

**ASIAN DEVELOPMENT BANK**

**TAR:STU 35478**

**TECHNICAL ASSISTANCE**

**FOR PREPARING THE**

**REGIONAL GAS TRANSMISSION IMPROVEMENT PROJECT**

**IN THE**

**CENTRAL ASIAN REPUBLICS**

**March 2002**

## CURRENCY EQUIVALENTS

(as of 1 March 2002)

<b>Country</b>	<b>Currency Unit</b>	<b>Equivalent (per \$1)</b>	<b>\$ Equivalent (per 1 unit)</b>
Kazakhstan	Tenge (T)	T143.00	\$0.00699
Kyrgyz Republic	Som (Som)	Som47.00	\$0.02128
Tajikistan	Somoni(TJS)	TJS2.80	\$0.35714
Turkmenistan	Turkmen manat (MNT)	MNT5,200.00	\$0.00019
Uzbekistan	Sum (SUM)	SUM650.00	\$0.00153

## ABBREVIATIONS

ADB	–	Asian Development Bank
BCM	–	billion cubic meter
CAR	–	Central Asian republics
TA	–	technical assistance
TCM	–	trillion cubic meters

## NOTE

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

## I. INTRODUCTION

1. The natural gas sector has considerable potential for increasing regional cooperation in Central Asia, in particular among Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. Regional technical assistance (TA) of the Asian Development Bank (ADB) have provided a platform for the Central Asian republics (CARs) to discuss related issues, and have resulted in the identification of required follow-up actions to increase regional cooperation<sup>1</sup> During a regional energy conference organized by ADB in Bishkek in July 2001, concerned government representatives requested ADB assistance in improving the regional gas transmission network. In August 2001 the Senior Officials Meeting held in Manila endorsed this proposal. In response to these requests to help improve natural gas trade among these countries, the ADB Fact-Finding Mission visited Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan in January 2002. The Mission reached understandings on the objectives, scope, terms of reference for consultants, cost, financing plan, and implementation arrangements of the TA. The TA framework is in Appendix 1.<sup>2</sup>

## II. ISSUES OR PROBLEMS

2. Natural gas is the predominant energy source in the CARs and the extensive pipeline network in the region reflects its importance. Uzbekistan and Turkmenistan are the two major natural gas producers in the region followed by Kazakhstan.<sup>3</sup> Turkmenistan currently produces about 71 billion cubic meter (BCM) of natural gas a year, Uzbekistan 66 BCM, Kazakhstan 5.7 BCM, Tajikistan 20 MCM and Kyrgyz Republic 10 MCM. Inadequate infrastructure and lack of investible resources for increasing natural gas operations and exploiting these resources are major hurdles for developing and utilizing natural gas resources to promote regional economic growth. The gas transmission systems were established in the Soviet era when natural gas was transported from the former Central Asian Soviet republics to the northwest as feedstock for the major refineries in European Russia. With the discovery of natural gas in Siberia, exports to these traditional markets declined. However, natural gas continued to be distributed through pipelines to other republics in the former Soviet Union.

3. Most of Uzbekistan's natural gas resources are consumed domestically for power generation and production of petrochemicals. This has reduced the amount of natural gas available for export to Kazakhstan, Kyrgyz Republic, and Tajikistan. Exports are also hampered by the lack of alternatives to the existing Central Asia–central Russia pipeline system. The eastern section of this system connects Uzbekistan with Kyrgyz Republic and Kazakhstan, and the western section connects Turkmenistan with Uzbekistan and the Russian Federation. Frequent nonpayment for exported natural gas by the recipient countries is also discouraging gas exports.

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<sup>1</sup> The program of regional economic cooperation in Central Asia has been supported by TA 5707-REG: *Regional Economic Cooperation in Central Asia*, for \$1,150,000, approved on 8 November 1996; TA 5760-REG: *Workshops on Economic Cooperation in Asia*, for \$344,000, approved on 14 November 1997; TA 5818-REG: *Regional Economic Cooperation in Central Asia, Phase II*, for \$1,350,000, approved on 11 December 1998; TA 5942-REG: *Regional Economic Cooperation in Central Asia, Phase II-Year Two*, for \$420,000 approved on 2 October 2000; and TA 5988-REG: *Regional Economic Cooperation in Central Asia, Phase II-Year Three*, for \$950,000, approved on 12 July 2001.

<sup>2</sup> The TA first appeared as a prefeasibility study in *ADB Business Opportunities* (Internet edition) on 9 November 2000. It appeared as a project-preparatory TA on 14 November 2001.

<sup>3</sup> Estimated proven natural gas reserves are about 2.8 trillion cubic meter (TCM) for Turkmenistan, 1.9 TCM for Uzbekistan, 1.8 TCM for Kazakhstan, and 5.7 BCM each for Kyrgyz Republic and Tajikistan.

4. Six gas pipelines connect Kazakhstan to other countries in the Central Asian region and the Russian Federation. However, within Kazakhstan natural gas-producing areas in the west are not connected to natural gas-consuming areas within the country, such as the populous southeast and the industrial north. Kazakhstan mainly exports its natural gas production in the west to the Russian Federation while importing about 40 percent of its natural gas requirements for the southeastern part of the country from Turkmenistan and Uzbekistan. The eastern section of the Central Asia–central Russia pipeline system that links Uzbekistan, Kyrgyz Republic, and Kazakhstan was built during 1967–1969, originating in Bukhara in Uzbekistan and ending in Almaty via Tashkent and Bishkek.

5. Turkmenistan’s economic prospects depend largely on its ability to increase its natural gas exports. However, due to Turkmenistan’s landlocked location and the abundant natural gas resources of Uzbekistan, Turkmenistan is not a major natural gas supplier to other countries in the Central Asian region. Also, after natural gas from Turkmenistan has entered the Russian Federation through the western section of the Central Asia–central Russia pipeline system, Turkmenistan is required to use the old Russian pipeline network to export its natural gas to third countries. Turkmenistan is therefore aiming to develop alternative gas transmission systems to export natural gas to South and Southeast Asia, the People’s Republic of China, and possibly Europe.<sup>4</sup> However, until now only a new gas transmission pipeline of about 200 kilometers to northern Iran has been completed.

6. The Kyrgyz Republic is almost entirely dependent on natural gas imports from Turkmenistan and Uzbekistan through the existing transmission pipeline system to meet its domestic demand of 1.9 BCM, which accounts for about 30 percent of its energy consumption mostly in the northern part of the country. The Kyrgyz Republic’s dependence on natural gas imports has left it vulnerable to supply disruption.<sup>5</sup>

7. Tajikistan also relies heavily on natural gas imports from Turkmenistan and Uzbekistan to meet its energy needs, despite the significant rise in gas production in recent years with the commissioning of new gas fields and increasing production from existing fields. Natural gas pipelines run from Uzbekistan to Tajikistan under a barter arrangement that permits the use of a rail transport corridor through northern Tajikistan linking eastern Uzbekistan with its gas fields.

8. Regional cooperation among the CARs to develop and utilize the region’s natural gas resources would help these countries to become a larger exporter of energy. It would also enable them to meet their energy needs in the most economically efficient and environment-friendly manner. The main constraints for such interregional trade are national policies of the regional countries that favor self-sufficiency and import substitution at the expense of trade and rationalization of energy use. Others include poor communications infrastructure, lack of institutional and regulatory framework for cross-border supply of energy, inadequate legal frameworks for ensuring payment for energy supplies and settlement of disputes, and absence of appropriate energy policies in the concerned countries.<sup>6</sup>

9. Increasing the natural gas supply from Uzbekistan to Kyrgyz Republic, Kazakhstan, and Tajikistan requires an assessment of the available natural gas reserves in Uzbekistan and Turkmenistan that could be produced for use in the Kyrgyz Republic and Kazakhstan. At

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<sup>4</sup> During the country strategy consultations, Turkmenistan requested ADB assistance to support these endeavors.

<sup>5</sup> Since Uzbekistan began trading its natural gas more in line with commercial principles, payment arrears by the Kyrgyz Republic have often resulted in gas supply interruptions by Uzbekistan until the arrears were settled.

<sup>6</sup> TA 5960-REG: *Regional Power Transmission Modernization Project in the Central Asian Republics*, for \$900,000, approved on 12 December 2000, helped formulate a project to facilitate power exchange among the CARs.

present, the existing gas transmission systems in these regional countries have deteriorated considerably and require rehabilitation to ensure that stability, quality, and reliability of natural gas supply among the countries are maintained. The configuration of the gas transmission system also does not facilitate the expansion of natural gas consumption within the region. Detailed studies are required to determine the financial and economic viability of a coordinated program for rehabilitating, upgrading, and operating the existing gas infrastructure, including constructing new branch pipelines, and completing the parallel gas transmission pipelines. Policy, legal, and other arrangements required to support the supply, delivery, and trade of natural gas among the countries should also be outlined. The TA will address these constraints.

10. Effective functioning of the improved natural gas systems would require improving the policy framework for a market-oriented energy structure, adopting appropriate pricing principles, and evaluating and mitigating environmental and social impacts. Tariffs must be adjusted and collected to cover real costs, problems with nonpayment for energy services resolved, and nontechnical system losses minimized. In this context, the regional countries must reach a broad consensus to delink energy trade from water issues

11. For the region's pro-poor economic growth strategies, the participating governments will seek to provide improved and wider access to modern energy by the poor. ADB will support the improvement of the natural gas network for more efficient transmission and distribution to facilitate human poverty reduction, serving the less-developed parts of the countries. The ensuing project will involve expanding and renovating the existing natural gas transmission networks in the five countries, and completing a new parallel gas pipeline from Uzbekistan through Kazakhstan into the Kyrgyz Republic and back into Kazakhstan. The project, which is in line with ADB's operational strategy in the region and is included in the Central Asian Assistance Plan, will support developing regional energy trade on market principles. In this context, the participating governments have given priority to improving subregional gas trade among them.

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

#### **A. Purpose and Objective**

12. The long-term objective underlying the TA is to promote sustained economic growth through regional cooperation in the CARs by eliminating technical and institutional bottlenecks and other barriers that constrain efficient operation and flow of natural gas, prevent energy trade, and impede rational use of the transmission system linking them. The objective of the TA is to assist five CARs to formulate a strategy to improve gas transmission, including necessary policy, regulatory, and institutional measures, and investment and action plans for implementing the strategy for promoting efficient gas trade in the region. The TA will formulate a regional project suitable for ADB financing to improve the gas transmission network in the five countries to facilitate access to modern energy by the rural poor, regional major cities, and commercial centers. The scope of the ensuing project will be determined in consultation with the participating countries based on the findings of the study.

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

13. The study to be financed by the TA will review present gas transmission arrangements for the supply of natural gas from Turkmenistan and Uzbekistan to Kazakhstan and Kyrgyz Republic, including an assessment of the natural gas reserves and the potential for gas trade. Measures for developing a competitive framework in each country, including promoting private

investment, appropriate business management, and financing practices will be outlined. The required regional, institutional, and contractual arrangements for operating the present and any expanded transmission system will be identified. The technical feasibility, and financial and economic viability of the various options for increasing natural gas supplies by pipelines from Turkmenistan and Uzbekistan to Kyrgyz Republic and Kazakhstan will be assessed including possible environmental, social, and poverty reduction impacts. The study will also analyze natural gas trade and pricing principles in the Central Asian and Caspian Sea regions. The economic benefits and costs of increased natural gas trade among the participating countries will be assessed both in regional and international contexts. The investment requirements for improved natural gas production, processing, and distribution in the region will be determined based on this analysis. The TA will also provide a forum for the five CARs to exchange views on the envisaged increased gas supplies and discuss the study findings during implementation. Outline terms of reference for the consultants are in Appendix 2.

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

14. The total cost of the TA is estimated at \$1,180,000 equivalent, comprising a foreign exchange cost of \$773,000 and a local currency cost of \$407,000 equivalent (Appendix 3). ADB will provide \$900,000 equivalent to finance the entire foreign exchange cost and \$127,000 equivalent of the local currency cost. The TA will be financed by ADB on a grant basis from the ADB-funded TA program. The participating governments will finance on a prorata basis \$280,000 equivalent in local currency costs. The governments have been advised that provision of the TA does not commit ADB to finance any ensuing project.

### **D. Implementation Arrangements**

15. The implementation arrangements are designed to ensure proper coordination among the participating governments and ADB to evolve a consensus on the policy issues and the project components to be selected for financing. ADB will be the Executing Agency of the TA. In each participating country, the respective natural gas transmission companies will act as implementing agencies for the TA.<sup>7</sup> They will form a working group on regional natural gas trade to monitor TA implementation and discuss the options and requirements for the proposed increased natural gas supplies. When required, the working group will be joined by, or will obtain advice from, representatives of other government agencies, in particular those dealing with cross-border issues. Minutes of these consultations will be the principal formal means by which ADB will carry out its role as the Executing Agency. ADB resident missions and liaison offices in the participating countries will also be involved in coordinating the activities of the working group.

16. Each national implementing agency will assign coordinating and liaison officers, and provide adequate counterpart staff to work with the consultants to undergo on-the-job training in preparing feasibility studies, and to ensure that the governments' inputs to the TA are provided in a timely manner. The counterpart agencies will provide all administrative support staff, office space, furniture, and utilities. The consultants will provide technical support, equipment, computer software, and transport. They will be based in Tashkent, and in coordination with the concerned governments, will establish a presence in the other participating countries. Computers and office equipment such as photocopiers will be procured by the consultants in

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<sup>7</sup> Because of its importance in the gas market in the Central Asia and the Caspian Sea regions, Azerbaijan will also be consulted during implementation.

accordance with ADB's *Guidelines for Procurement* and other arrangements satisfactory to ADB.

17. The TA will finance the services of international and domestic consultants who will be engaged from consulting firms in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the engagement of domestic consultants. The consultants will be selected on the basis of full technical proposals from consulting firms. The international consulting firms will associate with domestic consultants and include them in their proposals. The consulting team will comprise experts in natural gas sector planning and regulation, transmission, energy economics, environment, social issues, gender, and poverty reduction. International consultants will be engaged for a total of 20 person-months, and domestic consultants for 30 person-months. The domestic consultants will assist the international consultants in gathering and analyzing pertinent information from concerned agencies, and in reviewing feasibility and other reports and documents provided by the implementing and other agencies. In reviewing these documents and information, the international and domestic consultants will inspect selected gas transmission facilities.

18. The study will be carried out in two phases. During the first phase, to be implemented within three months of the commencement of the study, policy and institutional issues will be reviewed and analyzed to outline specific measures essential to support the ensuing project. The policy measures will cover such areas as tariffs, accounts receivable, commercial operation of utilities, and natural gas trade. The components to be financed under the ensuing loan project will also be identified in this phase. The second phase will involve detailed evaluation and assessment of the components and will last six months. This phase will start after a gap of about one month during which the findings of the first phase, presented in an interim report, will be reviewed by ADB jointly with the participating governments to reach an understanding on subsequent activities of the study. In addition, two workshops will be organized in conjunction with the tripartite meetings of the governments, consultants, and ADB to conduct a review of TA activities and disseminate study findings.

19. The study is expected to commence in June 2002 and be completed in 10 months. The consultants will submit an interim report within two months from the start of the first phase, and a draft final report within three months of the start of the second phase. The interim report will cover all relevant aspects, drawing conclusions with appropriate policy, institutional, and other recommendations for the second phase. The interim report will be reviewed in a workshop participated by the concerned governments to provide guidance for subsequent study activities. The draft final report will be reviewed in a tripartite meeting of ADB, the participating governments and consultants within one month of its submission. The final report will be submitted within one month after tripartite review of the draft final report.

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

20. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance, on a grant basis, in an amount not exceeding the equivalent of \$900,000 for the purpose of preparing the Regional Gas Transmission Improvement Project in the Central Asian Republics, and hereby reports such action to the Board.

## TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Risks/Assumptions
<p><b>A. Sector Goal</b></p> <p>Reduce poverty by expanding the use of natural gas resources in the Central Asian republics and enhancing subregional economic cooperation among Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan.</p> <p>Restructure the natural gas sector in line with the needs of a market economy.</p>	<p>Regional and subregional economic growth, social development, and poverty reduction</p> <p>Improved governance of state-owned energy enterprises</p>	<p>Policy dialogue with government agencies, review missions, and consultants' periodic reports</p>	<p>Active involvement of the regional countries and their long-term commitment to improving energy supply services and improving subregional natural gas trade</p> <p>Participating governments to introduce market-oriented reforms</p>
<p><b>B. Purpose</b></p> <p>Formulate a strategy for improving and developing natural gas infrastructure to promote regional natural gas trade, and prepare a project that will improve the quality and reliability of power supply.</p>	<p>Improvements to the policy, institutional, and regulatory frameworks for enhancing efficient regional natural transmission and distribution</p> <p>Estimation of prioritized investment and maintenance requirements for gas transmission improvement</p>	<p>Policy dialogue, review missions, and consultants' periodic reports</p>	<p>Adequate progress on policy and institutional issues to increase cooperation in subregional natural gas trade</p> <p>Adequate resources found for construction, operation, and maintenance of gas transmission projects</p>
<p><b>C. Outputs</b></p> <ol style="list-style-type: none"> <li>1. Outline policy and institutional measures to guide market-oriented gas sector reforms and restructuring.</li> <li>2. Assess the feasibility of increasing natural gas supply from Uzbekistan and Turkmenistan to Kyrgyz Republic, Kazakhstan, and Tajikistan.</li> <li>3. Develop cost-based pricing mechanisms for gas transmission.</li> <li>4. Formulate a prioritized capital investment and maintenance program.</li> </ol>	<p>Establish a broad institutional framework for improving regional gas supply, system reliability, and energy efficiency.</p> <p>Assess current patterns of natural gas trade among the participating countries, and outline measures for increasing such trade.</p> <p>Review the system of tariff determination, and develop the mechanism of tariff setting for regional trade.</p> <p>Estimate associated investment requirements; and assess financial and economic viability of the proposed project, including environmental, social, and poverty reduction impact assessments</p>	<p>Policy dialogue, review mission, and consultants' periodic reports</p>	<p>Implementation of gas sector policy and institutional reforms by the participating governments</p> <p>Continued government commitment to promote commercial gas trade and develop competitive market</p> <p>Adoption of market-oriented pricing</p> <p>Availability of counterpart funds for meeting local currency costs</p>
<p><b>D. Activities</b></p> <ol style="list-style-type: none"> <li>1. Review existing policies, institutional frameworks, and regulations; and identify barriers to market-oriented gas sector development.</li> </ol>	<p>Action program for further policy and institutional reforms, including governance reforms, private sector participation, and commercialization of utility operations</p>	<p>Policy dialogue, review missions, and periodic reports</p>	<p>Cooperation of national government agencies in formulating desired policy measures and institutional strengthening programs</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Risks/Assumptions
<p>2. Review gas sector studies financed by other aid agencies, and existing government development plans and strategies.</p> <p>3. Prepare an energy balance for each participating country, and analyze and assess the gas demand and supply situation in each country</p> <p>4. Review present infrastructure and arrangements including pricing and payment principles for natural gas trade among the participating countries.</p> <p>5. Assess the potential for increased gas production and supplies in Uzbekistan (and Turkmenistan) and the potential demand for increased gas consumption in Kazakhstan, Kyrgyz Republic, and Tajikistan.</p> <p>6. Estimate and prioritize investment requirements by sector.</p> <p>7. Determine at the feasibility study stage the requirements for upgrading and expanding the existing gas transmission system.</p> <p>8. Organize workshop in conjunction with final review of study findings</p>	<p>Outline an optimal strategy for development of the gas sector, including gas trade among the participating countries</p> <p>Formulate a projected natural gas supply demand profile for the next 10 years</p> <p>Establish agreed principles for governing future gas supplies from Uzbekistan and Turkmenistan to Kazakhstan, Kyrgyz Republic, and Tajikistan</p> <p>Assess the feasibility of improving and increasing natural gas supplies through regional transmission networks</p> <p>Formulate long-term development program for the sectors.</p> <p>Formulate the preliminary design of a project for improving the regional transmission improvement system, including assessment of possible environmental and social impacts</p> <p>Disseminate information on project design and benefits</p>	<p>Policy dialogue, review missions, and periodic reports</p>	<p>Cooperation of concerned agencies in providing required information</p> <p>Cooperation of concerned agencies in providing required information</p> <p>Cooperation of national government agencies in addressing the need for establishment of such principles</p> <p>Willingness of national governments to improve regional gas transmission networks</p> <p>Cooperation of concerned government agencies in providing required information</p> <p>Availability of qualified counterpart staff and cooperation of concerned national agencies</p> <p>Participation of stakeholders</p>
<p><b>E. Inputs</b></p> <p>Consulting Services</p> <p>Costs</p> <p>Financing</p>	<p>International consulting services for 20 person-months</p> <p>Domestic consulting services for 30 person-months</p> <p>Estimated total cost \$1,180,000 equivalent including \$773,000 in foreign exchange and \$407,000 equivalent in local currency</p> <p>Asian Development Bank financing of \$900,000 equivalent, including \$127,000 equivalent in local currency, on a grant basis</p> <p>Participating governments' prorata contribution of \$280,000 equivalent</p>	<p>Policy dialogue, review missions, and periodic reports</p>	<p>Capable consultants with requisite skills will be engaged.</p> <p>Domestic consultants will provide the required support.</p> <p>Counterpart funds are available to meet the local currency costs.</p>

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

### A. International Consultants

#### 1. First Phase

##### a. Gas Sector

1. Responsibilities of the consultants will include the following:

- (i) Review available information and data to develop a comprehensive understanding of the status and potential of natural gas in meeting the energy requirements of the regional countries, including domestic consumption and intercountry export.
- (ii) Analyze the gas sector development programs in each country including planned production, transmission and distribution arrangements, and expected overall national and regional economic benefits from the gas sector.
- (iii) Determine the main factors influencing development of the gas sector, including prospects for interfuel substitution and market-based pricing of gas.
- (iv) Identify major policy, regulatory, institutional, management, operational, and financial barriers to improving efficiency of gas production, transmission, and distribution to facilitate regional economic growth, and recommend actions to address these barriers.
- (v) Outline measures for developing a competitive framework in each country, including promoting private investment, and appropriate business management and financing practices.

##### b. Transmission and Distribution

2. The consultants will undertake the following:

- (i) Review the status of gas supply and transmission arrangements from Turkmenistan and Uzbekistan to Kazakhstan, Kyrgyz Republic, and Tajikistan.
- (ii) Assess the reasons for any discrepancy in the quantities supplied by exporting countries and the quantities received by importing countries, and outline measures for their reconciliation.
- (iii) Review the technical specifications and present capacity of the existing transmission pipeline, and evaluate whether it has the potential for rehabilitation and upgrading to ensure more efficient operations.
- (iv) Review the status of construction of the parallel gas transmission pipeline(s), identify the main obstacles to its implementation, and determine the main requirements and timing for making the gas transmission pipeline operational.

**c. Regional Gas Trade**

3. The consultants will have the following responsibilities:
- (i) Prepare a total energy balance for each participating country for 1991–2001, forecast energy requirements until 2020, and assess the contribution of the gas sector in meeting these requirements.
  - (ii) Assess the present and projected gas production and supply potential of Uzbekistan and Turkmenistan, and the present and expected gas demand in the northern part of the Kyrgyz Republic and the southeastern part of Kazakhstan for the next 10 years.
  - (iii) Analyze the current patterns of natural gas trade among the countries, and assess the impact of trade in other forms of energy on the gas trade.
  - (iv) Assess financial and commercial barriers to regional gas trade, and develop a strategy for improving such trade along commercial lines.

**d. Gas Tariffs**

4. Activities of the consultants will include the following:
- (i) Make a general assessment of energy prices and gas tariff structures of the participating countries, and estimate the economic costs of gas production, transmission, and distribution, separately for each country,
  - (ii) Identify the major economic distortions in the present tariff structure, including the extent of financial subsidies and cross subsidies for major consumer subgroups.
  - (iii) Compare existing tariffs for production, transmission, and distribution with the respective long-run marginal cost, and recommend measures for adjusting tariffs on a time-bound basis.
  - (iv) Review the pricing principles for the sale, transportation, and purchase of natural gas among the participating countries.
  - (v) Propose possible adjustments in the pricing principles to achieve commercial operations; analyze the present arrangements for payment of the supply and transportation of the gas, and status of payments due, including barter arrangements.

**e. Institutional Aspects**

5. The consultants will undertake the following:
- (i) Identify the institutional barriers to the promotion of regional gas trade.
  - (ii) Determine the required intercountry agreements and institutional, contractual, and gas pricing arrangements for the efficient and commercial operation of the existing and envisaged parallel gas transmission pipelines

- (iii) Recommend measures to establish such agreements and arrangements, based on a review of recent intercountry pipeline agreements being discussed under the European Union initiatives in this field.

**f. Poverty Reduction**

6. The consultants will undertake the following:

- (i) Review the incidence of poverty in the participating countries, taking into account the related studies undertaken under the initiatives of the Asian Development Bank (ADB) and other aid agencies.
- (ii) Review the poverty reduction implications of the proposed policies, and undertake a preliminary assessment of poverty reduction impacts of the proposed improvements in the gas transmission networks.

**2. Second Phase**

**a. Technical Aspects**

7. The consultants' responsibilities will include the following:

- (i) Determine the general technical feasibility of rehabilitating and upgrading the existing pipeline system, and completing the parallel gas transmission pipeline.
- (ii) Determine the gas processing facilities and infrastructure that need to be developed for this purpose, and estimate the required investments.
- (iii) Assess item-wise investments required for improving the existing gas transmission network and the parallel lines, taking into account available gas supplies in Turkmenistan and projected gas demand in Kazakhstan, Kyrgyz Republic, and Tajikistan.
- (iv) Identify the critical assumptions made for the pricing of the gas and transportation costs to ensure financial viability.

**b. Institutional Aspects**

8. Activities of the consultants will include the following:

- (i) Assess the operational and management capabilities of the agencies and enterprises involved in gas production, transmission, and distribution; and recommend improvements.
- (ii) Review and evaluate the institutional capabilities of the proposed executing and implementing agencies.
- (iii) Prepare institutional development and capacity building plans for the relevant agencies and enterprises for the successful implementation of the envisaged improvement programs and efficient regional gas trade.
- (iv) Assess possible public and private sector sources of financing.

**c. Environmental Considerations**

9. Activities will include the following:

- (i) Conduct initial environmental examinations for the various components of the proposed project in accordance with ADB's environmental guidelines, including environmental profiles and the required mitigation measures in the design, construction, and maintenance of the transmission pipelines.
- (ii) Prepare a detailed environmental impact assessment and a summary environmental impact assessment proposing mitigation measures and identifying costs related to the mitigation of adverse environmental impacts, if the initial environmental examinations indicate that adverse impacts are likely,

**d. Social Assessment**

10. The consultants will undertake the following:

- (i) Prepare a social impact assessment and summary social impact assessment, and carry out a thorough review of the socioeconomic impact of the proposed project according to ADB's *Handbook for Incorporation of Social Dimensions in Projects*.
- (ii) Review land acquisition and relocation plans of project components that involve resettlement, and assess their conformity with ADB *Guidelines for Involuntary Resettlement*, including (a) time-bound arrangements, public consultation, relocation, compensation for affected inhabitants along the route of the transmission line, and demolition of any existing facilities; and (b) costs related to relocation, compensation for land acquisition, and right-of-way.
- (iii) Incorporate all mitigation measures into the cost estimates of the project components.

**e. Poverty Reduction Impact**

11. The consultants will undertake the following:

- (i) Evaluate the impact of proposed policy and institutional measures on individuals, households, and groups.
- (ii) Estimate the number of beneficiaries and all other stakeholders, and estimate the economic benefits of the proposed project in terms of direct and indirect earnings, cost savings, and poverty reduction impacts.

**f. Financial Analysis**

12. Activities will include the following:

- (i) Prepare detailed project cost estimates in ADB format based on 2002 prices expressed in foreign exchange and local currencies, including appropriate provisions for physical contingency, price escalation, and interest during construction.

- (ii) Develop a suitable financing plan for the respective components, including financing available from national sources.
- (iii) Assess the financial feasibility of the proposed project and its financial performance, prepare appropriate financial statements in accordance with ADB's *Guidelines for the Preparation and Presentation of Financial Analysis*, and undertake benefit-cost analysis to compute the financial internal rate of return for the individual investment components.
- (iv) Undertake sensitivity analyses of the components' financial evaluation considering key factors that could affect their viability.

**g. Economic Analysis**

13. The consultants will undertake the following:

- (i) Estimate the economic capital and operating costs, and carry out least-cost, viability, and beneficiary analysis of the proposed project, including sensitivity analysis according to ADB's *Guidelines for the Economic Analysis of Projects*, using a net present value approach based on a discounted cash-flow analysis to assess the comparative economic advantage of the proposed project.
- (ii) Undertake economic benefit-cost analysis to confirm the overall viability of the proposed project in terms of economic internal rates of return.
- (iii) Assess the uncertainties and risks facing the proposed project, and carry out sensitivity analyses to check its viability under adverse conditions.
- (iv) Evaluate the proposed project's direct and indirect environmental impacts, and carry out an economic analysis of these impacts in terms of net present value and internal rates of return in accordance with the ADB's *Handbook on Economic Evaluation of Environmental Impacts*.

**B. Domestic Consultants**

14. The domestic experts will have the following responsibilities:

- (i) Assist in determining the technical feasibility of rehabilitating and upgrading the existing pipeline system and completing the parallel pipeline.
- (ii) Identify relevant policy, regulatory, and contractual issues that need to be addressed to enable increased natural gas supplies from Uzbekistan to the Kyrgyz Republic and Kazakhstan.
- (iii) Assist in preparing cost estimates for rehabilitating and upgrading the existing gas transmission pipelines and completing the parallel pipeline.
- (iv) Assist in assessing possible environmental and social impacts of rehabilitating and upgrading the existing pipeline system, and completing the parallel pipeline, as well as the economic benefits and costs for the participating countries
- (v) Assist in arranging regional working group meetings and workshops to discuss the study findings.

**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	563.0	0.0	563.0
ii. Domestic Consultants	0.0	52.5	52.5
b. International and Local Travel			
i. International Consultants	57.0	10.0	67.0
ii. Domestic Consultants	0.0	2.0	2.0
2. Equipment	10.0	0.0	10.0
3. Workshops, Training, and Seminars	0.0	20.0	20.0
4. Surveys			
a. Reports and Communications	10.0	2.5	12.5
b. Purchase of Documents/Surveys	0.0	5.0	5.0
c. Translation Services	0.0	8.0	8.0
5. Miscellaneous Administration and Support Costs <sup>b</sup>	6.0	10.0	16.0
6. Contract Negotiations and Policy Dialogue	24.0	0.0	24.0
7. Contingencies	103.0	17.0	120.0
<b>Subtotal (A)</b>	<b>773.0</b>	<b>127.0</b>	<b>900.0</b>
<b>B. Government Financing</b>			
1. Administrative Support	0.0	90.0	90.0
2. Counterpart Staff	0.0	100.0	100.0
3. Studies, Surveys, and Reports	0.0	60.0	60.0
4. Others	0.0	30.0	30.0
<b>Subtotal (B)</b>	<b>0.0</b>	<b>280.0</b>	<b>280.0</b>
<b>Total</b>	<b>773.0</b>	<b>407.0</b>	<b>1,180.0</b>

<sup>a</sup> Financed from the Asian Development Bank-funded technical assistance program.

<sup>b</sup> Secretarial services, office accommodation, and office supplies.

Source: Staff estimates.