



Technical Assistance

TAR: PRC 39019

Technical Assistance to the People's Republic of China for Preparing the Inner Mongolia Autonomous Region Environmental Improvement Project

April 2005

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 15 March 2005)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.1208
\$1.00	=	CNY8.2767

The exchange rate of the yuan is determined in relation to a weighted basket of currencies of the trading partners of the People's Republic of China. In this report, a rate of \$1.00 = CNY8.30 is used.

ABBREVIATIONS

ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
GDP	–	gross domestic product
GHG	–	greenhouse gas
GIMAR	–	Government of Inner Mongolia Autonomous Region
IA	–	implementing agency
IMAR	–	Inner Mongolia Autonomous Region
m ³	–	cubic meter
PRC	–	People's Republic of China
t	–	metric ton
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Energy
Subsector	–	Gas, heating
Themes	–	Sustainable economic growth, environmental sustainability
Subthemes	–	Promote economic efficiency and enabling market; fostering physical infrastructure development

NOTES

In this report, \$ refers to US dollars.

<p>This report was prepared by a team consisting of B. Lin (team leader), A. Bhargava, A. Maxwell, T. Oi, and S. F. Wong.</p>

I. INTRODUCTION

1. The Government of the People's Republic of China (PRC) requested Asian Development Bank (ADB) assistance to prepare the proposed Inner Mongolia Autonomous Region Environmental Improvement Project. The project preparatory technical assistance (TA) concept paper was approved on 22 February 2005. From 24 February to 3 March 2005, a fact-finding mission visited the PRC and reached an agreement with the Government on the objectives, scope, cost estimates, financing plan, and implementation arrangements of the TA.¹ The TA design and monitoring framework is in Appendix 1.

II. ISSUES

2. The PRC has severe environmental problems, including air pollution associated with rapid economic growth, heavy reliance on coal as the primary fuel, and use of obsolete technology. The State Environmental Protection Administration estimates that since the early 1990s, pollution has resulted in a loss to the PRC economy of approximately 4% of gross domestic product (GDP). Air pollution accounts for 59% of this loss.² Inner Mongolia Autonomous Region (IMAR) is one of the PRC provinces experiencing severe air pollution problems due to its heavy reliance on coal as the primary fuel for its many heavy industries and small coal-fired heating boilers. Before 2002, only one of the major cities in IMAR met the national class II air quality standards. Due to the Government's concerted efforts to close small and highly polluting heating boilers, urban air quality has improved in recent years. In 2003, 3 of the 14 major cities in IMAR met the national class II air quality standards.

3. Urban heating demand has increased rapidly in the PRC due to rising incomes, privatization of residential housing, and housing sector growth. As incomes increase, people living in the cold northern and northwest provinces have demanded more and reliable heating. Central heating in terms of square meters (m²) recorded an annual growth rate of 16% between 1992 and 2003. Nationwide, residential buildings account for about 70% of the total space heated; commercial and public buildings account for the remaining 30%. Heating demand in IMAR has also increased rapidly during the past decade. In the PRC, over 60 million tons (t) of coal are burned by 500,000 small, inefficient, coal-fired heating boilers every year, resulting in the emission of substantial amounts of sulfur dioxide, carbon dioxide, nitrogen oxides, and total suspended particulates. The majority of urban heating supplies in IMAR come from small boilers, which contribute significantly to air pollution problems in urban areas.

4. IMAR has a population of about 24 million; 26% live in urban areas. Continued strong economic growth, combined with a significant increase in urban housing construction, has resulted in heating demand outpacing supply. Cities in IMAR experience heating supply shortages during the 5-month winter season; this adversely affects quality of life and health of urban residents, particularly the poor. The adverse effects of urban poverty are often compounded by environmental pollution from energy and heating sources at the household level. The poor do not have the information, access, or funds for more efficient (less polluting) equipment and fuel. The gas and heating distribution systems often function poorly or are absent in the poorer sections of the city. Poorly maintained gas and heating distribution systems increase the exposure of the poor to daily doses of pollutants as well as to the risk of accidents. Indoor air pollution particularly puts women and children at risk. By improving the efficiency and

¹ The TA first appeared in the *ADB Business Opportunities* (Internet edition) on 9 March 2005.

² Based on a study by the Policy Research Center for Environment and Economy of the State Environmental Protection Administration.

capacity of city gas and heating distribution, closing the existing small heating boilers in project cities, and implementing tariff reforms and special tariff reduction programs, the Project will help reduce environmental pollution and ensure that the poor have an affordable and adequate heating supply. The Project will also entail enhanced levels of safety (safe gas distribution), in addition to direct benefits to the poor.

5. As one of the 12 western provinces, IMAR has benefited less than the east coast from economic growth and reforms. Incomes are lower; poverty is more widespread; health and education indicators are lower; land degradation problems are serious; and physical infrastructure has weaknesses, including roads, railways, power, and telecommunications. In 2003 the average per capita GDP in IMAR was CNY8,734, lower than the national average of CNY9,046. Of the province's 101 counties, 31 are national poverty counties and 29 are provincial poverty counties. The fiscal revenue of the poverty counties cannot cover salaries of the government officials, teachers, and health personnel. Investments in basic education and public health are inadequate. In 2003, about 1.3 million people, more than 10% of IMAR's rural population, lived on incomes below the official poverty line,³ compared with the PRC's national poverty incidence of 3%. About 2.5 million people, or 18% of the rural population, had incomes below the international poverty line of \$1/day.

6. In IMAR, the average heating bill for a poor household living in a 40 m² apartment unit is about CNY150 per month during the heating season. In a typical poor household of four, the income at the poverty line is about CNY650 per household per month under the average city poverty line. Thus, the heating bill represents about 23% of a poor household's monthly income. This indicates a serious affordability problem for poor households with income at or below the city poverty lines. In the project areas where the temperature in the winter can go as low as minus 25° Celsius, insufficient heating supply will severely affect the quality of life and health of the poor. The government of Inner Mongolia Autonomous Region (GIMAR) is making efforts to provide urban minimum living standard and social assistance programs to address the growing concern of urban poverty. Cost savings resulting from the efficiency improvement of the Project will be passed on to the poor in the form of lower gas and heating bills, and connection fee discounts. The TA will design assistance programs under the Project to alleviate affordability problems and ensure sufficient heating for the poor in the project cities. This effort will be supported by earlier ADB work addressing heating supply for the poor in the PRC.⁴

7. The resources of local governments and those provided by the central Government are inadequate to finance the large-scale investments required by rising gas and heating demand. So far, private sector involvement in gas distribution systems in the PRC has been weak and only a few joint ventures have been involved in combined heat and power generation plants. These subsectors do not provide enough incentives to make them attractive to private investors, because of (i) technical/institutional uncertainties involving city governments' control over gas and heating distribution; (ii) heating being considered a welfare measure, leading to poor fee collection; and (iii) lack of clear and transparent tariff setting for both gas and heat supply. To encourage private sector participation in areas where only the public sector has previously been involved, an enabling environment needs to be created. ADB policy dialogue in tariff reforms and institutional changes will promote private sector participation by helping create the enabling environment. Further, specific opportunities have to be identified for the private sector to share

³ PRC's official rural poverty line of CNY637 per capita/year is low compared with international rates.

⁴ ADB. 2000. *Technical Assistance to the People's Republic of China for Pro-Poor Urban Heating Tariff Reforms*. Manila. The TA was successfully completed in October 2004. ADB. 2004. *Technical Assistance to the People's Republic of China for Heating Supply for the Urban Poor in Liaoning Province*. Manila. The TA is currently under implementation.

part of the investment needs and functions, like initial public offerings of gas and heating companies, operation and maintenance contracts, and billing and collection services.

8. One of the Government's main development objectives is to improve the quality of the environment in cities and integrate environmental planning with economic and social development efforts.⁵ The aim is to contain the worsening trend of environmental pollution and ecosystem degradation, and to improve the environment in cities to demonstrate that rapid economic growth and a cleaner environment are compatible. The Government is planning to strengthen its control of pollutant discharge through the issuance of regulations on total pollutant control for selected cities and designated river basins and regions. Air quality in cities is to be improved by substituting coal with gas where feasible, modernizing and closing polluting boilers and industries, and increasing the use of technologies and fuels that minimize urban pollution.

9. The ADB operational strategy in the PRC aims to help the country achieve economic growth in an efficient, equitable, and sustainable manner. In the energy sector, the ADB strategy supports the Government's energy development program aimed at expanding energy supplies and promoting energy conservation and end-use efficiency. ADB strategy for the environment sector and gas subsector focuses on strengthening the legal and regulatory framework for sustainable environmental management, supporting the utilization of economic and other measures to ensure sustainable utilization of natural resources, and promoting the use of cleaner technologies. The ADB poverty reduction strategy for the PRC envisages a range of measures including providing goods and services directly to the most vulnerable members of society and promoting sustainable growth. Therefore, the proposed Project will support the PRC and GIMAR development priorities and is consistent with the ADB environment strategy and objective of poverty reduction. A summary initial poverty and social analysis is attached as Appendix 2.

10. Project completion reports prepared for three ADB environment projects and the project completion and project performance audit reports for one of the environment projects revealed that the achievements of some clean technology and heating supply components were lower than estimated at appraisal. The envisaged benefits were not achieved in some chemical industries (e.g., caustic soda, cement kilns, and ceramic products) because the imported clean technology could not be properly transferred. In the case of coke oven gas projects, the steel mill derived the benefit, but targets for supplies to households were not achieved.

11. Several factors affected the outcome of heating supply components, such as lower demand for heating, insufficient heat source, unsuitable design for switching from coal to natural gas, and lower heat and power tariffs than anticipated at project appraisal. Some projected industrial establishments either did not materialize or lacked the financial capacity to pay for heating services. Some heating components were canceled when no noticeable progress was made and after the project implementation agencies realized that the projected market for steam and heat usage was overly optimistic. In addition, the design to switch these heating companies' fuel source from coal to natural gas would have seriously affected their financial viability and required large government subsidies. The lower heat and power tariffs coupled with lower demand affected financial performance of heating supply companies.

⁵ The Government is planning to prepare and promulgate a law on environmental impact assessment that will require strategic environment assessments for all proposed national planning and policy development activities and full integration of possible environmental impacts in the decision-making process.

12. The proposed Project will not include assistance for clean technology in industries. It will ensure the viability and sustainability of heating supply by incorporating the lessons from earlier projects for design, preparation, risk assessment, and implementation. A demand analysis will be carried out to ensure that demand for the central heating and gas supplies will be sufficient. The expected improvement in efficiency by about 20%, and the improved bill collection under the Project will improve the gas and heating companies' financial performance. Strong economic performance is expected in IMAR, based on the Western Development Strategy under which the Government has made a strong commitment to accelerate development in the western region. The gas and central heating distribution systems under the Project are based on proven designs and conventional technologies that have been successfully used in the PRC. Though the gas and heating supply in IMAR have been demonstrated as viable activities, precautions will be taken by carefully assessing the project risks during project preparation. The risk of delay to construction due to late internal approvals and procurement will be addressed by early preparation and procurement training during TA implementation.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

13. The project preparatory TA will help the Government to design and prepare an environmental improvement project in IMAR. The project preparatory TA outcome will be an agreement with GIMAR and central Government on project design, detailed feasibility report, and implementation arrangements for the Project.

B. Methodology and Key Activities

14. The TA will (i) assess the gas and heating markets in IMAR; (ii) determine demand-side management potential; (iii) carry out demand forecast and gas and heating supply system planning, including least-cost gas and heating supply system planning, and incorporation of demand-side management options; (iv) evaluate the technical feasibility and engineering aspects of the Project; (v) provide cost estimates and procurement arrangements, and prepare a contract packaging plan; (vi) carry out the economic and financial analyses; (vii) prepare the environmental impact assessment and land acquisition and resettlement plan, and provide summaries of each; (viii) analyze the financial governance and financial performance implementation agencies; (ix) recommend necessary enterprise and sector reforms; (x) evaluate the poverty impact of the Project and identify ways to make the Project more pro-poor, including designing assistance programs on heating tariffs for the poor; (xi) establish monitorable indicators and a monitoring mechanism; and (xii) support private sector participation in the Project.

15. The major assumptions and risks that need to be considered for successful TA implementation include a change in GIMAR's priorities, lack of adequate and in-time provision of data, delay in submission of required studies, delay in consultant selection, and poor consultant performance. Efforts will be made to ensure that competent consultants will be recruited in time. GIMAR agrees to provide adequate counterpart support and data when needed. GIMAR also agrees to undertake and update all required studies according to a timetable agreed with ADB. Close coordination among the consultants, executing and implementing agencies, and ADB will further mitigate these risks.

C. Cost and Financing

16. The TA is estimated to cost \$700,000 equivalent with a foreign exchange cost of \$340,000 and a local currency cost of \$360,000 equivalent. ADB will provide \$500,000 equivalent to finance the foreign exchange cost and \$160,000 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB's TA funding program. GIMAR will contribute \$200,000 equivalent to finance the remaining local currency cost. Details of the cost estimates and financing plan are given in Appendix 3. The Government has been informed that provision of the TA does not commit ADB to financing any ensuing project.

D. Implementation Arrangements

17. The TA will be carried out by a consulting firm with experience in gas and heating supply; institutional, economic, financial, environmental, and social analyses; and impact assessment. The international consultants will include (i) a gas transmission and distribution specialist, (ii) a private sector development specialist, (iii) an environmental economist, (iv) a social and resettlement specialist, (v) a financial analyst, and (vi) an institutional specialist. The domestic consultants will include (i) a gas transmission and distribution specialist, (ii) a central heating specialist, (iii) a private sector development specialist, (iv) an environmental economist, (v) a social and resettlement specialist, (vi) a financial analyst, (vii) an institutional specialist, and (viii) a monitoring specialist to assist with data collection and processing and project monitoring. Domestic consultants will assist the international consultants in their respective fields. The consultants will be selected and engaged in accordance with ADB *Guidelines on the Use of the Consultants* and other arrangements satisfactory to ADB for the recruitment of domestic consultants. The services of consultants will be provided through a consulting firm selected after the submission of simplified technical proposals and the use of the quality- and cost-based selection method. An estimated total of 28 person-months of consulting services will be required: 8 for international and 20 for domestic services. The outline terms of reference for consultants are given in Appendix 4.

18. GIMAR will establish a project office comprising specialists in the relevant areas and headed by an experienced senior staff person to coordinate with the consultants during the project preparatory TA work. GIMAR will provide interpreters, local transportation, and office space in Huhehaote equipped with suitable facilities.⁶ Some of the office equipment will be financed under the TA and will be procured by the international consultants in accordance with ADB *Guidelines for Procurement*. The TA is expected to commence in June 2005 and be completed by April 2006.

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 \$500,000 on a grant basis to the Government of the People's Republic of China for preparing the Inner Mongolia Autonomous Region Environmental Improvement Project, and hereby reports this action to the Board.

⁶ The facilities usually include Pentium computers with e-mail and Internet access, telephone with international direct dialing access, two photocopiers, a laser printer, a projector, and a fax machine.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Environmental improvement in the Inner Mongolia Autonomous Region (IMAR)</p>	<p>Increased natural gas transmission and utilization</p> <p>Augmented central heating systems to facilitate closure of small inefficient coal-fired boilers</p> <p>Developed institutional and financial tariff reform action plan, and privatization plan</p> <p>Implemented assistance programs for the poor households</p>	<p>National statistics and regional environmental data</p> <p>Project survey of poverty impact</p>	<p>Assumptions:</p> <p>Government confirms to extend priority and resources to improving environment in IMAR</p> <p>Project design implemented effectively</p>
<p>Outcome</p> <p>Project design, feasibility study, and implementation arrangements agreed</p>	<p>Memorandum of understanding of final tripartite meeting signed by Government and the Asian Development Bank (ADB)</p>	<p>Consultant's final report</p> <p>Memorandum of understanding</p> <p>Back-to-office report of final technical assistance (TA) review mission</p>	<p>Assumption:</p> <p>Effective stakeholder participation and ownership developed</p> <p>Risk:</p> <p>Majority of partners do not follow strategy</p>
<p>Outputs</p> <p>1. Technical assessments completed</p> <p>2. Strategy for selected area agreed</p> <p>3. Project design requirements met</p>	<p>Inception report week 4 Draft final report week 16 Final report week 34</p> <p>Government, development partners, and nongovernment organizations endorse strategy</p> <p>Inception report week 4 Draft final report week 16 Final report week 34</p>	<p>Project reports TA reviews week 6, 18, and 36</p> <p>Strategy report Letters or signed statements of support</p> <p>Project reports Technical assistance reviews week 6, 18, and 36</p>	<p>Assumptions:</p> <p>No restriction on availability and access to timely information and personnel</p> <p>No restriction on accessing geographic sites</p>

<p>Activities with Milestones</p> <ol style="list-style-type: none"> 1. Analyze regional growth and development, and assess environmental links to economy and poverty reduction (weeks 1–4). 2. Assess adequacy of environmental policy and measures (weeks 5–8). 3. Carry out stakeholder workshops (week 6). 4. Complete a baseline survey (week 6). 5. Carry out social, poverty, ethnic minority, and gender assessment (weeks 8–10). 6. Carry out financial and economic analysis and institutional analysis (weeks 10–14). 7. Complete summary initial environmental examination (week 10). 8. Prepare participation and gender action plans and private sector participation development plan (weeks 10–14). 9. Prepare problem analysis and project framework (week 10). 10. Finalize project design and monitoring framework (weeks 15–16). 	<p>Inputs: \$700,000</p> <p>Financing: ADB : \$500,000 Government : \$200,000</p>
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INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkages to the Country Poverty Analysis

Is the sector identified as a national priority in country poverty analysis?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the sector identified as a national priority in country poverty partnership agreement?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<p>Contribution of the sector or subsector to reduce poverty in the People's Republic of China: Improved gas and heat distribution in two cities could improve the efficiency of energy supply by at least 20%. The supply companies will be in a position to share these efficiency gains with its poor urban consumers by lowering their tariffs without compromising its profitability. Upgrading and expanding the urban gas and heating supply system will benefit urban residents, particularly the urban poor by providing incremental energy supply and reducing losses and tariffs.</p>			

B. Poverty Analysis

Targeting Classification: General intervention

<p>What type of poverty analysis is needed? Basic poverty and social analysis is proposed (Appendix 4). The technical assistance (TA) will look at the incidence of poverty using existing data sources and supplementing it through the social survey of potential beneficiaries. Both income and nonincome poverty indices will be determined. The analysis will be carried out following the <i>Handbook on Poverty and Social Analysis</i>¹ and <i>Handbook for Integrating Poverty Impact on Economic Analysis of Projects</i>.² Particular attention is to be given to profiling the beneficiaries, including gender disaggregated demographic, economic, and social data where possible, plus the incidence of poverty, vulnerable groups, and any adverse impacts anticipated from the Project.</p>

C. Participation Process

<p>Is there a stakeholder analysis? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>A stakeholder analysis will be prepared as part of the TA. Participatory workshops will be held to strengthen the participatory approach. A workshop will be held for stakeholders to discuss and agree on the strategic plan, and the proposed investment project of the Asian Development Bank (ADB). In addition, workshops for local governments and communities will continue to formulate the project design. More intensive focus group meetings, interviews, and surveys will be held with local government agencies, development partners, and nongovernment organizations, private sector, and identified project beneficiaries to ensure a sense of ownership and agreement to the detailed design and implementation arrangements. Funds are being made available under the TA to ensure an effective stakeholder analysis is undertaken.</p>
<p>Is there a participation strategy? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>A participation strategy will be prepared as part of the TA. This strategy will aim to ensure the involvement of local government and communities, and particularly the poor, women, ethnic minorities, and vulnerable groups. Funds are being made available under the TA to ensure an effective participation strategy is completed. The participation and consultation strategy will be adopted for engaging with people who might be adversely affected by the Project.</p>

D. Gender Development

<p>Strategy to maximize impacts on women: Gender equality must be secured during project implementation for hiring construction labors. Also impacts of the Project on households headed by women will be examined during the TA.</p>

¹ ADB. 2001. *Handbook on Poverty and Social Analysis*. Manila.

² ADB. 2001. *Handbook for Integrating Poverty Impact on Economic Analysis of Projects*. Manila.

Has an output been prepared? Yes No
 A strategy to maximize impacts on women will be prepared as part of the TA.

E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	A short resettlement plan will be prepared during the TA and is reflected in the consultants' terms of references (Appendix 4).	<input type="checkbox"/> Full <input checked="" type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Issue will be considered during the social survey and the initial environmental examination and appropriate mitigation measures will be prepared as necessary.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	A reemployment plan may need to be prepared for the workers employed by small heating boilers plants to be closed. Additional funds are included in the TA budget to assess the need of a plan.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Indigenous Peoples	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The Project is located in the Inner Mongolia Autonomous Region with ethnic minorities. The need of an ethnic minority plan will be assessed during the TA and reflected in the consultants' terms of references (Appendix 4).	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other Risks and/or Vulnerabilities	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Issue will be considered during the social survey and the initial environmental examination, and appropriate mitigation measures will be prepared as necessary.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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	195,000.0	0.0	195,000.0
ii. Domestic Consultants	0.0	100,000.0	100,000.0
b. International and Local Travel	54,000.0	6,000.0	60,000.0
c. Reports and Communications	4,000.0	3,000.0	7,000.0
2. Equipment ^b	15,000.0	0.0	15,000.0
3. Training, Seminars, and Conferences	25,000.0	7,000.0	32,000.0
4. Surveys	1,000.0	15,000.0	16,000.0
5. Miscellaneous Administration and Support Costs	1,000.0	8,000.0	9,000.0
6. Contingencies	45,000.0	21,000.0	66,000.0
Subtotal (A)	340,000.0	160,000.0	500,000.0
B. Government Financing			
1. Office Accommodation and Transport	0.0	80,000.0	80,000.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	80,000.0	80,000.0
3. Others	0.0	40,000.0	40,000.0
Subtotal (B)	0.0	200,000.0	200,000.0
Total	340,000.0	360,000.0	700,000.0

^a Financed by the Asian Development Bank's technical assistance funding program.

^b Including three Pentium computers, two photocopiers, a laser printer, a projector, and a fax machine. The ownership of the equipments will be transferred to the Executing Agency at the end of the technical assistance completion.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The terms of reference of the consulting services will include the following.
2. The gas transmission/distribution specialists (one international and one domestic consultant) will do the following:
 - (i) Prepare a summary of the current status of resources in the energy sector and the gas sector for the People's Republic of China (PRC) and Inner Mongolia Autonomous Region (IMAR). Carry out least-cost gas planning in IMAR and discuss the assumptions, methodology, computer models, and completeness of data used. Present an analysis of the results of these studies. Verify and confirm that the Project is part of the least-cost expansion plan. Determine and provide the full technical justification for the Project and compare the same with possible alternatives. Review site information and prepare gas balance for the Project.
 - (ii) Review and identify the project design and if possible, present specific suggestions for improvement. Recommend pro-poor components that could be included in the Project and would directly benefit the rural and urban poor in IMAR, taking into account proposals for the executing agency, the Government of Inner Mongolia Autonomous Region (GIMAR) and project implementing agencies (IAs). Review the project cost estimates, including identifying local and foreign cost components and physical and price contingencies, and present the cost estimates in ADB format. Review GIMAR's proposed contract packaging and suggest improvements, taking into account efficiency in procurement and the estimated base costs for each package. Prepare the project implementation schedule showing the Project's critical path and the timing for each activity. Assess the likely technical risks facing the various aspects of the Project and carry out sensitivity analysis to check the viability of the Project under these risks. Prepare terms of reference, and person-month estimates for consulting services to assist the EA with subsequent project implementation and management.
3. The financial and institutional analysts (one international and one domestic consultant) will do the following:
 - (i) Review the accounting and financial records of GIMAR (if needed) and the IAs. Present the key audited financial statements for the past 5 years in ADB format. Carry out a detailed review of GIMAR and the IAs' financial position for the last 5 years, based on international accounting standards. Project their financial positions for the next 10 years, stating the assumptions used; present the projected financial performance in ADB format. Evaluate the possibility of future private sector participation in the gas and heating subsector. Examine the feasibility of the EA and IAs' investment plan for the next 10 years from the financial standpoint. Recommend measures that will improve their financial positions. Review the project cost estimates and financing plan. Discuss the methodology for assessing the financial viability of the Project and each of its components. Determine the financial viability of the Project and each of its components; include a computation of the Project's financial internal rate of return and the weighted average cost of capital, as well as a review of the potential cash flows of the Project in accordance with ADB guidelines. Assess the likely financial uncertainties and risks associated with the Project, and carry out sensitivity analysis to check the viability of the Project and its components under these risks

and uncertainties. Prepare gas and heating purchase agreements, acceptable to ADB. Review the internal controls within the EA and the IAs to ensure they are consistent with ADB *Guidelines on Prevention of Fraud and Corruption*.¹ Present the recommended organizational structure of the finance departments of the EA and IAs. Propose a capital/ownership structure for the IAs and develop a financial reporting system that will enable the EA to monitor the financial performance of the IAs.

- (ii) Describe the role and responsibilities of the various sector institutions and their relationships and the relationship to the EA, the IAs, and the provincial and local governments. Present the delegation of authority in key areas such as corporate governance, long-term planning, investment approval, appointment of key personnel, setting of performance targets, and monitoring of performance; and prepare a chart showing the gas and heating sector institutions and their relationships. Present the number of staff and staffing pattern in the EA and the IAs and categorize the staff and present their available skills. Present the corporate objectives and goals of the EA and the IAs. Assess how the enterprise reforms can be achieved within the framework of corporate long-term goals and objectives. Recommend measures for institutional strengthening, including organization structure, corporate governance, operational efficiency, delegation of power, and greater commercialization. Recommend measures for strengthening the organizational aspects of implementation arrangements for the Project, including the role of the EA and the IAs in project implementation. Assess their capabilities to manage the Project. Identify key issues and evaluate the prospects for private sector participation in the Project. Describe the institutional arrangements for transfer and delivery of gas and heating under the Project. Recommend commercial arrangements for efficient utilization and better cost recovery. Identify areas where the EA and the IAs require assistance for institutional strengthening including corporate governance and enterprise reforms, and prepare the terms of reference. Identify suitable training programs for staff of the EA and the IAs.

4. The private sector development specialists (one international and one domestic consultant) will do the following: Review and assess current status of private sector participation in district heating and gas transmission in IMAR and identify barriers—institutional, regulatory, financial, etc., in promoting private sector participation. Undertake resource and skills audit of project companies to identify their financial and management capacity, and prepare a comprehensive capacity enhancement program to bridge identified skills and resource gaps. Review and assess level of commercialization in existing operations of project companies, and develop an enterprise reform plan and a time-bound action plan for project companies to prepare them for full commercialization of their operations. Identify, prioritize, and rank areas of operation for divestment. Prepare action plan for divestment for the first rank area evaluating options for divestment. Prepare a time-bound action plan for private sector participation in the selected project companies. Determine the financing requirements of the Project in terms of both local cost and foreign exchange requirements, and identify options for cofinancing including economical cofinancing under ADB guarantee operations.

5. The domestic economic analyst will do the following:

- (i) Provide general macro and sector information, including energy production and consumption by sector, energy efficiency, and gas and heating production and consumption by sector for the PRC and IMAR. Analyze the sectoral and policy

¹ ADB. 2002. *Guidelines on Prevention of Fraud and Corruption*. Manila.

context of the Project. Provide an independent assessment of the short-term (3 years) and long-term (system planning period) demand forecasts that take into account historical trends, structural changes, efficiency improvement, energy prices, gross domestic product growth, investment distribution and growth, and other important factors affecting energy and gas and heating demand in IMAR. Analyze government policies that may have significant impact on the demand and supply of energy. Provide a detailed discussion of the assumptions and methodology used in demand forecasting. Make a comparison in terms of economic costs and benefits between the proposed use of gas for heating, and its alternative use in urban areas in project cities. Analyze the economic parameters. Provide quantitative and qualitative benefits of the Project and each of its components. Carry out an economic analysis based on ADB *Guidelines for Economic Analysis of Projects*,² specifically including (a) gas and heating demand analysis, (b) least-cost and equalizing discount rate analysis, (c) economic viability analysis, and (d) risk analysis. Discuss alternative methodologies for carrying out the economic analysis.

- (ii) Describe how the tariffs of the Project will be determined. Incorporate into the economic analysis an economic quantification of environmental impact due to the Project following ADB *Environmental Guidelines for Selected Industrial and Power Development Projects*,³ *Environmental Assessment Requirements and Environmental Review Procedures*,⁴ and *Economic Valuation of Environmental Impacts: A Workbook*, 1996.⁵ Discuss the assumptions and the economic parameters used in the economic analysis, including the assumed consumers' willingness to pay and resource cost savings in relation to alternative options. Compare the shadow prices with those in ADB or the World Bank projects, and discuss the source and justification for the shadow prices. Identify and analyze likely economic uncertainties that could affect the Project's viability, and carry out a risk analysis.

6. The environmental experts (one international and one domestic consultant) will undertake the following: Assist the EA in improving the environmental impact assessment (EIA) for the Project following ADB Environment Policy (2002) and *Environmental Assessment Guidelines* (2003), and *Environmental Review Procedures* to ensure that the EIA is comprehensive and complies with ADB requirements. Based on the review, provide the EA with specific and detailed recommendations for revisions and/or additional studies, if needed, to make the EIA conform to ADB requirements. Quantify the environmental impact and benefits resulting from the EA's proposed program for the closure of small, old boilers in IMAR, and suggest a scheme for environmental monitoring of the decommissioning of these plants. Prepare a summary EIA following ADB format prescribed in *Environmental Assessment Requirements and Environmental Review Procedures*. Assess other options for gas and heating production/distribution and meeting the energy demand. Compare their environmental and social sustainability. Review the environmental management capabilities of the EA and the local environmental protection bureaus and recommend institutional strengthening measures. Assess the global environmental benefits of the Project in terms of reduction of greenhouse gas (GHG) emissions, assess in monetary terms the value of the same (GHG emission reduction credits), and identify the certification requirements to enable the international trading of the GHG emission reduction credits.

² ADB. 1997. *Guidelines for Economic Analysis of Projects*. Manila.

³ ADB. 1993. *Environmental Guidelines for Selected Industrial and Power Development Projects*. Manila

⁴ ADB. 2003. *ADB Environmental Assessment Guidelines*. Manila.

⁵ ADB. 1996. *Economic Valuation of Environmental Impacts: A Workbook*. Manila.

7. The poverty and resettlement analysts (one international and two domestic consultants) will do the following:

- (i) Conduct a site visit to verify initial poverty and social assessment. Collect available reports and published statistics that are relevant to the Project. Identify the project stakeholders and examine their existing rights and possible risks from the Project. Assist in building public acceptance of the Project. Organize and conduct surveys in the project area, and consult with the government and nongovernment organizations to supplement secondary data. Prepare a poverty profile of the project area. Indicate the poverty incidence, the current situation, and the trend; include characteristics of poverty and the perceptions of people gathered through surveys or existing poverty assessments of the project area. 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 poor who will benefit from government expenditure. Where the Government has a net cost, estimate the proportion of marginal tax revenue derived from the poor. 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. 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 *Guidelines for Incorporation of Social Dimensions in ADB Operations*.⁶ Determine the likely social and gender effects, such as any joblessness created by closing old boilers in IMAR. Identify any mitigation measures or complementary activity that could help reduce poverty in the project area. Assess whether ethnic minority nationalities will experience any adverse or disproportionate affects. 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 documents: *Policy on Involuntary Resettlement*,⁷ *Handbook on Resettlement*,⁸ and *Guideline for Resettlement Plans for the PRC*.⁹
- (iii) Design tariff assistance programs that are consistent with ADB policy requiring that tariff subsidies to the poor be transparent and explicit, and funded by the government budget, which will separate the welfare objective from the commercial management of the public utilities. Identify relevant (a) indicators, (b) methodology, (c) plan and timing, (d) location, and (e) human resource requirements to analyze the poverty impact in the project area. These indicators should be incorporated into the project performance monitoring system. Prepare at least two candidate project proposals that can be complementary to the ADB loan funded project and can be funded by the Grassroots Human Security Fund by the Embassy of Japan. Such proposals have to be thoroughly discussed with local government agencies, local/international nongovernment organizations, and potential beneficiaries in the project area.

⁶ ADB. 1997. *Guidelines on Operational Procedures: Incorporation of Social Dimensions in Bank Operations*. Manila.

⁷ ADB. 1995. *Policy on Involuntary Resettlement*. Manila.

⁸ ADB. 1998. *Handbook on Resettlement: A Guide to Good Practice*. Manila.

⁹ ADB. 1997. *Guidelines on Operational Procedures: Involuntary Resettlement*. Manila.

8. The domestic heating supply specialist will do the following: Assess least-cost heating supply options in IMAR and discuss the assumptions, methodology, computer models, and completeness of data used. Present an analysis of the results of these studies. Verify and confirm that the Project is the least-cost option. Determine and provide the full technical justification for the Project, and compare the same with possible alternatives. Review site information, including the existing system for heating supply in IMAR and in the project cities. Prepare heating supply/demand balance for the Project. Review the technical conditions and need for monitoring safety. Review and identify the project design and, if possible, present specific suggestions for improvement. Recommend pro-poor components that could be included in the Project and would directly benefit the rural and urban poor in IMAR, taking into account proposals of the EA and IAs. Review the project cost estimates, including identifying of local and foreign cost components and physical and price contingencies, and present the cost estimates in ADB format. Review the EA's proposed contract packaging and suggest improvements, taking into account efficiency in procurement and the estimated base costs for each package. Prepare the project implementation schedule showing the Project's critical path and the timing for each activity. Assess the likely technical risks facing the various aspects of the Project and carry out sensitivity analysis to check the viability of the Project under these risks. Prepare terms of reference, and person-month estimates for consulting services to assist the EA with subsequent project implementation and management. Review the proposed program of the EA for the closure of small, old, polluting boilers in IMAR. Prepare a schedule for closing of these boilers and other necessary arrangements for a successful closure.

9. The domestic project monitoring and data analyst will do the following: Review the project-related documents to determine a set of monitorable indicators in the areas of economic growth, energy efficiency, gas reduction, and environmental improvement. Develop a project framework that outlines the goal, purposes, outputs, and inputs or activities with links to the set of monitorable indicators. Assess the data availability for determining monitorable indicators. Determine a feedback and reporting mechanism for effective project implementation. Prepare a framework for initial start-up activities, including baseline survey to be monitored with the follow-up surveys. Collect and analyze all relevant reports and studies pertaining to the production of gas and heating in IMAR, including annual production and sales data by type of gas and heating and region, domestic and foreign investments in the gas and heating sector, employment and productivity in the gas and heating sector, and restructuring of the gas and heating sector. Ensure that all relevant reports are made available to the international consultants and, if necessary, translate them into English. Arrange and coordinate the required meetings and visits for the international consultants and translate consultants' main reports into Chinese. Assist in the technical, financial, economic, environmental, and poverty impact evaluation of the Project.

10. The consultants will submit two copies of the following reports (one to the EA and one to ADB): (i) inception report in week 4, (ii) draft final report in week 16, and (iii) final report in week 34. The inception report will summarize the initial findings, and suggest changes in the TA's approach, methodology, and time schedule. The draft final report will be discussed in a consultation workshop with the participation of main project stakeholders and key officials from other government agencies involved in gas and heating supply, and ADB staff. The main objectives of the workshop are to (i) present to the policymakers and stakeholders the findings and recommendations of the TA, (ii) facilitate an exchange of ideas and gather comments, (iii) increase the sense of ownership and commitment to the TA recommendations, and (iv) allow the policymakers to discuss the feedback of stakeholders. The final report will take into account the comments of GIMAR and ADB on the draft final report, and the discussions held during the consultation workshop. The main reports should be translated into Chinese.