

**ASIAN DEVELOPMENT BANK**

**TAR:IND 36321**

**TECHNICAL ASSISTANCE**  
(Financed by the Government of the United Kingdom)

**TO**

**INDIA**

**FOR PREPARING THE**

**URBAN CLEAN FUEL PROJECT**

**September 2003**

## **CURRENCY EQUIVALENTS**

(as of 15 August 2003)

Currency Unit	–	Indian rupee/s (Re/Rs)
Re1.00	=	\$ 0.02
\$1.00	=	Rs 45.95

## **ABBREVIATIONS**

CNG	–	compressed natural gas
CPCB	–	Central Pollution Control Board
GAIL	–	Gas Authority of India Limited
HBJ	–	Hazira–Bijaypur–Jagdishpur
LNG	–	liquefied natural gas
NG	–	natural gas
PIL	–	public interest litigation
TA	–	technical assistance
TSP	–	total suspended particles

## **WEIGHTS AND MEASURES**

m	–	meter
mg	–	milligram
MMSCM	–	million standard cubic meters

## **NOTES**

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

## I. INTRODUCTION

1. Between 1951 and 1991, the urban population of India's cities more than tripled, from 62.4 million to 217.6 million. Nearly two thirds of India's population live in urban areas, and nearly half of the urban population is concentrated in 23 metropolitan areas with populations exceeding 1 million. Urban planners and city governments have been unable to deal with all the resulting environmental and other problems. Residential colonies and commercial centers have cropped up in an unplanned manner with inadequate infrastructure to support their needs. Due to the absence of integrated urban planning, industrial areas have been developed close to town centers and residential areas. Furthermore, the number of diesel and gasoline fuelled vehicles has greatly increased. Increased urbanization, industrialization, and mobility have contributed to poor air quality in many of the cities in India. The Government of India has requested the Asian Development Bank (ADB) to provide technical assistance (TA) to help prepare a Project to provide clean fuels (essentially compressed natural gas [CNG] and natural gas) to six cities for transport, domestic, industrial, and commercial use to help reduce air pollution in the selected cities. The TA is included in the India country strategy and program 2003–2006. The Fact-Finding Mission, conducted on 20 – 29 June 2003, resulted in an understanding with the Government on the components, scope, budget, and implementation arrangements of the TA.<sup>1</sup>

## II. ISSUES

2. Urban areas in India are affected by two kinds of air pollution: ambient air pollution, especially fine particulate matter, caused by emissions from mobile, stationary, and area sources; and indoor air pollution. The growth in mobility has caused a huge increase in the number of petrol and diesel fueled vehicles on the roads. Congested living conditions combined with increasing pollution levels have resulted in chronic health problems. The number of heart-related illnesses, acute respiratory infections, chronic obstructive lung diseases (such as asthma and bronchitis), lung cancer cases, and pregnancy-related problems have increased noticeably. A 1997 World Bank study of New Delhi illustrates the positive significant relationship between particulate pollution and daily nontraumatic deaths, as well as deaths from specific causes for certain age groups. The Study projected that a 100 milligram per cubic meter ( $\text{mg}/\text{m}^3$ ) increase in total suspended particles in New Delhi would result in a loss of about 1,385 lives in a year. Another World Bank study concluded that air pollution in Mumbai causes air 2,800 cases of premature deaths, 60 million respiratory symptom days, and 19 million restricted activity days, all of which are valued at a total cost of Rs18 billion a year. Similar studies by other bodies have also indicated that ambient air pollution is leading to severe respiratory disorders. The recent ban on diesel buses and the corresponding massive conversion to CNG in New Delhi has demonstrated the impact fuel switching can have on air quality levels. Substantial reductions in especially particulate matter have occurred during the last 2 years.<sup>2</sup>

3. Taking cognizance of a public interest litigation application<sup>3</sup> filed before it, the Supreme Court of India has stressed the need for incentives to identify the polluting sources and launch area-wide action plans for pollution control. The court has directed the Government to prepare

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<sup>1</sup> The TA was listed in the *ADB Business Opportunities* (Internet edition), on 13 May 2003

<sup>2</sup> According to monitoring by the Central Pollution Control Board, levels of suspended particulate matter (PM 10) in the downtown area were found to have decreased by as much as 50% 5 days after the ban on diesel buses was imposed by the Supreme Court of India in 2002. This ban was applicable to 6,000 buses in Delhi.

<sup>3</sup> PIL: An application filed before the Supreme Court of India by any citizen/groups/organizations when they are adversely impacted by any issue/activity that is not being addressed by the Government.

action to control pollution in cities and towns that do not meet national ambient air quality standards. In an aggressive order, passed in May 2002, the Court has stated: "...we may note here that there are, as per Central Pollution Control Board (CPCB) data, at least nine other (than Delhi) cities in India where the air quality is critical. These cities are: (i) Agra, (ii) Lucknow, (iii) Jharia, (iv) Chennai, (v) Varanasi, (vi) Faridabad, (vii) Patna, (viii) Jodhpur, and (ix) Pune. But there appears no effective plan to address the problem of the cities. If no immediate action is taken, then it may become necessary for some orders being passed so as to bring relief to the residents of these cities."

4. While the Government has been aware of the increasing pollution levels, the Supreme Court order provided the impetus for expeditious action. As a follow-up of the Supreme Court's directives, the Government directed the Gas Authority of India, Ltd. (GAIL) to identify the pollution sources, assess the pollution load, and prepare for each city, an action plan for control of pollution levels from various sources and sectors, including automobiles, industries, and other sources. GAIL has conducted preliminary studies and has submitted an action plan for cleaning up the air in six cities: Agra, Faridabad, Kanpur, Kolkata, Lucknow, and Pune. The cities were selected based on a combination of air quality problems and the availability of CNG.

5. Despite a history of producing hydrocarbons for over 100 years, India is not a significant producer of either oil or gas. Therefore, with a consistent gross domestic product (GDP) growth of about 6% in the last decade, the demand for natural gas has outstripped domestic production. While domestic production has been hovering around 75 million standard cubic meters (MMSCM) per year, the demand for natural gas is currently close to 120 MMSCM per year. GAIL manages India's main 2,600 kilometers (kms) gas transmission Hazira-Bijaypur-Jagdishpur (HBJ) pipeline. In the last 10 years the Government has taken fresh initiatives to enhance private sector participation in the exploration and production of hydrocarbons. As a result, a major gas field was discovered in the eastern offshore area by the private sector but it will take 4 – 5 years to fully appraise and develop this discovery. To enhance availability of natural gas in India, the Government has removed all licensing restrictions and slashed duties for the import of liquefied natural gas (LNG). This has resulted in initiatives by the private sector to import LNG into India. Such projects have, however, a long gestation period and therefore the HBJ is likely to be the most important source of natural gas supplies in the country for the next few years. Hence, the cities selected by GAIL to be taken up in the first phase of the Project, with the exception of Kolkata and Pune, are those that close to the HBJ pipeline. GAIL has assured that ADB supply of gas will be available for these two cities from independent sources.

6. GAIL proposes to take up the proposed Project in two phases. The Board of Directors of GAIL has already approved phase 1 for Agra, Faridabad, Kanpur, Lucknow, and Pune. This will involve (i) setting up a main station with one or two substations for dispensing CNG to natural gas vehicles, (ii) providing gas supply to about 1,000 domestic customers, and (iii) providing natural gas through pipelines to a few commercial establishments. As per initial calculations by GAIL, this phase of the Project, to be taken up in 2004, is estimated to cost \$150 million. For the second phase, the supply network will be extended to larger parts of the cities (to the extent that laying of pipelines is feasible) to cover homes, commercial and industrial establishments, and CNG supply stations will be set up for selling CNG for motor vehicles. This phase of the Project is estimated to cost an additional \$150 million. No detailed estimates have been made for Kolkata; however, considering the size of the city, its population, and needs, the costs for Kolkata will be substantial. GAIL has requested ADB to consider providing assistance to both phases of the Project. GAIL is well experienced in managing natural gas and CNG supplies in urban areas. A relatively large network has been developed through joint ventures (with the

private sector) in Delhi and Mumbai. Delhi has a network connecting 15,000 domestic and 91 commercial customers. Also 110 CNG stations have been built catering to over 9,000 buses, 5,000 mini buses, 14,500 cars and taxis, and 51,500 scooters. The total cost of the Delhi (Indraprastha Gas, Ltd.) project is about \$320 million of which \$100 million has been spent. Similarly in Mumbai about 170,000 domestic, 500 commercial, and 40 industrial customers have been connected to natural gas supplies. In addition 51 CNG stations are catering to 46 buses, 29,000 cars and taxis, and 40,000 scooters. About \$83 million has been spent on the project in Mumbai.

7. The Project conforms with ADB's strategy for India. The strategy focuses on improving the urban environment by providing cleaner fuels to domestic and commercial users, and switching urban transport users to CNG. Part of ADB's energy policy is also to develop pipe networks for natural gas distribution. Without ADB, GAIL would have designed a straightforward gas transmission and supply project; ADB's involvement will ensure mitigation measures are included for people who may be adversely impacted by the Project. One of the essential aims of the Project is to contribute to poverty reduction and ensure that the benefits reach women, children, and other disadvantaged people. The environmental impact assessment, detailed poverty and social analysis, and comprehensive consultations with stakeholders and beneficiaries will assist the Project to serve the needs of the beneficiaries and adhere to ADB and Government requirements.

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

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

8. The purpose of the TA is to carry out a study for implementing a clean fuel project, with components in six cities, namely, Agra, Faridabad, Kanpur, Kolkata, Lucknow, and Pune, the project will help to decrease the air pollution levels in these cities. Components of the Project identified under the TA, will help to reduce emissions vehicular, indoor, and industrial sources, thus making a substantial contribution protecting the health of the residents of these cities, especially the poor. Improved air quality will reduce the costs of pollution to society.

9. The TA will develop a strategic plan on the use of CNG to improve urban air pollution, including an investment plan, to provide the required clean fuel supply. The plan might also provide the initial stock of cleaner vehicles, so enough of them are available to attract private sector investments to increase the outreach of the Project. To promote the required private sector involvement, the TA will study the conditions required for private sector participation and the bulk use of natural gas/CNG. The plan will include the possibility of banning diesel buses and/or providing preferential pricing for CNG-powered vehicles and cooking gas (versus coal and wood). New investments to be included in the scope of study under the Project will be (i) natural gas transmission lines, (ii) natural gas distribution network and connections to the new CNG filling stations, (iii) CNG filling and storage stations, (iv) kits for converting gasoline engines to CNG, (v) new CNG-based buses, (vi) stations for monitoring the ambient air quality, and (vii) an inspection and maintenance system to ensure compliance with vehicle emission standards.

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

10. The TA will assess existing laws and policies relating to ambient air quality and vehicular and indoor pollution in India. It will also study the existing clean fuel projects in New Delhi and Mumbai, and other ADB projects in Dhaka and Jakarta. By considering lessons learned from

these projects, the TA will be able to suggest plans for using the least cost and effective implementation mechanisms that are better than those used in the past.

11. The key activities under the TA will include (i) reviewing the project viability for the development of a city gas distribution system; (ii) assessing the current demand and investment requirements; (iii) formulating a strategy for implementing the Project; (iv) assessing the economic and environmental benefits resulting from improved air quality; (v) identifying the changes required in laws, policies, and rules governing the gas sector, and laws and policies governing supply of fuels to urban and industrial areas; (vi) an assessment of Environmental and Pollution Control Laws; (vii) prepare capital and operating cost estimates and work out the financial viability of the Project; (viii) carrying out the economic analysis for the CNG-natural gas distribution; (ix) training staff involved in the establishment and operation of infrastructure and in regulatory agencies; (x) assess the impact of the proposed Project design on poverty alleviation, and women and children; (xi) conduct an assessment of land acquisition and resettlement impacts; (xii) assessing social and poverty impacts, including any impacts on indigenous people; (xiii) consulting with stake holder and analyzing their input; (xiv) conducting an affordability analysis (disaggregated by consumer groups); and (xv) carrying out an environmental assessment.

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

12. The total cost of the TA is estimated at \$1.250 million equivalent, comprising \$ 755,000 in foreign exchange costs and \$495,000 equivalent in local currency costs. The entire amount of \$755,000 foreign exchange cost and \$240,000 equivalent of local currency costs will be financed on a grant basis from the United Kingdom Cooperation Fund (poverty-focused) for Technical Assistance funded by the Government of the United Kingdom, established by ADB and the Department for International Development in July 2001. GAIL will finance the remaining \$255,000 equivalent of local currency costs in kind (para. 15). The Government and GAIL have been advised that approval of the TA does not commit ADB to finance any ensuing project.

13. Any computer programs, data bases, and training materials developed by the consultants during TA implementation will be provided to GAIL upon completion of the TA. The TA budget provides for surveys, vehicle rentals, workshops, and demonstration projects.

### **D. Implementation Arrangements**

14. The TA will be carried out by a firm of international consultants with expertise in (i) energy economics and energy planning, (ii) gas infrastructure development and natural gas transmission and marketing, (iii) transport economics and transport planning, (iv) environmental and safety issues related to CNG vehicles, (v) air quality monitoring and management, and (vi) social development and poverty reduction. Domestic consultants will be engaged by the international consulting firm, which will have the overall responsibility for the TA. The TA will require about 20 person-months of international and 57 person-months of domestic consulting services to be provided by a firm. In addition, 4 person-months of individual international consultancy will be required for (i) stakeholder mobilization, and (ii) policy support for the air quality management dimension of the Project. An individual consultant will be needed in view of the specialized skills required and to act as a liaison between implementing agency, Consultant and Project team. Consultants will be engaged by ADB using the simplified technical proposal procedure and quality- and cost-based selection method in accordance with ADB's *Guidelines on the Use of Consultants*, and other arrangements satisfactory for the engagement of domestic consultants. An international CNG and transport specialist will be the team leader and will

coordinate the activities of all the consultants, except that the individual consultant will report directly to the ADB team leader. The domestic consultants will assist the international consultants in gathering and analyzing pertinent information and data, and in reviewing the documents provided by the concerned ministries and other agencies. The outline terms of reference of the consultants are provided in Appendix 3.

15. GAIL will be the Executing Agency for the TA. GAIL has set up a team of three senior staff to manage and monitor the project. GAIL will provide the consultants with adequate office space and other support services. The consultants will hold workshops and consultation meetings to obtain inputs from various departments, state government bodies, and private groups and NGOs. The consultants will develop workshop designs and identify participants in consultation with the core group assigned by GAIL and focal points appointed by the city governments to ensure comprehensive participation. The TA will commence in November 2003, will be implemented over a period of 8 months, and is expected to finish by June 2004. The consultants will submit an inception report within 1 month, an interim report within 4 months, and a draft final report within 6 months of the commencement of the TA. The draft final report will be discussed with the relevant ministries/organizations within the Government, concerned state governments, city authorities, ADB, and GAIL within 1 month of its issuance. The consultants will submit the final report within 1 month after the meeting, incorporating the comments of all involved. The consultants will also design and organize two training courses for staff in GAIL and other relevant agencies involved with supporting project implementation, including promotion of CNG/natural gas and the Project facilities.

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

16. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$995,000 to the Government of India to be financed on a grant basis by the Government of the United Kingdom for preparing the Urban Clean Fuel Project, and hereby reports this action to the Board.

## TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p><b>Goal</b></p> <ul style="list-style-type: none"> <li>• Improve the health of citizens especially of poorer people.</li> <li>• Accelerate use of natural gas, thereby improving air quality.</li> </ul>	<ul style="list-style-type: none"> <li>• Progressive improvement in air quality e.g., particulate matter content.</li> <li>• Progressive increase in the share of natural gas used in the cities.</li> <li>• Increase in number of vehicles powered by compressed natural gas (CNG).</li> </ul>	<ul style="list-style-type: none"> <li>• Central Pollution Control Board and Environment Protection Control Authority Reports</li> <li>• Reports of registration from regional transport authorities</li> <li>• Ministry of Environment and Forests</li> <li>• Ministry of Public Health</li> </ul>	<ul style="list-style-type: none"> <li>• Slow progress the switch over to natural gas</li> <li>• Support from the governments to promote projects based on natural gas.</li> <li>• Price of CNG and natural gas.</li> <li>• Cost of converting vehicles, equipment, and appliances to gas.</li> </ul>
<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>• Formulation of an economically viable project to promote widespread use of natural gas in 6 Indian cities.</li> </ul>	<ul style="list-style-type: none"> <li>• By end of the technical assistance (TA), such items as the number of CNG outlets, cars, and commercial, industrial and domestic users of natural gas.</li> </ul>	<ul style="list-style-type: none"> <li>• Reports from the executing agency (EA), Gas Authority of India, Ltd. (GAIL).</li> <li>• Consultants reports.</li> </ul>	<ul style="list-style-type: none"> <li>• Continued support from the Government, state governments, and GAIL.</li> </ul>
<p><b>Outputs</b></p> <ul style="list-style-type: none"> <li>• Policy guidelines and institutional measures for fast implementation of CNG development and development of policy framework, and laws for sustained use of natural gas in urban areas.</li> <li>• Sustainable natural gas distribution projects identified for external financing.</li> </ul>	<ul style="list-style-type: none"> <li>• Revised policy guidelines for pricing and institutional mandates.</li> <li>• An optimal strategy for the involvement of the private sector and the multilaterals.</li> <li>• Project plans for concerned cities with acceptable economic and financial viability.</li> </ul>	<ul style="list-style-type: none"> <li>• Reports by consultants.</li> <li>• Policy discussions with government agencies.</li> <li>• Review missions and consultants' periodic reports.</li> </ul>	<ul style="list-style-type: none"> <li>• Delayed implementation of proposed policies and institutional measures.</li> <li>• Continued government support for legislations required for promoting use of natural gas, i.e., land acquisition, pipeline laying permissions, etc.</li> </ul>

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Monitoring Mechanisms</b>	<b>Assumptions and Risks</b>
<ul style="list-style-type: none"> <li>• Institutional strengthening of gas sector operations.</li> </ul>	<ul style="list-style-type: none"> <li>• Approved plans for institutional strengthening and capacity building.</li> </ul>		
<p><b>Activities</b></p> <ul style="list-style-type: none"> <li>• Assessment of gas demand.</li> <li>• Carry out technology and economic feasibility study for the natural gas distribution system, including the feeder line and entire city gas distribution systems.</li> <li>• Prepare estimates of realistic capital and operating cost and work out financial viability of the project.</li> <li>• Assess social benefits.</li> <li>• Develop project implementation schedule and year-by-year financial requirements of the project.</li> </ul>	<ul style="list-style-type: none"> <li>• Gas demand for transport, industry, commercial, and domestic use by year.</li> </ul>	<ul style="list-style-type: none"> <li>• Consultants' reports.</li> <li>• TA review missions.</li> <li>• TA completion report.</li> <li>• Monitoring by EA.</li> </ul>	<ul style="list-style-type: none"> <li>• Close coordination and cooperation with statutory bodies and government agencies and GAIL.</li> </ul>
<p><b>Inputs</b></p> <ul style="list-style-type: none"> <li>• Consulting Services</li> </ul>	<ul style="list-style-type: none"> <li>• Appointment of a technical consultant.</li> </ul>	<ul style="list-style-type: none"> <li>• Review by GAIL</li> </ul>	

## SUMMARY INITIAL POVERTY AND SOCIAL ANALYSIS (IPSA) REPORT FORM

### A. Linkages to the Country Poverty Analysis

Sector identified as a national priority in country poverty analysis? No	Sector identified as a national priority in country poverty partnership agreement? No
<p>Contribution of the sector/subsector to reduce poverty in India</p> <p>Cities in India are facing huge environmental pollution problems. This has led to sever health problems. Most of those affected are the poor. The Project will lead to an improvement in health and greater productivity and will add jobs by helping industry switch to a more productive and cheaper source of energy.</p>	

### B. Poverty Analysis

**Proposed Classification: Other**

<p>What type of poverty analysis is needed? Social and poverty assessment will be undertaken.</p>
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### C. Participation Process

<p>Stakeholder analysis? Yes</p> <p>The consultants will identify all the major stakeholders in government, private sector, and civil society; characterize their attitude toward the Project; and assess their capacity to successfully participate in the Project.</p> <p>Participation strategy? Yes</p> <p>Based on the results of the stakeholder analysis, the consultants will hold discussions and consultations with local municipal authorities, local communities, local institutions, nongovernment organizations and affected private sector groups to arrive at a design for a full participation strategy to be undertaken before and during the construction period. The strategy will include the design of public information about the project scope, schedule, impacts and entitlements, grievance procedures, and consultation and participation during implementation. The local authorities will be asked to assign counterpart staff to work with the consultants during the technical assistance.</p>
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### D. Gender and Development

<p>Strategy to maximize impacts on women: The technical assistance will study the impact of the Project on women. The component for provision of natural gas for domestic use is expected to benefit women and children.</p> <p>Gender plan prepared? No specific gender plan was prepared since no negative impacts to women are to be expected, based on experience with similar projects and the nature of the interventions planned.</p>
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### E. Social Safeguards and other Social Risks

	Significant/ Nonsignificant/ None	Strategy to Address Issues	Plan Required
Resettlement	Unknown	Resettlement plans to be prepared as required.	Full/Short/ None
Indigenous Peoples	To be determined	To be determined	To be determined
Labor	To be determined	To be determined	To be determined
Affordability	Unknown	Affordability analysis will be undertaken.	To be determined
Other Risks/ Vulnerabilities	To be determined	To be determined	To be determined

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

Item	Foreign Exchange	Local Currency	Total
<b>A. Asian Development Bank Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. Foreign Consultants	540	0	540
ii. Domestic consultants	0	170	170
b. International and Local Travel	40	40	80
c. Report and Communications	15	0	15
2. Surveys	30	0	30
3. Vehicle Rental	20	0	20
4. Workshops and Demonstration Projects	15	20	35
5. Miscellaneous Administration and Support Cost	0	10	10
6. Representative for Contract Negotiations	5	0	5
7. Contingencies	90	0	90
<b>Subtotal (A)</b>	<b>755</b>	<b>240</b>	<b>995</b>
<b>B. Government Financing</b>			
1. Salary of Counterpart Staff	0	150	150
2. Office Accommodation and Support Services	0	40	40
3. Office Equipment and Supplies	0	30	30
4. Contingencies	0	35	35
<b>Subtotal (B)</b>	<b>0</b>	<b>255</b>	<b>255</b>
<b>TOTAL (A+B)</b>	<b>755</b>	<b>495</b>	<b>1,250</b>

<sup>a</sup> Financed by the United Kingdom Cooperation Fund (poverty-focused), funded by the Government of the United Kingdom and established by Asian Development Bank and the Department for International Development in July 2001.

Source: Asian Development Bank estimates.

## **OUTLINE TERMS OF REFERENCE FOR CONSULTANTS**

### **A. Consultancy Services by a Firm**

1. For each of the six cities the firm of consultants will:<sup>1</sup>
  - (i) conduct detailed air quality analysis and provide a report with the rationale and benefits that will accrue from the Project, through the use, that is compressed natural gas (CNG) and supply of natural gas through pipelines for the different sectors;
  - (ii) study the demand for natural gas in the transport, industrial and commercial, and domestic sectors;
  - (iii) based on the required technical designs and financial analysis, prepare a detailed feasibility study for the distribution and marketing of CNG and natural gas through a city gas distribution system; and
  - (iv) carry out the required environmental, economic, and social analyses for each of the cities included in the Project.
  
2. To prepare the required outputs the consultants will work as a team under the supervision of a team leader. The consultants' team will be based in India for the duration of the assignment. The international consultants will have expertise in natural gas marketing; transmission, distribution, and use of CNG as transportation fuel; transport planning and economics; financial analysis; environmental analysis; poverty impact assessment; social analysis; gender impact assessment; and urban planning and management. The domestic consultants will comprise a natural gas and CNG distribution specialist, environment specialist, and urban planning expert. The scope of the feasibility study will include, but not be limited to strategic planning, demand and supply analysis, project design, project financing and pricing, economic and financial analyses, and environment and social analyses.

### **B. Strategic Planning For Promoting Natural Gas/CNG to Improve Air Quality**

3. The consultants will
  - (i) review the existing laws, policies, regulations, standards, and guidelines for the use of natural gas for transportation and industry sectors and related Projects being considered by other funding agencies;
  - (ii) review reports on urban transport in India, particularly reports related to passenger traffic and vehicular emissions;
  - (iii) review the Government's policies for the development of CNG use for urban transport;
  - (iv) review reports on switching fuel for passenger transport, and compare the advantages and disadvantages of using CNG, including the financial gain or loss for using CNG and/or natural gas vis-à-vis other competing fuels;

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<sup>1</sup> The need for a full scale feasibility study for Kolkata will be determined during the inception phase of the Project.

- (v) based on discussions with the Government, derive an appropriate fuel pricing strategy that will (a) encourage switching to cleaner fuels for passenger transport, (b) ensure supply of natural gas, and (c) ensure the financial viability of operators that deliver the services; and
- (vi) Based on analysis of experiences in other CNG projects in the region, consider the feasibility and desirability of a selective ban of specific engine technologies for specific vehicle types.

### **C. Demand and Supply**

- 4. The consultants will
  - (i) determine the potential demand for natural gas and CNG for the transport, domestic, commercial, and industry sectors; and
  - (ii) review the natural gas and CNG supply sources, including the time frame for availability, quality, and quantity.

### **D. Project Design**

- 5. The consultants will
  - (i) develop a conceptual design of a least-cost CNG distribution system and develop estimations of distribution costs from the trunk line to the consumption centers, differentiated by common costs and costs attributable to specific user category;
  - (ii) develop a conceptual design of a least-cost natural gas distribution system for domestic, commercial, and industry use;
  - (iii) prepare capital and operating cost estimates — the capital cost estimates will include cost of pipelines, valves and fittings, pipe coatings, electrical and other instrumentations, cathodic protection, SCADA, land acquisition, civil construction, and ancillary facilities, gas conversion kits, vehicle emission testing equipment, and air quality monitoring systems;
  - (iv) review issues pertaining to land acquisition for pipelines and other facilities and suggest methods to hasten the existing procedures;
  - (v) develop a practical and expedient plan and develop a detailed schedule for project implementation;
  - (vi) prepare terms of reference for project design, implementation, construction supervision, and social and environmental impact monitoring;
  - (vii) design suitable organizational and administrative arrangements for the efficient management and supervision of project implementation and subsequent operations and maintenance of the facilities, including the requirements for consulting services;

- (viii) design technical justification for the proposed Project, and compare the advantages and disadvantages of using CNG; and
- (ix) prepare a project framework, a procurement package list, and proposed project implementation manual to ensure timely, effective, and efficient project implementation.

## **E. Financing Requirements and Pricing**

6. The consultants will

- (i) review the financing requirements of the Project, and identify the possibility of private sector participation and prepare a framework for it;
- (ii) review the existing pricing for alternative energy supplies and recommend a CNG pricing structure, taking into account delivery costs, costs of conversion, and cost of competing energy sources; and
- (iii) develop a pricing strategy that will encourage switching to cleaner fuels and ensure the financial viability of operators that deliver the services

## **F. Economic and Financial Analysis**

7. The consultants will

- (i) Undertake the economic analysis of the Project and its components in accordance with the *Guidelines for the Economic Analysis of Project* of the Asian Development Bank (ADB).
- (ii) carry out a quantitative risk analysis of the Project in accordance with ADB's *Handbook for integrating Risk Analysis in the Economic Analysis of Projects*.
- (iii) provide financial analysis including capital cost estimates, operating cost estimates, and net price of CNG and SNG price to transport customers and natural gas to domestic, commercial, and industry customers.
- (iv) assess the financial viability of the Project and its components, including the financial rate of return in accordance with ADB's *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank*;
- (v) provide the quantitative and qualitative benefits of the Project, and establish procedures for benefit monitoring and evaluation in terms of ADB's *Guidelines for Benefit Monitoring and Evaluation*; and
- (vi) analyze the distribution between stakeholders of the economic costs and benefits of the Project.

## G. Environmental and Social Aspects

### 8. The consultants will

- (i) carry out an environmental impact assessment and/or initial environmental examination, and provide the appropriate reports and their summaries in accordance with ADB's environmental guidelines and other requirements of ADB and the Government;
- (ii) assess the need for strengthening air quality monitoring in the cities involved in the Project to ensure that air quality benefits from the switch to CNG can be adequately captured;
- (iii) recommend appropriate quality assurance procedures for vehicle conversions to CNG and a system to assess on a regular basis the compliance of CNG vehicles with prevailing emission standards, whereby such assessment procedures will be an integral part of overall I/M systems in the city or state;
- (iv) review the safety aspects related to high pressure storage of CNG in vehicles and filling stations and provide environmental and safety management and monitoring plans;
- (v) conduct detailed poverty and social analyses following ADB's guidelines in the *Handbook on Poverty and Social Analysis* and, based on socioeconomic survey, assess the socioeconomic benefits of the Project and its possible negative impact;
- (vi) if the resettlement impacts are expected to be significant due to land acquisition, prepare a resettlement plan based on the identified design in each city, in accordance with ADB's policy on involuntary resettlement and *Handbook on Resettlement*;
- (vii) assess the Project's pro poor impact in terms of ADB's poverty reduction strategy and especially examine components that will have a positive impact on poverty alleviation;
- (viii) determine the beneficiaries by consumer category and identify (a) benefits and possible adverse impacts; (b) measures to improve the project design and enable poor and vulnerable groups to benefit from the Project; and (c) where pockets of poor and vulnerable groups are located in each city and describe the mechanisms designed to enable them to benefit from the Project: where relevant and required prepare maps indicating the locations and social groups of beneficiaries;
- (ix) conduct a stakeholder analysis and consultations with beneficiaries and stakeholders, including nongovernment organizations, regarding to ascertain their views on the project and incorporate recommendation in the design: (a) particular focus should be on the impacts (beneficial and adverse) on the different consumer categories; (b) mitigation measures should be recommended if required; and (c) where relevant and required, data and information should be disaggregated by gender;

- (x) in close cooperation with the Executing Agency and the international economist, identify issues related to affordability and willingness to pay;
- (xi) identify institutional issues that may have bearing on the project implementation and make recommendations for strengthening the institutions as required; and,
- (xii) in consultation with the team and the Executing Agency, (a) prepare a framework for monitoring social and poverty benefits, which will be streamlined and included in the project performance monitoring system; and (b) recommend measures to strengthen the Executing Agency's capacity for monitoring project benefits, including developing and maintaining an appropriate data base.

#### **H. Services to be Provided by the Individual Consultant**

9. The consultant<sup>2</sup> will

- (i) review and analyze the air quality management system in the six cities included in the project;
- (ii) make the institutional arrangements for implementation of the Project;
- (iii) engage in policy dialogue for the project;
- (iv) design and implement the stakeholder mobilization and participatory model to be followed in the TA; and
- (v) perform other tasks as specified by the team leader.

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<sup>2</sup> The consultant will be a member of the project team established for this project and will be expected to take part in review missions where TA progress will be reviewed.