



Technical Assistance Report

Project Number: 39622
December 2005

Technical Assistance Republic of Azerbaijan: Preparing the Renewable Energy Development Project (Cofinanced by the Government of Finland)

CURRENCY EQUIVALENTS

(as of 31 October 2005)

Currency Unit	–	Azerbaijan manats (AZM)
AZM1.00	=	\$0.00022
\$1.00	=	AZM4560

In this report, a rate of \$1.00 = AZM4560 is used.

ABBREVIATIONS

ADB	–	Asian Development Bank
CDM	–	clean development mechanism
CSPU	–	country strategy and program update
EBRD	–	European Bank for Reconstruction and Development
GDP	–	gross domestic product
GEF	–	Global Environment Fund
GHG	–	greenhouse gas
g/kWh	–	gram/kilowatt-hour
GW	–	gigawatt
IA	–	implementing agency
IEE	–	initial environmental examination
IFI	–	international financial institution
IMF	–	International Monetary Fund
KfW	–	Kreditanstalt für Wiederaufbau
MIE	–	Ministry of Industry and Energy
PREGA	–	promotion of renewable energy and greenhouse gas abatement
RAES	–	rapid assessment of the energy sector
RRP	–	report and recommendation of the President
SHP	–	small hydropower
SPRED	–	State Program on Poverty Reduction and Economic Development
SWOT	–	Strengths, Weaknesses, Opportunities, and Threats
TA	–	technical assistance
WTP	–	willingness to pay

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Energy
Subsector	–	Renewable energy generation
Themes	–	Sustainable economic growth, environmental sustainability
Subthemes	–	Fostering physical infrastructure development, cleaner production and control of industrial pollution.

NOTE

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

Vice President	J. Eichenberger, Operations Group 2
Director General	H. S. Rao, East and Central Asia Department
Director	A. Terway, Energy Division
Team leader	A. Bhargava, Energy Specialist, East and Central Asia Department
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I. INTRODUCTION

1. During discussions with the Government of the Republic of Azerbaijan on the Country Strategy and Program Update (CSPU) 2006, energy was identified as one of the priority areas for assistance. In July 2005, a rapid assessment of the energy sector (RAES) was undertaken. After reviewing the RAES, in October 2005 the Government requested Asian Development Bank (ADB) assistance to develop a priority renewable energy project and include an accompanying project preparatory technical assistance (TA).¹ The concept paper for the TA was approved in November 2005. The project and the TA are included in the draft CSPU 2006. A reconnaissance mission² visited Azerbaijan during 17–23 October 2005. Discussions were held with the Government on the impacts, purpose, scope, implementation arrangements, cost estimates, financing arrangements, and terms of reference for consulting services. The TA design and monitoring framework is in Appendix 1.

II. ISSUES

2. Azerbaijan is in its 14th year of transition following its independence in 1991. Like other former Soviet Union countries, it experienced an initial period (1990–1995) of dramatic economic collapse losing the gross domestic product (GDP) by 60%. The turnaround began in 1995, but economic growth was sluggish up to 2000, when it started to accelerate mainly due to increased oil export revenue. However, the GDP in 2003 was still about 20% below the 1990 level in real terms. GDP growth is projected to remain buoyant at least up to 2010, driven by the rapid expansion of oil and gas production and export. The International Monetary Fund (IMF) has projected that the GDP will grow by 21% in 2005 and 38% in 2006.

3. Despite recent economic growth, in 2003 about 45% of the population lived below the poverty line and 10% below extreme poverty. The incidence of income poverty is greatest among households in provincial towns, the rural areas are deficient in access to services, and there are significant regional variations in poverty rates.³ The country's high growth trajectory has raised people's expectations of sharing the wealth, but economic growth needs to be employment intensive to contribute to poverty reduction.⁴ The Government is committed to removing poverty and developing the non-oil sector, and it plans to create job opportunities to achieve balanced and sustainable growth.

4. Energy is a vital input to support sector growth in the non-oil services and industry sectors. The energy sector plays a central role in the economy, contributing one third of the GDP in 2004, making it the largest segment. With export of oil from the recently completed Baku–Tbilisi–Ceyhan pipeline and the expected completion of the South Caucasus Gas Pipeline in 2006, the share will be even larger. While the country has been successful in engaging the private sector for developing and exporting its oil and gas resources, the domestic energy sector is threatened by systemic collapse due to limited maintenance of aging infrastructure and underinvestment. The dichotomy of strong oil and gas export and a failing energy supply domestically is possible because the offshore oil and gas exploration activities are self-sufficient in energy.

¹ The TA first appeared in *ADB Business Opportunities* (internet edition) on 8 November 2005.

² The reconnaissance mission was upgraded to the technical assistance (TA) fact-finding in view of the agreement reached with the Government on all aspects of TA, and the request to expedite the processing of the TA. Quality aspects have been given due consideration and the preparation includes the dialogue and information collected during the preparation of rapid assessment of the energy sector (RAES).

³ Nakhchivan region has the highest poverty level (59.2%), whereas Baku has the lowest (35.4%).

⁴ The unemployment rate in 2003 was 10.7%, a decrease of 0.6% from 2002 figures.

5. Azerbaijan inherited a domestic energy sector—power, natural gas (gas) and heat—that was capable of providing acceptable services to almost 100% population and fully met the demand of its economy. Gas has been the dominant source of primary energy, it was the primary fuel for power generation and space heating, but was imported mainly from Russia. Soon after independence, the gas supply to Azerbaijan was disrupted.⁵ The restricted gas supply had serious impacts on the domestic energy supply—power plants were switched to oil, the reticulated gas supply remained available to only the large urban areas and industries, and the district heating system collapsed, causing high consumption of electricity during the winter months. With the economic recovery, gas import was resumed in 2001 but the restoration of energy infrastructure—power, gas, and heat—is slow, especially outside Baku.

6. In the power sector, the generation capacity comprises a mix of hydropower (19%) and thermal power plants (81%). The available power generation capacity⁶ is about 4.2 gigawatts (GW) compared with the estimated peak demand of about 5–GW. The efficiency of the existing thermal power plant is very low and is further deteriorating. Compared to 364 grams of oil equivalent/kilowatt-hour (g/kWh) in 1991, the average efficiency of the thermal power plants in 2003 was 410 g/kWh. A modern combined-cycle power plant in comparison can achieve 182 g/kWh (about 47% overall efficiency). Due to an aging transmission and distribution infrastructure, network losses have also risen from 13.6% in 1995 to 18.2% in 2003. Low power plant efficiency and high losses lead to wastage of fossil fuels that could have been exported, and nearly double the emissions of carbon dioxide, a major greenhouse gas, and other pollutants that damage the regional and global environment.

7. Insufficient power generation capacity, aging and overloaded transmission and distribution infrastructure, obsolete protection and control equipment result in acute peak power shortages and poor quality of power supply (lower voltages, frequent blackouts). Transmission bottlenecks further constrain power imports from regional interconnections with neighboring countries.⁷ Planned power outages⁸ are common in regional areas.⁹ About 3 GW generation capacity has to be added by 2013 to meet the projected demand growth.¹⁰ The Government aims to fully meet the power demand and has drawn a plan¹¹ for additional capacity, mainly through rehabilitation of existing thermal power plants and new gas-fired power plants located closer to the major load centers. However, because of serious transmission and distribution constraints, those measures are unlikely to provide relief to regional consumers located at the far end of the network.

8. About 48% of the country's 8.3 million people live in the rural areas, often with insufficient access to quality basic services. Lack of power, gas, and heat has aggravated the regional imbalance in the country. While the Baku region has access to reliable energy supply, other areas are experiencing extreme difficulty in meeting their basic energy needs. Poor-quality and unreliable electricity supply inhibits industrial and commercial activities, thus constraining

⁵ Gas supplies were disrupted due to chronic nonpayment, disagreement with transit parties, security, thefts, as well as geopolitical issues.

⁶ The nameplate installed rating is 5.1 gigawatts, which has been derated due to aging and maintenance problems.

⁷ Power exchange with Georgia is negligible; single interconnection with Russia is operating at full capacity; Armenia interconnection is non-operational due to territorial disputes. No net power exchange with Iran, interconnection with Turkey is limited to Nakhchivan area, not connected to Azerbaijan grid.

⁸ During the peak winter months of 2004–2005, power to regional areas was disconnected for 10–14 hours per day.

⁹ Azerbaijan has 59 districts that are divided into nine regions. Baku has benefited directly from the recent economic growth, and the Government's attention is now shifting to the remaining eight regions.

¹⁰ Based on Japan Bank for International Cooperation (JBIC). 2003. *Power Sector Study*. Japan.

¹¹ State Program for Fuel and Energy Sector of the Azerbaijan Republic (2005–2015), issued in February 2005.

economic growth and employment opportunities in regional areas; promotes switching to more polluting fuels and accompanying environmental impacts; and causes hardship to the population and affects their health.

9. In many areas, decentralized generation through alternative and renewable energy, mainly small hydropower (SHP) and wind power, offers a competitive and environmental-friendly option to meet power shortages. SHP and wind power potential is estimated to be about 4 GW, about 75% from wind power. The poorest region (footnote 3) in the country—Nackichivan region—is physically cutoff from the power grid and relies on local energy sources and imports from neighboring countries for its power needs. Recent studies by Kreditanstalt für Wiederaufbau (KfW) and European Bank for Reconstruction and Development (EBRD) have concluded that Azerbaijan has good SHP and wind power potential. The prefeasibility studies suggest that decentralized SHP and wind power projects will have economic benefits and will meet the power needs of many areas in Absheron peninsula and Nackichivan. The Government recognizes the importance of decentralized generation using renewable and alternative energy sources, and has formulated the State Program on Use of Alternative and Renewable Energy Sources (October 2004). The program highlights the importance of harnessing SHP and wind power potential to improve power supply in many areas, and diversify its energy resource base to ensure long-term energy security.

10. The Ministry of Industry and Energy (MIE) is mandated to implement the state program on development of alternative and renewable energy (para. 9). Through its participation in Promotion of Renewable Energy and Greenhouse Gas Abatement (PREGA) activities under an ADB regional TA, the Government has reinforced its commitment to promote renewable energy in the country.

11. Due to the share of the domestic energy sector in the economy and a large subsidy (approximately 15% of GDP in 2003), the Government with the support of other international financial institutions (IFI) has focused on sector reforms and policy issues. Significant progress has been made to streamline sector structure, improve fiscal discipline and transparency, promote tariff reforms, and seek private sector participation. Most important, four concessions for managing power distribution have been awarded.¹²

12. Development of renewable and clean energy sources to provide direct benefits to the rural poor is a priority of ADB's energy policy. Accelerating rural development by strengthening regional infrastructure and services is a strategic focus of its country program. The strategy is designed to support the State Program on Poverty Reduction and Economic Development (SPRED), and aims for balanced regional development through physical and social infrastructure improvement. In the energy sector, the strategy focuses on supporting the ongoing sector reforms and mitigating environmental impacts. The proposed project will be designed to synergize ongoing intervention to restore the social infrastructure in the same areas.

¹² The institutional arrangements are described in an ADB-PPIAF report. ADB. 2005. *Diagnostic Review of Regulatory Approaches and Challenges*. Manila.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

13. The project impact will be a reduction of the regional imbalance in economic growth with reliable and environmentally clean energy supply. The TA outcome will be an agreement on project design, feasibility study, and implementation arrangements.

B. Methodology and Key Activities

14. The project preparatory TA will be carried out in two phases. During the first phase, the consultant will (i) review and update all relevant studies, analyses, and data on renewable energy resources, audit the data, and disaggregate resource endowment on a geographical basis; (ii) review demand forecasts, develop screening criteria, and recommend the priority area(s) for the project; (iii) undertake least-cost analysis to identify appropriate renewable energy options; (iv) identify and rank bankable renewable energy projects—financing, institutional/organizational setup etc.; (v) undertake skills and resource audit of MIE (the Executing Agency) and identify capacity-building measures to implement the project and the state plan on the use of alternative and renewable energy; (vi) examine potential barriers—technical, institutional, financial, regulatory—and recommend policies and incentives for streamlining and accelerating promotion of renewable energy; (vii) disseminate initial findings through targeted workshops and seminars to stakeholders.

15. During the second phase, the consultant will (i) refine the techno-economic feasibility studies of selected priority projects; (ii) prepare a project loan proposal for ADB consideration, including the necessary documents under the safeguard policy; and (iii) identify the potential for carbon emission reduction under the clean development mechanism (CDM) and other incentives available under the Global Environment Fund (GEF).

16. The major assumptions and risks that need to be considered for successful TA implementation include (i) a change in MIE priorities, (ii) lack of adequate and time by provision of data, (iii) delayed in submission of required studies, (iv) delayed in consultant selection and poor consultant performance. Efforts will be made to ensure that competent consultants will be recruited expeditiously. MIE agrees to provide adequate counterpart support and data when needed. It also agrees to undertake and update all required studies according to a timetable agreed upon with ADB. Close coordination among the consultants, executing and implementing agencies, and ADB will further mitigate the risks.

C. Cost and Financing

17. The total cost of the TA will be \$900,000 equivalent. ADB will finance \$700,000 equivalent on a grant basis, which will comprise \$200,000 financed by the Government of Finland, and administered by ADB, and the balance by ADB's TA funding program. The Government will finance the remaining \$200,000 through in-kind contribution, including office accommodation and facilities, counterpart staff and data and other information needed for the TA. The cost estimates and financing plan are in Appendix 2. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

18. MIE will be the Executing Agency. MIE will provide a TA leader for day-to-day management of implementation. A steering committee or a lead group comprising representatives of key relevant ministries and agencies—Ministry of Finance, Ministry of Environment and National Resources, National Academy of Sciences, Ministry of Economic Development etc., will be set up by the Government, within 2 weeks of the start of TA activities to oversee and guide TA implementation.

19. The TA will be carried out over a 10 months period by a team of international and domestic consultants. The TA is expected to commence in February 2006 and be completed by December 2006. The total input of international and domestic consultants will be 16 and 34 person-months, respectively. The consultants will procure office equipment¹³ and will deliver it to MIE at the conclusion of the TA.

20. The international and domestic consultants will be engaged by ADB using the quality- and cost-based selection procedure using simplified technical proposals. The following international consultants will be required (person-months are in parentheses): (i) a renewable energy development specialist (6), (ii) an institutional development specialist (2), (iii) a power economist (3), (iv) a financial analyst (3), (v) a social/poverty specialist (1), and (vi) an environmental specialist (1). The following domestic consultants will be required (person-months are in parentheses): (i) two renewable energy development specialists (6 each), (ii) an institutional development specialist (4), (iii) a power economist (6), (iv) a financial analyst (6), (v) a social/poverty specialist (3), and (vi) an environmental specialist (3). Outline terms of reference for consulting services are in Appendix 3.

21. The consultant will submit an inception report within 1 month after TA commencement, an interim report after 3 months, a midterm report after 4 months, a draft final report after 8 months. The final report will be submitted within 10 months of the TA commencement. Workshops will be held at each of the subproject sites to seek local community and project beneficiaries' views on improving the project design; stakeholder participation will be encouraged through workshops and seminars to progressively discuss and share the results of the TA. Roundtable conferences with key stakeholders will be organized after submission of each of the milestone reports.

IV. THE PRESIDENT'S DECISION

22. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of technical assistance not exceeding the equivalent of \$200,000 to be financed on a grant basis by the Government of Finland, and (ii) ADB providing the balance not exceeding the equivalent of \$500,000 on a grant basis, to the Government of the Republic of Azerbaijan for preparing the Renewable Energy Development Project, and hereby reports this action to the Board.

¹³ Including four pentium computers, two photocopiers, two laser printers, one multimedia projector with screen, one digital camera, and two facsimile machines.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Reduction of regional imbalance in economic growth with reliable and environmentally clean energy supply</p>	<p>Increased utilization of renewable energy</p> <p>Augmented power supply to rural communities</p> <p>Developed institutional and financial management action plan</p>	<p>National and regional statistics</p> <p>Regional power data</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Government confirms to extend priority and resources to promote renewable energy. • Project design is implemented effectively.
<p>Outcome</p> <p>Project design, feasibility study, and implementation arrangements agreed upon</p>	<p>Memorandum of understanding of final tripartite meeting signed by Government and the Asian Development Bank</p>	<p>Consultant's final report</p> <p>Memorandum of understanding, back-to-office report of final technical assistance review mission</p>	<p>Assumption</p> <ul style="list-style-type: none"> • Effective stakeholder participation and ownership are developed. <p>Risk</p> <ul style="list-style-type: none"> • Key stakeholders do not agree with the technical assessment.
<p>Output</p> <p>Technical assessments completed, and design requirements met</p>	<p>Inception report, week 4</p> <p>interim report, week 20</p> <p>draft final report, week 30</p> <p>final report, week 40</p>	<p>Project reports</p> <p>TA reviews, weeks 6, 21, and 32</p>	<p>Assumptions:</p> <ul style="list-style-type: none"> • There is no restriction on availability of information and personnel and timely access to them. • There is no restriction on accessing geographic sites.
<p>Activities with Milestones</p> <ol style="list-style-type: none"> 1. Analyze regional growth and electricity demand, and assess least-cost options for meeting the demand-supply imbalance in project area (weeks 1–10). 2. Prepare a problem tree, and the initial project design and monitoring framework (weeks 1–6). 3. Undertake a SWOT analysis and recommend an action plan for renewable energy development (weeks 1–10). 4. Prepare criteria for selecting priority investment projects and develop a shortlist (weeks 1–8). 5. Prepare prefeasibility report for short-listed projects and rank priority projects (weeks 8–16). 6. Evaluate and identify appropriate institutional setup for implementing highest ranked priority projects (weeks 8–16). 7. Carry out social, poverty, ethnic minority, and gender assessment; recommend measures for strengthening project implementation management (weeks 8–20). 8. Carry out stakeholder workshops (week 18). 9. Complete a baseline survey (weeks 16–20). 10. Refine technical prefeasibility study, and optimize and upgrade the technical 			<p>Inputs: \$900,000</p> <p>16 person-months of international and 34 person-months of domestic consulting services.</p> <p>Financing:</p> <p>ADB: \$500,000</p> <p>Consultants: \$425,000</p> <p>Equipment: \$20,000</p> <p>Training, seminars and conferences: \$20,000</p> <p>Surveys: \$5,000</p> <p>Contingencies: \$30,000</p>

<p>design and feasibility reports (weeks 21–30).</p> <ol style="list-style-type: none"> 11. Carry out financial, economic, and institutional analyses (weeks 28–36). 12. Complete summary initial environmental examination (weeks 21–24). 13. Complete social, poverty, ethnic minority, and gender assessment; develop corporate strategy and the business plan for the project implementing agency; set up project management structure in the implementing agency (weeks 21–30). 14. Assess potential for carbon emission reduction under CDM (week 28–32). 15. Finalize project design and monitoring framework (weeks 28–30). 	<p>Government of Finland: \$200,000</p> <p>Consultants: \$140,000 Training, seminars and conferences: \$30,000 Contingencies: \$30,000</p> <p>Government of Azerbaijan: \$200,000</p> <p>Office accommodation and transport: \$80,000 Personnel: \$80,000 Logistics: \$40,000</p>
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CDM = clean development mechanism; SWOT = strengths, weaknesses, opportunities, and threats; TA = technical assistance.

COST ESTIMATES AND FINANCING PLAN
(\$)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants (12 person-months)	285,000	0	285,000
ii. Domestic Consultants (23 person-months)	0	75,000	75,000
b. International and Local Travel	32,000	12,000	44,000
c. Reports and Communications	3,000	3,000	6,000
2. Equipment ^b	20,000	0	20,000
3. Training, Seminars, and Conferences	15,000	5,000	20,000
4. Surveys	2,000	3,000	5,000
5. Miscellaneous Administration and Support Costs	3,000	12,000	15,000
6. Contingencies	20,000	10,000	30,000
Subtotal (A)	380,000	120,000	500,000
B. Government of Finland Financing^c			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants (4 person-months)	95,000	0	95,000
ii. Domestic Consultants (11 person-months)	0	25,000	25,000
b. International and Local Travel	13,000	3,000	16,000
c. Reports and Communications	2,000	2,000	4,000
2. Training, Seminars, and Conferences	20,000	10,000	30,000
3. Contingencies	20,000	10,000	30,000
Subtotal (B)	150,000	50,000	200,000
C. Government of Azerbaijan Financing			
1. Office Accommodation and Transport	0	80,000	80,000
2. Remuneration and Per Diem of Counterpart Staff	0	80,000	80,000
3. Others	0	40,000	40,000
Subtotal (C)	0	200,000	200,000
Total	530,000	370,000	900,000

^a Financed by the Asian Development Bank (ADB) technical assistance funding program.

^b Including four pentium computers, two photocopiers, two laser printers, one multimedia projector with screen, one digital camera, and two facsimile machines. The equipments will be handed over to the Executing Agency at the end of the technical assistance

^c Administered by ADB.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The project preparatory technical assistance (TA) will be implemented in consultation with relevant stakeholders, including the Ministry of Industry and Energy (MIE), National Academy of Science, other relevant ministries and agencies, relevant local communities, and other development agencies. The team of international consultants (16 person-months) will coordinate their work with the domestic consultants (34 person-months). The international consulting team will have: (i) a renewable energy development specialist, (ii) a financial analyst and institutional development specialist, (iii) a power economist, (iv) a financial analyst (v) a social/poverty specialist, and (v) an environmental specialist. The domestic consultants will have similar areas of specialization. The international renewable energy development specialist will be the team leader who will allocate tasks among the consulting team members and will be responsible for overall coordination of the TA activities.

A. First Phase of TA Activities

2. The TA will be carried out in two phases. During the first phase, the following specific tasks will be carried out by the relevant specialists.

3. **Renewable Energy Development Specialist** (international, 4 person-months). The specialist will undertake the following activities:

- (i) Review all previous renewable energy studies, ongoing studies, the Government's energy policy, and the *State Plan for Development of Alternative Energy*.
- (ii) Analyze potential sources for alternative energy development based on their geographical dispersion and prepare an alternative energy map indicating estimated alternative energy sources in different locations of the country.
- (iii) Undertake strategic analysis—strengths, weaknesses, opportunities and threats (SWOT)—of the existing technical, financial, institutional, and regulatory structure for promoting alternative energy development; recommend the way forward.
- (iv) In consultation with key stakeholders, prepare criteria for selecting the investment project-priority areas and alternative energy options in these areas.
- (v) Considering international experience, prepare a prefeasibility plan for the selected investment project identifying the investment need.
- (vi) Design an action plan for implementing the selected investment project in consultation with the government and other stakeholders.
- (vii) Design a media campaign plan to educate the wider population on alternative energy technologies.
- (viii) Present an investment project design and prefeasibility studies, and prepare a due-diligence report on the technical assessment of the project and coordinate with other team members.

4. **Institutional Development Specialist** (international, 2 person-months). The specialist will undertake the following activities:

- (i) Describe the role and responsibilities of the various sector institutions and their relationships and their relationship to MIE, the Executing Agency.
- (ii) Undertake skills and resource audit of MIE to identify areas that need to be strengthened to implement the State Plan on Use of Alternative and Renewable Energy; design a capacity-building program.
- (iii) In coordination with the team leader, compare and contrast the organizational setups for the investment project. Consider possible use of market intermediaries such as rural energy supply companies.

- (iv) Identify institutional and human resource requirements for a self-sustaining energy service organization that can design, install, operate, and maintain an alternative energy system in rural areas.
- (v) Prepare a business plan to establish locally owned commercial energy service providers, including (a) legal requirements for registration, (b) staffing needs, (c) market development, and (d) initial capitalization and ongoing financial management.
- (vi) Identify a package of policy and regulatory initiatives to create enabling conditions for an alternative energy supply.

5. **Power Economist** (international, 2 person-months). The power economist will undertake the following tasks:

- (i) Summarize the current and projected energy demand in Azerbaijan, including energy consumption, generation, future trends, price and subsidies.
- (ii) Analyze the energy consumption patterns, and possible energy savings by demand management, and estimate the potential for alternative energy development in the project area.
- (iii) Review the country's development plans in light of the energy needs, resource endowments, development goals, and status of economic development.
- (iv) Assess consumers' willingness to pay (WTP) for electricity in the project area in consultation with the social/poverty specialist, based on a sample survey of energy consumed and price paid by households. Also assess household income.
- (v) Construct a demand function from the survey data.
- (vi) Update the least-cost generation plan, taking into account all forms of energy, including conventional thermal sources, and the proposed alternative energy projects.
- (vii) Assist the renewable energy development specialist to establish the least-cost nature of the proposed investment project.
- (viii) Assess the economic impact of the proposed investment project and identify measures to maximize economic benefits.

6. **Financial Analyst** (international, 1.5 person-months). The financial analyst will undertake the following tasks:

- (i) Document the financial performance of existing alternative energy options in Azerbaijan.
- (ii) Undertake a detailed financial analysis of the identified investment project.
- (iii) Evaluate the financial implications of the proposed renewable energy options on all stakeholder groups.
- (iv) Analyze the financial feasibility, including tariff and leasing option (highlighting examples), that make alternative energy attractive to the relevant stakeholders.
- (v) Help develop criteria for assessing the identified alternative energy investment project.

7. **Social/Poverty Specialist** (international, 0.5 person-month). The social/poverty specialist will undertake the following tasks:

- (i) Conduct site visits to make initial poverty and social assessment. Identify the project stakeholders and examine their existing rights and possible risks from the project. Assist in building public acceptance of the project.
- (ii) Assist the power economist to assess WTP through a structured survey of households in the project area.
- (iii) Assist the team leader in determining appropriate ways to make the investment project design suitable for the poor people in the project area.

- (iv) Make an initial assessment of any land acquisition and resettlement issue associated with the proposed investment project and devise ways to address them during the project design.

8. **Domestic Consultants.** During the first phase of the TA activities, the domestic consulting team (person-months are in parentheses) will comprise (i) two renewable energy development specialists (4), (ii) an institutional development specialist (3), (iii) a power economist (3), (iv) a financial analyst (3), and (v) a social/poverty specialist (2). They will be engaged to support the international consultants. The domestic consultants will have extensive knowledge of alternative energy-related issues in the country and will assist the international consultants to quickly become familiar with their tasks by reviewing relevant reports, analytical data, policies, regulations, and translating relevant documents into English.

B. Second and Final Phase of TA Activities

9. During the second phase of TA activities, the project preparation activities for the identified alternative energy project(s) will be undertaken as per Asian Development Bank (ADB) and national requirements. The activities and the consulting input are detailed as follows:

10. **Renewable Energy Development Specialist** (international, 2 person-months). The specialist will undertake the following activities:

- (i) Refine the feasibility reports prepared for the investment project under the first phase, incorporating relevant stakeholders' comments; identify key technical challenges that may threaten project development.
- (ii) Validate the assumptions made, verify the data utilized in the feasibility reports, and optimize the proposed design to reflect the most cost-effective solution for the investment project.
- (iii) Update and refine the cost estimation for the investment project based on relevant international experience; identify procurement packages and recommend the mode of procuring these packages.
- (iv) Prepare a project implementation schedule and sequencing of subprojects, if any; with implementation matching the capacity of the implementing agency (IA).
- (v) Assist MIE in implementing the recommendations made on the appropriate organizational setup for implementing the investment project.
- (vi) Prepare a project report and coordinate with other team members to ensure timely availability of all reports, data, and analysis to the ADB project team.

11. **Power Economist** (international, 1 person-month). The power economist will prepare a cost-benefit analysis of the investment project(s), taking a conservative approach to measuring the project benefits. Environmental and social benefits, as well as reliability improvements, will be described in detail. Only the benefits of increased electricity supply to the grid will be quantified. The cost-benefit analysis will comprise the following main tasks:

- (i) Estimate the incremental electrical energy supplied throughout the life of the project, excluding the technical losses.
- (ii) Estimate consumers' WTP through a representative survey.
- (iii) Using the WTP and the incremental energy supply, estimate economic benefits from each subproject.
- (iv) Calculate an economic internal rate of return for each subproject.
- (v) Conduct a sensitivity analysis for plausible scenarios.
- (vi) Identify and analyze likely economic uncertainties that could affect the project's viability, and carry out a risk analysis.

- (vii) Produce a report detailing all the relevant numerical analysis, and the unquantifiable benefits of the project.

12. **Financial Analyst** (international, 1.5 person-months). In accordance with *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank* (2002),¹ the consultant will refine and finalize the financial analysis of the investment project and financial performance of the IA. The task will include preparing relevant sections of the report and recommendation of the President (RRP) of ADB. The consultant will do the following:

- (i) Carry out in-depth financial analysis of the proposed investment (and any defined subprojects), including calculating the financial internal rate of return and weighted average cost of capital, taking into account all financial costs and benefits.
- (ii) Identify all risks to project revenue and costs, and conduct relevant sensitivity analyses on the financial results.
- (iii) Prepare an entire project cost estimate, separating foreign exchange and local currency; and including physical and price contingencies, interest during construction, commitment fee, and other financing charges.
- (iv) Prepare a financing plan for the project, including proposed ADB lending, any prospective cofinancing, and appropriate counterpart funds for local currency expenditures.
- (v) Review the most current audited and/or unaudited financial statements of the IA, if available, to assess (a) historical financial performance, (b) retail tariff levels, (c) capital structure, and (d) sufficient generation of internal funds to ensure sustainability of ongoing operations (i.e., self-finance a reasonable percentage of capital expenditures and service existing debt); also review recent audited project accounts of the IA to determine proper accounting and cost control.
- (vi) Prepare an appendix to the RRP briefly summarizing past historical and projected financial performance, which will include 10-year pro forma financial statements (balance sheet, income statement, statement of cash flows) for the IA, if applicable.
- (vii) Recommend appropriate financial performance measures/ratios for the IA, and assess compliance with such measures/ratios in pro forma statements.
- (viii) Assess the IA's financial management capabilities; make recommendations for institutional strengthening of financial management along with a recommended time-bound implementation plan.

13. **Social/Poverty Specialist** (international, 0.5 person-month). The social/poverty specialist will undertake the following tasks:

- (i) Assess the pro-poor impacts of the project, taking into account linkage effects. Identify ways to make the project pro-poor, design a time-bound plan for monitoring, and outline the plan and resources required to implement the monitoring plan.
- (ii) Estimate the number of poor people who will benefit from the project. Estimate the proportion of the poor who will benefit from government expenditure. For net benefits to the economy, estimate the proportion directly benefiting the poor. Calculate the poverty impact ratio. Conduct risk analysis for key variables and assumptions used in calculating the ratio, and explain the implications.
- (iii) Provide a statement of the project features relating to poverty reduction. Assess the social and gender considerations as part of the project design. Prepare a social analysis in accordance with ADB's *Guidelines for Incorporation of Social Dimensions in*

¹ ADB. 2002. *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank*. Manila.

ADB Operations.² Determine the likely social and gender effects. Identify any mitigating measures or complementary activity that could help reduce poverty in the project area. Assess whether ethnic minority nationalities will experience any adverse or disproportionate effects. If impacts are significant, prepare an ethnic minority development plan based on the ADB policy on indigenous peoples. If a resettlement plan is required, prepare it following ADB guidelines.

14. **Environmental Specialist** (international, 1 person-month). The environmental consultant will undertake the following:

- (i) Prepare the initial environmental examination (IEE) for the project in accordance with ADB's *Environment Policy (2002)*³ and *Environmental Assessment Guidelines (2003)*,⁴ and finalize the IEE by incorporating comments from ADB.
- (ii) Prepare the summary IEE document in accordance with ADB's *Environment Policy (2002)* and *Environmental Assessment Guidelines (2003)*.
- (iii) Review the environmental management capabilities of MIE and the local environmental monitoring units and recommend institutional strengthening measures, if required.
- (iv) Assess the global environmental benefits of the project in reducing greenhouse gas (GHG) emissions, assess in monetary terms the value of the same (GHG emission reduction credits), and identify the certification requirements to enable international trading of the GHG emission reduction credits. Prepare project design documents for each project, suitable for submission to the clean development mechanism (CDM) executive board.
- (v) Assist MIE in conducting appropriate public consultation, as required, in accordance with the ADB's *Environment Policy (2002)* and *Environmental Assessment Guidelines (2003)*.

15. **Domestic Consultants**. During the second and final phase of the TA activities, the domestic consultant team (person-months are in parentheses) comprising (i) two renewable energy development specialists (2), (ii) an institutional development specialist (1), (iii) a power economist (3), (iv) a financial analyst (3), (v) a social/poverty specialist (1), and (vi) an environmental specialist (3), will be engaged to support the international consultants. The domestic consultants will have extensive knowledge of the alternative energy-related issues in the country and will assist the international consultants to carry out all the analytical work and support dissemination of TA results to stakeholders by translating relevant documents into English and presenting them at the appropriate forums.

² ADB. 1997. *Guidelines on Operational Procedures: Incorporation of Social Dimensions in Bank Operations*. Manila.

³ ADB. 2002. *Asian Development Bank Environment Policy*. Manila

⁴ ADB. 2003. *Environmental Considerations in ADB Operations. Operations Manual*. Section F1/OP. Manila.