



Technical Assistance Report

Project Number: 39584
December 2005

Technical Assistance Papua New Guinea: Preparing the PNG Gas Project

CURRENCY EQUIVALENTS

(as of 30 October 2005)

Currency Unit	–	kina (K)
K1.00	=	\$3.03
\$1.00	=	K0.33

ABBREVIATIONS

DPE	–	Department of Petroleum and Energy
EIA	–	environment impact assessment
FEED	–	front end engineering and design
IRC	–	Internal Revenue Commission
MRDC	–	Mineral Resources Development Company
PNG	–	Papua New Guinea
SEIA	–	summary environment impact assessment

WEIGHTS AND MEASURES

MMSCFD (million standard cubic feet per day)	–	unit of volume per time, million standard cubic feet per day at standard temperature and pressure, typically at a temperature of 15° Celsius and pressure of 101.327 kilopascals
PJ/a (petajoules per annum)	–	unit of energy per time, petajoules per annum = joules x 10 ¹⁵ per year
TCF (trillion cubic feet)	–	unit of volume, trillion cubic feet = 10 ¹² cubic feet

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	Targeted intervention
Sector	–	Energy, industry and trade
Subsector	–	Conventional energy generation, industry, trade
Themes	–	Sustainable economic growth, governance, private sector development
Subthemes	–	Promoting macroeconomic stability, financial and economic governance, public-private partnerships

NOTE

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

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I. INTRODUCTION

1. The Government of Papua New Guinea (PNG) intends to participate in the development of the PNG Gas Project. The project scope includes developing new gas fields in Hides (Southern Highlands Province), converting existing oil fields to gas production, and developing a new gas conditioning facility at Kutubu (in the same province), associated infrastructure, and a 192-kilometer (km) onshore and 270 km offshore gas pipeline from the highlands up to the Australian border. The project aims to produce around 616 million standard cubic feet per day (MMSCFD) of raw gas, treat and condition it, and then transport 529 MMSCFD, equivalent to 215 petajoules per annum (PJ/a) of specification sales gas. During treatment and conditioning, about 160 million barrels of gas condensates and some natural gas liquids will be recovered and blended into the crude oil stream of an existing oil project pipeline. In addition, about 150 million barrels of crude oil will be produced and processed.

2. The project is being proposed by a joint venture comprising ExxonMobil Corporation (as operator); Oil Search Limited; Nippon Oil Exploration; and Mineral Resource Development Company Limited (MRDC), a PNG company representing landowner interests. The front-end engineering and design (FEED) work is substantially complete, but activities continue to adjust pipeline alignment, enhance the project definition, and finalize various optimization and trade-off studies.

3. On 5 September 2005, the Government formally requested the Asian Development Bank (ADB) to consider funding PNG's equity participation in the project. ADB confirmed that it would favorably consider a major role in the transaction, with participation dependent on the outcome of preparatory activities. As the development schedule calls for project sanction by mid-2006, there is limited time to plan and arrange the project financing. A fact-finding mission was fielded on 24–27 October 2005, when ADB met with the Government and the project proponents. Having requested a project preparatory technical assistance (TA) for ADB's involvement, the Government concurs with the impact, outcome, outputs, implementation arrangements, cost, financing arrangements, and terms of reference.¹

II. ISSUES

4. PNG seeks to develop its substantial natural gas resources, identified during the petroleum exploration boom that ensued after PNG's first commercial oil discovery in 1986. Since mid-1992, the petroleum industry has contributed an average of 10% per annum to gross domestic product (GDP) and 27% per annum to export earnings. However, in the absence of significant new oil discoveries in the depleted fields, only elevated global crude oil prices have mitigated the reduced contribution of oil production to the national economy. Oil production is limited by the need to deal with increasing volumes of associated natural gas that are being produced with the oil. If commercial evacuation of the gas were developed, oil production and recovery efficiency would be enhanced and extended. PNG has, in order of magnitude, more gas reserves than oil reserves in energy terms, making it likely that gas development and production will continue for considerably longer than oil production to date. Development of PNG's gas resources is expected to have direct positive impact on the wider national economy. The Government has recognized that it needs a large export-oriented gas development to drive the initial full-scale gas field developments and establish gas transportation infrastructure upon which subsequent domestic gas development and use will depend. In due course, domestic

¹ The TA first appeared in *ADB Business Opportunities* (internet edition) on 23 September 2005.

availability of gas may prompt commercial and industrial developments that may be of broad economic and social benefit.

5. In June 2002, the proponents entered into a project gas agreement with the Government, which, among others, establishes the basic terms for Government participation, the project scope, and various other matters such as the applicability of the gas fiscal regime. The two successive minor amendments to the agreement related to the commitment to, schedule for, and timing of the FEED. A third amendment is pending negotiations among project sponsors.

6. The project proponents committed to proceeding to FEED in October 2004. Potential customers saw this as a tangible commitment by the sponsors to undertake the project. The project is now considered economically and financially viable, with current indicative customer commitments of around 215 PJ/a, comprising five significant foundation load customers. However, the risk remains that customers may renege on their commitments to purchase PNG gas, especially if the project schedule slips and the targeted date of mid-2009 for first gas deliveries is missed. Still, should the project come to fruition, customers would increase, potentially raising gas demand to 300 PJ/a.

7. The project is estimated to require \$2.2 billion to develop fields for gas production, establish treatment and conditioning facilities, and construct pipelines. Ancillary to the project is pipeline construction and associated compression facilities in Australia, costing some \$1.8 billion. In accordance with its established petroleum regime, and obligations under the gas agreement, the Government intends to participate with a direct stake in the project by exercising its option in the agreement to buy an interest in the existing assets at the Hides gas field.² This would result in a net 11.2% interest in the overall project to PNG. The Government would require an estimated \$328 million for its stake in the project. The economic and financial rationale for PNG's participation will have to be established.

8. By 2030, project-related income taxes are estimated to comprise 4–5% of total public revenue (around \$100 million per annum). Other revenues have yet to be estimated and include royalties, equity dividends, and other taxes. The Government's main fiscal policy challenges are ensuring that revenues from these exhaustible resources are used in a way that protects the competitiveness of the non-energy sector and builds assets to ensure intergenerational equity. From the fiscal management perspective, attention should be paid to ensuring that revenue calculation, collection, and distribution mechanisms are effective, efficient, equitable, and transparent.

9. PNG has well-defined petroleum laws that govern the conduct of private sector investments and operations, including project-licensing requirements. PNG also has sophisticated pipeline laws³ that provide for the strategic designation of pipelines and the submission by the licensees of arrangements for third-party access to optimize the use of installed infrastructure. The proper implementation of these provisions is vital to the use of gas infrastructure for domestic gas utilization.⁴

² This would cover the acquisition costs of equity in the Hides gas field and a pro rata share of project development costs (including past costs), and include the capitalization of interest and funding of reserve accounts.

³ ADB. 1995. *Technical Assistance to the Papua New Guinea for the Petroleum Sector and Policy Framework Study*. Manila.

⁴ Following a request from the Government, ADB is considering the provision of policy advice for the planned Konebada Petroleum Park through the planned TA for policies for private sector development.

10. Almost all land (97%) is customarily owned by clan-based communities to whom it is all-important. There are no particularly dominant clans as there are more than 800 linguistic groups. PNG claims ownership of the subsurface mineral and petroleum rights by virtue of its Constitution⁵ and reestablishes that in respect of oil and gas in the Oil and Gas Act. Notwithstanding such provisions, access to those resources may only be obtained through the occupation and use of customary land, for which there are strict laws requiring compensation. Aside from compensation for direct impacts, PNG has progressively introduced significant and progressive benefit-sharing arrangements with local communities comprising customary landowners and local and provincial governments. Initially, through the Government's policy direction, but now through law, the Government has an array of benefit-sharing arrangements comprising the transfer of royalties, grant of a 2% free equity interest in a project to landowners, payment of development levies to Governments, and other grants and programs. Oil, gas, and mineral projects have different types of benefit sharing, for which there is a significant knowledge base in PNG about arrangements that are effective and those that are not. Lessons learned need to be distilled and good practice applied.

11. As the project will be expanding and modifying preexisting petroleum projects, the Government has devised the Gas Project Co-operation and Sharing Agreement, through which it intends to facilitate the management of the benefits that the existing arrangements would yield for each beneficiary landowner group. Specific arrangements have been made in respect of the Hides gas field. Landowners are to be granted 2% free equity, while the National Gas Corporation will be allocated 4% equity at cost, and the two provinces affected by the project—Southern Highlands and Gulf—will be allocated 1% equity at cost. These equity holdings will most likely be managed by the Government-owned MRDC, which is responsible for managing such community project interests. Careful management of the benefit flows will be important to ensure that each participant in the community receives a fair share in cash or kind. In the past, some benefit flows were mismanaged and disproportionately distributed.

12. Project components that will likely impact on the environment are the expansion of operations at Hides and Kutubu, and gas pipeline construction and operation. The gas pipeline passes through various habitats, including alpine forest, limestone habitats, lowland forest, swamp, mangroves, coastal habitats, mudflats, and sea grass beds. The Kikori river basin, where the project is located, has been identified as an area of high biodiversity and conservation value, where unique plant and animal species occur. The project's environmental impact has been minimized through maximum use of the existing project footprint and pipeline right-of-way. Nonetheless, the project facilities and pipeline may affect 700–900 hectares of forest. Under the gas agreement, the project is required to construct about 153 km of certain public roads in Kutubu and Kopi. This road component will be carefully reviewed to ensure compliance with the ADB forest policy⁶ and to minimize impacts on biodiversity of the area. Since the environment impact assessment (EIA) is being finalized by the proponent, the precise TA scope is not yet known. The TA will have to be flexible enough to accommodate changes in the scope and content of the terms of reference. The EIA will include an environmental management and monitoring plan to ensure policy compliance. It will be further refined during detailed design.

⁵ Constitution, National Goals and Directive Principles, 4—Natural Resource and Environment: "We declare our fourth goal to be for Papua New Guinea's natural resources and environment to be conserved and used for the collective benefit of us all, and be replenished for the benefit of future generations."

⁶ ADB. 2003. *ADB Forest Policy*. Manila.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

13. The TA objective is an agreed design for the PNG Gas Project, which will contribute to local and national economic and social development. Specifically, the TA will (i) be based on an acceptable feasibility analysis, and prepare documentation leading to the provision of an ADB loan, political risk insurance, and possibly a partial credit guarantee; (ii) review and prepare safeguards' documents related to the environment, indigenous people, and involuntary resettlement; (iii) agree with the Government on arrangements for sound fiscal management of revenues accruing to PNG from the project; and (iv) contribute to a review of economic and financial viability and sustainability.

B. Methodology and Key Activities

14. The TA will undertake due diligence on (i) environment assessment, (ii) involuntary resettlement and social issues, and (iii) fiscal and financial management issues. The TA will explore the fundamentals of the project to ensure that any Government participation funded by ADB will be robust and meet appropriate economic, social, and financial criteria, and comply with the ADB safeguard policy. The TA will assess the suitability of PNG taking an equity stake in the project. The TA will involve substantial and extensive consultations with Government agencies, the communities, and the project companies. Major assumptions and/or risks include the quality of the project's due diligence, and the Government's willingness to proactively engage in a policy dialogue on fiscal management. Consultants' outline terms of reference are in Appendix 4.

C. Cost and Financing

15. The TA's total cost is estimated at \$1,250,000 equivalent, comprising \$871,500 in foreign exchange costs and \$378,500 in local currency costs. ADB will provide \$1,000,000 to finance the TA on a grant basis from ADB's TA funding program. The Government will finance the remaining \$250,000 equivalent to cover office accommodation and support services. Detailed cost estimates and the financing plan are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

16. ADB's Pacific Department will be the Executing Agency. Stakeholder Government agencies include the departments of treasury, petroleum and energy, and environment and conservation, and the Internal Revenue Commission.

17. The TA will require the services of about 30.5 person-months of intermittent international and 18 person-months of domestic consultants with expertise in areas, including (but not limited to) social development, gender, environmental management, fiscal and financial management, and PNG-specific oil and gas sector issues.

18. Because the project information is confidential, the scope of due-diligence work is as yet uncertain and will depend on the quality of the FEED work soon to be submitted to ADB. Given the tight deadlines for project sanction and preliminary terms of reference, consultants will be engaged as individuals following the quality-based selection QBS method in accordance with

Individual Consultant Selection (ICS) process and the *Guidelines of the Use of Consultants* and other arrangements satisfactory to ADB for the engagement of domestic consultants.

19. The TA will begin in December 2005 and will be implemented over 11 months until October 2006. Support will be provided intermittently, the duration and frequency of which will be based on identified needs and agreed with the consultants. Reporting requirements will be specific to the focus of each assignment. Comprehensive policy dialogue with Government officials, private sector stakeholders, and public consultation will be required.

20. The expected outputs will be disseminated in accordance with ADB's public disclosure policy.⁷ Since the project is covered by a confidentiality agreement with its sponsors, all documents will be cleared with the project before disclosure.

IV. THE PRESIDENT'S DECISION

21. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$1,000,000 on a grant basis to the Government of Papua New Guinea for preparing the PNG Gas Project, and hereby reports this action to the Board.

⁷ ADB. 2005. *The Public Communications Policy of the Asian Development Bank, Disclosure and Exchange of Information*. Manila.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Project financing approved and effective	RRP and loan documentation completed in time for project sanction and financial close	RRP and loan agreement ADB and Government PPTA completion report	
Outcome 1. ADB project documentation based on acceptable feasibility analysis 2. Project technical, economic and financial viability confirmed 3. Environment and social safeguards in place or plans agreed 4. Arrangements for sound fiscal management of revenues accruing to PNG from the project agreed with Government	Project endorsed by ADB management by project sanction Project fully compliant with ADB policies and standards and satisfies all feasibility requirements Acceptable stakeholder consultation process and outcome as well as information disclosure	PPTA final reports and outcomes from specific consultations, reports, and studies Memoranda of understanding with Government and project sponsors Review missions TA and project reports EIA and SEIA Environmentally sound design incorporating environment assessment IPDP and IRP	Assumptions <ul style="list-style-type: none"> • Safeguard work by project sponsors and the Government is of acceptable quality and submitted on time • Government willing to adopt good-practice fiscal management • Sound GPCSA and preceding consultation and disclosure process • Cofinancing arranged Risks <ul style="list-style-type: none"> • Government engages proactively in policy dialogue on fiscal management issues • Government fulfills conditions precedent to effectiveness and disbursement • Procurement and legal issues agreed with project sponsors • Inadequate coordination from bilateral financing agencies • Effective management of public relations
Outputs 1. Acceptable economic and financial returns to Government on financially viable terms 2. Confirmation of technical soundness 3. Sound EIA and SEIA 4. IPDP and IRP, including well-defined and effective community benefit arrangements and mitigating measures	Economic and financial models accepted by project sanction SEIA disclosed for 120 days before Board discussion of the loan EIA completed and available during SEIA circulation IPDP and IRP completed before Board approval Benefit arrangements widely understood TA prepared and approved by Board	Review missions TA and project reports Gas supply–demand model EIA and SEIA, IPDP, IRP	Assumptions <ul style="list-style-type: none"> • Government endorses PPTA • Certification of reserves • Market analysis and audit • Field appraisals have led to correct interpretations • Customers confirm gas purchase commitments • Reliable information available potential gas development schemes • Licenses correctly granted and dealings registered without adverse claims • Reliable cost estimates, gas prices, and forecast of crude oil prices • EIA and SEIA of project are acceptable

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>5. Measures to strengthen revenue collection and expenditure capacities</p> <p>6. Compliance with ADB procurement procedures, including Government's investment in existing project assets</p>	<p>Fiscal management and expenditure plans</p> <p>Community affairs program for the project agreed and approved by the Board</p>		<ul style="list-style-type: none"> • Complex arrangements can be simplified • IRC, DPE, and MRDC willing to accept assistance to redress weaknesses • Government will maintain expenditure management efforts • Sufficient incomes to the Government from gas • Community willingness to accept social programs <p>Risks</p> <ul style="list-style-type: none"> • Unexpected geological complexities • Customers abandon PNG gas because of project delays • Government patronizes unrealistic gas development ventures • Errors in license title and/or improper grant procedures or other license process • Higher project cost, fall in A\$, rise in steel prices, drop in crude prices • Unforeseen EIA omissions • No benefit law reform and no agreement on GPCSA • Government agencies reject TA, make no improvement • Government elects to spend gas incomes on recurrent costs • Communities agitated, unwilling to accept assistance

Activities with Milestones	Inputs
<p>1.1. Economic and financial analysis by end of February 2006. 1.2. Review GPCSA and financing structure by end of February 2006</p> <p>2.1. Review FEED documentation by end of February 2006 2.2. Review Oil and Gas Act</p> <p>3.1. Review FEED documentation by end of February 2006 3.2. Review of draft EIA/SEIA and experiences of environmental assessments for large and environmentally sensitive pipeline projects, by mid-December 2005 3.3 Review of supplementary EIA incorporating cumulative and associated impacts by end of February 2006 3.4 Review Oil and Gas Act by end of February 2006</p> <p>4.1. Review FEED documentation, including EIS by end of February 2006 4.2. Review GPCSA, Oil and Gas Act, community impacts and benefit arrangements, community consultation and disclosure process, lessons learned from implementation of past compensation arrangements by end of February 2006 4.3. Determine any deficiencies and address the gaps by end of May 2006 4.4. Review and apply lessons learned from the past oil/mineral projects in PNG</p> <p>5.1. Review fiscal collection processes by end of February 2006 5.2. Review Government expenditure management plans and fit with gas incomes by end of February 2006 5.3. Policy dialogue with Government on mitigating measures until end of May 2006 5.4. Review and apply lessons learned from the past oil/mineral projects in PNG</p> <p>6.1. Review audit and past procurement of existing assets to be purchased by PNG</p>	<p>Up to \$1,250,000 48.5 person-months of specialist expertise Government contributions in kind, collaboration, dialogue, and information Beneficiaries Project sponsors Project information</p>

ADB = Asian Development Bank, A\$ = Australian dollar; DPE = Department of Petroleum and Energy, EIA = environmental impact assessment, EIS = environment impact study; SEIA = summary EIA, FEED = front end engineering and design, GPCSA = Gas Project Cooperation and Sharing Agreement, IPDP = indigenous people development plan, IRP = involuntary resettlement plan, MRDC = Mineral Resources Development Company, MOU = memorandum of understanding, PPTA = project preparatory technical assistance, RRP = report and recommendation of the president, TA = technical assistance.

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
Contribution of the sector or subsector to reduce poverty in Papua New Guinea:	
<p>PNG's human development index has improved since the mid-1970s, but very slowly. PNG ranks 137, reflecting alarming economic and social intra-country disparities. On the UNDP poverty index, PNG ranks 68 among developing countries. It ranks last among Pacific developing member countries on both indexes and clearly faces formidable tasks and challenges in achieving the MDGs.¹</p> <p>Poverty estimates have not been updated since the last household survey in 1996. However, the World Bank² has projected poverty levels using information on the rate and sector patterns of output and employment growth. According to the projections, poverty has increased at an alarming rate in recent years. The proportion of poor living under the national poverty line was estimated to be about 53.0% in 2003, compared with 37.5% in the benchmark year of 1996. The proportion of the population living on less than \$1 a day is estimated to have increased from 24.6% in 1996 to 39.1% in 2003. Many health indicators have deteriorated in recent years, including the availability and performance of health facilities. Immunization and infant mortality rates have deteriorated since 1990. The increase in reported HIV/AIDS cases is alarming. PNG is the only Pacific island country considered to have a generalized epidemic of HIV.³ PNG has a population of 5.8 million people and, over the past 5 years, economic growth has barely kept pace with population growth. GDP increased by 2.6% in 2004, slightly down from 2.8% in 2003. More than 80% of the population lives in rural areas with little access to basic social services. The literacy rate is 57%; and life expectancy is 55 years. Coupled with this is a high incidence of diseases, particularly HIV/AIDS, tuberculosis, pneumonia, malaria, and dengue. In some provinces, the infant mortality rate is more than 100 for every 1,000 live births, and maternal mortality rate is 300 per 100,000 births.</p> <p>The development of new gas fields, road construction, and conversion of oil fields matches the priorities set forth by the Government in the National Poverty Reduction Strategy, which is structured around five pillars: (i) strengthen governance, (ii) increase development of land and natural resource, (iii) improve and maintain physical infrastructure, (iv) improve and expand economic growth opportunities, and (v) strengthen and expand social services. The project will help achieve these goals by increasing exploration and sustainable use of natural resources; maintaining and improving the capacity of transport infrastructure networks; improving access to financial services and facilitating income-generating opportunities; and improving the delivery of social services, especially in health and education. Specifically, the project is committed to employing PNG nationals to the maximum extent practical. Preference will be given to qualified individuals from communities in projected-affected areas. The project is committed to using qualified PNG businesses to supply goods and services to the maximum extent practical. As such, the project will bring business opportunities and financial benefits for regional communities, including landowner groups. Ancillary benefits from the new Kokori–Highlands road will benefit isolated highland communities by facilitating access to markets and health and educational facilities and to improved business opportunities.</p> <p>The project will significantly boost mining and energy exports, which otherwise are expected to fall by around \$400 million in real terms as oil production declines and major mining projects reach the end of</p>	

¹ United Nations Development Programme (UNDP). 2005. *Human Development Report 2005*. New York.

² World Bank. 2005. *Papua New Guinea: Interim Strategy Note*. Washington, DC..

³ Secretariat of the Pacific Community and UNDP. 2004. *Pacific Islands Regional Millennium Development Goals*. Fiji Islands. HIV epidemics are defined as follows: (i) generalized epidemic: HIV prevalence over 1% of the general population; (ii) concentrated epidemics among specific groups: HIV prevalence is over 5% in any subpopulation exhibiting high-risk behavior; and (iii) low-level or emerging epidemics: HIV prevalence below 1%.

their operating lives. This is a key benefit of the project—the potential to compensate for loss of economic contribution from the petroleum and mining sectors as oil fields (Kutubu, Gobe, and Moran) are depleted, and major mining projects (such as Ok Tedi and Porgera) face closure within the next decade.

The project will provide a large number of jobs for PNG nationals. During the initial construction phase, up to 1,750 jobs will be created directly, around 80% for local workers. Once the project moves into the operational phase, 500–600 full-time equivalent positions will be maintained directly by the production operations. The direct project benefits will include valuable revenue streams for the national and provincial governments (through taxes, levies, and other charges, and through equity participation in the project's production and infrastructure components) and for local landowners (through royalty and levy payments, compensation, equity dividends and discretionary expenditure by the project proponents). Payments to landowners could improve quality of life and economic stability in the long run.

Apart from the direct impacts on the Government and landowners in terms of revenue and jobs, the project has the potential to kick-start the country's ailing petroleum exploration and production sector, providing a focus for ongoing involvement by major international players that would help attract investment and development.

B. Poverty Analysis

Targeting Classification: Targeted Intervention

What type of poverty analysis is needed?

During project preparation, the project sponsor, together with the Government, conducted extensive sociocultural analysis. Three broad sets of social investigations have been identified and carried out (landowner identification and social mapping, social and economic impact assessment, survey of archaeological and cultural sites). A poverty impact assessment and social analysis will be conducted during the project preparatory TA. During TA implementation, consultants will determine any possible gaps that should be addressed and will delineate a plan to address poverty reduction methods and other outstanding issues.

C. Participation Process

Is there a stakeholder analysis? Yes No

Attention to social issues is central to project feasibility. PNG's resource development legislation pays specific attention to the relationship between project developers, government agencies, and customary landowners. In achieving this, the project sponsor and the Government have (i) identified landowners and conducted social mapping, (ii) assessed social and economic impacts, and (iii) surveyed archaeological and cultural sites. For landowner identification and social mapping, the team gathered information through participant observation. Three parallel campaigns of 3–4 weeks each were undertaken for Hides–Kutubu, Gobe environs, and Omati environs. For the social and economic impact assessment, the team assessed the PNG Gas Project environmental inception report and surveyed households and villages in 90 communities in the project area. A rapid rural appraisal and a participatory rural appraisal (interviews of focus groups) were conducted. Additional sector analysis was carried out via interviews. Field surveys of archaeological and cultural heritages were conducted in three delineated catchment areas: Huli Komo–Hides–Moran, Kutubu–Gobe, and Kikori–Omati. Five to 10 sites representative of different ethnic groups were inspected and informants interviewed about significant sites and places.

The project and government consulted communities in the Western Province and Torres Strait; PNG-based NGOs; project community representatives from Hides, Moran, Kutubu, and Gulf; National Museums; National Fisheries Authority; timber industry representatives; and national and provincial representatives.

During TA implementation, consultants will verify these activities and suggest additional stakeholder analysis that might be necessary, such as addressing local NGOs and women's groups. The distribution of benefits (compensation and payments) from landowner to other family members will be studied and provisions for equal distribution will be suggested. Should additional stakeholder analysis be needed, these will be carried out during PPTA implementation.

Is there a participation strategy? Yes No

During PPTA implementation, the social development/gender specialist and involuntary resettlement specialist will examine stakeholder participation opportunities and delineate a participation strategy for the ensuing loan. This will assure that a broad range of stakeholders are identified and consulted on issues, involving pros and cons of community-based, labor-intensive rehabilitation and maintenance, culturally sensitive modalities to increase jobs for women, and ensuring adequate attention to HIV/AIDS prevention and road safety, in the specific context of the project area.

D. Gender Development

Strategy to maximize impacts on women:

Traditional gender division of labor can be challenged by proactively ensuring women's involvement in road maintenance and other jobs. During TA implementation, areas will be identified for additional involvement of women, including support services to construction camps. Women's effective access to these jobs will require targeted programs of labor skill transfer. In light of women's traditional exclusion from construction jobs and benefits, the TA will recommend socioculturally sensitive modalities to ensure women's involvement in new work. Local NGOs that could be engaged will be identified during TA implementation. As the newly built road will increase traffic between villages and as the temporary construction will invite a number of construction workers, the TA will recommend a plan to ensure HIV/AIDS awareness among women in the project area.

Has an output been prepared? Yes No

A gender strategy will be included in the resettlement plan and the indigenous peoples development plan.

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	Under the Oil and Gas Act 1998 of PNG, compensation will be paid for any demonstrable project-associated damage to subsistence crops. A resettlement plan will be prepared in accordance with the Oil and Gas Act and ADB policy. The plan will be disclosed to the public and to affected people. Internal and external monitoring arrangements will be put in place.	<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	No tolls are proposed for the use of the roads built under the project. There are no plans to sell in PNG the gas derived from the project.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Project construction and new transportation services will create jobs, particularly for the poor. The local government will help identify available labor, with priority on people from poor areas. Provisions will be made to actively seek jobs for women.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Indigenous Peoples	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	PNG's population consists of more than 800 indigenous peoples' groups. No particular group in the country or in the project area is considered dominant. The project will compensate affected people through the equitable distribution of jobs and cash compensation made available under PNG law. Compensation is addressed in the resettlement plan. Since many of the people in the project area	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

		are indigenous and poor, additional measures will be taken to enhance their benefits from the project. The indigenous peoples development plan will include strategies to maximize project benefits to women.	
Other Risks and/or Vulnerabilities	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	<p>Compensation offered under the project might encourage people living outside the project area to seek resource rent and compensation by migrating into the project area.</p> <p>The project will integrate a new gas conditioning facility with existing Kutubu oil facilities. As such, compensation claims might increase as the site will be used to treat and condition other petroleum derived from other fields. Landowners may make more demands in recognition of this new addition. A strategy to address this issue will be included in the resettlement plan.</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

GDP = gross domestic product, HIV/AIDS = human immunodeficiency virus/acquired immunodeficiency syndrome, MDG = Millennium Development Goal, NGO = nongovernment organization, PNG = Papua New Guinea, PPTA = project preparatory technical assistance, TA = technical assistance.

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	676.5	0.0	676.5
ii. Domestic Consultants	0.0	56.0	56.0
b. International and Local Travel	95.0	62.0	157.0
c. Reports and Communications	0.0	2.5	2.5
2. Workshops and Surveys	0.0	8.0	8.0
3. Contingencies	100.0	0.0	100.0
Subtotal (A)	871.5	128.5	1,000.0
B. Government Financing^b			
1. Office Accommodation and Transport	0.0	175.0	175.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	75.0	75.0
Subtotal (B)	0.0	250.0	250.0
Total	871.5	378.5	1,250.0

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

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Petroleum Fiscal Management Expert (international, intermittent 5 person-months)

1. The expert will be an economist with at least 10 years of relevant professional experience. The expert should have extensive experience in designing and/or reviewing fiscal management arrangements in relation to extractive industries. Experience in Papua New Guinea (PNG) would be an asset.

2. The expert will do the following:

- (i) Review PNG experience in managing natural resource revenues and identify lessons learned (e.g., for Bougainville, Ok Tedi, Porgera, Lihar, and Kutubu).
- (ii) Review international experience in managing natural resource revenues and identify best practice and potential lessons for PNG, including from Azerbaijan, Chad-Cameroon, Timor-Leste, Philippines ([Malampaya gas field](#)), and Laos (Nam Theun 2 project).
- (iii) Briefly analyze potentially competing energy sources, identifying possible competitive threats to the project's viability from alternative gas sources (Bass Strait, Timor-Leste, and Bowen Basin) and from locally produced coal. This should include a medium- to long-term forecast (10–15 years) of each competing class of fuel.
- (iv) Briefly review the Australian regulatory regime for electricity and gas (including pipelines). Identify potential risks that would affect the project's economic and financial viability.
- (v) Review the Gas Project Cooperation and Sharing Agreement and compare proposed arrangements, including benefit and cost splits among stakeholders (national, provincial, and local governments; landowners; project companies) with other PNG projects and against international norms, considering PNG-specific conditions (high extractive costs).
- (vi) Review and analyze experiences with natural resource funds (NRFs), including the PNG Mineral Resource Stabilization Fund and the Timor-Leste Petroleum Fund, and identify lessons that might be applied in designing a new PNG NRF.
- (vii) Prepare a proposal to establish a new NRF that reflects international best practice, PNG conditions, and PNG experience.
- (viii) In collaboration with Treasury and Department of Petroleum and Energy (DPE) officials, examine the options, utility, and potential value or otherwise of establishing a new NRF.
- (ix) Review PNG arrangements and institutions for collecting resource-related revenues. Determine if these arrangements are appropriate to the Internal Revenue Commission (IRC) (income tax), DPE (royalty and development levy) and MRDC (equity). Review intergovernmental (national, provincial, and local) and landowner arrangements in relation to sharing natural resource revenues and identify potential issues and ways to address them.
- (x) Review oil and gas project revenue-sharing systems (royalty benefits, equity benefits, development levies, income tax credits, and other devices) and proposed project arrangements, including proposed Oil and Gas Act amendments. Identify ways to better target community beneficiaries. Review equity and gender aspects of proposed benefit arrangements, particularly regarding the final use of cash benefits granted to landowners.

- (xi) Identify and review PNG and project proponent involvement to date with the Extractive Industries Transparency Initiative (EITI) (e.g., ExxonMobil is an EITI member).
- (xii) Identify the steps required for PNG to accede to EITI membership, and prepare briefing materials for government and industry officials.

B. Petroleum Financial Management Expert (international, intermittent 4 person-months)

3. The expert will be an accountant with at least 10 years of relevant professional experience. The expert should have extensive experience in designing, operating, and/or reviewing financial management arrangements in relation to extractive industries. PNG experience would be an asset.

4. The expert will do the following:

- (i) In consultation with the Government, define expenditure management processes and priorities for project incomes that accord with Government initiatives.
- (ii) Identify current and proposed revenue-flow mechanisms (e.g., local government consolidated revenue accounts, the Government Trust Account, offshore and/or escrow accounts), including proposals for calculating and allocating joint venture project revenues attributable to gas operations and non-gas operations.
- (iii) Review IRC's institutional framework and capability with regard to the administration and audit of natural resource-related revenues and propose options to address identified weaknesses.
- (iv) On the basis of the report prepared for the Government, review the calculation and the statement of the sunk costs that the Government will finance in respect of the acquisition of equity in the Hides gas field, and payment for sunk costs attributable to the proportionate interest in the project.
- (v) Review proposals for developing local business from the perspective of good governance and gender policy, and considering ADB's anticorruption policy¹.
- (vi) In consultation with the project team, review and analyze financial and economic aspects of the project based on the generic oil and gas banking model.

C. Environmental Expert (international, intermittent 5 person-months)

5. The expert will be highly experienced in environmental assessment, with experience in similar large projects. The expert should have knowledge of and experience in ecosystem assessments as well as induced and cumulative impact assessments. The expert will do the following:

- (i) Review and evaluate all environment documentation, environment impact assessment (EIA), and summary EIA (SEIA), including an EMP to comply with ADB standards, format, and requirements.
- (ii) Review environmental assessments for large and/or environmentally sensitive pipeline projects to identify potential gaps of the draft EIA.
- (iii) Review environmental management and performance of similar large energy projects in PNG and incorporate lessons learned into the SEIA.
- (iv) In coordination with the project operator and the consultants preparing the EIA, identify gaps, report deficiencies, and areas that require further inputs and strengthening, recognizing that Government requirements may differ slightly from those of ADB, and make arrangements with the project operator for further study.

¹ ADB. 2000. *Anticorruption Policy*. Manila.

- (v) Examine the cumulative impacts, i.e., combination of impacts from activities of the proposed Gas Pipeline Project and other past, present, and reasonably foreseeable actions. The individual project impacts may combine with (a) impacts from other projects of the same type in the same area, (b) impacts on the same ecosystem from preexisting human activities (including agriculture and logging, and coastal and marine fisheries), (c) impacts from activities that are induced by the Gas Pipeline Project, and (iv) impacts from different components of the project.
- (vi) Examine the associated impacts, i.e., environmental impact from facilities not considered for project financing, but which facilities would not exist or be viable without the PNG Gas Project. The spatial project boundaries are not limited by legal agreements or political jurisdictions. In particular, undertake environmental due diligence on such projects (including the Australian gas pipeline project² and others that may use the gas produced by the project) that these facilities have been (or will be) established in compliance with the government regulations, and in line with ADB requirements and procedures.
- (vii) Closely examine (a) consultants' findings on the high biodiversity value of the area, (b) forest areas to be affected by project (the environment inception report indicates 700–900 ha), and (c) a proposed community road from Kutubu to Kopi (around 153 km) and an access road along the proposed pipeline from Kopi to Omati landfall (on possible direct and indirect/induced impacts on forest and other natural resources because of improved access). In coordination with the project operator and the EIA consultant, carefully design and formulate the mitigation measures to meet ADB's environmental safeguard policy and forest policy,³ and minimize the environmental impacts to acceptable levels.
- (viii) Discuss the findings with the project operator and the EIA consultants, and in coordination with them incorporate findings and recommendations in the EIA report. If time does not permit this, prepare a supplementary EIA report addressing the gaps, including an assessment of cumulative and associated impacts to ensure that the overall reports (EIA and supplementary EIA reports) meet ADB's safeguard policy and guidelines, and the forest policy (footnote 3).
- (ix) Assess and monitor public consultation processes.
- (x) Make recommendations on overall acceptability of environmental processes for the completion of environmental procedures.
- (xi) Review environmental economic analysis per ADB guidelines and incorporate findings in the EIA and SEIA.

D. Environment Specialist (domestic consultant, 4 intermittent person-months)

6. The consultant will do the following:

- (i) The domestic consultant (based in Manila) will independently review and evaluate all relevant documentation, particularly EIA/SEIA and related environmental documentation for compliance with ADB standard, format and requirements. Provide suggestions to improve compliance.

² The PNG–Australia gas pipeline consists of two sections (two separate projects): (i) the PNG section or the upstream section (ExxonMobil, Oil Search Ltd., Nippon Oil Exploration, MRDC, the Government); and (ii) the Australian or downstream section (Australian Gas Light Ltd., and Petronas) that will supply growth centers in Queensland (Gove, Townsville, Gladstone, Mount Isa, and Moomba) and to Sydney with a total of around 3,800 km gas pipeline. The EIA prepared by the project covers the upstream section—from the production field to the PNG–Australia border).

³ ADB. 2003. *ADB Forest Policy*. Manila.

- (ii) Monitor public consultation process for environmental aspects during project processing.
- (iii) In coordination with the international consultant engaged under the TA and consultants who prepared the EIA/SEIA provide support to the ADB project team in addressing external comments.
- (iv) In coordination with the ADB project team and the ADB's Department of External Relation maintain the website of the Project, including updating the content based on comments received during 120 days SEIA circulation.
- (v) When necessary, undertake field survey to collect data gaps.
- (vi) Undertake related works as directed by the Project team.

E. Social Development Specialist/Gender Specialist (international, intermittent 6 person-months) and **Social Development Assistant** (domestic, intermittent 6 person-months)

7. The social development specialist should have field experience in conducting qualitative and quantitative social research, be familiar with the culture of the area, and have considerable experience in development projects affecting indigenous people. As substantial and extensive consultations with the communities and other stakeholders is invaluable to this project, the consultant will ensure that the preparation for the indigenous people development plan (IPDP) is conducted through a participatory process. The consultant will do the following:

- (i) Undertake an initial assessment (desk review) of the project's effects on IPs.
- (ii) Based on the initial desk review, the specialist will prepare terms of reference for the national consultant.
- (iii) Prepare the terms of reference for the social development assistant.
- (iv) Conduct a poverty and social analysis in accordance with ADB's *Handbook on Poverty and Social Analysis* and *Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of Projects*.⁴
- (v) Determine how the proposed project activities will help improve people's incomes and livelihoods.
- (vi) Identify the needs for targeting women or other subgroups of IPs and ensure that a plan is prepared for fair project benefit distribution.
- (vii) Help the fiscal specialist review equity and gender aspects of proposed project arrangements and review proposals for developing local business from the perspective of ADB's gender policy.⁵
- (viii) Gather relevant baseline data on indigenous peoples for use as monitoring indicators during implementation.
- (ix) Prepare an IPDP as set out in ADB's indigenous people's policy.⁶
- (x) Conduct surveys to develop a profile of jobs and determine whether women will have access to them.
- (xi) Consult with local governments to identify development initiatives that could complement the gas pipeline project, particularly those targeting the poor and ethnic minorities.
- (xii) Help the Government establish consultation and participatory processes that will continue throughout project design, construction, and operation.
- (xiii) Organize town-hall public consultations for a range of potentially interested persons in the public, private, and nonprofit sectors.
- (xiv) Visit development enclaves and suggest HIV/AIDS prevention programs.

⁴ ADB. 2001. *Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of Projects*. Manila.

⁵ ADB. 2003. *Policy on Gender and Development*. Manila.

⁶ ADB. 1998. *The Bank's Policy on Indigenous Peoples*. Manila.

- (xv) Meet with civil-society representatives to assess the effects of the project on women, in particular, and suggest remedies for any negative effects and equal distribution methods.
- (xvi) Contribute ideas on indigenous peoples and gender issues to the draft report and recommendation of the President.

F. Resettlement Specialist (international, 4.5 intermittent person-months) and **Domestic Resettlement Specialist** (2 people, 8.0 intermittent person-months total)

8. The resettlement specialist will do the following:

- (i) Prepare the resettlement plan according to ADB's *Policy on Involuntary Resettlement*.⁷
- (ii) Assess the site identified for land acquisition, established right-of-way, and options to avoid or minimize involuntary resettlement.
- (iii) Identify all potential involuntary resettlement⁸ impacts and affected persons⁹ of the project, including new gas fields at Hides, a new gas conditioning facility at Kutubu, associated infrastructure in PNG, a 192 km onshore and a 270 km offshore gas pipeline.
- (iv) Determine the potential impact on community livelihoods of any restrictions of access to resources such as forests, mangroves, coastal habitats, mudflats, river basins, among others, and incorporate measures to help draw up the resettlement plan.
- (v) Prepare the terms of reference for the domestic resettlement specialists.
- (vi) Consult the agencies responsible for land acquisition and resettlement on ADB's policy on involuntary resettlement and review the laws, regulations, and Government directives that apply to land acquisition and involuntary resettlement. Identify gaps in these policies and propose measures to bridge the gap between the national legal frameworks and ADB's policy on involuntary resettlement.
- (vii) Undertake an inventory of losses and a socioeconomic survey of affected populations and ensure that data is disaggregated by gender. Document any steps to reduce land acquisition and resettlement impacts through changes in the alignment or scope of project components. Suggest a cut-off date for entitlements.
- (viii) Conduct a participatory rapid appraisal in the project area.
- (ix) Assess the socioeconomic condition, needs, and priorities of women, and identify specific measures to assist them and ensure that land acquisition and resettlement do not disadvantage them.
- (x) Together with the social development specialist, prepare socioeconomic profiles, including gender and indigenous people, of the project-affected communities in terms of household size, demographic trends, income sources and levels,

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

⁸ "Involuntary resettlement" addresses social and economic impacts that are permanent or temporary and are caused by (i) acquisition of land and other fixed assets, (ii) change in the use of land, or (iii) restrictions imposed on land as a result of an ADB operation (ADB's Operations Manual, section F2, on involuntary resettlement, 2003).

⁹ "Affected persons" include individuals, households, firms, or private institutions that, on account of changes resulting from the project, will have their (i) standard of living adversely affected; (ii) right, title, or interest in any house, land (including residential, commercial, agricultural, forest, and/or grazing land), water resources, or any other moveable or fixed assets acquired, possessed, restricted, or otherwise adversely affected, in full or in part, permanently or temporarily; and/or (iii) business, occupation, place of work or residence, or habitat adversely affected, with or without displacement (ADB's Operations Manual, section F2, on involuntary resettlement, 2003).

occupation, socioeconomic conditions, social service infrastructure, and social organizations.

- (xi) Review likely environmental impact of the resettlement process, and build in plans to mitigate any adverse environmental effects.
- (xii) Help the Government prepare a public consultation and disclosure plan, initiate a participatory process to prepare and implement a resettlement plan, and develop a transparent mechanism to redress grievances of affected persons.
- (xiii) Develop a system to monitor and evaluate the progress of resettlement planning and implementation.
- (xiv) Develop an implementation schedule, showing how activities will be scheduled with time-bound actions in coordination with the civil works.
- (xv) Prepare a detailed budget with unit costs estimates based on replacement costs for lost assets, implementation schedules, management arrangements, and arrangements for internal and external monitoring and evaluation.
- (xvi) Participate in the loan fact-finding and provide input to the report and recommendation of the President.

G. PNG Oil and Gas Sector Expert (international, 6 intermittent person-months)

9. The expert will do the following:

- (i) The expert should be familiar with the PNG oil and gas sector and have insight into technical, socioeconomic, legal, environment, and economic aspects of the project, as well as a broad understanding of PNG's context, people, and their customs.
- (ii) Provide PNG sector-specific and country advice to ADB and the project preparatory technical assistance (TA) experts in preparing for potential ADB lending to the Government.
- (iii) Liaise between ADB and the project preparatory TA experts to focus on issues pertinent to the interest of ADB and the Government.
- (iv) Liaise with the key Government agencies involved in the project, and the Government Gas Office.
- (v) Prepare progress and status reports on project preparatory TA work.
- (vi) Identify any new issues or potential impediments to ADB involvement in the project.
- (vii) In consultation with all stakeholders, prepare a comprehensive risk matrix outlining major risks, the party to deal with the risks, and the monitoring and mitigation strategies to be developed.