



# Technical Assistance Report

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Project Number: 41008  
March 2007

## Socialist Republic of Viet Nam: Preparing the Support for the Public-Private Development of the O Mon Gas Pipeline Project (Financed by the Japan Special Fund )

## CURRENCY EQUIVALENTS

(as of 12 March 2007)

Currency Unit	–	dong (D)
D1.00	=	\$0.000062
\$1.00	=	D16,010

## ABBREVIATIONS

ADB	–	Asian Development Bank
BP	–	British Petroleum
CDM	–	clean development mechanism
EA	–	executing agency
EIA	–	environmental impact assessment
EMP	–	environment management plan
EVN	–	Electricity of Viet Nam
FS	–	feasibility study
GHG	–	greenhouse gas
JBIC	–	Japan Bank for International Cooperation
kWh	–	kilowatt-hour (1,000 Wh)
m <sup>3</sup>	–	cubic meter
MOI	–	Ministry of Industry
MW	–	megawatt (1,000,000 watts)
OGMB	–	O Mon Gas Management Board
PV	–	Viet Nam Oil and Gas Corporation (PetroVietnam)
RP	–	resettlement plan
SEIA	–	summary environmental impact assessment
TA	–	technical assistance
UXO	–	unexploded ordnance

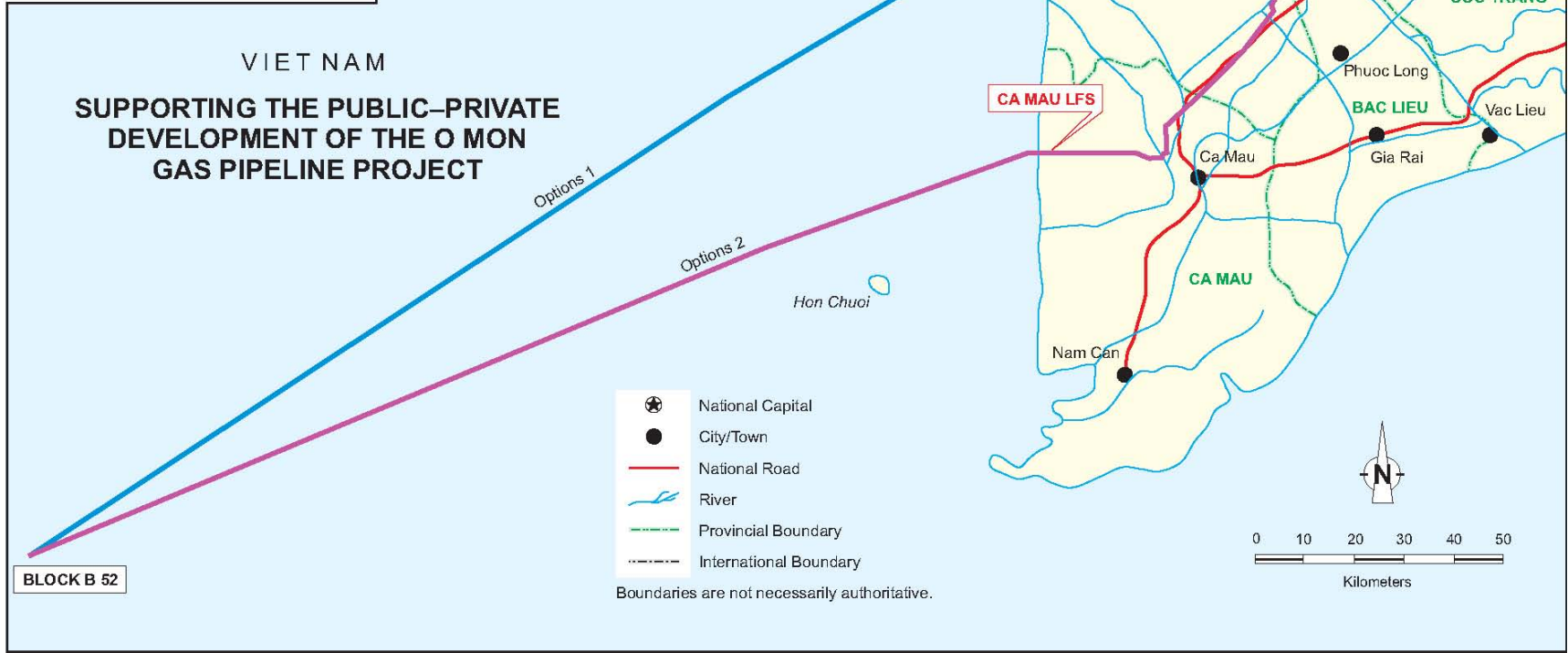
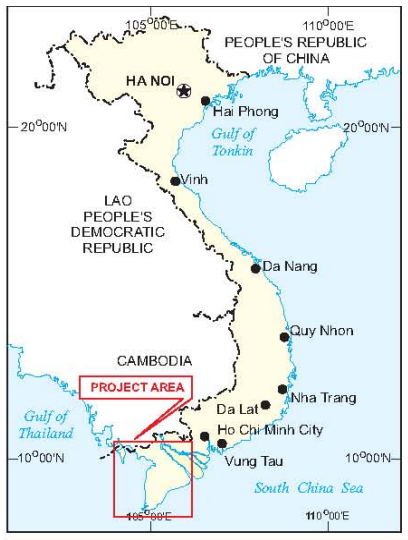
## TECHNICAL ASSISTANCE CLASSIFICATION

<b>Targeting Classification</b>	–	General intervention
<b>Sector</b>	–	Energy
<b>Subsector</b>	–	Conventional energy generation (other than hydropower)
<b>Themes</b>	–	Sustainable economic growth, environmental sustainability, private sector development
<b>Subthemes</b>	–	Fostering physical infrastructure development

## NOTE

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

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## I. INTRODUCTION

1. Viet Nam's offshore natural gas reserves are estimated at 400 billion cubic meters (m<sup>3</sup>). Gas production in 2005 was 6.5 billion m<sup>3</sup> and is expected to reach 15 billion m<sup>3</sup> by 2010. Currently, production is concentrated in the Nam Con Son basin off the southeast coast, with most of the gas produced being used to generate power in the Ba Ria and Phu My thermal power plants.

2. From 2009 to 2012, the Government of Viet Nam will commission four power plants at the O Mon power complex<sup>1</sup> with a total installed capacity of 2,760 megawatts (MW).<sup>2</sup> O Mon I power plant (600 MW) is under construction with assistance from the Japan Bank for International Cooperation (JBIC). O Mon III (660 MW) power plant is being developed by Electricity of Viet Nam (EVN), for which international competitive bidding began in October 2006. EVN is now undertaking technical evaluation of the bids and the contract is expected to be awarded in May 2007. The Asian Development Bank (ADB) is assisting EVN in developing O Mon IV power plant and also with the preparation for competitive bidding of O Mon II power plant to the private sector. All four power plants will ultimately be operating as gas-fired combined-cycle power plants, subject to availability of gas. O Mon I and O Mon III will initially operate using fuel oil and will convert to gas once it is available. The commissioning of these power plants has created a demand for 4.3 billion m<sup>3</sup> of gas per year and justifies the construction of a pipeline to transport gas from an offshore field being developed by a consortium of international oil companies led by Chevron<sup>3</sup> of the United States. The pipeline, which will have both offshore (278 kilometers [km]) and onshore (103 km) sections, is to be in place by end-2010 to meet the tight commissioning schedule of the power plants.

3. Given the situation, the Government has requested project preparatory technical assistance (TA) from ADB to prepare the Support for the Public-Private Development of the O Mon Gas Pipeline Project. The Fact-Finding Mission visited Viet Nam from 4 to 8 December 2006 and held discussions with PetroVietnam (PV), Ministry of Industry (MOI), Ministry of Planning and Investment, State Bank of Viet Nam, and Chevron. The Mission reached an understanding with the Government on the objectives, cost estimates, implementation arrangements, and terms of reference for the TA. The design and monitoring framework is in Appendix 1.<sup>4</sup>

## II. ISSUES

4. Viet Nam's gross domestic product has grown at 7.5% per annum over the last 5 years and is envisaged to grow at about 8% per annum during 2006–2010. This will result in an electricity demand growth of about 15% per annum. The Government's current Power Development Master Plan projects electricity demand to grow at 16% per annum during 2006 to 2010, slowing down to 11% per annum during 2011–2015 and then at 9% per annum toward 2025. To meet this increase in demand, about 30,000 MW of new generating capacity is required from 2006 to 2015.<sup>5</sup>

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<sup>1</sup> The O Mon power complex is located in O Mon district of Can Tho province, about 200 km southwest of Ho Chi Minh City.

<sup>2</sup> O Mon I unit 1 (300 megawatts [MW]) is scheduled for commissioning in 2009 and unit 2 (300 MW) will be commissioned in 2011; O Mon II (750 MW) will be commissioned in 2012, O Mon III (660 MW) in 2009, and O Mon IV (750 MW) in 2011.

<sup>3</sup> Chevron owns 42.38%; Mitsui Vietnam Petroleum, 25.62%; PetroVietnam Exploration & Production, 23.50%; and PTT Exploration, 8.5%.

<sup>4</sup> The TA first appeared in *ADB Business Opportunities* on 29 January 2007.

<sup>5</sup> As of 31 December 2006, almost 14,600 MW of installed generating capacity are at various stages of construction or investment decisions have been made. The total comprises 6,200 MW generated from hydropower, 2,800 MW from gas power, and 5,600 MW from coal-fired power.

5. At present, Viet Nam's power system is heavily dependent on hydropower, which accounts for almost 40% of the total generating capacity. During the dry season, power from hydro plants decreases significantly due to low water levels in the reservoirs. Consequently, power shortages occurred during the dry season in the last 3 years. To rectify the imbalance between hydro and thermal power generation, an increase in the thermal power generating capacity is essential. Half of the planned generation capacity additions (15,000 MW) will be thermal-based (to diversify away from hydropower). Of that volume, 8,000 MW will be generated with gas, for which the O Mon power complex will account for 2,760 MW. Among other benefits, the use of gas for generating power will substantially reduce greenhouse gas (GHG) emissions compared with other fuel alternatives (coal and fuel oil for example).

6. PV is responsible for all activities related to the oil and gas industry in Viet Nam, from upstream production of oil and gas to downstream activities, such as transportation and distribution. At present, PV has production sharing contracts with a number of international oil companies operating in several offshore oil fields. These oil fields also produce associated gas. The field from which the O Mon power complex will receive gas is estimated to have sufficient reserves to provide gas for more than 25 years.

7. PV, in joint venture with foreign partners, is already operating two gas pipelines. The first is the 400 km Nam Con Son pipeline that transports gas to the Phu My power complex.<sup>6</sup> The second pipeline transports associated gas from the White Tiger field to Baria Vung Tau. PV is now constructing in the southwest a third pipeline (280 km) that will supply gas to the Ca Mau power and fertilizer complex. PV has been operating gas pipelines for the past 5 years and has gained considerable operational experience.

8. A significant contribution from the O Mon gas pipeline will be the generation of electricity from a cleaner energy source by using domestic natural gas. In the absence of the gas pipeline project, the O Mon power plants would use coal or fuel oil, which would have serious implications for GHG emissions. In addition to serving the O Mon power complex, the proposed pipeline will provide gas for the Tra Noc power plant (Can Tho city) and other industrial gas consumers in the vicinity. Together with the existing gas pipelines, the O Mon pipeline will play an important role in meeting the growing gas demand in southern Viet Nam.

9. The O Mon power complex is a potential project for the clean development mechanism (CDM) of the Kyoto Protocol. The CDM is a market-based financial instrument that assists developing countries to achieve sustainable development and industrialized countries to meet their emission reduction targets. The difference in GHG emissions between the baseline (without the project) scenario and the project scenario will generate certified emission reduction units that can be used by industrialized countries to comply with their commitments under the Kyoto Protocol. These emission reductions could also be used to meet other commitments subsequently adopted outside the Kyoto Protocol.

10. Before construction of the pipeline starts, PV must first reach agreement with the Government on (i) gas price and volume of off-take by EVN, (ii) the structure of the pipeline's ownership and operation, (iii) economic and financial viability of the pipeline, (iv) pipeline specification and routing, (v) its social and environmental impacts, and (vi) operation and maintenance procedures. The feasibility study prepared for the pipeline covered project economics, and financial and technology aspects, but did not investigate in depth possible ownership structures of the pipeline; nor did it evaluate the environmental and social aspects of the project. To address the gaps, the Government requested ADB to assist in conducting due diligence to confirm the project's viability, verify the project cost estimates, develop possible

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<sup>6</sup> ADB's private sector department provided financing for Phu My 2 and Phu My 2.3. The Phu My power complex has a total installed generating capacity of 2,000 MW and uses natural gas as fuel.

pipeline ownership structures, and prepare the necessary safeguard documents for a possible investment loan.

11. Past experience demonstrates that ADB support has been a catalyst in fostering public-private cooperation in Viet Nam's power sector. PV has also been working for a long time with private sector developers in the offshore gas fields. With expanding operations in the oil and gas sector, public-private partnerships are becoming even more important. The proposed TA would further strengthen PV's capacity to work effectively with foreign partners. It would also facilitate negotiations on the pipeline ownership and reduce the risk of such negotiations not producing an effective result.

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

#### **A. Impact and Outcome**

12. The main impact of the TA will be the availability of reasonably priced domestic natural gas for generating power at the O Mon power complex. That will be achieved by constructing a 381 km pipeline to transport gas from an offshore field to be developed by international oil companies led by Chevron. This project will help Viet Nam secure a more balanced power generation mix (increasing the share of power generation by gas and reducing that by hydropower), thus ensuring a more reliable electricity supply especially during dry season. In addition, the TA will assist PV with developing environmental and safety good practices in offshore gas production, transportation, and operation. The TA will support public-private partnerships by examining various ownership structures for the pipeline. The TA will also contribute to lowering GHG emissions from the power sector in Viet Nam. Without the gas pipeline and the natural gas supply, the sector would generate electricity using more carbon-intensive fuels in less efficient power plants. Overall the far-reaching impact of the TA will be meeting the increasing electricity demand that fuels economic growth in an economically efficient and, locally as well as globally, environment-friendly manner by utilizing domestic energy resources. The ultimate outcome of the TA will be a successful investment decision to construct the gas pipeline based on a full and comprehensive assessment (technical, financial, economic, social, and environmental) of the proposed project.

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

13. The TA will conduct a full assessment of the proposed pipeline project and propose measures to ensure that the project meets ADB's economic and financial viability criteria and safeguard policies. Specifically, the TA will (i) review the gas pipeline's feasibility study to determine if the project is technically, economically, and financially viable; (ii) determine the least cost and environmentally and socially suitable option for the pipeline route; (iii) review engineering designs and develop procurement packages; (iv) determine the extent of unexploded ordnance (UXO) in the selected alignment (both onshore and offshore); (v) assess resources needed to undertake UXO clearance in the project area and draft broad terms of reference for such work; (vi) review financing options for the pipeline that has been proposed in the original feasibility study including possible public-private partnerships, and recommend an appropriate ownership structure; (vii) assess PV's capacity to operate the pipeline and the need to further develop such capacity; (viii) determine the scope of work of consulting services for construction supervision and develop broad terms of reference for such services; (ix) prepare a detailed resettlement and compensation plan based on the selected pipeline routing including access roads and other associated facilities; (x) estimate the likely reductions in GHG emission; evaluate and develop the potential downstream power projects for certified emission reductions and develop these under the CDM; and (xi) prepare an environmental impact assessment (EIA) report, a summary EIA (SEIA) report, and a costed environment management plan. The TA will

also assess any possible impacts on the indigenous and ethnic minorities in the project area and prepare an ethnic minority development plan, if necessary.

14. ADB will use the final TA outputs in considering the provision of a loan to PV for construction of the pipeline. PV will use the TA findings in finalizing its feasibility study to be submitted to the Government for approval.

15. In accordance with ADB's *Environment Policy* (2002) and *Environment Assessment Guidelines* (2003), the TA will conduct an EIA and prepare an EIA report, an environment management plan, and SEIA.<sup>7</sup> Public consultation will be carried out during the preparation of the EIA and the SEIA report.

16. To ensure compliance with ADB's social safeguard policies in *Involuntary Resettlement* (1995), *Policy on Indigenous Peoples* (1998), and *Gender and Development* (1998), the TA will assess the resettlement and other impacts arising from the construction of the pipeline and include these impacts and remedial measures into the resettlement plan. The summary initial poverty and social analysis is in Appendix 2.

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

17. The total cost of the TA is estimated at \$1,095,000. The Government has requested that ADB provide \$975,000 to cover most of the TA cost. The TA will be financed on a grant basis by the Japan Special Fund, funded by the Government of Japan. The Government of Viet Nam will provide counterpart staff, office space and facilities, technical feasibility studies, environmental reports, and support services. Detailed cost estimates and a 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**

18. The Executing Agency (EA) for the TA will be PV and the Implementing Agency (IA) will be the O Mon Gas Pipeline Management Board (OGPMB). The TA will require about 29 person-months of international and 25 person-months of national consulting services. Individual consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2006, as amended from time to time). The consultants will be working in close collaboration with each other and under the direct supervision of Infrastructure Division of the Southeast Asia Department (SEID). The staff responsible for the TA will discuss the terms of reference (TOR) in detail with the consultants, explain their respective outputs, and monitor their progress to ensure the delivery of cohesive and comprehensive outputs that address all issues and are adequate for processing a subsequent investment loan. The TA will be implemented over 6 months starting in late March 2007 and ending in August 2007. The outline TOR for the consultants are in Appendix 4, while the detailed TOR are in Supplementary Appendix A. Purchase of equipment will be in accordance with ADB's *Procurement Guidelines* (2006, as amended from time to time) and equipment procured will be handed over to the Government at TA completion.

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

19. The President, acting under authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$975,000 on a grant basis to the Government of Viet Nam for preparing the Support for the Public-Private Development of the O Mon Gas Pipeline Project, and hereby reports this action to the Board.

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<sup>7</sup> In preparing the safeguard documents, geotechnical and social surveys may be undertaken. Drilling to take core soil samples and test groundwater for contamination will be undertaken. If the project area is populated, a social economic survey will also be conducted.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p><b>Impact</b> Viet Nam's power supply will have a balanced generation mix, thereby ensuring a reliable supply of electricity, and will contribute to economic growth that is sustainable and environmental friendly.</p>	<p>Increased share of gas-powered generating capacity and a reduced dependency on hydropower generation by 2011</p> <p>Improved environmental and social performance of the power, and oil and gas sectors by 2011</p> <p>Increased benefits to the local population and industry sector</p>	<p>EVN annual report and statistics</p> <p>Official reports and feedback from PV, EVN, private sector partners and off-takers.</p> <p>Government statistics, financial, industrial, and other reports containing the sector's performance data</p>	<p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Government and the private sector have a firm commitment to invest in the gas pipeline project.</li> <li>Continued strong economic growth supports the industry sector's demand for electricity.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Chevron and its partners decide not to develop the gas fields.</li> </ul>
<p><b>Outcome</b></p> <p>(i) Investment decision</p> <p>(ii) Availability of off-shore natural gas for generating electricity at O Mon power complex</p>	<p>Gas delivered to O Mon power complex by late 2010</p>	<p>PV and EVN annual reports</p>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Government adopts TA recommendations and proposed procedures in implementing the O Mon gas pipeline project.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Parties (e.g., Chevron - field developers, PV - gas off-taker) are unable to reach an agreement on price, volumes, etc.</li> </ul>
<p><b>Outputs</b> Successful preparation of O Mon Gas Pipeline project, including</p> <ol style="list-style-type: none"> <li>confirmation of economic and financial robustness of the project;</li> <li>complete EIA and EMP;</li> <li>complete RP;</li> <li>clear and complete plan for design, procurement; and</li> <li>complete project implementation schedule and measures to adhere to the schedule.</li> </ol>	<p>Economic and financial indicators that meet ADB criteria</p> <p>Timely disclosure of SEIA and RP</p> <p>Schedule to meet target of 2010</p>	<p>Technical assistance reports</p> <p>ADB review missions and review of safeguard documents</p> <p>Standard ADB safeguard documents for project preparation (resettlement, social and environment)</p> <p>Draft ADB Board document for investment loan project (RRP) for O Mon gas pipeline project</p>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Executing Agency and IA cooperate with consultants and show flexibility in complying with ADB requirements.</li> </ul> <p><b>Risks</b></p> <ul style="list-style-type: none"> <li>Internal governmental approval processes are lengthy and milestones are not achieved. SEID staff coordinating the works of the consultants to obtain quality outputs have a heavy work load.</li> </ul>

<b>Activities with Milestones</b>	<b>Inputs</b>
<p><b>1. Economics and financial viability of the project</b></p> <p>1.1 Review the feasibility study already done by PV and conduct additional analysis if necessary to confirm the economic robustness of the proposed project taking into consideration pipeline routing, design, cost estimates, and economic benefits that it would bring.</p> <p>1.2 Review and conduct additional analysis as necessary to check the financial soundness of the project. Analyze the financial status of PV and its credit rating on the basis of international practices.</p> <p><b>2. Engineering design, cost estimates, and procurement packaging</b></p> <p>2.1. Review engineering design of the pipeline, confirming the length, size, capacity, etc., of the pipeline and associated facilities.</p> <p>2.2. Confirm or make necessary adjustments to cost estimates in the FS to arrive at a firm estimate of the project costs. Prepare the financing structure.</p> <p>2.3. Prepare procurement packages and a procurement schedule.</p> <p><b>3. Compliance with ADB's environmental safeguard policies</b></p> <p>3.1. Upgrade environmental analysis of the existing FS to a full EIA in accordance with ADB guidelines; prepare a summary EIA.</p> <p>3.2 Prepare EMP that includes necessary measures to mitigate environmental impacts of the project.</p> <p>3.3 Conduct necessary public consultations during the preparation of the EIA, and follow all public disclosure requirements.</p> <p><b>4. Compliance with ADB's social safeguard policies</b></p> <p>4.1 Assess the resettlement requirements, given the selected pipeline routing.</p> <p>4.2. Prepare a resettlement action plan according to ADB's safeguard guidelines and policies.</p> <p>4.3 Prepare necessary mitigation measures and institutional strengthening requirements with related costing and implementation procedures.</p> <p><b>5. Capacity building needs</b></p> <p>5.1. Explore with PV its need for capacity building and institutional strengthening in preparing and negotiating production sharing contracts on gas.</p> <p>5.2. Set up a particular training and/or consultation program to meet the above needs.</p>	<ul style="list-style-type: none"> <li>• ADB financing will include 29 person-months of international and 25 person-months of national consulting services</li> <li>• ADB-JSF grant funding: \$0.975 million</li> <li>• Government in-kind contributions equivalent to \$0.120 million include: counterpart staff, office space and facilities, technical feasibility studies, environmental reports, and support services</li> </ul>

EIA = environmental impact assessment, EMP = environmental management plan, PV = PetroVietnam, RP = resettlement plan, RRP = report and recommendation to the President.

## INITIAL POVERTY AND SOCIAL ANALYSIS

### A. Linkages to the Country Poverty Analysis

<b>Is the sector identified as a national priority in country poverty analysis?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Is the sector identified as a national priority in country poverty partnership agreement?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Contribution of the sector or subsector to reduce poverty in Viet Nam:</b> The 2007–2009 country strategy and program <sup>1</sup> stresses the importance of maintaining sustainable and equitable economic growth momentum to achieve further reductions in poverty. Viet Nam's success in bringing down the percentage of the population below the poverty line from 70 in 1990 to 27 in 2005 is based on rapid but equitable economic growth recorded during that period. The availability of cheap and reliable electricity generated from indigenous sources is an essential requirement for sustaining economic growth and maintaining the international competitiveness of the Vietnamese economy as it makes the transition from an agriculture-based to an industrialized economy. For example, during the period 2000–2005, electricity consumption grew at almost 15%, contributing to 7.5 % growth of the gross domestic product. Viet Nam has also put emphasis on creating nonfarm employment opportunities for its rural population by providing rural infrastructure including access to electricity. Viet Nam has achieved considerable success in rural electrification, with over 90% of rural communes and over 80% of households having access to electricity.	

### B. Poverty Analysis

**Targeting Classification:** General intervention

<b>What type of poverty analysis is needed?</b> The Government's Poverty Reduction Strategy would be reviewed to identify the role and impact of large-scale infrastructure projects such as the proposed project on overall poverty reduction in Viet Nam.
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### C. Participation Process

<b>Is there a stakeholder analysis?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No The project preparatory TA consultants will conduct a stakeholder analysis.
<b>Is there a participation strategy?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No In their inception report, the consultants will prepare a participation strategy to be followed during the TA, as well as a participation strategy for project implementation.

### D. Gender Development

The TA consultants will conduct a detailed gender assessment and prepare a gender strategy for addressing gender concerns in the project, in accordance with OM C2/OP<sup>2</sup>

<b>Strategy to maximize impacts on women:</b>  <b>Has an output been prepared?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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### E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/None	Strategy to Address Issues	Plan Required
<b>Resettlement</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	A resettlement plan will be prepared during the TA in compliance with ADB's policy contained in <i>Involuntary Resettlement</i> (1995). It will address resettlement impacts related to the O Mon gas pipeline project construction including, but not limited to, access roads, associated facilities, etc.	<input type="checkbox"/> Full <input checked="" type="checkbox"/> Short <input type="checkbox"/> None
<b>Affordability</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Labor</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	Project-affected people will be given opportunities for project-related construction work. Standard clauses with respect to international labor standards and national labor legislation will be included in the Report	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

<sup>1</sup> ADB. 2007. *Viet Nam Country Strategy and Program 2007–2009*. Manila

<sup>2</sup> ADB. 2006. *Operations Manual*. Section C2/OP: Gender and Development in ADB Operations. Manila (25 September).

		and Recommendation to the President and loan agreement.	
<b>Indigenous Peoples</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	Fact-finding during the TA showed no ethnic minority people living in the project area.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Other Risks and/or Vulnerabilities</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None		<input type="checkbox"/> Yes <input type="checkbox"/> No

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

Item	Total Cost
<b>A. Asian Development Bank Financing <sup>a</sup></b>	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	460.0
Number of Person-Months	29.0
ii. National Consultants	150.0
Number of Person-Months	25.0
b. International and Local Travel	70.0
c. Interpretation and Translation	20.0
d. Reports and Communications	30.0
2. Equipment <sup>b</sup>	10.0
3. Workshops, Training / Seminars, and Conferences	
a. Facilitators	10.0
b. Other Expenses for Workshops	35.0
4. Local Transport <sup>c</sup>	5.0
5. Technical Field Surveys <sup>d</sup>	70.0
6. Miscellaneous Administration and Support Costs	15.0
7. Contingencies	100.0
<b>Subtotal (A)</b>	<b>975.0</b>
<b>B. Government Financing</b>	
1. Office Accommodation and Transport	30.0
2. Remuneration and Per Diem of Counterpart Staff	20.0
3. Studies Undertaken by the Executing Agency's National Consultant	30.0
4. Contingency	40.0
<b>Subtotal (B)</b>	<b>120.0</b>
<b>Total</b>	<b>1,095.0</b>

<sup>a</sup> Financed by the Japan Special Fund, funded by the Government of Japan.

<sup>b</sup> One desktop computer, a printer, a scanner, and a photocopier.

<sup>c</sup> Rental of a 4-wheel-drive vehicle to inspect the pipeline route and boat rental to examine the offshore oil and gas exploration site as well as marine life in the coastal area.

<sup>d</sup> Geological technical surveys/investigations (such as water sampling/testing, soil sedimentation testing, and geological soil drilling to determine groundwater contamination, etc.) will need to be undertaken in preparing safeguard documents (i.e., environmental impact assessment, resettlement plan, etc.).

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The implementation of the project preparatory technical assistance (TA) will require the services of a multidisciplinary team of consultants providing 29 person-months of international and 25 national consultant inputs. Individual consultants will be engaged to expedite preparation of safeguard documents, undertaking of due diligence of the feasibility study, and preparation of the necessary financial and economic analyses.

2. The international environmental specialist will be the team leader for the environmental component, and will be responsible for coordinating the tasks of the international and national consultants in the project's environmental aspect and finalizing the environmental impact assessment (EIA) report and the summary EIA (SEIA). The team leader will be responsible for the quality and timely delivery of the EIA/SEIA reports. Similarly, the international resettlement specialist will be responsible for the overall output and for preparing a detailed resettlement plan. The consultants will be collaborating closely with each other in sharing information and providing cross inputs as necessary. They will be working under the overall coordination and monitoring of the project officer, who will ensure complementarity and cohesion among the consultants' outputs

3. The consultants are expected to work closely with the national experts of the Executing Agency (PetroVietnam [PV]), and the Implementing Agency (O Mon Gas Pipeline Project Management Board). The consultants will also meet and discuss issues relevant to the project with the Ministry of Industry (MOI), Electricity of Vietnam (EVN) and the provincial authority of Can Tho province. They will have access to all feasibility studies (FS) prepared for the project, financial reports of PV, corporate restructuring program of PV and information pertaining to the proposed project's FS. The detailed tasks of the consultants are described in Supplementary Appendix A.

### A. International Consultants

#### 1. Lead Environmental Specialist (5.0 person-months)

4. The lead environmental specialist as the team leader for the environment component of the project will have overall responsibility for preparing the EIA, SEIA, including an environment management plan (EMP) for the gas pipeline project that meets the requirements of both the Government of Viet Nam's regulations and *Environmental Assessment Guidelines* (2003) of the Asian Development Bank (ADB)<sup>1</sup> assess the impacts on and prepare related mitigation measures for water quality and terrestrial ecology; advise on public information and disclosure activities; liaise with PV and local authorities; and coordinate the activities of a team of international and national environmental specialists.

#### 2. Environmental Assessment Specialist (2.5 person-months)

5. The specialist will report to the environmental team leader and assist in the following: (i) review relevant project-related documents including the FS and concept design plans, and prepare a description and define the scope of the EIA; (ii) assist the team leader and team members in preparing detailed terms of reference (TOR); (iii) guide the environmental team

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<sup>1</sup> In the case of conflict between the Government's environmental regulations and ADB guidelines, the consultant will be expected to follow the ADB guidelines in preparing the EIA and the EMP and promptly inform the Government of that decision.

members in collecting and submitting primary data, if needed, and employing mathematical models as required per their respective TOR; (iv) oversee national consultants carrying out terrestrial ecology assessment and development of mitigation measures for the identified impacts; prepare documentation for inclusion in the EIA; (v) assist in preparing assigned sections of the draft EIA report and an SEIA report to meet both the Government's requirements and ADB's *Environmental Assessment Guidelines*; the EIA will follow ADB's SEIA format and include (a) the description of the project including that of the Government's legal and administrative framework of environmental assessment; (b) a description of existing environmental conditions in the project area; (c) identification of impacts expected during preconstruction, construction, and operation phases, including cumulative impacts of the O Mon power complex and offshore gas exploration and production platform; (d) assessment of alternatives to the preferred project option; (e) a description of public involvement and disclosure activities; (f) the EMP; and (g) conclusions and suggested environmental loan covenants; and (vi) prepare the EMP.

### **3. Air Quality Specialist (2.0 person-months)**

6. The specialist will report to the environmental team leader, assess the project impacts on air quality, and prepare mitigation measures and an EMP. Specifically, the specialist will (i) review the FS and related documents, and discuss with PV and agencies concerned the environmental concerns of the project; (ii) review air quality in the project area and assess the potential air quality impacts of the project and the alternatives during construction and operation, with a special focus on greenhouse gas emissions; (iii) conduct due diligence on environmental management of the offshore gas production platform and O Mon power plant, and assess cumulative impacts on air quality in the project area; (iv) prepare mitigation measures and costs; and (v) prepare relevant sections of the EIA and submit to the lead environmental specialist for compilation.

### **4. Marine Biologist/Fishery Specialist (1.5 person-months)**

7. The specialist will report to the environmental team leader and be responsible for assessing the impacts of the gas pipeline and production on the marine and coastal environment. Specific tasks are to (i) visit sites (both onshore and offshore) with PV staff and meet with local authorities to collect information on the marine environment; (ii) review data or reports available on the marine and coastal environment; (iii) assess the environmental impacts of the proposed gas pipeline project and offshore gas production on fishery; and (iv) prepare mitigation measures and costs, and EMP and related data for inclusion in the EIA/SEIA reports.

### **5. Natural Gas Engineer (3.0 person-months)**

8. The specialist will assess the technical and engineering aspects of the project including the operational safety, risks, and impacts of the proposed pipeline and associated offshore gas production plan. The specific tasks are to (i) review available data or reports on the technical FS and safety design of the pipeline and offshore gas production plan, visit the site to understand land use surrounding the project alignment, and identify potential operational safety issues; (ii) assess potential safety and risk issues of the pipeline and offshore gas production plans, and the adequacy of the safety and risk management plan of the proposed project; (iii) assess PV's capacity in gas pipeline construction, operation, and its maintenance; (iv) identify potential operational safety impacts of the proposal on nearby residential development and other sensitive land uses, and prepare an assessment report including relevant data for inclusion in the EIA/SEIA reports; (v) prepare recommendations addressing mitigation and risk management

practices during the construction and operation stages; and (vi) liaise with the resettlement/social consultant team to address issues associated with sterilization of land in the vicinity of the pipeline.

**6. Social Development, Resettlement, and Ethnic Minority Specialist (5.0 person-months)**

9. As leader of the social safeguard team, the specialist will (i) guide the national resettlement and social development specialists in determining potential permanent and temporary socioeconomic impacts of the selected pipeline routing, restricted access due to safety exclusion zones, access roads, and other associated facilities; (ii) prepare a resettlement plan and an ethnic minority development plan (if required) in accordance with ADB's relevant policies and guidelines with the assistance of the national social development and resettlement specialists; and (iii) review and provide guidance in the preparation of a social assessment report in the context of the project.

**7. Clean Development Mechanism (CDM) Specialist (4.0 person-months)**

10. The specialist will review the four O Mon power projects for their potential as CDM projects contingent on the development of the O Mon gas pipeline. The specialist will undertake the project in three phases. In phase 1, the specialist will develop O Mon I and III as CDM projects using an existing approved methodology. In phase 2, the specialist will prepare a methodology — if none exists — applicable to O Mon I and III. Phase 3 involves developing O Mon II and IV as CDM projects and assisting with their validation and registration.

**8. Project Financial Analyst (3.0 person-months)**

11. The tasks are to (i) carry out a financial analysis of the project including computation of the financial internal rate of return and an analytical review of 5 years of PV's audited financial statements and 10 years of projected financial statements, focusing on financial viability and tariff issues; and (ii) assess PV's corporate finance structure and recommend changes if necessary.

**9. Project Economist (3.0 person-months)**

12. The specialist will undertake economic analyses of the project and prepare reports of the analyses, including the sensitivity analysis, for inclusion in the EIA report.

**B. National Consultants**

**1. Environmental Chemist and Environmental Specialist/Deputy Environmental Team Leader (4.0 person-months)**

13. The duties are to assist the international environmental specialist team leader in (i) coordinating with PV and government agencies and the EIA team in preparing the EIA/SEIA, (ii) in consultation with local government agencies to the extent possible, assessing soil contamination with unexploded ordnance in the onshore project area and in the offshore area, and the project impacts on the environment due to excavation and contamination of soil in the project area; and (iii) prepare sections of the EIA report.

**2. Air Quality Specialist (1.5 person-months)**

14. Under the international air quality specialist's guidance, the national specialist will (i) collect air quality data and reports; (ii) conduct primary data collection, if necessary, and analyze the data; and (iii) help in assessing air quality impact and preparing mitigation measures.

**3. Maritime Safety Specialist (1.5 person-months)**

15. The specialist will assess safety impacts of the offshore pipeline and prepare a report for the team leader to incorporate in the EIA/SEIA. The specialist will (i) collect and review the FS report and relevant documents; (ii) collect and review data on shipping traffic in the offshore project area; (iii) assess the potential impacts of the project on shipping and pipeline safety, and recommend appropriate mitigation measures; and (iv) prepare a report on the safety impact assessment to help the lead environmental specialist prepare the EIA/SEIA.

**4. Marine Biologist/Fishery Specialist (2.0 person-months)**

16. The specialist will assist the international marine biologist in preparing a report assessing the marine environment and fishery activities. The specialist will (i) collect and review reports and documents on marine and coastal natural resources and fishery activities in the project area; (ii) visit the project site and participate in public consultation, if required by the team leader; (iii) prepare a report on the marine and coastal environment and fishery; and (iv) work together with the international marine biologist to assess the potential project impacts on marine/coastal fishery and recommend mitigation measures.

**5. Terrestrial Biodiversity Specialist (2.0 person-months)**

17. The specialist will assist the team leader in assessing the project impacts on the terrestrial ecology. Specifically, the specialist will (i) collect and review relevant reports and documents; (ii) visit the project site and discuss with government agencies concerned the natural environment of the area, and their concerns about the project's environmental impacts; (iii) identify any ecologically sensitive areas in the project site or vicinity; and (iv) prepare a report on the terrestrial ecological environment of the project area and the potential project impacts on the natural environment.

**6. Resettlement Specialist/Ethnic Minority Specialist (4 person-months)**

18. Together with and under the guidance of the international resettlement specialist, the national resettlement specialist will (i) prepare a social assessment report of the project and assist in preparing a resettlement plan and ethnic minority development plan (as required) in accordance with ADB's relevant policies and guidelines, and (ii) lead in analyzing and preparing the social impacts section of the environmental assessment.

**7. Social Development Specialist (2.5 person-months)**

19. Under the guidance of the international resettlement and ethnic minority specialist and in coordination with the national resettlement/ethnic minority specialist, the national social development specialist will prepare a social assessment report, a social awareness campaign on HIV/AIDs and a program for the prevention of human trafficking, and a gender assessment report in the context of the project.

**8. Project Financial Analyst (2.5 person-months)**

20. The project financial analyst will assist the international project financial analyst in carrying out full financial analysis of the project, including computation of the financial internal rate of return and an analytical review of 5 years of PV's audited financial statements and 10 years of projected financial statements, with emphasis on financial viability and tariff issues.

**9. Project Economic Analyst (2.5 person-months)**

21. The project economic analyst will assist the international project financial analyst in carrying out a full economic analysis of the project. The specific tasks are to (i) assist international consultants in obtaining necessary data and information (such as gas master plan, power master plan) for reviewing the national demand forecast for gas and gas supply by looking at the existing gas master plan of PV; analyze the past and present situation of gas supply-consumption and future supply-demand; and review and document PV's operational experience with existing pipeline projects; (ii) assist international consultants in confirming that the proposed gas pipeline project is part of the least-cost plan for supplying fuel to the O Mon power complex; identify and document alternatives to the project, including using imported coal to generate power and importing electricity from neighboring countries through the proposed Greater Mekong Subregion power grid, to meet the demand for electricity in the south; (iii) help international consultants in evaluating the economic costs and benefits of the proposed project; conduct full economic analysis of the project in accordance with ADB's guidelines on economic analysis of projects using indicators such as the economic internal rate of return and net present value; (iv) together with international consultants, conduct sensitivity and risk analyses of the project economics with respect to key parameters and assumptions; (v) assess PV debt sustainability with and without the project; and (vi) undertake a distribution analysis of project social benefits and work with the resettlement and social development specialists to identify the proportion of benefits accruing to the poor.

**10. Social Economic Surveyors (2.5 person-months)**

22. Social economic surveys of affected households in the project area will be undertaken. On the basis of the initial findings of the resettlement specialist in the field, specific terms of reference will be drafted and approval obtained from ADB for recruiting national experts in undertaking these baseline surveys.