the-job training outside the country to fulfill their training needs. Two seminars will be held,

participated by the energy sector entities, to discuss the preparation of the energy sector assessment and gas subsector development plan. All computer programs, databases, and training materials developed by the consultants during TA implementation will be provided to MMI upon completion of the TA. The TA budget provides for purchase of office equipment, office supplies, telecommunications equipment, furniture, and vehicles, which will be procured in accordance with ADB's *Guidelines for Procurement* and other arrangements satisfactory to ADB.

#### **IV. THE PRESIDENT'S DECISION**

19. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$950,000 on a grant basis to the Islamic Transitional Government of Afghanistan for the purpose of Energy Sector Review and Gas Development Master Plan, and hereby reports such action to the Board.

## TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p><b>1. Goal</b></p> <ul style="list-style-type: none"> <li>• Accelerate utilization of natural gas, thereby optimizing use of domestic energy resources and reducing import of petroleum products</li> <li>• Improve the gas sector's efficiency, financial viability, and long-term sustainability</li> </ul>	<ul style="list-style-type: none"> <li>• Progressive increase in the share of natural gas in the energy mix over the next 10 years</li> <li>• Sector entities that are efficient, financially viable, and effectively able to operate and maintain expanded gas system</li> </ul>	<ul style="list-style-type: none"> <li>• National reports, review missions, and sector reports</li> <li>• Consultants' reports and TA review missions</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient mobilization of required financing for priority projects</li> <li>• Continued government commitment to promote sustainable gas sector development</li> </ul>
<p><b>2. Purpose</b></p> <p>Formulate a strategy for sustainable energy sector development that will encourage investment to improve energy supply</p> <p>Prepare a gas development master plan</p> <p>Mobilize of required investments for gas exploration, production, transmission, and distribution</p>	<ul style="list-style-type: none"> <li>• Improvements in the policy and institutional setup that will promote efficient energy sector development</li> <li>• Development of incremental gas infrastructure and increased investments in the gas sector</li> <li>• Increased use of natural gas including by small-scale consumers</li> </ul>	<ul style="list-style-type: none"> <li>• Policy dialogue, review missions, and periodic reports</li> <li>• Annual reports and statistics of the Ministry of Mines and Industries (MMI)</li> <li>• Sales volume of gas production and distribution entities</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of the recommended policy measures and institutional development</li> <li>• Delays in the implementation of the master plan</li> <li>• Insufficient mobilization of required financing</li> </ul>
<p><b>3. Outputs</b></p> <ul style="list-style-type: none"> <li>• Policy guidelines and institutional measures to guide energy sector development</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a broad framework for improving energy supply based on a review of Government policies and strategies in the energy sector</li> </ul>	<ul style="list-style-type: none"> <li>• Reports submitted by consultants</li> </ul>	<ul style="list-style-type: none"> <li>• Delays in implementation of proposed policy and institutional measures</li> </ul>

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
<ul style="list-style-type: none"> <li>• Sustainable gas sector projects identified for external financing</li> <li>• Institutional strengthening for efficient gas sector operations</li> <li>• Environmental improvement in urban areas due to increased utilization of natural gas by replacing other fossil fuels</li> </ul>	<ul style="list-style-type: none"> <li>• An optimal strategy for ADB involvement in the gas sector based on the master plan</li> <li>• Identification of training needs and carrying out internal and external training programs</li> <li>• Air quality improvements</li> </ul>	<ul style="list-style-type: none"> <li>• Policy discussions with government agencies</li> <li>• Review missions and consultants' periodic reports</li> <li>• Air quality indicators</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of domestic financing</li> <li>• Continued government commitment and support for institutional reforms</li> <li>• Delays in project development</li> </ul>
<p><b>4. Activities</b></p> <ul style="list-style-type: none"> <li>• Reviewing and analyzing energy sector policies and programs</li> <li>• Estimating investment requirements to increase primary energy production</li> <li>• Assessing potential for increased natural gas utilization including small-scale usage</li> <li>• Developing a gas sector development plan</li> <li>• Assessing economic and environmental benefits</li> <li>• Identifying changes to laws, rules, and policies governing the gas sector</li> </ul>	<ul style="list-style-type: none"> <li>• Medium- to long-term development plans and programs for the energy sector, based on market-oriented policies and project viability</li> <li>• Evaluation of options and prioritization of projects for further development</li> </ul>	<ul style="list-style-type: none"> <li>• Consultants' reports</li> <li>• TA review missions</li> <li>• TA completion report</li> </ul>	<ul style="list-style-type: none"> <li>• Close coordination among the consultants, energy sector ministries and hydrocarbon sector entities</li> </ul>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<ul style="list-style-type: none"> <li>Organizing workshops for energy sector entities</li> </ul>			
<p><b>5. Inputs</b></p> <ul style="list-style-type: none"> <li>Consulting services</li> <li>Funds</li> </ul>	<ul style="list-style-type: none"> <li>International consulting services for 22 person-months</li> <li>Domestic consulting services for 40 person-months</li> <li>Total cost \$950,000 equivalent, including \$870,000 in foreign exchange and \$80,000 equivalent in local currency</li> </ul>	<ul style="list-style-type: none"> <li>Review missions and periodic reports</li> </ul>	<ul style="list-style-type: none"> <li>Engagement of capable consultants with requisite skills</li> <li>Availability of domestic consultants for the required support</li> </ul>

**COST ESTIMATES**  
**(\$'000)**

<b>Item</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total</b>
1. Consultants			
a. Remuneration and Per Diem			
(i) International Consultants	585	0	585
(ii) Domestic Consultants	0	40	40
b. International and Local Travel	70	5	75
c. Communications and Reports	15	0	15
2. Equipment	25	0	25
3. Vehicles	40	0	40
4. Training, Workshops and Seminars	50	15	65
5. Miscellaneous Administration Support Costs		10	10
6. Contract Negotiations	5	0	5
7. Contingencies	80	10	90
<b>Total</b>	<b>870</b>	<b>80</b>	<b>950</b>

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The terms of reference include, but are not limited to, the following:

### A. International Consultants (22 person-months)

#### 1. Energy Sector Assessment

2. The consultants will

- (i) review available information and data on the primary energy resources<sup>1</sup> in Afghanistan, and estimate their potential for future energy sector development;
- (ii) review the existing policy framework as well as new initiatives by the Government to promote and develop domestic energy resources;
- (iii) review and assess energy demand for all energy subsectors;
- (iv) estimate the investment requirements to increase primary energy production to meet the medium-term requirements, evaluate options, and identify possible sources of financing; and
- (v) prepare an energy balance that indicates the present supply and consumption of primary and transformed commercial energy, and recommend appropriate action for regular updating of energy balance;

#### 2. Energy Supply and Demand Analysis

3. The consultants will

- (i) determine the medium- and long-term primary energy supply scenario in Afghanistan; and evaluate the various options for development of natural gas, coal, and hydropower; and
- (ii) determine the medium- and long-term primary energy demand projections and suggest a methodology for assessing regional and seasonal demand.

#### 3. Energy Policy Review

4. The consultants will

- (i) review the present tariff and pricing structures for primary commercial energy, and identify measures required to mobilize resources for the development of energy infrastructure;
- (ii) review government strategy for encouraging foreign investment and domestic resources to finance sustainable energy sector development; and

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<sup>1</sup> Includes natural gas, oil, coal, hydropower, wind, and solar energy.

- (iii) review the Government's gas policy; identify measures required to mobilize private sector participation; and suggest changes in existing laws, rules, and policies.

#### **4. Institutional Development**

- 5. The consultants will
  - (i) comment on the overall institutional setup for the hydrocarbon subsector and suggest further steps that can be taken to meet its development needs; and
  - (ii) evaluate and propose an institutional setup of Afghan Gas that will be effective for operation and maintenance of the expanded gas production, transmission, and distribution system.

#### **5. Gas Sector Review**

- 6. The consultants will
  - (i) review the reserves for each discovered natural gas field and its composition, and determine the potential for development;
  - (ii) review the gas transmission and distribution infrastructure and identify the least cost expansion scenario for the next 10 years;
  - (iii) examine the use of compressed natural gas (CNG) in the country, and identify impediments for self-sustainability and expansion; estimate the financing required to develop and expand CNG utilization; and
  - (iv) identify the most realistic market development scenario for natural gas; make a qualitative and quantitative assessment of the economic, environmental, and social benefits of the use of natural gas.

#### **6. Gas Development Master Plan**

- 7. The consultants will
  - (i) prepare a gas sector development master plan that (a) examines the target market and the sector, (b) prioritizes projects for further development of the sector, and (c) identifies the actions required and investments needed to achieve the development;
  - (ii) prepare project profiles, estimate capital costs, and develop schedules for the projects proposed under the master plan;
  - (iii) assess the investment requirements to appraise and develop the existing and potential gas reserves, including gas processing and production costs, under various scenarios of reserves and production levels; and

- (iv) assess the downstream investments that are expected to be required in the gas sector during the next 10 years to meet the increased demand for gas.

## **7. Environmental Aspects**

- 8. The consultants will
  - (i) review the environmental standards applicable to the energy sector and assess its effectiveness;
  - (ii) examine the present environmental, safety, and quality standards that are applicable to the hydrocarbon sector, including the institutional arrangements for their enforcement; recommend suitable measures for the monitoring and compliance of the prescribed standards; and
  - (iii) propose measures to curtail pollution resulting from new investments in oil and gas exploration and development.

## **8. Seminars and Training**

- 9. The consultants will
  - (i) develop a comprehensive capacity building plan for Afghan Gas so as to address its short and medium-term training needs;
  - (ii) conduct a suitable in-house training program as well as identify external training for Afghan Gas in maintaining the integrity of the gas operating system;
  - (iii) arrange two seminars for the energy sector entities to disseminate pertinent information relating to the energy sector assessment and gas development master plan, respectively; and
  - (iv) train concerned staff in the Planning Department of Ministry of Mines and Industry in the use and regular updating of the energy balance and gas sector development plans.

## **B. Domestic Consultants (40 person-months)**

10. The domestic consultants will assist the international consultant in undertaking the following tasks:

### **1. Energy Sector Assessment**

- 11. The consultants will
  - (i) assist in collection and analysis of data on primary energy resources and production in the country;

- (ii) summarize the current energy situation in the country, including the role of natural gas, hydropower, coal, and oil, taking into account all available data and ongoing activities in the energy sector;
- (iii) assist in obtaining energy supply and consumption data for Afghanistan, and discuss with concerned government agencies to ensure their accuracy to the extent possible;
- (iv) review and analyze the pricing structure of all available energy products, and assess changes anticipated in this pricing structure in the future; and
- (v) assist in the preparation of the energy balance for the country.

## **2. Gas Sector Review**

12. The consultants will

- (i) assist in obtaining information on natural gas reserves; its composition; and the physical infrastructure for gas production, transmission, and distribution;
- (ii) review and analyze planned public and private sector investments for gas infrastructure and prepare the most probable development scenario for the next 5 years; and
- (iii) help identify and prioritize packages for gas infrastructure activities and policies needed to promote natural gas use by small-scale users.

## **3. Seminars and Training**

13. The consultants will

- (i) assist in the training needs assessment to be conducted by the international consultant;
- (ii) assist and participate as resource persons in the training events; and
- (iii) organize and facilitate workshops and seminars, including logistics and translation services.