

ASIAN DEVELOPMENT BANK

TAR:INO 36563

TECHNICAL ASSISTANCE
(Financed by the Japan Special Fund)

TO THE

REPUBLIC OF INDONESIA

FOR PREPARING THE

**GAS TRANSPORTATION PROJECT THROUGH PUBLIC-PRIVATE
PARTNERSHIP**

July 2004

CURRENCY EQUIVALENTS

(as of 11 May 2004)

Currency Unit	–	rupiah (Rp)
Rp1.00	=	\$0.000111
\$1.00	=	Rp9, 010

ABBREVIATIONS

ADB	–	Asian Development Bank
ASEAN	–	Association of South East Asian Nations
BAPPENAS	–	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency)
CSP	–	country strategy and program
EIA	–	environmental impact assessment
EPC	–	engineering design, procurement, and construction
GPUS	–	Gas pricing and utilization study
IEE	–	Initial environmental examination
JBIC	–	Japan Bank for International Cooperation
LARAP	–	Land acquisition and resettlement action plan
LNG	–	liquefied natural gas
MIGAS	–	Directorate General of Oil and Gas
PGN	–	Perum Gas Negara (State Gas Corporation)
TA	–	technical assistance

WEIGHTS AND MEASURES

BCFD	–	billion cubic feet per day
MW	–	megawatt
TCF	–	trillion cubic feet

TA CLASSIFICATION

Poverty Classification	–	Other
Sector	–	Energy
Subsector	–	Gas
Thematic		Sustainable economic growth
		Regional cooperation
		Private sector development

NOTE

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

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I. INTRODUCTION

1. The Government of the Republic of Indonesia has requested the Asian Development Bank (ADB) to provide technical assistance (TA) for preparing a gas transportation project through public-private partnership. The Fact-Finding Mission, conducted from 23 February to 5 March 2004, reached an understanding with the Government on the objectives, scope, cost estimates, and financing plan of, and implementation arrangements for the TA.¹ A preliminary project framework is attached as Appendix 1.

II. ISSUES

2. Among Southeast Asian countries, Indonesia is particularly well endowed with natural gas (gas) resources. The current gas reserves are estimated at 177 trillion cubic feet (TCF), of which half (about 90 TCF) are proven. At the current production rate (around 3 TCF per annum over the last 7 years), the reserves-production ratio is well over 50 years. About 70 percent of the gas produced is exported, as liquefied natural gas (LNG) and through pipelines, and the balance is consumed domestically. While some major reserves (East Kalimantan, offshore Riau, and Irian Jaya) are located far from the main consumption centers (West Java and East Java), significant reserves in South Sumatra (about 23 TCF) are available less than 600 kilometers from the Jakarta area. Government reports indicate some 7 TCF of remaining reserves in West Java alone, although these have not been developed. If this potential is realized, coupled with the South Sumatra reserves, gas supply to the Java market should be secure for the medium term.

3. With gross domestic product (GDP) growth rates in Indonesia expected to be, on average, more than 4% per annum over the long term (to 2025), and the Government's planned withdrawal of fuel subsidies,² gas demand in Java is projected to grow at 4-8% per annum, based on "low" and "high" GDP growth rates, thus trebling to sextupling the present level of domestic gas consumption, to 3-6 billion cubic feet per day (BCFD), by 2025. The main drivers for this rapid growth will be gas for power generation, and for residential and commercial uses, which are forecast to capture 65% and 27% of the total gas market by 2025, compared with 54% and 22%, respectively, in 2003. The gas demand in West Java is projected to increase 2% per annum faster than that in Central and East Java, reaching 2-4 BCFD by 2025.

4. Indonesia has huge gas reserves and a strong domestic market for gas, but it lacks the gas infrastructure required to meet potential domestic demand, including that in Java. ADB has previously assisted in developing gas transmission and distribution infrastructure in Sumatra and Batam, respectively, and was also involved in extending the Gresik-Duri gas transmission pipeline system (in Sumatra) to Singapore. For developing downstream gas infrastructure in Indonesia, over the medium to long term, the participation of the private sector will be essential. Under its earlier intervention (involving the gas transmission system in Sumatra), ADB precipitated the induction of a strategic investor in the state-owned gas company, PGN. To meet the gas demand in Java beyond the medium term, two gas transportation options can be considered: (i) long-distance gas transmission pipelines (e.g., from South Sumatra, East Kalimantan, and Sulawesi), and (ii) terminals in Java for receiving (and regasifying) LNG from competitive sources (e.g., from East Kalimantan, Western Papua, and Sulawesi). Although, based on the projected level of gas demand in Java both gas transportation options may be

¹ The TA first appeared in *ADB Business Opportunities* (Internet edition) on 22 March 2004.

² According to the government's program, fuel subsidies will be removed by the end of 2004, leaving only limited subsidies for kerosene used by low-income households.

viable in the long term, it is necessary to determine their complementarity and prioritize their implementation, considering macroeconomics and a rational energy mix policy for the country. A project will be prepared after an optimum gas transportation plan for Java has been formulated and the priority gas transportation scheme has been clearly identified.

5. In line with the country strategy and program (CSP) for 2003–2005, which was approved in October 2002, and its update in October 2003, the TA and the ensuing project will meet the following three development objectives: (i) subregional integration, because the project will develop gas transportation links between various islands of Indonesia, which could form part of an integrated regional system; (ii) promotion of private sector participation, through effective public-private sector partnership because the project will be designed to include private sector involvement; and (iii) promotion of clean and indigenous resources (natural gas, in this case) to meet the country's energy requirements.

6. There is considerable potential for regional cooperation in the energy sector in the Southeast Asian countries, particularly with regard to cross-border gas transactions. The Association of South East Asian Nations (ASEAN) Council on Petroleum (ASCOPE) has prepared a Trans-ASEAN Gas Pipeline Master Plan (2001), which indicates 175 TCF of proven and 94 TCF of probable gas reserves in ASEAN member countries. This large resource base can support regional gas transportation from gas-rich countries (principally Indonesia), to gas-deficient countries, for sustainable energy sector development in these countries. The ensuing project will constitute an important element of regional gas trade.

7. Considering the magnitude of investment envisaged for the ensuing project, and the public resource constraints regarding financing for such a project, substantial private sector involvement will be necessary in project financing. However, there are certain significant factors that are inhibiting private investment in Indonesia's gas sector. The new Oil and Gas Law, designed to liberalize the petroleum sector, was passed in 2001, but corresponding implementing rules and regulations have not yet been introduced. Thus, there is no clarity regarding important features of the Law, including ownership and licensing of downstream businesses (processing, transportation, and trading), arrangements for regulating downstream activities, distribution of responsibilities between regional governments and the central government for administering downstream businesses, and the mechanism for fulfilling the government's "social" obligations with regard to tariff subsidies. The overall tariff regime applicable to the gas sector also needs to be made more transparent and rationalized in a manner consistent with the planned phasing out of subsidies for liquid petroleum products. In addition to such gas sector-specific issues, certain generic issues also hold back private investment such as institutional effectiveness and capacity of the executive and judicial branches, transparency in regulation, and the enforceability of legal contracts. In this transition period, a public-private partnership arrangement limiting private investors' exposure will give them some degree of comfort.

8. The World Bank and Japan Bank for International Cooperation (JBIC) have been consulted during the formulation of this TA. The World Bank is financing a gas distribution system in West Java, while JBIC is financing the South Sumatra-West Java gas transmission pipeline. Both institutions have expressed interest, in principle, in cofinancing the ensuing gas transportation project, as prioritized by the Government.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

9. The TA aims to support the Government's strategy for promoting the domestic use of natural gas in the interest of sustainable economic growth. The TA will comprise parts A and B. Part A will review gas transportation options for Java in the context of the Government's energy resource allocation/energy mix policy, formulate a gas transportation plan, and select the priority gas transportation scheme. Part B will prepare the gas transportation project.

10. The work in part A will help the Government select the optimum gas transportation scheme for Java. This work will take into account, among others, the findings of the Gas Sector Development Plan, prepared with ADB assistance,³ and the Gas Pricing and Utilization Study (GPUS) being undertaken with World Bank assistance (in particular, the results of the assessment, under GPUS, of the projected gas market). These studies will help evaluate the potential for increasing the share of gas in the country's energy mix using appropriate policies, including a gas pricing policy. The priority gas transportation scheme will be selected after an evaluation of energy equilibrium models, national and regional development impacts, economic viability, and financial sustainability.

11. Part B will comprise detailed studies necessary to formulate and implement the ensuing gas transportation project, as identified/prioritized in part A. Specifically, part B will assess the gas market, undertake front-end engineering design, conduct environmental and social impact assessment, and prepare an "optimum" project structure and financing plan based on public-private sector partnership. Ownership of downstream gas transportation infrastructure in Indonesia has traditionally been the exclusive domain of the public sector (with PGN and Pertamina). With the sale of an equity interest in PGN's Sumatra assets, the private sector has been successfully introduced. The transition to full private sector ownership of downstream gas infrastructure is, however, likely to take some time because of the nature of the business, certain sector-specific constraints (paragraph 7), and the perceived country risk. The public-private partnership approach being proposed will build on a successful precedent, by providing an opportunity for collaboration between public sector entities and private entrepreneurs.

B. Methodology and Key Activities

12. Part A will be undertaken in two steps. Step 1 will involve these activities: (i) prepare an inventory of primary energy resources; (ii) compile production, transmission, and distribution data for each type of commercial energy; (iii) prepare national and regional energy balances; (iv) develop a national, web-based energy database, with the on-line submission of information or data; and (v) review the current energy resource allocation/energy mix policy, with a view to formulating recommendations for gas sector development. Relevant computer hardware and software will be acquired to support the establishment of the energy database, and to run macroeconomic and energy equilibrium models. The equipment and software will be turned over to the Government upon completion of the TA, for institutional capacity strengthening. Step 2 will review existing feasibility studies of gas transportation options for Java, including long-distance gas transmission pipelines and LNG terminals, and determine the most cost-effective scheme for meeting the gas demand in Java. As a part of the review, potential environmental and social impacts as well as major environmental and social issues associated with the

³ ADB. 1999. *Technical Assistance for Preparing Gas Sector Development Plan*. Manila.

transportation options will be identified. A stakeholder consultation workshop will be held to discuss the results of part A.

13. Part B of the TA will have the following activities:

- (i) A project-specific gas supply and demand assessment to determine potential/uncommitted gas supply sources for Java, and the gas market in Java through a detailed market survey.
- (ii) Front-end engineering design for the selected gas transportation scheme, including preliminary design, cost estimates, procurement packages, and a project implementation schedule.
- (iii) Financial analysis of the proposed project, and a financial management assessment of the implementing agency, in accordance with ADB's *Guidelines for the Financial Governance and Management of Investment Projects*, and other ADB guidelines. The analysis will review project financing options and determine an appropriate project structure/financing plan, based on public-private sector partnership, taking into account the legal and regulatory framework applicable to the gas sector.
- (iv) Economic analysis of the proposed project, including sensitivity analyses, according to ADB's *Guidelines for the Economic Analysis of Projects*. The analysis will include alternatives analysis, rate of return analysis, sensitivity analysis, risk analysis, financial impact analysis, and distribution analysis.
- (v) Environmental impact assessment (EIA) of the proposed project in accordance with ADB's *Environment Policy and Environment Assessment Guideline (2003)* and Indonesian environmental laws. If the initial examination indicates that significantly adverse environmental impacts are likely, a detailed EIA will be conducted, including a summary EIA, mitigating measures will be proposed and costs related to the mitigation of significantly adverse environmental impacts will be identified. Available information suggests that the environmental category of the project is likely to be A or B.
- (vi) Social and poverty analysis and impact assessment of the proposed project. This task includes preparing (i) a social and poverty analysis report, consistent with the requirements of ADB's *Handbook for Social and Poverty Analysis*; (ii) for project components involving land acquisition and resettlement, a Land Acquisition and Resettlement Action Plan (LARAP), consistent with ADB's policy on involuntary resettlement as detailed in the ADB's *Handbook on Resettlement*; and (iii) for project components eventually involving impacts on indigenous peoples' communities, an indigenous peoples development plan, consistent with the requirements of ADB's policy on indigenous peoples.

C. Cost and Financing

14. The total cost of the TA is estimated at \$1.15 million equivalent, comprising foreign exchange of \$684,000 and local currency of \$466,000 equivalent. The Government has requested ADB to finance \$910,000 equivalent, covering the entire foreign exchange cost and \$226,000 equivalent of the local currency cost. The TA will be financed by ADB on a grant basis

by the Japan Special Fund, funded by the Government of Japan. The Government and PGN will contribute the remaining cost in kind by providing office accommodation in Jakarta, counterpart staff time input, secretarial support, and workshops. The Government has been advised that approval of the TA does not commit ADB to financing any ensuing project. Detailed cost estimates and the financing plan are in Appendix 3.

D. Implementation Arrangements

15. BAPPENAS (through its Directorate of Energy, Communication and Informatics) will be the Executing Agency and Implementing Agency for part A, and will work in close collaboration with MIGAS, PGN, and other stakeholders. BAPPENAS will assign a project coordinator and counterpart staff to work with the TA consultants. MIGAS and PGN will assign suitable staff to work with BAPPENAS and the consultants. PGN will be the Executing Agency and Implementing Agency for part B and will assign a project coordinator and counterpart staff to work with the consultants. MIGAS will also assign counterpart staff to work with PGN and the consultants. A steering committee will be established, headed by BAPPENAS, to monitor and coordinate work for parts A and B.

16. The TA will be carried out over 11 months (3 months for Part A, 7 months for Part B, and one month between these two parts) starting in October 2004 and ending in August 2005. An international consulting firm will be selected for both parts, in accordance with ADB's *Guidelines on the Use of Consultants*, and other arrangements satisfactory to ADB for engaging domestic consultants. The full technical proposal process and the quality- and cost-based selection procedure will be used in selecting the consulting firm. Research institutions and universities in Indonesia may participate as domestic consultants. All procurement under the TA will follow ADB's *Guidelines for Procurement*.

17. The TA will require about 21 person-months of international and 46 person-months of domestic consulting services. Depending on the priority gas transportation scheme selected, it may be necessary to deploy additional consulting resources (beyond those allocated under this TA) to prepare an optimum project structure based on public-private partnership. Outline terms of reference are included in Appendix 4. The consultants will prepare inception, draft final, and final reports for part A, due 2 weeks, 9 weeks and 12 weeks, respectively, after the start of services. A consultative workshop will be held after the draft final report for part A is submitted. The consultants will prepare inception, draft final, and final reports for part B, due 2 weeks, 6 months and 7 months, respectively, after the services start.

IV. THE PRESIDENT'S DECISION

18. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$910,000 on a grant basis to the Government of Indonesia for preparing the Gas Transportation Project Through Public-Private Partnership, and hereby reports this action to the Board.

PRELIMINARY PROJECT LOGICAL FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Goal Support the Government's strategy for developing the gas sector to promote sustainable economic growth</p>	Improved energy supply reliability	<p>Country economic and energy sector statistics</p> <p>Sector review</p>	
<p>Purpose Review energy resources allocation/ energy mix policy, and optimize gas transportation scheme for Java</p> <p>Prepare and implement the gas transportation project</p>	<p>Increased use of clean, indigenous, and competitive energy resources for power generation, and industrial, commercial, and household applications</p> <p>Java gas demand is met</p>	<p>Review missions</p> <p>Project implementation progress reports and completion</p> <p>Project Performance Audit Report</p>	<p>Assumption: Adequate information and data</p> <p>Risks: Continuation of liquid fuel subsidies</p> <p>Lack of private sector interest</p> <p>Financing constraints</p>
<p>Outputs (of the TA) ^a Part A</p> <p>Inventories of existing energy resources, and production, transmission and distribution data by type of commercial energy</p> <p>Development of a national energy database including provision for web-based on-line submission of information</p> <p>Review of current energy mix and recommending appropriate national energy mix policy for development of the gas sector</p> <p>Review of existing feasibility studies of gas transportation options including LNG terminals in Java and long-distance pipelines</p> <p>Determination of the most cost-effective transportation scheme to meet gas demand in Java</p>	<p>Availability of an energy database as planning tool for the energy sector</p> <p>Final report reviewed and accepted by the Government and ADB in accordance with the TOR</p>	<p>TA review missions</p> <p>TA reports</p> <p>Tripartite meetings</p> <p>TA Completion Report</p>	<p>Assumption: Availability and reliability of necessary data and statistics</p> <p>Risk: Weak performance of consultants</p>

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LOGICAL FRAMEWORK—Continued

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Part B</p> <p>Market assessment</p> <p>Front-end engineering</p> <p>Financial analysis</p> <p>Economic analysis</p> <p>Environmental impact assessment</p> <p>Social impact assessment</p>			
<p>Inputs (of the TA)</p> <p>Consulting services</p> <p>Equipment</p> <p>Survey and Data Collection</p> <p>Training Workshop</p> <p>Government counterpart support and staff</p>	<p>Consultants recruited in October 2004. Full report available by August 2005</p>	<p>TA review missions</p> <p>TA reports</p> <p>Tripartite meetings</p> <p>TA Completion Report</p> <p>TA accounts</p>	<p>Assumptions:</p> <p>Competence of consultants</p> <p>Adequacy of budget</p> <p>Risks:</p> <p>Quality of BAPPENAS, MIGAS, and PGN counterpart staff</p> <p>Lack of support facilities</p>

ADB = Asian Development Bank, BAPPENAS = *Badan Perencanaan Pembangunan Nasional* (National Development Planning Agency), LNG = liquefied natural gas, MIGAS = Directorate General of Oil and Gas, PGN = *Perum Gas Negara* (State Gas Corporation), TOR = terms of reference.

^a Project inputs and outputs and quantitative targets and other indicators will be determined during technical assistance implementation.

SUMMARY INITIAL POVERTY AND SOCIAL ASSESMENT

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
Contribution of the sector or subsector to reduce poverty in Indonesia:			
<p>The poverty partnership agreement signed in April 2001 states that, in the medium term, poverty reduction development priorities will focus on three major areas of intervention: economic growth, human resource development, and good governance.</p> <p>Reliable supply of energy is important for attracting commercial and industrial activities, which in turn enable the poor to diversify income sources from increased employment opportunities. The ability of regional governments to promote economic development and improve living standards depends on the availability of adequate energy supply. The gas transportation project will provide clean and affordable energy to consumers and contribute to economic development and poverty reduction.</p>			

B. Poverty Analysis

Proposed Poverty Classification

What type of poverty analysis is needed?	Economic Growth/Non-Poverty
<p>Poverty analysis will make use of existing surveys and national, provincial, and regency data combined with consultations in the field. The analysis will assess direct impact and indirect impacts, and macroeconomic effects. To the extent possible, the study will include gender as a specific socioeconomic group across poverty status. Greater access to clean and affordable energy will gradually increase productivity. The technical assistance will examine and combine consumer base data and poverty data for specific target regencies to establish a poverty profile of consumers as primary beneficiaries, and their consumption patterns.</p> <p>The analysis will include a review of the impact of development aspects, interlinking the projected effects of increased energy supply with sector growth patterns, employment, and poverty in the target regencies. It will use data from the Central Bureau of Statistics (BPS). The analysis will assess the impacts of planned development on absorption of unskilled versus skilled labor and implications for income and income source diversification. The analysis will particularly assess effects in production activities, the ability of the poor to benefit from job opportunities, and sustainability of poverty reduction effects. To the extent possible, the analysis will discern the effects of employment opportunities on gender. The analysis will also assess the causality between energy demand and economic growth, sector growth patterns, and the effects on poverty reduction.</p> <p>The poverty analysis will identify monitorable proxy indicators for assessing the poverty impact of the proposed project.</p>	

C. Participation Process

Is there a stakeholder analysis?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there a participation strategy?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

D. Gender Development

Strategy to maximize impacts on women:	
Project preparation will ascertain whether there is potential for delivering specific benefits to women. If such potential is ascertained a strategy to maximize benefits will be prepared.	
Has an output been prepared?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

E. Social Safeguards and other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Impact magnitude will be determined by the consultant once the type of intervention is established. In case a gas pipeline is built, impacts will be extensive. If only LNG terminals are built, impacts will be much less significant and possibly only short RP will be needed.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Indigenous Peoples	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Uncertain; to be determined during project preparation	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other Risks and/or Vulnerabilities	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input checked="" type="checkbox"/> None		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

COST ESTIMATES AND FINANCING PLAN

(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	462.0	0.0	462.0
ii. Domestic Consultants	0.0	161.0	161.0
b. International and Local Travel	40.0	20.0	60.0
c. Reports and Communications	6.0	0.0	6.0
2. Software, Equipment ^b	50.0	10.0	60.0
3. Surveys and Data Collection	40.0	10.0	50.0
4. Training, Workshop, Consultations	25.0	5.0	30.0
5. Contract Negotiations	6.0	0.0	6.0
6. Contingencies	55.0	20.0	75.0
Subtotal (A)	684.0	226.0	910.0
B. Government Financing			
1. Office Accommodation	0.0	40.0	40.0
2. Counterpart Staff	0.0	100.0	100.0
3. Surveys	0.0	40.0	40.0
4. Secretarial Support, Translation	0.0	30.0	30.0
5. Others	0.0	30.0	30.0
Subtotal (B)	0.0	240.0	240.0
Total	684.0	466.0	1,150.0

^a Financed by the Japan Special Fund, funded by the Government of Japan.

^b Relevant computer software will be acquired to support the establishment of energy database. Equipment to be purchased includes the required server, desktop and laptop computers, and related accessories for the operation of energy database and running of macroeconomic and energy equilibrium models. All the software and equipment procured will be turned over to the Government upon completion of the technical assistance.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Establishment of Energy Database, Review of Energy Mix Policy, and Determination of Least-Cost Gas Transportation Scheme for Java

1. Part A of the Technical Assistance (TA) will be carried out over 3 months starting in October 2004 for completion by December 2004. Consultants' inputs will amount to about 13 person-months (5 international and 8 domestic). International consultants (person-months in parentheses) will include (i) an energy economist/energy sector planning specialist (3), and (ii) a gas sector specialist (2). Domestic consultants will include (i) an energy database specialist (2), (ii) a programmer/web designer (3), (iii) a gas sector specialist (2), and (iv) an environmental engineer (1).

2. Part A will be undertaken in two steps. Step 1 will have the following activities:

- (i) Develop an inventory of primary energy resources; compile energy production, transmission, and distribution data for each commercial energy type; and prepare a national energy balance and regional energy balances (including for West, Central, and East Java), taking into account both commercial and non-commercial/"traditional" energy sources.
- (ii) Review the Government's current energy resource allocation/energy mix policy, taking into account export commitments and domestic demand. Recommend an appropriate energy mix policy, based on macroeconomic considerations, taking into account, among others, the potential for fuel substitution and economic pricing of fuels.
- (iii) Review/identify major policy, regulatory, institutional, management, operational, and financial barriers to private sector participation in gas sector development.
- (iv) Develop a national, web-based, energy database, including provision for on-line submission of information and data.
- (v) Provide necessary computer hardware (including server and workstations) and associated software for establishing the energy database, and for energy sector planning.
- (vi) Strengthen the data management and energy planning capability of staff in the above areas.

3. Step 2 will include the following activities:

- (i) Review existing feasibility studies of gas transportation options/schemes for Java, including long-distance gas transmission pipelines (including the proposed second Sumatra–Java and East Kalimantan–Java pipelines) and liquefied natural gas terminals.
- (ii) Apply macroeconomic and energy equilibrium models to determine and quantify, to the extent possible, the social and economic impacts of the gas transportation options/schemes.

- (iii) Assess potential environmental impacts of and identify major environmental issues associated with the alternative gas transportation schemes, and determine the scope of environmental assessment that will be required for the priority scheme.
- (iv) Formulate an optimum gas transportation plan for Java, and determine the most cost-effective/priority gas transportation scheme for meeting the gas demand in Java beyond the medium term.
- (v) Organize a consultation workshop of stakeholders in Indonesia to discuss the results of the study, reach consensus on the gas transportation plan and the priority scheme.

B. Preparation of the Gas Transportation Project

4. Part B of the TA will be carried out over 7 months, starting about one month after the end of part A, in February 2005, for completion by August 2005. Consultants' inputs will amount to about 54 person-months (16 international and 38 domestic). The international consultants (person-months in parentheses) will comprise (i) a gas sector specialist (team leader, 4), (ii) an engineering design specialist (2), (iii) an energy economist (2), (iv) a financial analyst (2), (v) a structured finance specialist (2), (vi) an environmental specialist (2), and (vii) a social development specialist (2). The domestic consultants will include the following experts: (i) a gas sector specialist (7), (ii) a process engineer (3), (iii) a mechanical engineer (4), (iv) a civil engineer (2), (v) an electrical/instrumentation/telecommunications engineer (6), (vi) a corrosion engineer (1), (vii) an energy economist (4), (viii) a financial analyst (4), (ix) a structured finance specialist (2), (x) a legal/regulatory advisor (2), and (xi) an environmental specialist (3).

1. Reserves and Market Assessment

5. This assessment will determine (i) the location and quantum of uncommitted gas reserves in the country, for potential supply to Java; and (ii) the gas market in Java (and along the gas transportation route, if applicable) as an energy source and as feedstock. Specifically, the following tasks will be undertaken:

- (i) Review gas reserves data and existing/proposed gas supply contracts to establish the location and quantum of uncommitted gas reserves in the country, prepare supply projections, and identify potential sellers, for the Java gas market.
- (ii) Conduct a market survey for Java (and for intermediate markets/locations, if applicable): identify gas buyers; assess willingness and ability to pay; prepare demand projections for low, moderate, and high, gross domestic product (GDP) growth rate scenarios; assess availability of gas supply infrastructure; and estimate fuel conversion costs.
- (iii) Prepare gas supply and demand balances for Java for the period 2005–2025, at 5-year intervals.

2. Front-End Engineering Design

6. The front-end engineering design will involve the following tasks:

- (i) Conduct hydraulic analysis or process design/selection, as applicable, including preparation of process flow diagram, and piping and instrumentation diagram.
- (ii) Undertake route selection, if applicable, for preliminary engineering design and bid preparation purposes.
- (iii) Conduct mechanical design, including preparation of specifications of major items of equipment/material.
- (iii) Prepare foreign and local currency cost estimates of equipment, material and services (consulting, construction, commissioning, etc.).
- (iv) Identify procurement packages.
- (v) Prepare a project implementation schedule, identifying design, procurement, construction, and commissioning activities.
- (vi) Draft bidding documents for an EPC (engineering design, procurement, and construction) contract.

3. Financial Analysis

7. The financial analysis will follow ADB guidelines (including *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank, 2001*) and will comprise these activities:

- (i) Prepare detailed foreign and local currency cost estimates, covering all financial costs, and making appropriate provisions for physical contingency, price contingency, and interest- during- construction, in accordance with ADB guidelines/format.
- (ii) Establish an appropriate project structure, based on public-private partnership, and consistent with the legal and regulatory framework applicable to the gas sector.
- (iii) Prepare a preliminary project financing plan, including (as applicable), lending and/or equity participation from multilateral and bilateral agencies, prospective commercial and noncommercial cofinancing, and public and private equity.
- (iv) Prepare preliminary cash flow projections for the project, including all relevant financial costs and benefits; subject them to a financial benefit-cost analysis, and compute the financial internal rate of return for the project.
- (v) Identify project revenue and cost risks, and: (a) conduct relevant sensitivity analyses, and (b) identify practical risk mitigation strategies and approaches.
- (vi) Assess the financial management capabilities of the project sponsors, including their internal control mechanisms.

4. Economic Analysis

8. The economic analysis will follow ADB's guidelines (including *Guidelines for the Economic Analysis of Projects*) and will comprise these activities:

- (i) Prepare a project framework according to ADB standards, which clearly identifies the project goals and objectives, required inputs, targets or benchmarks, monitoring indicators and mechanisms, potential risks, and assumptions.
- (ii) Conduct an economic evaluation of the proposed project, including benefit-cost analysis and using a net present value approach based on a discounted cash-flow analysis; and compute the economic rate of return for the project.
- (iii) Assess the uncertainties and risks facing the proposed project and undertake appropriate sensitivity and risk analyses, with respect to the economic internal rate of return, in accordance with ADB's *Handbook for Integrating Risk Analysis in the Economic Analysis of Projects*.
- (iv) Recommend procedures, guided by ADB's *Guidelines on Benefit Monitoring and Evaluation*, and identify indicators that can be used/monitored to assess project benefits.
- (v) Evaluate the project's direct and indirect environmental impacts, and carry out an economic analysis of these impacts in terms of net present value.

5. Environmental Assessment

9. Initial environmental examinations (IEEs) will be conducted for the components of the proposed project, in accordance with ADB's *Environmental Assessment Requirements* and Indonesian environmental laws, including environmental profiles, and the required mitigating measures in the design, construction, and maintenance of the project facilities. If the IEEs indicate that significantly adverse impacts are likely, a detailed environmental impact assessment (EIA) will be prepared, including a summary EIA proposing mitigating measures and institutional requirements, and identifying costs related to the mitigation of adverse environmental impacts. Among the outputs are an environmental monitoring plan that provides methods for monitoring impact at various stages, and an environmental management plan that provides methods to prevent, control, and address the important negative environmental impacts.

6. Poverty and Social Analysis and Impacts Assessment

10. The consultants will recommend project design features with a view to minimizing land acquisition and resettlement impacts, and will provide inputs and support for the establishment of a Social Development Unit to participate in project preparation and implementation.

11. The consultants will carry out investigations for the poverty and social analysis (PSA) and prepare a PSA report fitting the requirements of ADB's *Handbook on Poverty and Social Analysis*. The report will cover the following:

- (i) Poverty analysis including (a) socioeconomic profile of the areas serviced by the project; (b) poverty profile and comparison with national standards of the areas

serviced by subproject interventions; (c) stakeholder analysis based on available statistics and qualitative fieldwork; (d) identification of specific poverty issues related to water use and based on statistical analysis, fieldwork, and the results of the social analysis in (ii); and (e) identification of complementary physical/nonphysical interventions that may enhance the poverty reduction potential of the project; and

- (ii) Social analysis based on statistical studies and fieldwork including (a) social assessment identifying the poverty and socioeconomic dimensions of gender, age, ethnicity, education, and livelihood patterns in the project areas; and (b) identification of social factors that may either facilitate or obstruct project implementation.

12. The consultants will prepare all documentation relative to the ADB social safeguard policies, and will ensure that the executing agency (EA) carries out impact surveys and census of affected people and families as required and prepares the following:

- (i) Land acquisition and resettlement action plan (LARAP) consistent with the requirements of ADB's involuntary resettlement policy. The LARAP will include chapters detailing (i) compensation eligibility and entitlement provisions; (ii) baseline information on impacts and affected people, families and women heads of households; (iii) socioeconomic census findings; (iv) affected items values and relative valuation methods; (v) interventions for eventual informal settlers including relocation areas and plans; (vi) rehabilitation interventions for vulnerable affected families; (vii) institutional arrangements and responsibilities for LARAP planning and implementation; (viii) complaints and grievance mechanisms; (ix) public participation and disclosure activities; (x) implementation issues including schedules connecting LARAP tasks and civil works activities; (xi) LARAP budgets inclusive of a time-bound plan detailing financial allocations needed.
- (ii) Indigenous peoples' development plan (IPDP), if required, consistent with ADB's policy on indigenous peoples. The IPDP will detail provisions commensurate with the sociocultural situation of the affected peoples and with the extent of impacts, based on intensive participatory mechanisms.