

ELECTRICITY OF VIETNAM
POWER COMPANY N^o 2

RURAL ENERGY 2 PROJECT - PHASE 1A
IN CAMAU PROVINCE

ENVIRONMENTAL ASSESSMENT
REPORT

(REVISED)

Prepared by:

PC2 - RURAL ENERGY PROJECT MANAGEMENT BOARD

Hochiminh City, December 2003

FILE COPY

ABBREVIATIONS

ADB	Asian Development Bank
ASS	Acid Sulphate Soils
CPC	Commune People's Committee
DPC	District People's Committee
DONRE	Department of Natural Resources and Environment
DOSTE	Department of Science, Technology and Environment
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EVN	Electricity of Vietnam
GDP	Gross Domestic Product
GOV	Government of Vietnam
IEE	Initial Environment Examination
KVA	Kilovolt Ampere
LV	Low Voltage
MONRE	Ministry of Natural Resources and Environment
MOSTE	Ministry of Science, Technology and Environment
MV	Medium Voltage
PAH	Project Affected Household
PAP	Project Affected People
PC2	Power Company No.2
PECE	Power Engineering and Consulting Enterprise of PC2
PMU	Project Management Unit
PC	People Committee
RAP	Resettlement Action Plan
RE	Rural Energy (Project)
ROW	Right-of-Way
T/L	Transmission Line
VESDEC/EPC	Vietnam Environment & Sustainable Institute - Environmental Protection Centre
USD	United State's Dollar
VND	Vietnam Dong
WB	The World Bank

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EXECUTIVE SUMMARY

1. Introduction

The Rural Energy 2 Project (Phase 1a) - Rural Electrification for Camau Province (hereafter: the Project) is to distribute electricity to 12 communes of the 5 districts of Camau Province, created better conditions for socio-economic development in the remote rural areas.

This Report included an Initial Environmental Examination (IEE) and an Environmental Management Plan (EMP) aims at identification, prediction and assessment of the potential impacts of the project activities on the natural environment and on socio - economic conditions of the project affected households (PAHs). The report gives also recommendation of a proper Environmental Management Plan (EMP), a process of public consultation and information dissemination. This EIA Report will be used for Project approval and environmental management in all phases of project implementation.

2. Policies, Legal and Administrative framework

This EIA Report is prepared based on the Vietnamese legal framework and guidelines, of which the most important documents are: Law on Environmental Protection issued by the order of the National President on 10 January 1994; Government Decree N^o 175/CP dated 18/10/1994 guiding the implementation of the Law on Environmental Protection; Ministerial Circular N^o 490/1998/TT-BKHCMMT of MOSTE dated 29/4/1998 guiding EIA preparation and appraisal and the Vietnamese Standards for the Environment issued in 1995, 2000 and 2001.

This EIA is prepared based also on the WB guidelines and policies: Environmental Assessment (OP 4.01, BP 4.01, GP 4.01); Natural Habitats (OP 4.04, BP 4.04, GP 4.04); Cultural Property (OPN 11.03); Indigenous Peoples (OD4.20); Involuntary Resettlement (OD4.30) and Information Disclosure (BP17.50).

3. Scope of the Project

The Project includes installation of 837.06 km of distribution lines, of which 339.62 km are medium voltage (MV) lines and 497.44 km are low voltage (LV) lines. Total the substations are 333, which are pole-mountings substation type. This project will upgrade, rehabilitate of power network for Camau Province to support socio-economic development for people in the 12 communes of 5 districts.

The safety right of way (ROW) for the 1 phase, 3 phase MV and LV lines is 4m, 6m and 2m, respectively, from which all housing and other building facilities will be removed and all trees which are higher than 4 m have to be cut. The access roads for construction will be built from the rural roads as required; some parts of transmission lines will go through agricultural land.

The total project cost is estimated as 114,761.404 mil VND. Of which 83,811.312 mil VND will come from the World Bank (WB) loans.

The project period (from the pre-construction to beginning of the operation) is from the end of 2003 to the first half of 2005.

The project will be managed by the Power Company N2 (PC2) of the Electricity of Vietnam (EVN) and its appointed Project Management Board (PMB) for Rural Energy Project.

4. Baseline Data

In this report the major characteristics of the natural environment and socio-economic conditions of Camau Province and the districts in the project area are summarized. Due to location in the wetland mangrove or malaleuca forest ecological zones all 12 communes have rich biological resources but they are still poor in economy. All 12 communes in the Project area have some constraints in climate (draught in the dry season and inundation in the high tidal period), in soil quality (high salinity and/or acidity) and in low development of infrastructural facilities, education and health care. In 12 communes belonging to the project there are not natural reserves sites but some of them located nearby by wetland conservation sites in Cai Nuoc, Dam Doi, Nam Can and Tran Van Thoi districts.

In the project's communes there are some ethnic groups: Kinh is majority (occupied over 97% of total population), others ones: Kh'mer and Hoa (Chinese) are ethnic minorities.

5. Environmental Impacts

The potential impacts on the natural and socio - economic environment may be divided into 3 phases of project implementation. Impact scales may be classified as minor; major, unknown and no impacts.

• Impacts in the Pre - Construction Phase

Due to clearance of project ROW and substation sites in the pre - construction phase the project may create some impacts on ecological system: effect of vegetation clearing and tree cutting in ROW as all trees of as would be higher 4m must be cut down. However, the ROWs have a small area and they will not go though any mangrove and malaleuca forests and natural reserve areas, the impacts on ecological system are assessed as *minor* and *mitigable*.

The ROWs do not occupy any area of cultural, religious and historical sites in all communes. Therefore, impacts on these issues are not expected.

The most significant impact in the Pre-Construction Phase relates with relocation and resettlement. Total number of the Project Affected Households (PAHs) is 4,480 in which 33 are ethnic minority (Khmer); total area of land in ROW is 76,418 m²; total area of land affected permanently is 63,282 m² and total area of land affected temporarily is 13,136 m². However, this type of impacts is assessed in a Resettlement Action Plan (RAP) Report, prepared by the Project Owner.

The War residues (toxic chemicals and explosive materials) are not expected in the present agricultural and residential land in the project area.

- **Impacts in the Construction Phase**

During construction of the substations and transmission lines some impacts on the environment are expected:

- Air and noise pollution caused by construction machines
- Water pollution and change in landscape caused by construction spoil disposal
- Water, land, air pollution caused by disposal of wastes from worker's camps
- Labour accident caused by insufficient conditions in labour safety.

All above expected impacts during the construction phase are assessed as *minor* and may be well *mitigated* by proper management and technical measures given in the EMP in this report.

- **Impacts in the Operation Phase**

In this phase, the impacts may be created by operation and maintenance activities. They are impacts on biological environment by cutting tree for protection of transmission lines, environmental and health impacts fire hazard and by electric shock. These expected impacts are assessed as *minor* and may be *mitigated* by proper management and technical measures given in the EMP in this report.

The project operation may create various induced development, eg promotion in urbanization, trade, transportation, aquaculture, small industry et. which may produce both negative and positive impacts on the environment.

6. Environmental Management Plan (EMP)

EMP includes impact mitigation, monitoring and capacity building

- **Mitigation Measures**

Mitigation measures to reduce the project impacts will be carried out in 3 phases: pre - construction, construction and operation

During the pre - construction phase, the layout of the lines need to be concurred and cleared by the local authority to minimize the adverse impacts on local socio-economy.

A proper Resettlement Action Plan (RAP) prepared by PC2, based on the policies of GOV and WB, will be implemented to minimize the impacts to PAHs and support PAHs in rehabilitation of their economic activities.

In the design phase, the alternatives for each component need to be considered and selected to ensure they have the lowest impacts on natural ecosystem. The route of ROW will be discussed and agreed with the local authorities and relevant organizations. The substation will be equipped with all necessary protection devices. No transformers with PCB will be used in the project.

In the construction phase, mitigation measures include control of soil erosion, disposal of spoil material containing acidic materials, control of air and water pollution; ensure safety regulations in place, health care regulation for workers in camps and other measures. All measures will be included in the bidding documents for works.

During the operation phase, mitigation measures include control of ROW maintenance, access road to sensitive areas, control of fire hazards and ensure safety for workers and local residents.

- **Environmental Monitoring**

Since the Project is categorized as B class Project with very limited impacts to the environment, the environmental monitoring is focused on environmental performance of the construction and implementation of EMP. Contractors and related PMUs. The environmental monitoring will be carried out during construction and operation phases of the Project. Thirteen parameters are developed for monitoring.

During construction phase, Contractors will submit their monthly report on application of mitigation measures as specified in EA report and in bidding document. Three parties will actively involve in the environmental monitoring: PMUs of related Project owners (as an internal monitoring); Safeguard Independent Monitoring Consultant- SIMC (as an external monitoring); and Commune's leaders.

7. Public Consultation and Information Dissemination

Public consultation and information dissemination are necessary for this type of project.

Public participation for the project was conducted in December 2003

Consultants from PC2 have met with representatives of local Government (commune, district, provincial People Committees), environmental management agency (DONRE), local social associations such as the Women Union, Farmer Association etc. and representatives of PAHs in the project area to inform and receive their comments on the project. All of representatives support the project but they require PC2 to implement a good RAP and to protect the environment in all 3 phases of the project.

In the construction phase PC2 and PMU will continue proper programs on Public Consultation following the Guidelines of the WB and GOV.

8. Conclusions

From IEE study combining with preparation of EMP it may be concluded that the Rural Energy 2 Project (phase 1a) in Camau Province will improve electrical service in 12 communes of the province. It will greatly support socio-economic development, poverty alleviation for local people. It also may create some negative impacts on natural environment and socio- economy. However, all expected impacts are short-term and mitigable. PC2 and the Camau People Committee will implement all effective measures recommended in the EMP to mitigate the negative impacts, created by the Project and to monitor the project implementation.

1. INTRODUCTION

1.1. Report Objectives

The Vietnam Rural Energy Project (REP2) (Phase 1a in Camau Province) (hereafter "the Project"), including upgradation, rehabilitation and extension of power network to providing electricity for the remote rural areas in 12 communes of 5 districts (Thoi Binh, Cai Nuoc, Ngoc Hien, Tran Van Thoi, Dam Doi) in Camau Province. This will support development of the socio-economy and poverty alleviation in the province.

According to the guideline of the former Ministry of Science, Technology and Environment (MOSTE) of Vietnam, the projects in substation and transmission line development are classified as the projects of Class II. For projects of class II, it is not required to have EIA report but the "Registration to Meet the Environment Standards" is needed. However, according to the policies of the World Bank (WB) this type of projects is classified as the project of the Category B, which need to have an Initial Environmental Examination (IEE) to be combined to Environment Management Program (EMP). Therefore, this report is prepared following the WB guideline, in order to focus on the following objectives:

Generally describe the current environment status of the province/districts, where the project components are located.

Identify potential impacts on the environment of the proposed activities of the project during the pre-construction, construction and operation phases.

Screen and initially assess the impacts (in this IEE the negative impacts are main focuses for assessment).

Develop an Initial Environmental Management Plan (EMP), including measures for mitigation of the negative impacts and monitoring programs during the pre-construction, construction, and operation phases

Propose a process for public consultation and information dissemination for the project.

This IEE combining with EMP will help WB, Vietnam Environment Management Agencies and the Vietnam Energy Company (EVN) to approve and manage the project.

1.2. Methodology Applied in This IEE

From the technical aspects and location of the project, it is expected that the impacts of the project on the environment may not be complicated. Therefore, the method applied in this IEE is mainly based on judgment, checklist, matrix and network. No environmental model is necessary for quantification. After the screening the potential impacts, these impacts were assessed and classified.

In this study, the anticipated negative environmental impacts are classified into four categories: "major", "minor", practically "not significant" or "no impact" and "unknown impacts".

- A "major impact" can change an element of the environment or create a strong environmental modification. Such an impact can strongly affect an environmental

component and/or on a large group of the population.

- A "*minor impact*" may slightly change value or use of an environmental component and slightly affect on a small group of the population.
- Some activities of the project may not cause evident impacts. In such cases, the assessment will not be detailed but some commentaries will be given. This type of impact is identified as "*not significant*" or practically "*no impact*".
- Some activities of the project may cause some impacts but the magnitude of the impacts can not be predicted. This type of impacts is identified as "*unknown impact*".

In each type of impacts, there are "negative" and "positive" ones.

Beside the 4 categories, each impact may be assessed as "*mitigable*", "*controllable*" or "*uncontrollable*", "*local*", "*temporary*", "*short-term*" or "*long-term*", depending on the intensity and scale of the impact.

Based on the impact classification in the Environmental Management Plan different measures will be recommended to mitigate different types of impacts.

- *No impact and No significant impacts*: These impacts do not need to have measures for mitigation.
- *Minor impacts*: For this type of impacts, the appropriate measures for mitigation should be developed.
- *Major impacts*: It is necessary to have more detailed information and quantification of impacts, and measures for mitigation have to be designed more carefully during project preparation and construction.
- *Unknown impacts*: It is necessary to have further study to know the nature and scale of the impact.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. World Bank Policy on Environmental Assessment

The Project is classified as a Category B project and therefore requires the completion EA report, which is consisted of IEE and EMP. The World Bank's policy on conducting EIA is to follow Operational Policy 4.01: *Environmental Assessment* (January, 1999). This describes guidance on Bank's policies and procedures for conducting environmental assessments of proposed projects.

Additional World Bank policies that were considered through the EA process for this project include:

- *OP 4.01 Environmental Assessment*
- *OP 4.04 Natural Habitats*
- *OP 4.11 Cultural Property*
- *BP 17.50 Public Disclosure*

Detailed guidance on assessment methodologies and common impacts associated with transmission projects are found in:

- *World Bank, 1991. Environmental Assessment Sourcebook, Volume 3*
- *World Bank Operational Policies, 1993, 1995, 1999*
- *IFC, 1998. Environmental, Health, and Safety Guidelines on Electric Power Transmission and Distribution.*

2.2. Vietnamese Policy and Administrative Framework on Environmental Assessment

• Vietnamese Policy Framework

Vietnam's most relevant environmental policies for environmental assessment are:

Law on Environmental Protection (LEP) was enacted in January 1994

The LEP:

- Identifies the responsibilities of the state centre, provinces, organizations and individuals to prevent and remedy environmental deterioration and pollution and carry out specified environmental protection functions;
- Provides for the development of environmental standards and submission of environmental impact assessment reports on new and existing facilities;
- Provides for responsible parties to pay compensation for environmental damage;
- Establishes the right of individuals and organizations to petition for enforcement of environmental regulations;
- Calls for civil and criminal penalties for violations; and
- Encourages international environmental co-operation.

Decree 175/CP was promulgated in October 18, 1994 by the Government to guide implementation of the LEP and provides broad guidelines for division of responsibility

among Ministries; environmental impact assessments; pollution prevention and disaster control; sources of finance; and environmental inspections and standards.

Circular No. 490 was promulgated in April 29 1998 by the Ministry of Science, Technology and Environment (MOSTE) to provide guidance on setting up and appraising environmental impact assessment reports for investment projects. The Circular identifies the legal requirements according to the stages of implementation of a project and its category; defines the content of project subject to the EIA procedures; and specifies management of the EIA report appraisal.

To supplement the above key environmental assessment policies, there are a large range of laws, decisions, regulations, and standards may also be considered:

Law on Forest Protection (1992), this law regulates forest management, protection, development, and exploitation, prevention of wood-cutting, and forest destruction. It also encourages individuals and organizations to protect and develop forests.

Decree 54/1999/ND-CP specifies guidance on the protection of high-voltage networks.

Decree 70/1987-HDBT specifies safety casements of high-voltage transmission lines.

Decree 24/2000/ND-CP specifies the implementation on the Law on Foreign Investment in Vietnam (Article 82) concerning environmental protection as follows: 1) enterprises with foreign investment capital and joint ventures are obligated to observe regulations, satisfy standards in environment protection, and comply with Vietnam legislation on environment protection; 2) if investors apply international advanced environmental standards these standards should be registered with MOSTE.

Decree 52/1999/ND-CP was appended to include environmental considerations for construction management as follows: 1) for PFS, Provision 3 of Article 23 stipulates that requirements for environment study relating to the "selection of construction sites, estimation of land use area needed, in ways which comply to the principle of minimizing land use and environmental and social impacts, and resettlement to the lowest possible level". 2) Provisions 4 and 7 of Article 24 stipulate that FS must propose "specific site options (or regions, routes) which much match with construction plans (including documents on site selection, together with proposed solutions for minimizing environmental and social impacts)", and "architectural alternatives, construction solutions, preliminary designs suggested for selection, environment management and protection solutions". 3) For technical design: Section B, Provision 1, Article 37 and Section A, Provision 2, Article 38, contain regulations on appraisal and approval of "techniques for the protection of environment and ecology; for prevention and combating of explosion and fire and for occupational safety and industrial sanitation."

Decree 26/1996/CP provides regulations on the punishment of administrative violation of Environmental Protection Law. Chapter 1 describes the general provisions for punishment under the Environment Protection Law. Chapter 2, Article 6 details recommended punishments for parties who violate environmental pollution and prevention act. These punishments include financial penalties for not submitting an EIA report.

Vietnam Standards for the Environment (TCVN) are national standards established by MOSTE in 1995, 2000 and 2001 and applied to all government agencies. They include

engineering, construction, scientific, and environmental standards. TCVN environmental standards include acceptable limits of many air, noise, and water quality parameters. In general the list of biophysical parameters are broad enough such that most monitoring programmes can employ TCVN standards as metrics of evaluation. There are some exceptions - for example, sediment, soil, and vibration standards do not yet exist. In these cases, it is common practice for ODA projects to use standards from other countries or international organisations.

18 TCN-03-92 provides standards for safety clearances for 500 KV Electrical Equipment Installation Standards. Section 1 of this policy states numerous requirements. For example, trees outside of the ROW must have two meters clearance between conductors and trees, and the clearance between top of the trees and conductors in the ROW must not be less than six meters.

11 TCN-1984 sets the standard for minimum clearance between live parts of a line and trees. Trees outside of ROW must ensure two meters of clearance between conductors and tree parts. The clearance between top of the trees and conductors in the ROW must not be less than six meters. The ROW identified by two parallel planes is seven meters from the outer conductors when they are vertical and not less than two meters when conductors are at maximum swing angle.

- **Vietnamese Administrative Framework**

The Government of Vietnam is in the process of creating a new administrative framework for environmental management. For the Additional Works Project, the framework's relevant institutes are as follows:

Ministry of Natural Resources and Environment (MONRE). MONRE was established by a Prime Ministerial Decision on November 11, 2002. This new ministry includes four vice-ministers, 16 departments, one newspaper, and one magazine. MONRE merges numerous departments from several national agencies. These are outlined in Decree 91/2002/ND-CP: *Providing for the functions, duties, powers and organisational structure of the Ministry of Natural Resources and the Environment.*

Environmental Impact Assessment and Appraisal Department. This Department is under MONRE. According to Decree 91/2002/ND-CP, the Department's function includes: *To appraise environmental impact assessment reports of projects and of business and production establishments.* Environmental Impact Assessment and Appraisal Department is guided by the Vietnam's established regulatory framework: i.e. LEP, Circular 490, CP 175, etc.

Provincial Departments of Natural Resources and Environment (DONRE). Each provincial DONRE houses an Environmental Management Division (EMD). The EMD is responsible for ensuring environmental protection and management of provincial matters in accordance with LEP, Decree 175, and Circular 490. Hence, it is DONRE - and in particular, its EMD - that will likely play a key regulatory role during project construction and operation.

3. PROJECT DESCRIPTION

3.1. Project Name and Involved Agencies

Project Name: Rural Energy 2 Project (phase 1a) in Camau Province.

Investor: The Power Company No.2 (PC2) and;
Camau Provincial People's Committee

Consulting Company: The Power Engineering Consulting Enterprise (PECE)

3.2. Project Location

The development of substation and transmission lines in the framework of the project will be done in 12 communes belonging to 5 districts in Camau - a province in the Southern Mekong Delta. The characteristics of the natural and socio-economic conditions of the area, where the project is located, are summarized in *Section 4*. Name and area of the communes are given in *Table 3.1*. The location of 12 communes in Camau Province is shown in *Table 3.1* and *Figures 3.2*

Table 3.1: Location and area of the Project's communes

District	Commune	Area of Natural Land (ha)	Area of Cultivated Land (ha)
Thoi Binh District	Tan Loc Dong	4,064	3,422
	Tan Loc	2,762	2,556
	Thoi Binh	5,803	5,600
	Tan Phu	8,681	8,584
Tran Van Thoi District	Khanh Binh	3,474	2,402
Cai Nuoc District	Viet Thang	3,658	2,946
	Tan Hung	5,260	4,233
	Phu Hung	4,159	3,816
Dam Doi District	Ta An Khuong Dong	4,449	3,040
	Quach Pham	3,380	3,056
Ngoc Hien District	Tam Giang Dong	6,043	3,363
	Tan An Tay	10,488	3,275

Source: The Power Engineering Consulting Enterprise, PC2, 2003

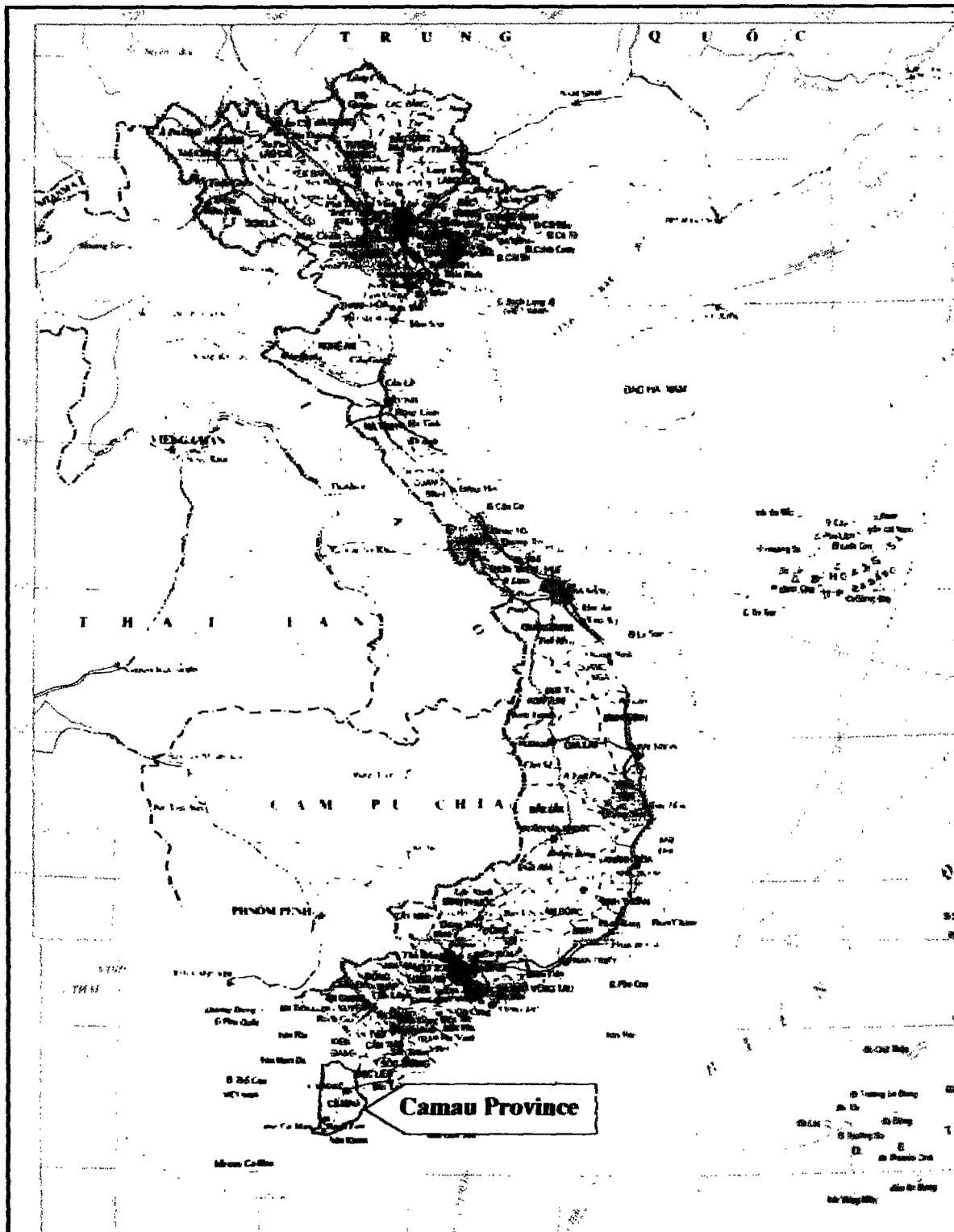


Figure 3.1. Location of Camau Province in Vietnam

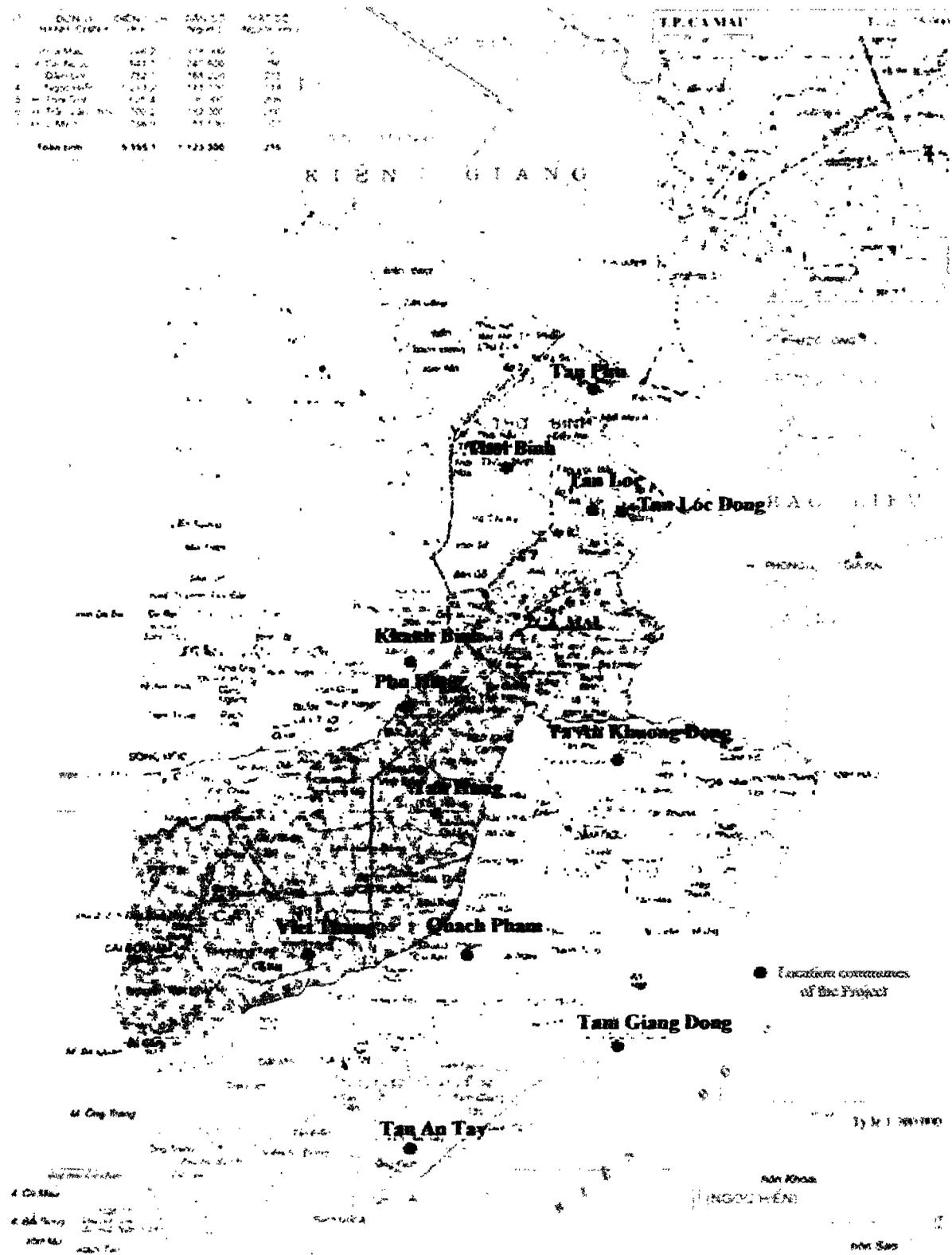


Figure 3.2: Location communes of the project

3.3. Basic Content of the Project

3.3.1. State of Electrical Resources

At present, electricity provided for Camau Province is supplied by the transmission line 110 kV from Tranoc - Cantho - Soctrang - Baclieu to Camau. 12 communes of the project area obtain electricity from stations: Camau station 110/35/22kV-2×40MVA, Cai Tau station 35/22kV-2×6.3MVA, Dam Doi station 35/22kV-2×6.3MVA, Tran Van Thoi station 35/22kV-2×6.3MVA, Nam Can station 35/22kV-1×6.3+1×4MVA and Cai Nuoc 35/22kV-2×6.3MVA.

These communes have Medium Voltage (MV) and Low Voltage (LV) framework. However, the transmission lines and substations are degraded and power transmission capacity is low. Therefore, a lot of households can not use electricity in domestic and production activities.

Table 3.2 describes the present MV and LV lines in the area of the project.

3.3.2. Projects Main Technical Features

The project is proposed for supplying the electricity to 12 communes of 5 districts in Camau Province in the period 2002 to 2005.

The technical features of the project are summarized as follows:

• Lines	Length
- <i>Medium Voltage Lines</i>	339.62
<i>Rehabilitation of the Medium Voltage Lines:</i>	<i>34.0 km</i>
In which:	
- 1 phase MV 2AC50 to 2AC.A50+2AC50:	4.5 km
- 1 phase MV 2AC50 to 3AC.A70+2AC50:	10.8 km
- 1 phase MV 2AC50 to 3AC.A95+2AC50:	18.7 km
<i>Building new 3 phases Medium Voltage Lines:</i>	<i>35.15 km</i>
In which:	
- 3 phase MV 3AC.A70+2AC50:	25.9 km
- 3 phase MV 3AC.A95+2AC50:	9.3 km
<i>Building new 1 phases Medium Voltage Lines:</i>	<i>270.47 km</i>
In which:	
- 1 phase MV 2AC.A50:	270.47 km
- 1 phase MV 2AC.A70:	0.0 km

Table 3.2: Existing Length and Number of Station in 12 Communes of the Project in Camau Province

Commune	Primary Station	Existing Medium Voltage Line					Existing Low Voltage Line		
		3 phase MV (km)	1 phase MV (km)	Total (km)	Number of substation (number)	Capacity (kVA)	Mixed LW (km)	Independent LW (km)	Total (km)
Tan Loc Dong	Caitau	11.6	12.42	24.02	19	385	9.25	8.82	18,07
Tanloc	Caitau Camau	5.35	6.2	11.55	11	375	21.35	20.34	41,69
Thoi Binh	Caitau	9.3	9.3	18.6	28	1.250	14.40	8.40	22,80
Tan Phu	Caitau	10.04	14.28	24.32	25	825	19.29	17.35	36,64
Khanh Binh	Tran Van Thoi	10.20	9.53	19.72	16	345	9.53	6.28	15,81
Viet Thang	Nam Can	6.14	10.67	16.80	11	200	15.07		15,07
Tan Hung	Cai Nuoc	7.71	7.23	14.94	10	300	12.80	0.20	13,00
Phu Hung	Camau	21.00	4.02	25.02	15	490	21.27		21,27
Ta An Khuong Dong	Camau	11.01	27.59	38.60	32	650	35.94	9.32	45,26
Quach Pham	Camau	6.33	21.47	27.80	27	753	24.05	9.60	33,65
Tam Giang Dong	Nam Can	1.62	21.25	22.86	17	395	21.67	3.94	43,36
Tan An Tay	Nam Can	10.28	25.48	36.30	24	575	19.28	8.82	28,10

Source: The Power Engineering Consulting Enterprise, PC2, 2003

- Building New Low Voltage Lines **497.44 km**

In which:

- 1 phase mixed LV 2AV50:	244.15 km
- 3 phase mixed LV 3AV50:	4.80 km
- 1 phase independent 2AV50+AC.A50:	246.89 km
- 1 phase independent 3AV50+AC.A50:	1.60 km

• Substations

333 new substations with total capacity are 6,617.5 KVA will be installed in the framework of the Project.

In which:

Substation 3×15kAV:	4/180	kAV
Substation 1×15kAV:	180/2,7000	kAV
Substation 1×25kAV:	148/3,700	kAV
Substation 1×37.5kAV:	1/37.5	kAV

3.3.3. Project's Socio-Economic Objectives

The project is targeted to:

- Rehabilitate and improve the current electrify framework
- Increase electrical ratio in the area's project from 43.2% (in 2002) to 81% (in 2005)
- Supply electricity for development of the main economic sectors of Camau Province, especially, aquaculture and small industries.
- Supply electricity to help rural people in poverty alleviation.
- Promote ability in management low electricity of local management
- Improve education, culture and health care for local people.
- Meet the increased demands in electricity supply of the province in the coming years.

3.3.4. Socio-Economic Benefits of the Project

The project will play an important role for assuring "Action Program of the Electricity of Vietnam" that by the year 2005, 100% of rural and mountainous communes will be electrified and 80% of their population will be demand in electrical supply. The project will satisfy the electricity requirement of the 12 communes of 5 districts in Camau Province in the period 2003-2010. Electric source will be provided by this project is:

- In 2003 - 2005 Stage:	35 kWh/household/month
- In 2005- 2010 Stage:	40 kWh/household/month
- In 2010 - 2015 Stage:	45 kWh/household/month

This may contribute in solution of electrical demand of project' area and implementation of provincial poverty alleviation program.

This will strongly promote economic development in the rural area of Camau Province. Therefore, the socio-economic benefits of the project are great.

3.3.5. Cost of the Project

Total Project cost included cost for equipment, poles erection, and other costs for improvement, upgrading and installation of the power network of Camau province as follows:

Table 3.3: Estimated cost of the project

Component	Domestic Capital (VND)	IDA (VND)	Total (VND)
<i>1. MV framework</i>			
Total basic costs	7,818,808,807	34,373,706,179	42,192,514,986
Total costs	11,521,167,949	39,592,762,105	51,050,930,054
<i>2. LW framework</i>			
Total basic costs	14,565,090,646	38,505,695,384	53,070,786,031
Total costs	19,428,924,506	44,281,549,692	63,710,474,199
3. Total Costs of Project	30,950,092,455	83,811,311,789	114,761,404,253

1USD = 15.600 VND (in December, 2003)

Source: The Power Engineering Consulting Enterprise, PC2, 2003

Capital sources:

- PC2's funds: 51.050.930.054 VND
- Domestic capital: 11.521.167.949 VND
- WB's loans: 39.592.762.105 VND
- Local loans: 54.790.844.199 VND
 - Domestic capital: 10.509.294.506 VND
 - WB's loans: 44.281.549.692 VND
- Capital contributed by population: 8.919.630.000 VND

3.3.6. Proposed Implementing Schedule

The project is planned to be implemented in the period 2002 - 2005

Progress of the Project is showed in *Table 3.4*

Table 3.4: Progress of the Project

Tasks	2003					2004												2005					
	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4		
Establishing Feasibility Study Report	██████████																						
Reviewing Feasibility Study Report				██████																			
Investigating Technical - Constructive Design		████████████████████																					
Reviewing Technical - Constructive Design						████████████████																	
Establishing Contracted File of the Project								██████															
Making Tender for Project Construction										██████													
Compensation and Resettlement												████████████████											
Construction														██									
Checking and Taking Over the Project																						•	
Summing up																						•	

Source: The Power Engineering Consulting Enterprise

3.4. Project Activities

The following activities of the project will be carried out:

3.4.1. In the Pre-Construction Phase

The safe corridor will have a width of 4.0 m for installation of MV transmission lines and 2.0 m for LV transmission line. Vertical distance from the lines to top of trees is not less than 2 m. Therefore, in the pre - construction phase at the designed safe corridor of the right of way (ROW) all 4 m - higher trees and all wooden trees in the corridor will be cut.

To clear the safe corridor all houses, shops, building facilities located in the safety distance should be removed partly or fully. Some areas of agricultural, aquaculture and residential lands will be used for construction of transmission lines and substations. According to a calculation of PC2, total area of land temporarily and permanently used for the corridor is 76.418 m².

According to results of the field surveys conducted by PC2 in 2003, no part of the natural forests and protected areas and nor any historical, cultural, religious sites are located the designed ROW.

3.4.2. In the Construction Phase

Along ROW various poles in each commune will be erected. Substations will be installed on some poles.

To erect poles some construction activities will be done: excavating a hole with 2000 mm in depth, 1700 mm in width for fixing MV poles in ground; disposal of waste excavated earth; transport of construction materials and poles.

ROW in most of communes is designed along the existing roadsides to minimize encroachment onto protected natural, historical sites, residential and agricultural land and to easily supply electricity for households. The electric lines will be installed on the erected poles or in the excavated ditch.

To rehabilitate and construct the MV lines various construction machines will be used and hundreds workers will participate in the project's activities during the construction phase.

3.4.3. In the Operation Phase

In this phase cutting trees encroached to the safe distance of the ROW will be done: maintaining poles and substations will be regularly carried out.

From the above describe activities and the characteristics of the environment (*Section 4*) the project may not create serious (major) impacts but various minor ones on the natural and socio-economic environment are expected (*Section 5*).

4. PRESENT BASELINE ENVIRONMENTAL CONDITIONS

The project area includes 12 communes in 5 districts: Thoi Binh, Tran Van Thoi, Dam Doi, Cai Nuoc and Ngoc Hien of Camau Province (*Table 3.1, Section 3*). The major natural environment and socio-economic conditions of the province and districts are specified as follows.

4.1. Natural Environment of Camau Province

4.1.1. Location

Camau Province is re-established in January 01, 1997 from the former Minhhai Province. The province has an area of 5,211 km² located in the latitude of 8^o30' - 9^o10' N and longitude of 104^o80' - 105^o5' E. It has a border with the provinces of Kiengiang at the North, Baclieu at the East, the East Sea (the South China Sea) at the South and the Gulf of Thailand at the West (*Figure 3.1, Section 3*).

4.1.2. Topography

Camau has topography of flat lowland with average elevation of 0.2-1.0 m. A great of its area is inundated by tide from the East Seas (the South China Sea) and the Gulf of Thailand, and from the dense river network. This condition created a wide wetland ecological area with a distinct mangrove forest ecosystem, in the Southern districts of Ngoc Hien, Dam Doi, Cai Nuoc and a typical melaleuca forest ecosystem in the districts of Tran Van Thoi, Thoi Binh. Annually, with a great sedimentation the length of the top of the Camau peninsula at Datnui (Ngoc Hien Districts) may extent to 30-40 m to the Sea.

4.1.3. Climate

Camau Province has a sub-equatorial tropical climate with 2 distinct seasons. The dry season with dominant E-NE wind, lasts from December to April next year. The rainy season with dominant W-SW wind lasts from May to November. Camau has highest rainfall in the Mekong Delta. In the rainy season rainfall occupies over 80% of the average annual rainfall of 2,360 mm. Rainfall unequally distribute not only in the months but also at the spaces: it is highest at the Western part (1,600-2,400 mm), and lowest at the Eastern part of the province (1,450-1,550 mm).

Average annual temperature is 26,5^oC with maximum of 38,3^oC in April - May and minimum of 15,3^oC in December - January. During the recent years climate in Camau has some changes in air temperature, humidity rainfall and sunny hours (*Table 4.1*).

Table 4.1: Change in climate in Camau Province (1996-2000)

Parameter	1996	1997	1998	1999	2000
Average annual temperature (°C)	26.9	27.2	27.9	27.0	27.3
Average annual relative humidity (%)	83.8	83.3	81.2	83.6	82.8
Average annual sunny hours (h)	1,960	2,223	2,232	1,918	2,019
Average annual rainfall (mm)	2,771	2,548	2,596	3,459	2,630

Source: DOSTE Camau, June 2002

4.1.4. Hydrology

Camau has a dense canal and river network, connecting the East Sea to the Gulf of Thailand and commune to other communes. The major rivers are Trem (in districts of U Minh, Thoi Binh), Ongdoc (in Tran Van Thoi), Dongcung, Bayhap (in Cai Nuoc), Ganhhao (in Dam Doi), Cualon-Bode (in Ngoc Hien) and Dam Doi (in Dam Doi). Total length of all rivers and canals is over 1,000 km. Due to location in flat, low land with dense river and canal system connecting to the seas most of area of the province is strongly affected by tides from the Sea. Tide from the East Sea is stronger than one from the Gulf of Thailand. With regular tidal influence, 5-6 decades ago, most of the area of Camau was covered by well-developed mangrove and melaleuca forests.

4.1.5. Soils

Camau Peninsula was newly formulated by interaction between sedimentation and sea in the last 6,000 years. Therefore, the major soils in the province relate with saline and acid sulphates.

In the province there are 4 main soil groups:

- *Acid sulphate soils (ASS)* occupied 334,925 ha (64.27% total provincial area) mainly in districts of U Minh, Thoi Binh, Tran Van Thoi and Cai Nuoc. Some communes of the project are located in ASS area: 4 communes in Thoi Binh District, Khanh Binh in Tran Van Thoi District and Phu Hung in Cai Nuoc District. This type of soils includes potential ASS and actual ASS. Potential ASS with high organic and nitrogen components and neutral pH is suitable for rice, sugar cane cultivation. Actual ASS has low fertility and low pH, which may cause constraint for agriculture.
- *Saline soils* occupied 150,278 ha (28.84% of the total area), in which 82,351 ha is moderate saline, 57,987 ha is low saline and the remaining is high saline and mangrove saline soils. Saline soils distribute mainly in Dam Doi, Cai Nuoc, Ngoc Hien districts. The project's communes located in saline soil area are Ta An Khuong Dong, Quach Pham (Dam Doi District), Tan Hung, Viet Thang (Cai Nuoc District), Tam Giang Dong, Tan An Tay (Ngoc Hien District). Saline soils are not suitable for agriculture but good for development of mangrove forest and saline aquaculture.
- *Peat soils* occupied 10,564 ha (2.03% of the total area) mainly in the U Minh melaleuca forest (Tran Van Thoi and U Minh districts). This type of soils has high organic and nutrient components, high fertility, which support to develop melaleuca forest and agriculture. However, in the recent years a large area of peat soils was burn, created acidity and reduced fertility of the soils. Peat soils are found in Khanh Binh and Tan Hung communes in the project area.
- *Sediment soils* occupied 9,057 ha (1.82% of the total area) mainly in districts of Ngoc Hien (7,632 ha) and Cai Nuoc (1,875 ha). This type of soils is formulated by sediment settlement at the coastal line therefore it has high salinity, suitable for mangrove forest and shrimp cultural development. In the project area sediment soils are widely found in Tam Giang Dong and Tan An Tay communes.

Area of sediment soils is continuously increased due to a rapid extension of the coastal line at the top of Camau peninsula with 30-40 m/year.

4.1.6. Water Quality

Due to great influence of seawater, *salinity* is main factor in water quality of all rivers and canals in the province. Salinity varies from river to river and from site to site at each river and from month to month.

In the dry season (March) salinity at the river mouth of all rivers varies from 28.4‰ – 29.9 ‰ (at Tan An Tay, Tam Giang Dong communes in Ngoc Hien District); at inland area salinity of the rivers is 15-21‰ (the Trem River at Thoi Binh) and 15-20‰ at Tan Loc communes.

In the rainy season salinity is significantly reduced: at the Trem river salinity is 24.5‰ in March but it is only 1.7‰ in September (*Table 4.2*). High salinity causes a great constraint for irrigation and domestic water supply but may be suitable for saline water aquaculture. Naturally, water turbidity and pH value of rivers, canals in the project's commune depend greatly on the location and seasons. In the dry season suspended solids (SS), turbidity is low (SS = 10-15 mg/L) and pH is neutral (6.5-8.0) in all communes. In the rainy season SS, turbidity are increased (SS = 50-150 mg/L) in all communes; pH is normally neutral, but in the beginning of the rainy season (May, June) pH of canals in Thoi Binh, Tan Phu, Tan Loc is low (4.5-5.0) due to leakage of acidic materials from ASS.

Water pollution caused by human activities is evident in the rivers and canals in the project's communes:

- *Organic pollution* of the most of the rivers is high with DO of 2.5-5.5 mg/L, BOD of 5-10 mg/L, which exceed the Vietnamese Standards for Water Source A (TCVN 5942-1995 for Water Source A), particularly at the dense populated areas BOD values are up to 15-28 mg/L.
- *Bacteriological pollution* at some sites is serious: at Kingxang, Chacbang canals at Thoi Binh, coliform bacteria is 24,000 MNP/100mL or 2.4 times higher the Vietnamese Standard for Surface Water (TCVN 5942-1995). However, at various rivers (Trem at Thoi Binh, Bay Hap at Cai Nuoc) bacteriological pollution is still low (coliform bacteria are only 9 - 4,600 MNP/100mL or still meet the Vietnamese Standard).

Concentration of iron (Fe) in all rivers and canals in the project's area is high (1.4 - 23.7 mg/L) due to leakage of run-off water from acid sulphate soils areas. Water pollution caused by hazardous compounds, e.g heavy metals and/or pesticides in rivers of Camau is still low, which meet the Vietnamese Standard for drinking water.

Data on surface water quality in Camau province and the project's communes are shown in *Table 4.2*

4.1.7. Groundwater quality

According to DOSTE Camau province, in general, at present, groundwater quality in a large part of Camau Province is good, meeting the Vietnamese Standard for groundwater (TCVN 5943-1995). However, salinity and/or acidity are problems at some places. Additionally, with the impacts of leakage of domestic and animal wastes various wells is polluted by bacteria.

There are not sufficient data on ground water quality at the project's communes.

Table 4.2: Water Quality of Various Rivers in some Project's Districts and Communes

Location	Date	pH	DO (mg/L)	Salinity (mg/L)	BOD (mg/L)	Fe (mg/L)	Coliform (MNP/100mL)	
• Bayhap River at Cai Nuoc District	- At mouth	Mar 2002	7.75	2.6	31.2	18	13.2	23
		Sep 2002	6.73	3.2	28.1	15	15.5	240
	- At Dongcung	Mar 2002	6.80	3.5	15.5	15	8.30	2,400
		Sep 2002	6.50	4.5	10.2	12	5.70	1,100
	- At Tan Hung commune	Dec 2003	6.85	5.2	8.5	10	3.50	2,400
• Ongdoc River	- At mouth	Mar 2002	7.90	3.94	28.4	25	1.4	43
		Sep 2002	6.77	5.10	9.70	20	1.2	150
	- At Tran Van Thoi Town	Mar 2002	7.41	8.25	21.40	22	1.4	90
		Sep 2002	6.37	3.30	2.50	15	0.9	240
	- At Khanh Binh	Dec 2003	7.20					
Quanlo - Phungiep canal (at Tan Loc Dong commune)		Mar 2002	6.85	2.5	15.5	28	1.2	46,000
		Sep 2002	5.75	3.5	4.5	17	0.8	11,000
Songtrem River (at Thoi Binh commune)		Apr 2003	6.90	3.8	12.5	12	2.5	4,600
		Oct 2003	7.20	4.5	3.5	5	1.8	1,100
Bode River (at Tam Giang Dong commune)	Dec 2003	7.50	5.5	28.5	8	2.5	240	
Vietnamese Standard (TCVN 5942-1995) Water Source A		6.5-8.0	6.0	-	4	1.0	5,000	

Source: DOSTE of Camau, 2002 and VESDEC, 2003

4.1.8. Air Quality and Noise Pollution

Most of the area of Camau Province is rural. Area of towns and industry are small, road transport is not developed. Therefore, at present, air pollution is not a problem in Camau Province as well as in the project's communes. According to data of the air quality monitoring of DOSTE Camau, concentrations of all air pollutants at all towns and districts still meet the permissible levels of the Vietnamese Standard for Ambient Air Quality (TCVN 5937-1995). Only dust (TSS) content in the air in district's townlets (Dam Doi) sometime is higher than the Standard (Table 4.3).

Table 4.3: Air quality and noise at some sites at the districts in the project's area, March 2002

Location of monitoring sites	TSS (mg/m ³)	NO ₂ (mg/m ³)	SO ₂ (mg/m ³)	CO (mg/m ³)	Noise (dBA)
1. Thoi Binh Townlet	0.13	0.05	0.05	ND	60-70
2. Sugar Plant at Thoi Binh	0.03	0.06	ND	ND	60-75
3. Tran Van Thoi Townlet	0.06	0.02	0.1	2.0	67-70
4. Cai Nuoc Townlet	0.10	0.012	0.1	0	64-67
5. Ngoc Hien Townlet	0.12	0.02	0.1	22	66-70
6. Dam Doi Townlet	0.33	0.02	0.2	0	56-60
Vietnamese Standard (TCVN 5937-1995)	0.30	0.40	0.50	40	70

Source: DOSTE Camau, 2002

From Table 4.3 it is clear that, beside of dust, noise pollution is not evidently found at the center of the townlet in the project's area where traffic is dense.

4.1.9. Biological Resources

Located in a large wetland area, Camau Province has high biodiversity in terrestrial and aquatic ecosystems. In the province 3 major ecosystems are identified: mangrove ecosystem, inland wetland (melaleuca forest) ecosystem and estuarine ecosystem. Area and quality of mangrove and melaleuca forests of Camau are largest and best in Vietnam.

• Mangrove Ecosystem

This ecosystem plays vital roles in protection of habitat for aquatic animals, support of sedimentation, control of soil erosion, clean up water pollution, reduction of waves and regulation of climate. Mangrove ecosystem occur in the districts of Ngoc Hien, Dam Doi, Cai Nuoc and Tran Van Thoi where are strongly affected by tide and sedimentation. The area of mangrove forest in the province is about 60,000 ha which is the largest in Vietnam but it is mainly replanted one. In Camau mangrove forest 93 species of vegetation with the dominant species of *Rhizophora*, *Avicennia*, *Sonneratia*, *Aegiceras*..., 6 species of amphibians, 34 species of reptiles, 124 species of birds and 28 species of mammal animals are identified. Some of them belong to the Rare or Endangered species listed in the Vietnam Red Data Book (*Pelecanus onocrotalus*, *Ibis*

leucophalus, *Leptoptilos dubius* (bird), *Lutra lutra* (mammal), however they are observed in the Namcan Mangrove Conservation site only..

Of the 12 communes in the project area the following ones still have mangrove forests: Tam Giang Dong, Tan An Tay (in Ngoc Hien District), Viet Thang (Cai Nuoc District) and Quach Pham (Dam Doi District).

Mangrove forest in Tam Giang Dong and Tan An Tay are rich but in Quach Pham and Viet Thang are poor. There are not conservation sites in these communes.

- **Inland Wetland Ecosystem (Melaleuca Forest Ecosystem)**

Inland wetland ecosystem with dominant melaleuca forest is typical terrestrial ecosystem in the Northwestern part of Camau Province. Melaleuca forests play important roles in soil stability, regulation of hydrological regime, prevention of acidification, storage of water for domestic and irrigation and conservation of biodiversity. Melaleuca forests are well developed on the peat soils and ASS in U Minh, Thoi Binh, and Tran Van Thoi districts.

In the past, area of melaleuca forests in Camau was over 100,000 ha. At present, area of melaleuca forests is only 37,100 ha. The largest melaleuca forests are Vodoi (at Tran Van Thoi districts) and U Minh (at U Minh district). Vodoi and U Minh are not located in the project's communes. The province has a plan to expand area of Vodoi melaleuca forest from 3,755 ha to 10,600 ha by 2010.

Melaleuca forests are vulnerable to impacts from human activities: they are easily burn by fire and died by drought or long-term inundation. In 2001 thousands ha of melaleuca forests in Camau were burn.

In Vodoi Melaleuca Forest 129 vegetation species of 36 families; 12 amphibians, 32 reptiles, 95 birds and 21 mammal species were identified. Some of wild animals listed in the Vietnam Red Data Book are: *Leptotilos dubius*, *Phalacrocorax carbo*, *Ciconia episcopus* (birds), *Felis chaus*, *Lutra lutra* (mammals).

Of 12 communes in the project area there are 6 communes where melaleuca forests grow: Tan Phu, Tan Loc, Thoi Binh, Tan Loc Dong (Thoi Binh District), Khanh binh (Tran Van Thoi District) and Tan Hung (Cai Nuoc District). However, melaleuca forests in all communes are poor. *There are not conservation sites in the project's communes.*

- **Natural Conservation Sites**

In Camau Province there are 1 National Park (Vodoi Melaleuca Forest at Tran Hoi and Khanh An communes, 3,394 ha), Nam Can Mangrove Forest (at Vien An, 4,472 ha), 2 Bird Sanctuaries at Dam Doi (at Tan Duyet communes, 129 ha) and Cai Nuoc (at Dong Thoi commune, 29 ha). *There are not conservation sites in the 12 project's communes (Figure 3.3).*

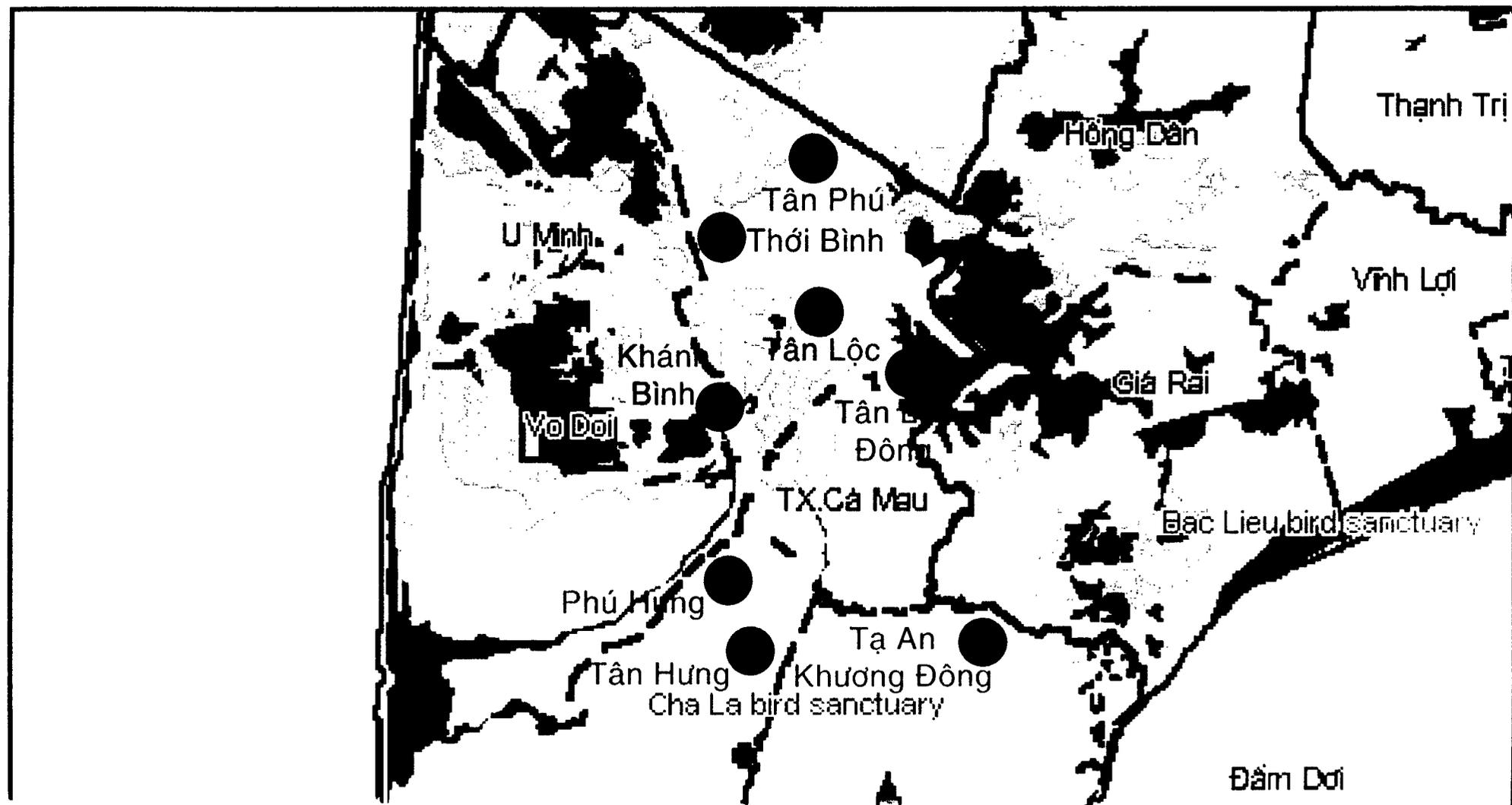
4.1.10. Socio-Economic Conditions

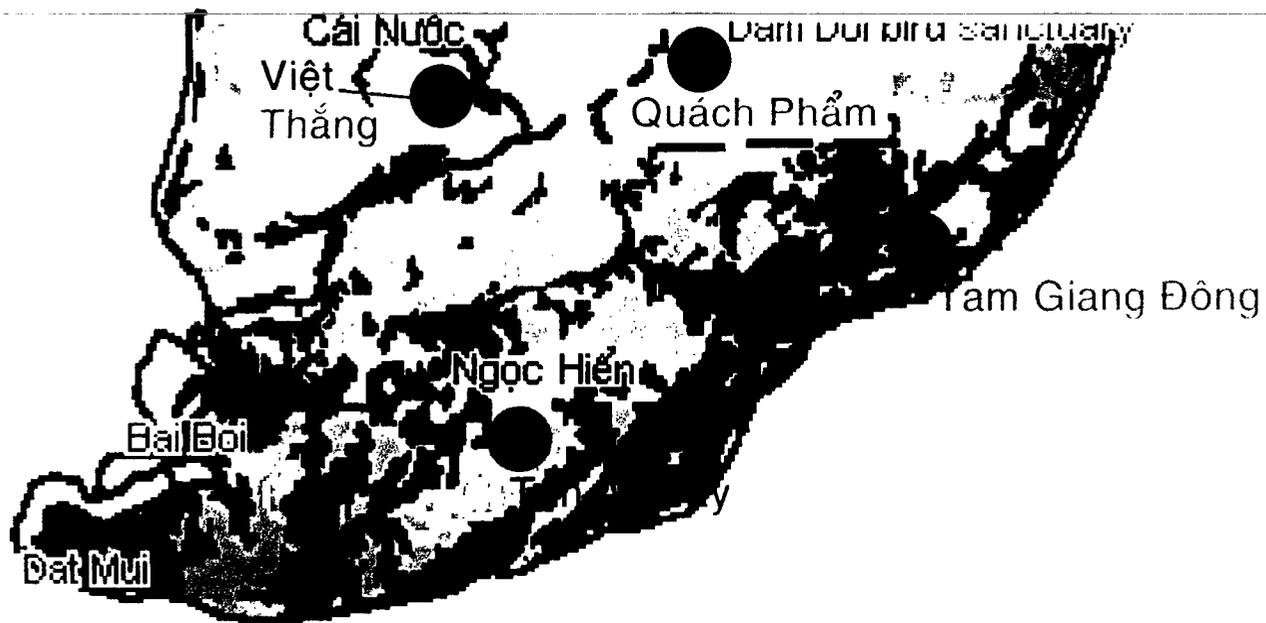
- **Present Socio-economic Conditions**

- *Economy*

Camau Province has an area of 5210,8 km², population of 1,245,000 inhabitants (2002), population density of 240 person/km², annual population growth rate of 2.15% (1992-2000) and 1.80% (2000-2002). In the province, there are 20 ethnic groups, in which Kinh occupy 97.16%; Khmers 1.86%, Chinese 0.95% of the total population.

Figure 3.3 **LOCATION OF PROJECT/KHU VỰC DỰ ÁN
CA MAU PROVINCE/TỈNH CÀ MAU**





Hon Khoai

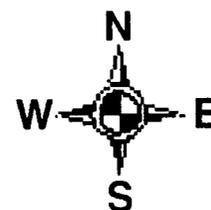


Vegetation type / Kiểu rừng

- Evergreen forest / Rừng thường xanh
- Coniferous forest / Rừng lá kim
- Deciduous forest / Rừng rụng lá (khôp)
- Semi-deciduous / Rừng nửa rụng lá
- Limestone forest / Rừng núi đá
- Bamboo / Rừng tre nứa
- Plantation forest / Rừng trồng
- Grassland and scrub / Đất trống
- Agricultural land / Đất nông nghiệp
- Water bodies / Mặt nước
- Mangrove / Rừng ngập mặn
- Melaleuca / Rừng tràm

Legend / Chú giải

- Protected area / Khu bảo vệ
- Province border / Ranh giới tỉnh
- - - District border / Ranh giới huyện
- Project area / Xã nằm trong dự án



Camau Province has one town (Camau City) and 6 districts: Thoi Binh, U Minh, Ngoc Hien, Cai Nuoc, Dam Doi and Tran Van Thoi.

In the period of 1991-2002, average economic growth rates of the Province was 7.75%. It was 11.2% in 2002. In general, Camau is still an agricultural province. However, during last 10 years economic structure is greatly changed with increase of industrial and construction sector, which occupied 13.21% in 1991, 16.70 in 1995 and 21.23% in 2002 in the total provincial GDP.

Contribution of service sector in the total GDP is increased which was 13.35% in 1991, 15.05% in 1995 and 21.07% in 2002. Contribution of agriculture, forestry and fishery sector is continuously reduced, which was 73.26% in 1991, 68.24% in 1995 and 57.70% in 2002.

GDP/capita of Camau is increased from USD 223 (1991), 267 (1995), 361 (2000) and 426 (2002).

- Infrastructural Facilities and Society

Although Camau has high economic growth rate but it is also still poor province with low development of infrastructural facilities (roads, airport, ports, electricity, water supply, wastewater drainage and treatment), education, science, technology and healthcare. Living standard of most of households, particularly households in the remote area at Thoi Binh, Cai Nuoc, Ngoc Hien, Dam Doi and Tran Van Thoi districts are still low. Poverty is still a problem in all districts and town. Therefore, poverty alleviation is one of the main tasks of the province.

- Culture

Camau Province consists of various ethnic groups. Each ethnic group has its typical culture (language, custom, holiday, religion).

In the province there are 4 major historical and cultural sites which were approved by the Ministry of Culture:

- Quan Am Temple, constructed in the middle XIX Century in Camau Town
- Hung Quang Temple, constructed in 1950 in Camau Town
- Tan Hung Temple, constructed in 1907 in Camau Town
- Hong Anh Library, established in the Early XX Century in Camau Town.

In 12 project's communes there are not cultural/historical sites approved by the Ministry of Culture as well as the provincial.

• Master Plan for Socio-Economic Development to 2010

On April 15, 2003 the People Committee (PC) of Camau Province has approved a Master Plan for Socio-Economic Development to the year 2010. The main features of the Plan are summarized as follows.

In 2010, GDP growth rate will be 10.3-11.3% to meet the total GDP to be 2.7-3.1 times higher than that in 2000.

Great change in economic structure: contribution of agriculture, forestry and aquaculture will be only 36%, industry and construction will be 38.5% and service sector will be 25.3% of the total provincial GDP.

GDP/capita will be USD 850

Electricity supply to 90% of households

Clean water supply to 85% of households

4.2. Environment and Socio-Economic Conditions at the Districts in the Project Area

The project area consists of 12 communes in 5 districts: Thoi Binh, Tran Van Thoi, Cai Nuoc, Dam Doi and Ngoc Hien. List of the communes in the project area is given in *Table 3.1 (Section 3)*.

Thoi Binh and Tran Van Thoi districts are located mainly in the inland wetland zone (melaleuca forest ecological zone) and Dam Doi, Cai Nuoc, Ngoc Hien districts are located in the mangrove ecological zone.

Environmental and socio-economic conditions of the districts in the project area are summarized in *Table 4.4-4.8*

Table 4.4: Summary of Environmental and Socio-Economic Conditions of Dam Doi Districts and Quach Pham, Ta An Khuong Dong communes

Natural Environment	Socio-Economy
<ul style="list-style-type: none"> - <i>Climate</i>: 2 distinct seasons: rainy (V-XI), dry (XII-IV): annual rainfall 1800-1900 mm (80% in the rainy season), average annual air temperature 26.5⁰C (max: 38.3⁰C, min 15.3⁰C), average annual humidity 85.6%; - <i>Hydrology</i>: coastal line: 25 km, diurnal tide: main river: Dam Doi and dense canal network; - <i>Topography</i>: flat, low elevation (0.2-0.5m), muddy swamp - <i>Soils</i>: saline soils (43.629 ha), ASS (30.666 ha) - <i>Water quality</i>: high salinity, low pollution, suitable for aquaculture but not for domestic use. - <i>Air quality</i>: good, meeting the Vietnamese Standard - <i>Biological resources</i>: Mangrove forest (7,989 ha) at coastal line and along rivers, canals. 64 vegetation species, 12 mammal and 12 reptiles, 319 fish species. A great area of forest area was changed into shrimp farms. 	<ul style="list-style-type: none"> - <i>Area</i>: District: 782.0 km² Quach Pham: 36.96 km² Ta An Khuong Dong: 32.08 km² - <i>Population</i> (inhabitant, 2002): District: 175,953 Quach Pham: 11,270 Ta An Khuong Dong: 9,611 - <i>Ethnic groups</i>: Kinh (97%), Khmer, Chinese - <i>Economy</i>: Annual growth rate: 14.6 (1996-2001). Contribution of sectors: Agriculture + forestry + aquaculture: 50%; Industry + construction; 23%; Service: 27% of total GDP. GDP/capita: USD 400 Poverty: 28% (1997) 11% (2001); - <i>Historical/cultural conservation site</i>: no - <i>Plan to 2010</i>: Landuse: Agriculture: 80% (no change), forest: 10% (no change), others: 10% (no

There is a Bird Sanctuary (129 ha) at Tanduyet commune. At the project's communes of Taankhuong Dong and Quachpham, there are not conservation sites.	change) GDP/capita: USD 840 Contribution in GDP: agriculture 65-67%, industry + service: 33-35% Compulsative education: basic secondary
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Table 4.5: Summary of Environmental and Socio-Economic Conditions of Ngoc Hien District and Tam Giang Dong, Tan An Tay communes

Natural Environment	Socio-Economy
<p>- <i>Climate</i>: similar to Dam Doi District</p> <p>- <i>Hydrology</i>: the district is located at the top of Camau peninsula, surrounded by the East Sea and the Gulf of Thailand. Strongly tidal influence. Saline water inundation in most of the district area.</p> <p>Dense river and canal network. The main rivers are Cualon - Bode. Duongkeo connecting the East Sea and Gulf of Thailand. There are 2 river flow across Tam Giang Dong and Tan An tay communes.</p> <p>- <i>Topography</i>: flat, low land average elevation 0.1-0.3 m</p> <p>- <i>Soils</i>: saline soils (100% area)</p> <p>- <i>Water quality</i>: strong salinity (ground and surface water). evidence of pollution caused by human activities (high BOD and bacteria)</p> <p>- <i>Air quality</i>: good, no pollution, meeting the Vietnamese Standard</p> <p>- <i>Biological resources</i>: Typical mangrove ecosystem: forest area: >20,000 ha. Conservation site: Nam Can (4,472 ha) at Vienan commune. Over 90 vegetation species, 6 amphibians, 18 reptile, 41 bird, 15 mammal species in this site.</p> <p>In the project communes (Tam Giang Dong and Tan An Tay) there is not conservation site.</p>	<p>- <i>Population</i> (inhabitant, 2002): District: 95,300 Tan An Tay: 9,622 Tam Giang Dong: 4,143</p> <p>- <i>Ethnic groups</i>: Kinh (97.8%), Khmer, Chinese (Hoa)</p> <p>- <i>Economy</i>: GDP growth rate: (1996-2002): 12%/year. Contribution in provincial GDP: Agriculture + forestry + aquaculture: 57.7%; Industry + construction: 20.5%; Service: 21.8% (2002).</p> <p>Poverty: 15% of population</p> <p>- <i>Education</i>: 96% of children (6-16 years) go to schools. 2 secondary schools and >50 primary schools</p> <p>- <i>Healthcare</i>: Limitation in medical service</p> <p>- <i>Historical/cultural Conservation site</i>: no</p> <p>- <i>Plan to 2010</i>: Annual GDP growth rate: 9 - 12%/year; increase of industry (development of Nam Can Industrial Park 200-300 ha); protection of mangrove forest; development of Nam Can Town; increase of electricity: 15-19%/year</p>

Table 4.6: Summary of Environmental and Socio-Economic Conditions of Cai Nuoc District and Viet Thang, Tan Hung, Phu Hung communes

Natural Environment	Socio-Economy
<p>- <i>Climate</i>: similar to Dam Doi and Nam Can Districts</p> <p>- <i>Hydrology</i>: coast line 18 km at the Gulf of Thailand. Dense river and canal network. The main rivers: Dongcung, Bayhap; canals: Caidoi, Baquan. Strong tidal influence. Large area is inundated by tide.</p> <p>- <i>Topography</i>: flat, low land, average elevation 0.2-0.8 m</p> <p>- <i>Soils</i>: saline soils (70% area), ASS (25%), other (5%)</p> <p>- <i>Water quality</i>: high salinity in all rivers, canals. Organic and oil pollution of river at harbours and residential areas</p> <p>- <i>Air quality</i>: noise pollution at fishing harbour, water way. No dust, SO₂, CO, NO_x pollution</p> <p>- <i>Biological resources</i>: Mangrove ecosystem but mangrove forest land is small (<5000 ha). A Bird Sanctuary at Dong Thoi commune (129 ha) (Figure 3.3). There is not conservation site in the project's communes.</p>	<p>- <i>Population</i> (inhabitant, 2002) District: 155,500 Commune: Tan Hung: 14,829; Phu Hung: 10,355; Viet Thang: 9,250</p> <p>- <i>Ethnic groups</i>: Kinh (96.5%), Khmer, Chinese</p> <p>- <i>Economy</i>: Annual GDP growth rate: (1995-2002): 9.5%/year. GDP/capita: USD 255 (2002) Contribution in GDP: Agriculture + forestry + aquaculture: 58%; Industry + construction: 22%; Service: 20% (2002). Poverty: 18% of population</p> <p>- <i>Education</i>: 95% of children of 6-10 years go to primary schools. 35 primary schools and 2 secondary schools</p> <p>- <i>Historical/cultural conservation site</i>: no</p> <p>- <i>Plan to 2010</i> Annual GDP growth rate: 9 - 12%/year; increase of industry, aquaculture, service; reduction of poverty to <10% of population</p>

Table 4.7: Summary of Environmental and Socio-Economic Conditions of Thoi Binh District and Tan Loc Dong, Tan Loc, Thoi Binh, Tan Phu communes

Natural Environment	Socio-Economy
<p>- <i>Area and location</i>: 625.41 km² in the North of Camau Province</p> <p><i>Climate</i>: similar to Cai Nuoc, Dam Doi Districts</p> <p>- <i>Hydrology</i>: No coastal line, dense canal systems, main canals: Langtram, Tanphong, Chacbang,</p>	<p>- <i>Population</i> (inhabitant, 2001) Commune: Tan Loc Dong: 5,012; Tan Loc: 9,856; Thoi Binh: 15,972, Tan Phu: 13,550 Population density: 215 inhabitants/km² Population growth rate: 1.75% (1996-2000);</p> <p>- <i>Ethnic groups</i>: Kinh (96.6%), Khmer</p>

<p>Trem. Slight influence by the tides from the Gulf of Thailand and the East Sea.</p> <ul style="list-style-type: none"> - <i>Topography</i>: flat. average elevation: 0.2 - 0.4 m - <i>Soils</i>: ASS: 45.116 ha (72.14%), saline soils: 16.231 ha (25.95%) - <i>Water quality</i>: salinity and slight pollution by organic matter, acidity. Ground water: no salinity, suitable for drinking water supply - <i>Air quality</i>: Slight noise, dust pollution at urban site - <i>Ecological Resources</i>: Melaleuca forest (10.079 ha). There is not conservation site in the district. 	<p>(3.01%) + 7 other groups</p> <ul style="list-style-type: none"> - <i>Economy</i> Annual GDP growth rate: 8.5%/year (1995-2002). GDP/capita: USD 187 (2000) (only 55% of the Province) Contribution in GDP: Agriculture: 70.8% (2000), 75.6% (1995); Industry 10.7% (2000); Service: 18.5% (2000), 16.7 (1995). Poverty: 23.1% of total households - <i>Education</i>: total school pupils 29,600 (22.06% total population); 30 primary schools and 2 secondary schools - <i>Healthcare</i>: Limitation in healthcare facilities - <i>Historical/cultural conservation site</i>: no - <i>Plan to 2010</i>: GDP growth rate: 9 - 10%/year
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Table 4.8: Summary of Environmental and Socio-Economic Conditions of Tran Van Thoi District and Khanh Binh commune

Natural Environment	Socio-Economy
<ul style="list-style-type: none"> - <i>Area and location</i>: 700.23 km² in the West of Camau Province - <i>Climate</i>: Similar to other districts of Camau Province - <i>Topography</i>: Flat. low land, average elevation: 0.1 - 0.5 m - <i>Hydrology</i>: coast line 22 km at the Gulf of Thailand. Dense river and canal network. Main rivers: Ongdoc, Dongcung. Strong tidal influence from the sea. In Khanh Binh there are Ongdoc and Tac Thu rivers. - <i>Soils</i>: saline soils 45%; ASS: 51%, other 4%. most of area of Khanh Binh is ASS. - <i>Water quality</i>: River water: high salinity; organic and oil pollution in Ongdoc river. Ground water: slight salinity, high content of 	<ul style="list-style-type: none"> - <i>Population</i>: District: 188,490 inhabitants, population dense 269 inh./km². Annual growth rate: 2.12% (1998-2002) Khanh Binh: 145,300 - <i>Ethnic groups</i>: Kinh (97.2%), Khmer, Chinese (1.71%) and 5 other groups. - <i>Economy</i>: Annual GDP growth rate: 8.5%/year (1996-2002); GDP/capita: USD 253 (2002) Contribution of economic sector: Agriculture + aquaculture: 65.5%; Industry: 15.2%; Service: 19.8%

<p>Fe</p> <p>- <i>Air quality</i>: slight noise and dust pollution at Songdoc Townlet: no pollution at other communes</p> <p>- <i>Biological Resources</i>:</p> <p>Rich in aquatic organisms and fish species.</p> <p>Mangrove and melaleuca forest: small area.</p> <p>In Khanh Binh there are not forests.</p> <p>No conservation site in the district and in Khanh Binh</p>	<p>(2002).</p> <p>Poverty: 15.5% of total households</p> <p>- <i>Education</i>: 91% population (>6 years); 95% ≥ 6 years go to schools</p> <p>- <i>Healthcare</i>: Improvement in disease prevention and care</p> <p>- <i>Historical/cultural conservation site</i>: no</p> <p>- <i>Plan to 2010</i></p> <p>GDP growth rate: 9 - 11%/year:</p> <p>Reduction of poverty</p>
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Sources: Table 4.4 - 4.8 are compiled by the Consultant from the reports on socio-economic of Camau PC and related District PCs, 2002-2003 and from data obtained by the Consultant during his survey in December 2003 at 12 communes

5. INITIAL EXAMINATION OF ENVIRONMENTAL IMPACTS

5.1. Screening for Potential Impacts

The Project, including the rehabilitation construction and the operation of MV, LV transmission lines and substations in 12 communes in 5 districts of Camau Province will play a very important role in the rural electrification program and poverty alleviation of the province. It will also create a great opportunity for overall socio-economic development of the remote rural areas of the province.

Beside the significant beneficial impacts, the RE2 Project in Camau Province may cause various negative impacts on the local environment and socio-economy. The potential environmental impacts are screened below (*Figure 5.1*). From analysis of the collected data and results of field surveys in December 2003 by the Consultant an initial examination of environmental impacts are given in *Section 5.2*.

5.2. Initial Assessment of Impacts Associated with the Pre - Construction Phase

5.2.1. Impacts Caused By Land Acquisition

In this phase of the project, the project activities will create significantly negative impacts on the households who will lose partly or totally housing facilities or lands for the preparation of ROW. Due to the number of the project affected households (PAHs) will be high (4,480 PAHs with 18,271 PAPs).

- **Number of Project Affected Households (PAHs)**

According to update of the PC2, number of PAHs in 12 communes are 4,480 (4,447 Kinh's PAHs and 33 Khmer's PAHs). In each commune number of PAHs is high, varied from 144 (Tan Phu commune of Thoi Binh district) to 584 (Phu Hung commune of Cai Nuoc district).

- **Area of Land Acquisition**

- *Permanent Land Acquisition*

Total permanent land acquisition is 63,282, in which rice land: 23,162 ha; garden 39,732 ha, upland crops 498 ha, but not residential land.

- *Temporary Land Acquisition*

Total temporary land acquisition is 13,136 ha. All of this area is rice land.

- **Loss of Plants and Crops**

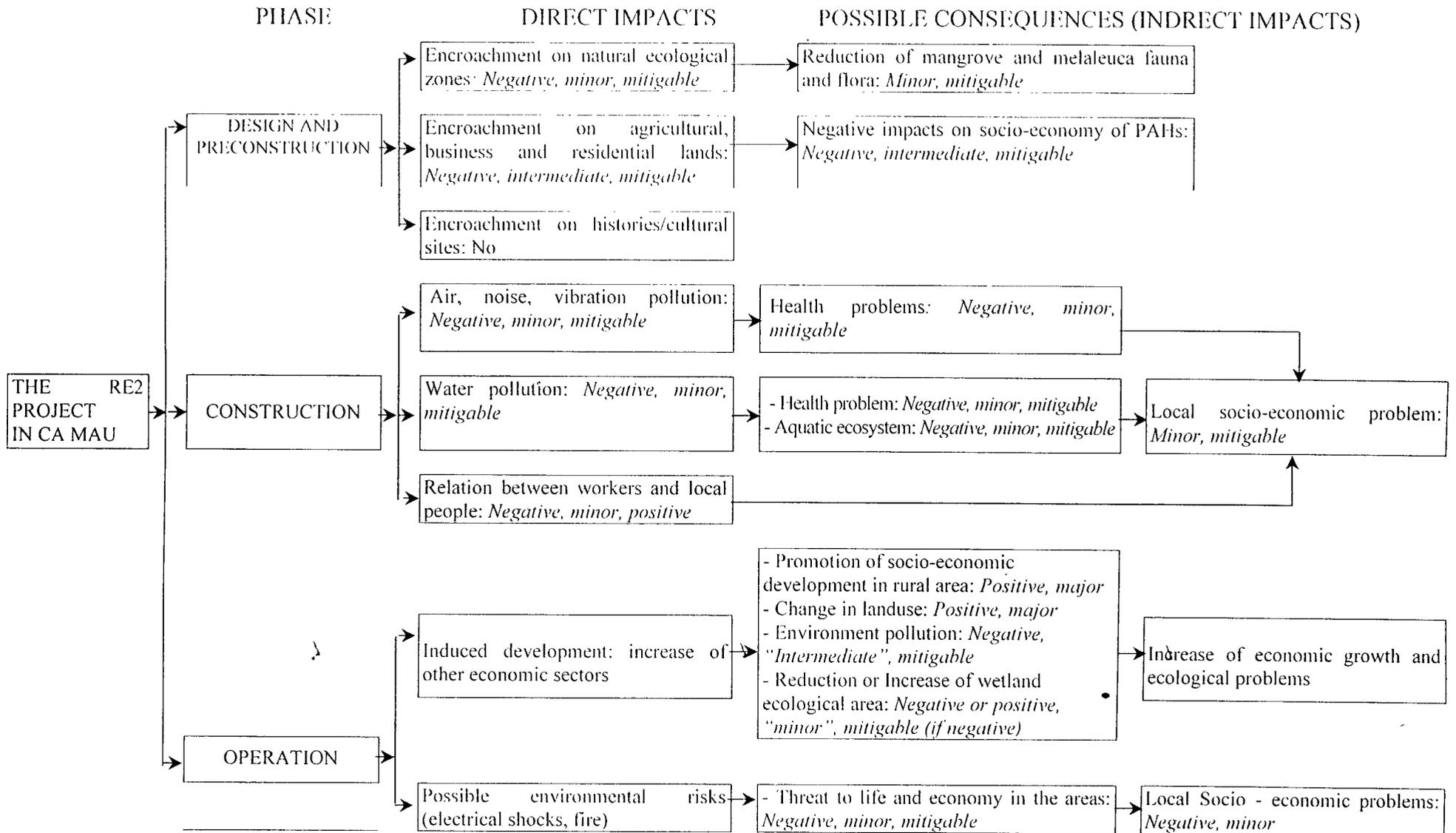
Beside land and houses affected, 1,570 coconut trees, 2,576 eucalyptus trees, 170 mango trees, 8,297 others trees will be cut by the project.

However no any area of mangrove and melaleuca forest will be cut off by the project.

With the above indicated data, considering the total area and total population of 12 communes and the positive impacts of the project, the anticipated negative impacts created by the project is assessed as "minor" and "mitigable" according to the impact classification given in *Sector 1.2*.

Impacts caused by land acquisition are detailly assessed in RAP Report prepared by PC2 for this Project.

Figure 5.1: Screening of potential environmental impacts of the RE2 project in Camau Province



The PC2 of EVN has set up a Resettlement Action Plan (RAP) (see detailed RAP Report). Proper implementation of this RAP the anticipated impacts on local socio-economy will be mitigated.

5.2.2. Impacts on Ethnic Minorities (EM)

In 12 communes of the project in Camau Province beside of the major ethnic group (Kinh) occupied over 97% total population of each commune, there are 2 minor ethnic groups: Khmer and Chinese. Socio-economic impacts caused by the Project on the ethnic groups are assessed in RAP Report.

5.2.3. Impacts Caused By the War Residues (Explosive Materials and Toxic Chemicals)

In the Vietnam War (1961 - 1975), American Army had sprayed great amount of the herbicides, mainly agent Orange, and other toxic chemicals on a large area of melaleuca and mangrove forests in Camau Province, especially in Thoi Binh, Ngoc Hien, Nam Can, Cai Nuoc districts. However, after 30 years, toxic chemical residues with evident amounts in all project's communes do not occur. Therefore, *impacts by toxic chemicals on the project preparation for ROW are not expected.*

During the War hundreds thousands of bomb, mines were used in Camau Province but the problem of residue of explosive materials in the residential and agriculture land has been solved in the period 1975-1985. Therefore, problem of residue of explosive materials may not be considered at the project ROW.

5.3. Impacts Associated with the Construction Phase

During the construction phase the expected potential environmental impacts are identified in *Section 5.1.2.*

The identified environmental impacts are assessed as *negative*. However, they will be *short-term, local, minor* and *mitigable*, due to the construction activities will only occur in a short duration and scales of construction (transport of materials and excavation for erection and substation) are small.

The main impacts are examined as follows.

5.3.1. Impacts on Air Quality

In the construction phase air pollution will be produced by dust (total suspended particulate, TSP), toxic gases (SO₂, NO_x, CO, volatile organic compound (VOC) from construction machines.

The major air pollutant in construction phase will be dust produced by earth works (digging, excavating, filling, levelling), using motorized machines. The affected receptors are areas surrounding the construction sites, as well as houses, cultural, religious buildings located at a distance of about 50m from the construction site. At this distance in the dry season and at the peak construction hours, ambient air quality may be degraded. However, number of truck and/or construction machines used for excavating pole's foundation is small so the impact of air pollution on these types of receptors is assessed as *minor*. This impact may be *mitigable* by technical and management measures (*see Section 6*).

5.3.2. Impacts Noise and Vibration

• Noise Impact

According to monitoring data, the present noise levels in the 12 communes in the project are low and meet the Vietnam Noise Standards (TCVN 5949-1995) (Table 5.1) excepted for some sites in urban areas. Table 5.2 shows ambient air values recommended by The World Bank (WB).

Table 5.1: (TCVN 5949-1995) Vietnamese Permissible Noise Level in Public and Residential Area (in dBA)

Area	Period of time		
	From 6h-18h	From 18h-22h	From 22h-6h
<i>Areas needed special low noise</i> (Hospitals, libraries sanatoria, kindergartens, schools)	50	45	40
<i>Residential area:</i> (Hotels, administration offices, apartment houses, etc)	60	55	45
<i>Commercial and service areas</i>	70	70	50
<i>Small industrial factories in residential areas</i>	75	70	50

Source: MOSTE, Vietnam Standards on the Environment, 1995

Table 5.2: World Bank Ambient Noise Quality

Receptor	Maximum allowable Leq. (hourly) in dB(A)	
	Day time (7:00 - 22:00)	Night time (22:00 - 7:00)
Residential, Institutional educational	55	45
Industrial commercial	70	70

Source: WB. Thermal Power - Guideline for New Plant, 1999

During the construction phase noise pollution may be caused by:

- Construction equipment
- Earth excavating activity
- Generators (if any)
- Vehicles used for material and pole transport

Noise level of special construction activities are evaluated as follow:

The work will require some types of machines, including trucks for earth excavating and moving. Noise from this equipment can reach 90 dBA each at 15 meters distance.

As the construction site is small, earthworks will be generally limited. Additionally most of the planned excavation sites is located at rice field or waste land but not in dense population site. Therefore noise impact is assessed as *minor* and *short-term*.

- **Vibration Impact**

During construction, the major potential vibration sources are material transport activity. Heavy vehicles may create high vibration. However, number of vehicles used for construction activities is small and the routes used for material transport will not go to dense populated areas, this impact will be *minor* and *short-term*.

5.3.3. Soil Erosion

The province is located in a flat region with soil structure being quite stable. The vegetation coverage in the area is relatively high. There are still some fall out land but the bare land are not observed. Therefore, soil erosion is often considered not a problem in the area. In addition, the overall Project impact on erosion during construction will likely be minor for the following reasons:

- The ROW required to construct medium voltage lines is only 4.2 m for medium voltage lines and 2 m for low voltage lines;
- The construction pole's foundation requires little excavation; thereby the rate of erosion will be minimal.

Therefore, soil erosion may be assessed as *minor* and *mitigable*.

5.3.4. Acidification

In this construction phase at each commune various poles will be erected. Volume of earth to be excavated is 8m³ for 3 phase MV pole and 6.4m³ for LV pole. Amount of waste (redundant) earth is 0.3m³ for each MV pole and 0.72m³ for each LV pole.

In communes at Tran Van Thoi (Khanh Hung), Thoi Binh (Tan Phu, Thoi Binh, Tan Loc) and Cai Nuoc (Phu Hung) districts area of acid sulphate soils (ASS) occupies 60-80% of the total one. ASS contains a great amount of acidic materials. In case of disposal of waste earth, containing acid materials into surrounding, acidification may be created when pyrite (FeS₂) and jarosite layer in the soil will be exposed to the air and water.

The conversion of ferrous sulphate to ferric sulphate occurs very slowly below pH4, but is rapid in the presence of microbial catalysts such as iron-oxidizing bacteria, which can increase the rate of oxidation a million-fold.

Run-off water may transport acidic materials to rivers, canals or ponds causing water acidification.

A high acidity (low pH) can kill shrimp and fish and may be a constraint for domestic and irrigation water supply. This is clearly demonstrated in the monitoring data of VESDEC/EPC for the WB's Project of Rehabilitation of the Southern Waterway and Cantho Port in 2002, 2003.

However, in this project, amount of ASS to be excavated will be small and a large proportion of the excavated soil will be re-used for site construction and will be

compacted and covered by sand, stone, and concrete, acidic materials will not greatly leak into rice fields, aquacultural ponds or canals.

Therefore, the impact of acidification on water quality caused by excavation of acid sulfate soils for making foundations of poles in the project area in Tran Van Thoi, Thoi Binh and Cai Nuoc districts will be only minor and mitigable. Acidification may not occur in Ngoc Hien and Dam Doi districts by project activity.

5.3.5. Impacts Associated With Worker Concentration

During the construction phase in each commune about 10-15 construction workers will work.

The following impacts may be contemplated.

• Environmental Pollution

Environmental pollution will be a problem at the camping sites, where domestic waste will be created.

Average amounts of waste to be daily produced by a group of 15 workers is estimated as follows.

- Daily domestic wastewater: about 1.5-2.0 m³
- Daily domestic solid wastes: about 10-15 kg

This amount of domestic wastes is small and the impact on the local environment is *negative but minor and mitigable*. However, it is necessary to be considered in management of sanitation during construction activity at each commune.

• Possible Transmission of Infections Diseases from Workers to Local Population and Vice Versa

In the 12 communes in project's area communicable diseases, such as water-borne diseases (diarrhoea, dysentery, typhoid fever), vector-borne diseases (Dengue fever, Malaria) are still common. In the circumstance of low sanitary conditions and daily contact between local people and construction workers, infectious diseases may be transmitted from workers to local people and vice versa. However, this impact may not occur if effective mitigation measures will be adopted by local healthcare systems.

• Conflict Between Construction Workers and Local People

In some cases, conflicts between the construction workers and local people may be caused by the following reasons:

- Difference in customs and traditions
- Difference in income
- Encroachment of workers to historical, traditional sites and customs of local people.

However, in the case of this project this problem is not expected, due to number of workers will be small and most of workers come from Camau Province, who knows the customs and traditions of the project's communes.

On the another hand, with the presence of workers education, culture and healthcare in the project' communes may be better, due to active contribution of workers to support

communes' activities. However, construction duration at each commune will be short this impact is expected as *positive* but *minor*.

5.3.6. Impacts on Transportation on the Route

In the construction phase in each commune, some trucks or boats will be used for transporting materials and poles. Therefore, construction works may cause some impact on the normal traffic activity at local roads and waterways.

However, number of trucks or boats used for the project at each commune is small and the routes for material transport will not go through urban areas, this impact is assessed as *negative* but *minor* and *temporary*.

The project will need to transport an amount of construction materials and poles. In some case, the vehicles with heavy load may cause damage the local roads. This impact is expected as *minor* and *mitigable*.

5.3.7. Health and Safety

The main health and safety issues during construction phase are: 1) industrial accidents for construction workers, and 2) electrical safety for construction workers and the general public alike. Each is discussed below:

- **Industrial Accidents:**

Construction workers are at risk from industrial accidents in the workplace. Working near heavy machinery, electricity, erecting transmission/distribution line all comes with their share of safety risks. The severity and frequency of industrial accidents increase when safety procedures are not implemented, when construction equipment is not maintained, when safety gear is not issued or worn, or when construction workers are not trained on safety procedures.

- **Electrical Hazards**

The Project's construction phase is subject to several types of electricity hazards. For example: 1) on-site electrical supplies will be required for a range of equipment and lighting needs; 2) excavation and land clearing may need to take place near existing electrical utilities; 3) the Project itself is constructing a very large electrical transmission system, which comes with its own unique set of electrical hazards; 4) the Project may need to provide temporary sources of power for households and businesses near project affected areas; 5) there is a risk that when improving existing power systems, the existing power system may not be turned off properly before the Contractor begins construction; and 6) there is a risk that when the Contractor connects the new transmission line to the existing transmission line, the existing line may still be operating (i.e. live). All of these situations could create a risk of electric shock to workers and the general public alike.

5.4 Impacts Associated with the Operation Phase

5.4.1 Social Development and Poverty Alleviation

The Project will satisfy in electric supply for tens thousands households in 12 communes of 5 districts in Camau Province. It will increase electrification ratio in 5 districts from 43.2% (in 2002) to 81% (in 2005). This provision will greatly help economic development and poverty alleviation - two pillars of Vietnamese

development policy. With the contribution of the project in rural electrification, development not only agriculture, aquaculture, but also industry, urbanisation and service sector will be induced in these remote communes. This will create good conditions for improvement of life of local peoples, including ethnic minorities. *This impact is considered as being positive and major.*

5.4.2 Health and Safety

- **Magnetic Field and Electric Shock**

As the voltage of the project is only 35 kV and lower, the magnetic field generated will have *no impact* on health of people living in or near ROW. According to US EPA, the highest measured magnetic field of a 500 kV line in ROW during peak usage is only 183 milligauss, which is lower than this one caused by domestic items (for example hair dryers, *Table 5.3*).

Table 5.3: Magnetic Field Measurements of 115, 230, and 500 KV Transmission Lines

Type of Transmission	Max on ROW (milligauss)	Distance from lines (milligauss)			
		15m	30m	60m	90m
115 KV					
Average Use	30	7	2	0.4	0.2
Peak Use	63	14	4	0.9	0.4
230 KV					
Average Use	58	20	7	1.8	0.8
Peak Use	118	40	15	3.6	1.6
500 KV					
Average Use	87	29	13	3.2	1.4
Peak Use	183	62	27	6.7	3.0

Source: US EPA, 1990

Electric shock is a danger for the human life during the operation phase if there is no proper preventive measure, particularly for the people in the remote areas, where people's knowledge about electricity is limited. However, this a good safety management of the Camau Electric Board, electric shock is expected as rarely occur. This impact is *negative* but *minor* and *mitigable*.

- **Oil and Hazardous Waste**

The project will use very small amount of oil, which does not contain hazardous chemicals as polychlorinated biphenyls (PCBs). From early 1990s PCBs were not allowed to be used in Vietnam Power System. Oil contamination may occur during refill of transformer oil, which will be conducted about every 2 years. Amount of oil leakage in this performance is expected very small and it will be collected to be reused. Therefore, oil and hazardous contamination by the project operation is assessed as *minor* and *mitigable*.

5.4.3. Impacts on Natural Ecosystem

During the project operation, cut a part of trees encroached into the transmission lines will be taken. This action will not cause strong fragmentation and disturbance of the natural habitats, due to the project's ROW will not be located in mangrove or melaleuca forests or in the natural conservation sites.

Operation of the electric transmission lines in Camau will not influence to the aquatic ecosystem in the project's communes.

Therefore, impacts on natural ecosystem are assessed as *minor* and *mitigable*.

5.4.4. Induced Development

With the rural electrification in 12 remote communes, in the near future several economic sectors: agriculture, aquaculture, industry, trade, tourism... will be rapidly developed in Camau Province. This will create good conditions for increase of income, education, health care for local people. In the another hand, this may cause various environmental problems: water and air pollution; shortage in ground water source, change in life style etc. These impacts are clearly examined in various places in Vietnam, where investment projects do not well integrate to environmental protection.

These impacts are expected as *negative* but *mitigable* by proper policy in sustainable development, which will be considered by GOV as well as provincial PC.

Induced development may cause negative impact on the local biological resources, particularly mangrove and melaleuca forests in Ngoc Hien, Dam Doi, Cai Nuoc, Dam Doi and Tran Van Thoi districts, due to promotion of encroachment into wetland ecological areas, expansion of aquaculture and residential areas.

On the contrary, induced development may create better conditions for biodiversity conservation due to improvement of living conditions may reduced encroachment of local peoples into forest areas. This is clearly demonstrated in various projects in rural areas of Vietnam particularly projects related to development of buffering zones at the conservation sites, supported by WB, ADB etc. Therefore, this impact on biological resources may be *negative* or *positive*, depending on the socio-economic and environmental management capacity of the districts.

5.5. Summary of the Project's Impacts Assessment

From the above environmental assessment a summary of the potential impacts is given in *Table 5.4*.

Table 5.4: Identification of Potential Impacts of the Project

No	Impact	Magnitude	Duration	Evaluation of Impacts
	Pre-construction phase			
1	Permanent and temporary land acquisition	Medium	Short/ Long	Minor, Mitigable
2	Project affected household	Medium	Short	Minor, Mitigable
3	Impacts associated with clearing the ROW	Small	Long	Mitigable

4	Health risk due to explosives, chemical hazard	None	None	No Impact
5	Loss of historical and cultural properties	None	None	No Impact
	Construction phase			
6	Surface water contamination	Small	Short	Minor, Mitigable
7	Noise and vibration	Small	Short	Minor, Negative
8	Soil erosion	Small	Short	Minor, Negative
9	Air pollution	Small	Short	Minor, Negative
10	Agricultural production due to temporary acquisition of productive land	Small	Medium	Minor, Negative
11	Traffic disturbance	Small	Short	Minor, Negative
12	Damaging of the roads	Small	Short	Minor, Mitigable
13	Solid waste generated from excavating work for pole foundation	Small	Short	Minor, Negative
14	Environmental impacts caused by construction worker	Small	Medium	Minor, Mitigable
15	Conflict between construction worker and local people	Small	Medium	Minor, Negative
16	Health and Safety	Small	Short	Minor, Mitigable
	Operation phase			
17	Development and poverty alleviation	Large	Long	Major Positive
18	Habitat fragmentation	Small	Long	Minor, Negative
19	Increase access to wild lands	Small	Long	Minor, Negative
20	Health and safety	Small	Long	Minor, Mitigable
21	EMF	None	None	No Impact
22	Impact on birds and avian	Small	Long	Minor, Negative
23	Oil hazardous waste contamination	Small	Long	Minor, Negative

6. ANALYSIS OF ALTERNATIVES

6.1. Alternatives to the Project

To select the best solution to supply the electricity to the communes in the Camau Province some alternatives may be considered: wind energy, solar energy, small hydropower plants and diesel generators. The following analysis was given by EVN:

- If diesel plants used. the beneficiaries would be much more limited than the proposed project
- Small hydropower plants may not constructed in Camau Province
- Wind energy is not suitable for Camau Province
- Solar energy would require tremendous investment to support the communes. This region has high poverty rate, not suitable for large investment.

The most advantageous alternative is to construct the electricity network, due to:

- The national network grid was already available therefore it was most cost effective to add to the grid rather than to develop new energy sources.
- Network is more reliable - is most common way to utilize energy by grid.
- Grid has added benefit of creating infrastructure for installing fibre-optic cables and other communications lines.
- Cost for this alternative is lower than the other ones

6.2 Alternatives Within the Project

For within the project. the following alternatives were considered: choice of optimal voltage of network. alignment of transmission and distribution lines. access routes for construction and operation. capacity of transformers, and location of substation. Since this project is the second phase of the Rural Energy 2 Project, one of the criteria in considering the project's alternatives is that its main features need to be consistent with those of the first phase, which have been taken into consideration during the execution of F/S, EIA, and Technical Design of the project-phase I.

6.3 The "No Project" Alternative

If the "No Project" alternative was implemented, 12 communes with tens thousands households in Camau Province could not access the network for use of electricity. Some of poorest people in the country remote areas will not likely have access to electricity of any kind in the near future. This will affect the chances of economic development and poverty alleviation for rural peoples in this province.

7. ENVIRONMENTAL MANAGEMENT PLAN

According to the World Bank Operational Policies (OP.4.01, January, 1999) the “*Environmental Management Plan (EMP) consists of mitigation, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels*”.

The World Bank OP.4.01 also considers that “*EMP is essential elements of EA reports for Category A projects*”. The Rural Energy 2 Project (Phase 1a) - Camau Province does not belong to Category A but it also needs the following measures recommended to prevent and mitigate potential impacts and to manage the project in the pre-construction, construction and operation phases.

7.1. Mitigation Measures in the Design and Pre-Construction Phase

7.1.1. Limitation of Encroachment Into Natural Protected Areas

In the design phase the Project should:

- Align route, design ROWs to avoid mangrove, melaleuca forests and natural conservation sites.
- Not allow using herbicides/defoliants to clear the trees within ROWs.
- Not allow burning the wooden residue after tree cutting.
- Not allow hunting wild animals during construction ROWs.
- Replant trees elsewhere, if forested areas must be traversed.

7.1.2. Implementation of Resettlement Action Plan (RAP) to Mitigated Impacts on PAHs

The RAP should be based on the Vietnamese legislation and the WB guidelines.

The basic guiding principle of the World Bank's policy on Involuntary Resettlement (World Bank: OD 4.30) is that the affected people should be “*assisted in their efforts to improve their former living standards, income earning capacity, and production levels, or at least to restore them*”.

In the recent years, the Government of Vietnam (GOV) has issued various policies and guidelines for compensation and support to PAHs in rehabilitation of life. Each province based on the general policy of the Government has its own resettlement policy, to better support PAHs. PC2 has prepared a RAP for this project following the Guidelines of the Government, Camau Province combined with the WB policies. Applying this RAP the negative impacts on the PAHs are expected to be significantly mitigated. The main items of the RAP, which should be implemented by PC2 are:

- Select alignment with minimum affect to houses, shops, cultural, historical site
- Align ROWs, so that land acquisition could be minimized
- Adjust project structures to minimize impacts on remaining PAHs
- PAHs will be fairly compensated for loss of land and/or houses and supported to rehabilitate their business.

7.1.3. Investigation and Removal of War Residues (Mines) Before Construction

This activity will be conducted only in cases of the ROW will go to the area where explosive materials were not removed.

7.2. Mitigation Measures in the Construction Phase

7.2.1. Mitigation Measures for Impacts on Natural Ecosystems

• Protection of Terrestrial Ecosystems

There is no conservation site in the project area, specific, recommendations for their conservation are not required. However, propaganda and education for construction workers about wildlife conservation and environmental roles of wetland ecosystems should be conducted, so that, they would not encroach into forest or protected sites.

• Protection of Water Quality and Aquatic Ecosystems

- Disposal of solid waste (construction waste, sand, stone etc.) and waste grease and oil from construction equipment to canals, ponds, rivers or wells should be avoided. All these wastes should be collected and transported to the approved disposal sites at each commune.
- Disposal of excavated earth containing heavy, acidic materials to rivers, canals and ponds should be avoided. This type of soils should be used for road or house foundation construction.
- The project (Contractor) should install adequate sanitation systems (for example mobile toilet facilities) for workers or require them to use public sanitation facilities to prevent untreated domestic waste discharge.

These measures should be required in bidding document and strictly applied during construction.

- Discharge and disposal of domestic waste from construction camps into water sources should be avoided. Domestic solid wastes should be collected and transported to the disposal sites of each commune.

7.2.2. Prevention of Soil Erosion and Soil Loss

Soil erosion should be well managed during the construction phase.

After finishing foundation of the pole excavated earth should be strongly compacted to avoid soil erosion caused by run - off water. Proper runoff and erosion control through land protection and drainage channels is needed. Excess soil should be disposed only at approved sites.

7.2.3. Mitigation Measures for Impacts on Air Quality

The following recommendations are given to mitigate air pollution at the construction site.

- During the dry season in some places, particularly in residential areas, periodic water spray at construction sites should be necessary for dust control.
- All vehicles transporting construction materials (sand, clay, cement, stones...) should be covered to prevent dust dispersion. Installation and maintenance of mufflers on vehicles are necessary.

All above suggested measures will be included in bidding document.

7.2.4. Mitigation of Noise Impacts

According to various studies on impacts of noise from transport, it is necessary to indicate that even at a distance of 100m from a strong noise source (>90 dBA) the sensitive receptors (residential, historical, religious, sites, schools, office buildings etc) will still receive noise level higher than the Vietnamese Standard for residential areas

(60 dBA - day time). Therefore, the various following measures should be applied to prevent noise impact from construction equipment and vehicles.

If the required distance to avoid noise pollution (about 50m) is impossible where construction operation will be necessary, measures of noise prevention for sensitive receptors should be considered: noise generation sources will be avoided in the night time and installation of adequate barrier at schools, temples, offices... for noise control.

Operation of heavy vehicles in the densely populated areas of the communes must also be properly managed to reduce noise generation, particularly at places near sensitive receptors (schools, temples, offices etc.).

7.2.5. Vibration Control

Due to vibration impacts on residential areas will be only a minor impact and vibration control is not simple, therefore specific measure for vibration control is not recommended.

7.2.6. Prevention of Labor Accidents and Occupational Health for Construction Workers

Besides education for workers in electric safety, installation of adequate construction camps and sanitation facilities for construction workers to control transmission of infectious diseases will be necessary. Constructors should provide workers with equipment for noise, vibration and dust control, where and when it is necessary.

Medical station at each commune will help construction workers when they will get labor risks.

7.2.7. Prevention of Conflict between Construction Worker and Local People

- Hire as much as possible local citizens for the simple construction work to avoid the influx of migrants.
- In cases where the worker camps are near the communes, the Employer could request that the Contractor provide accurate, timely and regular information about the construction team to the People's Committees in affected areas. With open communication and information, the People's Committee and Contractor will be able to make a joint informed decision about the management of construction team accommodation.
- After the Project finished, all camps will be completely removed and the campsites will be rectified to their original conditions.

7.2.8. Health and Safety

• Minimize Health and Safety Problems at the Construction site

- During the construction, workers' health will be protected in accordance with specific regulation on health and hygiene methods. Each independent work unit will appoint one medical staff with adequate competence to take care of the workers and treat diseases as malaria, typhoid fever, diarrhoea, and other transmitted disease.
- Special transportation vehicles that should be checked before use in compliance with transportation security regulation must handle transport of long MV poles.

- Before starting works on foundations, it is necessary to coordinate with relevant agencies to identify and avoid damage on water pipes, postal cables or power cables during foundation and tower works. standard safety regulations should be strictly followed.
- Facilities and equipment must be carefully checked in terms of quality and quantity before use. The Constructor need to appoint a person responsible for security supervision. This person will check production equipment, labour protection facilities and remind every one for care.
- During the period of energizing the system after the completion of the project. the safety engineer of PC2 will ensure that every step prepared for energizing the system strictly follows the technical and safety regulation in order to avoid electrical shocks for the workers and to ensure the safety of the whole system.

- **Minimize Impacts of Electrical Hazards**

The Contractor must contact the Camau Provincial Power Company to make sure that the existing power system has been turned off during the period that they:

- To connect new transmission lines to the existing system; and
- To improve the existing system. Construction Workers must wear safety clothes and tools approved by the Employer. This includes safety shoes, safety hats, gloves, etc.

7.2.9. Mitigation for protection of historical and cultural heritage

Even the Project's impacts on historical and cultural heritage are considered as No Impact. But during earth's excavation activities of the Project, if there is any historical and cultural heritage was found, construction workers should immediately stop the excavation and Contactor should report to PMU for further reporting to Provincial Department of Culture and Information for investigation and consideration.

7.3. Mitigating Measures in the Operation Phase

7.3.1. Prevention of Habitat Fragmentation and Increase Access to Wild Land

Return unnecessary access roads to the previous state.

Cooperate with local Department of Forest to regular control the use of access roads by local people in the remote or forested areas.

7.3.2. Protection of Health and Safety

- **Minimize the Impact of Problems Created Through Health and Safety Issues Unrelated to Electric Shock**

This can be achieved by the following:

- Regular and ongoing preventive maintenance and fault treatment for the transmission lines and substations. The Camau Power Company of PC2 will undertake operation management of the MV line and substations. The provincial Joint Stock Power Company will manage and maintain the LV lines.
- Regular and ongoing training on safety, basic techniques of the network operation and environment management should be provided to the operators. Only the successful trainees with training certificate can undertake the management and operation duty.

- Regular and ongoing tree cutting/trimming to ensure no trees in ROW are higher than 4m. This work will be carried out manually to reduce impacts on the environment. The use of herbicide for vegetation management will be prohibited. Local authorities, organizations and landowners shall supervise the tree cutting.
- Surge arresters for over voltage wave protection.
- Place automatic breaker on LV side for short circuit and over current protection.
- Place lightning arrestor on appropriate equipment.
- All the line passing the populated areas for this project have to be designed with the cable or insulated wires, so the accident by contacting with the bare conductors have been already minimized.

- **Minimize the Frequency and Severity of Fire Hazards**

This can be achieved by the following:

- The substation is designed and equipped with fire detection and prevention according to Government regulations.
- All workers will be trained for fire prevention and fighting.
- There shall be regular monitoring for compliance with fire prevention regulations.
- To eliminate the fire initiated by the short circuit: whole the system will be disconnected from the grids when faults occur.
- Periodically check all the protection equipment, in house wiring, and connection.

7.3.3. Control of Oil and Hazardous Waste Contamination

- Oil refilling of transformers should be done in the Workshop.
- No PCBs will be used.
- Use oil collectors during maintenance services for unexpected oil spills.

7.4. Summary of The Potential Impacts and Possible Mitigation Measures for Negative Impacts

The main potential impacts and Counter Measures for impact mitigation for the project are given in the following matrix (Table 7.1).

Table 7.1: Matrix of the Project's Potential Impacts and Mitigation Measures

Potential Impact	Possible Mitigation Measures for Negative Impacts
Pre-Construction Phase	
Encroachment to Forested Areas	- Align ROWs avoid encroachment to forested area
Project Affected Households (PAHs)	- Align route to minimize resettlement - Adjust project structures to minimize impacts on remaining PAHs - Provide and support policies compensation for PAHs
Land Acquisition	- Align route to minimize private land - Provide compensation for land acquisition - Good implement of RAP
Impacts Caused By Clearing	- Align ROW to avoid forested areas.

the ROW	- Compensate for loss of agricultural productivity
Cultural Property	- No impact – mitigation measures are not required
Construction Phase	
Encroachment into Forested Areas	- Provide for workers guideline to avoid encroachment into forested areas and damage wild animal
Soil Erosion	- Excavated soil should be strongly compacted after finishing pole foundation - Proper runoff and erosion control through land protection and drainage channels - Dump excess soil in approved locations
Water pollution	- Avoid disposal of construction wastes and domestic wastes into canals, ponds, river - Install sanitary facilities at worker camps
Impacts on Noise and Air Quality	- Use water sprays on roads and piles of dirt - Avoid night works in sensitive areas - Install barriers at sensitive receptors for noise control if necessary - Avoid use of horn, airbrakes, etc... in residential sites - Construction equipment should meet relevant TCVN noise and air quality standards
Electricity Hazards	- Work with Provincial Power Department to make sure relevant parts of system are turned off - Workers need to wear safety clothes and work with approved safety tools
Social Impacts Caused by Construction Workers	- Hire local people whenever possible - Work with People's Committees and relevant unions to identify and propose: i) measures to minimize impacts from social evils; ii) locations for worker camps; iii) develop and implement any necessary public education programmes for local people and workers - Maintain relations with PC and unions during construction - After construction, remove and rehabilitate worker camp areas
Health and Safety of the General Public	- Minimize health and safety problems at worker camps (provide mosquito nets, sanitation facilities, adequate sleeping accommodation, nutritious food, etc) - Ensure adequate safety equipment and safety training for construction workers - Ensure access to adequate medical facilities for construction workers - Application of proper safety and warning measures - Public information campaign
Operation Phase	
Social Development and Poverty Alleviation	- Positive impact – mitigation measure not required

Degradation of natural ecosystems	- Align route to avoid forested areas. If forested areas must be traversed, work with local authorities to replant trees/develop forest elsewhere
Health and Safety	- Support public education programme on hazards and safety measures for electricity management – both in the home and near transmission/distribution structures - Provide training to selected commune residents on electrical safety - Ensure regular operations maintenance of project structures

7.5. Environmental Monitoring Plan

In order to properly control environmental impacts of the project as well as evaluate effectiveness of mitigation measures, some programs of monitoring and oversight of the project will be implemented.

7.5.1. Legal and institutional backgrounds

• Legal documents

Monitoring for project implementation is required by the Government of Vietnam as well as the World Bank. The major legal documents related to requirement in environmental monitoring are indicated as follows.

- Environmental Protection Law of Vietnam, issued on 10th January 1994 by Order of the President.
- Decree N175/CP on 18th October 1994 issued by the Government, guiding implementation of the Environmental Protection Law,
- Circular N276-TT/Mtg on 6th March 1997 issued by the Ministry Science, Technology and Environment (MOSTE) guiding implementation of pollution control and environmental monitoring after approval of EIA report.

In World Bank Guideline for Environmental Assessment, Environmental Monitoring is strongly required.

• Monitoring Agencies

In Vietnam, now the Department of Environmental Protection (DEP) within MONRE is responsible for the national wide environmental management including environmental monitoring. A National Monitoring System which has been set up by the former MOSTE from 1994 includes various environmental research centres. These centres carry out monitoring on air, water quality and wildlife in the selected areas and prepare reports to DEP.

According to the law, projects and/or companies which may have environmental problems may carry out themselves suitable monitoring programs during construction and operation (“*internal monitoring*”).

At provincial level, Department of Natural Resources and Environment (DONRE) of Camau Province is responsible for environmental management in the provincial territory. DONRE Camau ask the Camau Provincial Power Service and Project PMU to conduct an environmental monitoring for the project and submit regular monitoring reports to DONRE for review.

7.5.2. Environmental Monitoring Organization

- During Construction Phase:

The Project Management Unit (PMU) of PC2 or Camau Provincial Power Service (PPS) will be responsible for internal environment monitoring in Camau Province

Communes' leaders are asked to submit their assessment on environmental performance of the Project.

- During Operational Phase:

The PMU or Camau Provincial Power Service will be responsible for internal environment monitoring.

In both phase (Construction and Operation) an *Independent Monitoring Consultant* (Safeguard Independent Monitoring Consultant – SIMC) will be hired by the project owner to conduct internal monitoring programs.

7.5.3. Organisation of Environmental Monitoring for This Project

The approach to environmental reporting will be to include a section called “Environmental Management Plan” into PC2’s regular quarterly project report to EVN and WB. The Environmental Management Plan section will address:

- Issues relating to the effectiveness of environmental mitigation measures being carried out and any required modifications:
- Environmental monitoring results collected during the quarter: and
- Issues to be addressed in the forthcoming quarter. The environmental information used to write this section of the quarterly reports will be based on the monitoring reports prepared by the safeguard independent monitoring consultant, the construction contractor, and the communes. Key details of these three information sources are provided below.

• Responsibilities of Safeguard Independent Monitoring Consultant (SIMC)

SIMC will be hired by the Project Management Unit of PC2 to monitor the implementation of the EMP. The SIMC will report its environmental monitoring results every six months during the construction period to PC2, EVN and the WB.

An example of Terms of Reference for the SIMC during construction period is as below. The Safeguard Independent Monitoring Consultant will:

- Visually look at the construction sites and make notes related to the following environmental issues, but not limited to:

- General clean up after construction works,
- Excessive clear cutting of trees beyond ROW in communal or forest land.
- Measures taken by the contractor for cleaning up woody residues after tree cutting
- Status of access roads (have they been closed if in a protected area, are they still being used and to what extent, how are they being controlled/managed and by whom), Application of mitigation measures for or sign of soil erosion along T/L due to tree cutting and/or around tower foundation
- Status of re-vegetation in the ROWs and tower foundation
- Impacts on construction works (level of noise, dust, and damage to roads due to earthworks and transportation of building materials)

- Status of construction worker camps and sanitation facilities for them
- Proper distance between the houses and T/L.
- Status of implementation of safety measures (signboards, restricted zone, fences, isolation etc.)
- **Conduct Public Consultation to:**
 - Assess the level of involvement by the local authorities in dealing with environmental issues (dust, noise, and damage to roads due to the transport of construction materials, tree cutting on public lands and protected areas).
 - Identify any other environmental issues and record environmental complaints from the PAHs.
 - Report on responses (if any) from appropriate local authorities on environmental complaints or non-compliance

- **Construction Contractor**

The construction contractor will submit to PC2 monthly progress reports on the implementation of their Site Environmental Management Plan (SEMP). The SEMP report shall have the following contents.

Example Annotated Outline for Quarterly SEMP Report

Title Page

Table of Contents

Introduction

1 paragraph to introduce the purpose of the report

Update of Priority Issues Identified in the Last Reporting Period

- *List priority issues identified in last report*
- *List progress made by Contractor in solving each issue*
- *List any issues, which have not been adequately resolved, and provide recommendations on how to resolve those issues. If they cannot be resolved, explain why.*

Results of the Environmental Management Activities in This Reporting Period

- *Report on the mitigation measures that are identified in the SEMP.*
- *Is each measure meeting its mitigation objective? If not, why not? Make sure explanation is clear and thorough.*

Conclusions for this Reporting Period

- *List all priority issues identified during this reporting period*
- *Provide advice as to how and when the Contractor will resolve each issue. If the issue cannot be resolved, provide an explanation as to why it cannot be resolved.*

Appendices

- *Completed survey forms and maps relevant to the EMP.*
- *Copies of any other communications between PMU, Contractor, PCs, etc regarding SEMP-related activities*

- **Communes**

Each participating commune will submit monthly reports to PC 2 during the construction phase. If deemed necessary by WB, EVN, or MONRE, the communes can also submit reports during pre-construction and operation periods. The commune-level reporting process need to be simple, consistent between communes, and accountable. To achieve these need, the process should have the following characteristics:

- Data Sources

There are two kinds of data sources: 1) Regular monitoring of environmental impacts and effectiveness of mitigation measures and based largely on visual inspections by an authorized data collector (see below); and 2) Opportunistic monitoring based on complaints/comments from local community to Commune PC or other bodies.

- Data Collector

Commune People's Committee member or appointee in each Project commune (e.g. Women's Union or Youth Union, individuals with environmental interests). The data collector would be trained in environmental monitoring during the regional workshop.

- Data Reporting Process

The monitoring form will be completed by the data collector every three months and submitted to PC 2. Data collector may provide additional information (photographs, letters, etc) as they see fit.

An example data collection form is provided in *Table 7.2*.

Table 7.2: Example Commune-Level Dada Report Format

Commune Name:		<i>Tan Phu</i>
District Name:		<i>Thoi Binh</i>
Reporting Period		<i>April 2004</i>
Environmental Impacts:		
<i>Impact / Mitigation Measure</i>	<i>Commune Representative Comments</i>	<i>Community Comments</i>
Project vehicles or activities increased ambient dust levels	No comment	No comment
Project vehicles or activities increased ambient noise levels	Some noise near hospital, but no noise other sensitive areas (schools, pagodas, etc).	Hospital staff complained about construction noise to Peoples' Committee and Dept. of Health.
Project activities polluted local rivers or lakes	No comment	No comments
Project cleared vegetation and this caused environmental impacts	No comment	No comment
Project activities created impacts on agricultural and/or residential land	Visited location where farmers complained and saw piles of dirt on their land	Some farmers complained that piles of dirt are being left on their paddy fields.
Project activities impacted cultural property	No comment	No comment

Project construction caused traffic impacts	Yes, sometime vehicles transported materials influence on normal traffic in commune's road	No comment
Project caused solid waste or liquid waste impacts	Noticed garbage was left around construction camp	No comment
Project caused social and health impacts of workers	No comment	Shopkeepers are happy to receive business from construction workers
Accidents	Two local workers were injured when some equipment fell on them during excavation activity.	No comment
Dust suppression measures	No comment	No comment
Erosion and sediment controls	No comment	No comment
Sitting of materials etc. to avoid exacerbation of flood effects, chemical pollution etc.	No comment	No comment
Waste management practices	No comment	No comment
Project activities caused any impact on birds, animals and rare flora	Some birds nets has been destroyed during cable pulling	No comment
Project vehicles damaged the roads	Yes, 1 km pf intercommune's road was heavily damaged. Need to be recovered before rainy season	The vehicles were too heavy. Need to change to smaller vehicles with less loads.
Other	No comment	No comment
Recommendations <ul style="list-style-type: none"> - Future construction near hospital should be limited to 07:00 to 11:00 and 14:00-17:00. During the time 11:00 to 14:00 is when hospital staff and patients resting, so they need quiet during this time. - More care should be taken to clean up construction camps - Contractor should make sure to keep piles of dirt in designated working areas - More safety equipment and training programmes should be given to construction workers to reduce accidents...especially for the local workers because they don't know much about worker safety <p> Signature of Commune Representative: <i>Tran Van Be</i> Title of Commune Representative: <i>Huynh Tan Ba,</i> <i>Vice-Chairman, Peoples' Committee</i> Date: <i>June 30, 2004</i> </p>		

7.5.4. Monitoring Plan

In this project a Environmental Monitoring Plan is suggested as follows (*Table 7.3*)

Table 7.3: Monitoring Plan During Construction, and Operation Phase

	Parameters	How to Monitor	Frequency	Responsible bodies
	CONSTRUCTION PHASE			
1	<i>Surface water turbidity and other matters related to soil erosion</i>	1) Visual observation to assess whether the excavation and other construction activities cause any pollution to the surface water, especially in term of making water to be more turbid. 2) The measures applied by Contractor to avoid the pollution of surface water in term of turbidity. 3) The measurement should be taken when there is some complaint from local people	monthly	- Technical supervisor for PMUs - Safeguard independent monitoring consultants
2	<i>Noise level around construction sites and adjacent residential areas</i>	1) Assessment (observation) whether (i) the noise level is unacceptable in the Project's residential areas (ii) The construction machines annoy local people. 2) The mitigation measures applied by the Contractor to avoid the noise impact 3) The measurement should be taken when there is some complaint from local people	as above	
3	<i>Dust</i>	1) Assessment (by visual observation) whether (i) the dust caused by construction is serious; (ii) the measures that Contractors are taken to control the dust level 2) The mitigation measures applied by the Contractor to avoid the dust level increasing in the area 3) The measurement should be taken when there is some complaint from local people	as above	

4	Tree cutting and access road management and control	1) Assessment (by visual observation) whether (i) there is any excessive clear cutting of trees beyond ROW in communal land 2) Measures taken by Contractors for cleaning up woody residue after tree cutting.	as above	
5	Solid waste and site cleaning up after the construction	Assessment by visual observation whether: 1) Construction residues are clean up after the construction 2) The way that Contractor disposes the solid wastes from construction.	as above	
6	Workers sanitation and safety facilities	Assessment by visual observation: (1) Status of solid waste and waste water disposal in camping sites (2) Hygiene and safety issues in camping site (3) Check the agreement with communes people committee if the workers stay in homes of local peoples	as above	
7	Transportation disturbance	Assessment by visual observation: (1) Whether the construction and other project's activities such as pole's erection, cable pulling cause any serious disturbance to the local traffic; (2) Necessary measures are taken to avoid the disturbance of traffic such as: warning sign for construction work, avoiding of heavy traffic hours, ... (refer to Mitigation measures for details)	as above	
8	Road degradation	Assessment by visual observation (1) The transportation of materials and equipment causes any damage to the local road system and how is the level of damage (2) The vehicles used for Project is overloaded that potentially cause the damage to the existing road system? (3) The Contractor has taken any measure to repair the roads that were damaged during transportation of Project's equipment and material. (4) There is any complaints from local peoples on the issue	as above	

9	<i>Status of application of safety measures</i>	Assessment of safety issue during construction: - Personal safety equipment - Technical and safety regulation to avoid the electricity shocks, electrical hazards etc.	as above	
10	<i>Construction material management</i>	Assessment by visual observation: (1) The management of construction material in the warehouses (2) The management of construction material in the construction site	as above	
11	<i>Impact on wild life, natural resource and induced impacts to protected areas</i>	Notice of Consultant on: (1) There is any evidence that the Project's activities cause any disturbance to the wild life and natural resource (bird, reptiles, mammal, animals), to the precise trees. (2) Any hunting, trapping by construction workers in Project area.		
OPERATION PHASE (monitoring is carried out for the 1st year of operation)				
12	<i>Maintaining of ROW</i>	Assessment by visual observation (1) The tree cutting: whether the right trees or right parts of tree are cut. (2) The proper maintaining of distance from houses to the ROW		
13	<i>Impact on wild life and natural resource</i>	Notice of Consultant on: (1) There is any evidence that the Project cause any disturbance to the wild life (bird, reptiles, mammal etc.) and natural resource (water, melaleuca, mangrove forest etc.)		

7.5.5. Estimated Cost for Environmental Monitoring Programs

Cost for the above designed monitoring program, for RE-2 Project – Phase 1a – Camau Province is estimated in *Table 7.4*.

Table 7.4: Cost Estimation for Environmental Monitoring for Project in Camau

No	Item	Amount (VND)
Construction phase		
1	Labour requirement: 2 man-months x 10,000,000 VND/month	20,000,000
2	Supporting cost (lump sum): accommodations, transportation, sample collectors, writing report	20,000,000
Operation phase (per one year)		
3	Labour requirement: 1 man-month/year x 10,000,000 VND/month	10,000,000
4	Supporting cost (lump sum)/year: accommodations, transportation, sample collectors, writing report	10,000,000
Total		60,000,000

7.6. Capacity Building

Environmental management is a relatively new task for the power sector. Therefore, prior to project implementation, there should be training for staff that will participate in EMP. Management staff will be equipped with knowledge on mitigation measures for environmental impact and monitoring plan.

7.6.1. Conducted training activities

The following training has been conducted to date:

- **May 2002**

Training Workshop on the environmental issues, conducted by international and national environmental specialists. The objectives of the training were:

- Legal documents on environment protection
- WB stipulations on safeguard policies
- Responsibilities and rights of state functional bodies in environment management
- Identification of typical impacts of power transmission line projects and mitigation measures

- **August 2003**

Hands-on learning-by doing training for improving environmental reports. Local and international consultants worked with PCs staffs to improve draft EIA and EMP reports.

- **September 2003**

Hands-on workshop for environmental assessment of transmission and distribution projects. International and national environmental specialists lead PC 2 staff and other participants on a field trip to test new tools for environmental assessment, held group work activities on challenges and opportunities to improve environmental assessment, and held lectures on WB safeguard policies and GOV environmental requirements for the Distribution and Transmission Lines Project.

7.6.2. Future Training

Future training includes the following activities:

- **EVN training**

Internal training course on how to monitor Sumps and how to report environmental results as part of quarterly and annual project reports. The training will also include the methods for corrective action plan if some of EMP activities do not go well.

- **PC2 training**

The following training will be provided for the staffs of local power service and partly for local peoples:

- *Safety training*: Regular training on safety issues related to the distribution network maintenance;
- *Environmental management for the Project*: Providing basic knowledge for staffs and local peoples about the environmental issues related to the protection and maintenance of distribution lines.
- *Monitoring and reporting of environmental management plan* for stakeholders of the Project's communes: The training will give guidance to the local stakeholders about the participation of local peoples during implementation of EMP. The training will also include the methodology for site observation and monitoring check sheet filling.

All of PC2 training will be carried out in the Project's districts or commune's level to save the time and enable local stakeholders to attend as much as possible. Cost for the future training activities is estimated in *Table 7.5*.

Table 7.5: Cost Estimation for Future Training Activities

No	Training	Items	Estimation	Cost (VND)
1	EVN training	-	-	Covered by EVN
2	PC2 training on safety (regularly carried out by provincial power service)	-	-	Included in operation cost of provincial power services

3	PC2 training on environmental protection related to distribution lines projects	Consultant's manpower requirement	1/2 man-month	5,000,000
		Perdiem for 40 participants	40 people x 1 days x 100,000 VND/day	4,000,000
		Other expenditures: classroom, stationery...	lump-sum	2,000,000
4	PC2 training on monitoring and reporting	Consultant's manpower requirement	1/2 man-month	5,000,000
		Perdiem for 60 participants	60 people x 1 days x 100,000 VND/day	6,000,000
		Other expenditures: classroom, stationery...	lump-sum	2,000,000
Total				24,000,000

7.7. Cost Estimation for EMP Implementation

To well conduct the proposed EMP the following budget is needed (*Table 7.6*)

Table 7.6: Estimated Costs for Implementation of the EMP (VND)

No	Item	Construction	Operation (20 years of life cycle)
1	Mitigation measures	The costs are covered in Contract with Construction Contractors	The cost is covered in production cost of the provincial power service
2	Monitoring costs	2 man-month*10,000,000 = 20,000,000	1 man-month/year x 10,000,000 (<i>Table 7.4</i>) x 20 years = 200,000,000
3	Capacity building	24,000,000	-
	Total	44,000,000	200,000,000 This cost is covered in production cost of the provincial power service
	Grand total for whole project	244,000,000 VND, excepted for cost for mitigation measures	

7.8. Environment Reporting Requirement

To properly manage the project regular reports prepared by the related units to submit to the relevant environmental management agencies are required. Reporting requirement and structure of the reporting process is shown in *Table 7.7*.

7.9. Institutional Framework for Environmental Plan

Institutional Framework for the EMP of RE-2 Project – Phase 1a – Camau Province is suggested in *Table 7.8*.

Table 7.7: The Environmental Management Reporting Requirement

TT	Issues to be Reported	1 st Reporting Level	2 nd Reporting Level	3 rd Reporting Level (a Copy should be sent to DONRE)
	Construction Phase			
1	Implementation of mitigation measures and Site Environmental Management	By: the Contractor Frequency: Monthly To: Related PMUs	By: the related PMUs Frequency: Quarterly To: Related Project owner - EVN - Province	By: EVN, Province Frequency: Quarterly To: The WB
2	Environmental monitoring	By: Technical supervisors of the PMUs Frequency: Monthly To: Related PMUs	By: The related PMU Frequency: Quarterly To: Related Project's Owners (EVN, Province)	By: EVN, Province Frequency: Quarterly To: The WB
		By: Commune's People Committee Frequency: Monthly To: Related PMU		
		By: SIMC Frequency: Half-yearly To: the WB, EVN	-	-
	Operation Phase			
1	Environmental monitoring including safety issues	By: Technician of Provincial Power Service Frequency: Half-yearly To: Regional PCs (PC2)	By: PCs (PC2) Frequency: Yearly To: EVN	By: EVN Frequency: Yearly To: The WB
		By: Technician of District Power Joint Stock Company Frequency: Half-yearly To: Ca Mau Province (through DOI)	By: Ca Mau Province (through DOI) Frequency: Yearly To: The WB	

Table 7.8: Responsibilities of Related Parties for Implementation of EMP

Party	Responsibilities
Electricity Vietnam (EVN)	Electricity of Vietnam (EVN) is Project owner for MV component of RE 2 Project. Within its component, the EVN is responsible for Project management including overall environmental management. To carry out overall environment management, within EVN, there is an Environmental Management Department. The department is in charge of guiding and supervising implementation of the EMP for the project.
Camau Provincial People Committee (Camau PPC)	<p>Camau Provincial People Committee is Project owner for LV component of RE 2 Project. Within its component the Provincial People Committee is responsible for Project management including overall environmental management. To carry put environmental management, there is a DONRE. DONRE is in charge of guiding and supervising implementation of the EMP for the Project.</p> <p>Futhermore, the PPC's responsibilities include:</p> <ul style="list-style-type: none"> - The PPC's responsibilities include: - Guiding and monitoring environmental management planning and implementation within the province - Approving methods of environmental protection and impact mitigation including estimated costs after DoNRE appraisal - Reviewing documents on environmental activities within the province area - Provide guidance and coordination between sectors and departments in EMP implementation - Approving the unit price for the compensation
Power Company No. 2 (PC2)	Power Company No.2 (PC2) is member organization of EVN and authorised to manage the distribution network in Southern Region. PC2 is responsible for the project implementation, including implementation of RAP and EMP.

Provincial Department of Industry (DOI)	Provincial Department of Industry is an organization under Provincial People Committee and is responsible for management of industry's development of the Province. In RE 2 Project, DOI is authorised by the Province People Committee to manage the Low Voltage component including of implementation of RAP and EMP.
District Power Joint Stock Company	District Power Joint Stock Company is established by the Department of Industry of Provincial People Committee to take responsibility to implement the LV component of RE 2 Project. District Joint Stock Company plays is overall responsible for implementation of RAP and EMP of the Project for whole of its lifecycle.
Project Management Unit (PMU) for RE Project of PC 2 (MV) and PMU of Camau Province (LV).	<p>Project Management Unit (PMU) of related Project owner is responsible for project implementation. PMU responsibilities include:</p> <ul style="list-style-type: none"> - Overall planning, management and monitoring of the environmental management - Ensuring that all environmental protection and mitigation measures of environmental impacts are carried out in accordance with policies, regulations on environment and other relevant laws. - Coordinating with provinces' people committees, provinces' power services and districts' people committee in environmental management activities. - Organizing training courses for local staff (provinces, districts), commune representatives and contractors' teams on mitigation measures and safety methods (professional experts on environment shall be involved). - Carrying out internal monitoring and supervising independent monitoring, which will be contracted with other consulting services of the project. - Supervising and providing budget for monitoring activities. - Reporting on environmental information to EVN, the concerned DONRE and the WB. - Implement changes or adjustments according to DONRE recommendations to protect the environment according to Vietnam's standards, laws, and regulations.

Consultant	<p>The Consultant will be selected and managed by PC 2 to conduct several project tasks, including:</p> <ul style="list-style-type: none"> - Preliminary survey and design - Preparation of feasibility study - Preparation of RAP and EA report - Preparation of some bidding documents - Carry out some EMP tasks, and assist PMU with environmental issues during construction.
Provincial Power Services (PPS)	<p>Provincial Power Services (PPS) are provincial-level dependent utilities of PC2. PPS is responsible for EVN's business within each province. For the RE 2 Project, the PPS will be in charge of the supervision of the contractors during construction and will be in charge of the operation of the project. For the EMP, the PPS is working with PMU directly in charge of the supervision of the implementation during the construction stage, and implementation of the EMP during the operation stage.</p>
Civil Works Contractor	<p>The Civil Works Contractor (Contractor) will be selected by PMU and approved by PC2 and Power Joint Stock Company. Their responsibility includes Project construction works and following contractor specifications outlined in the EA and EMP. This includes:</p> <ul style="list-style-type: none"> - Applying construction-phase mitigation measures - Ensuring safety of construction workers and local people during construction - Following Vietnam and World Bank policies on environmental protection during construction
Safeguard Independent Monitor (SIMC)	<p>Independent monitoring of the SEMP/RAP implementation will be engaged by Project's owners through their PMU. The budget for the SIMC is part of the RAP monitoring budget.</p>

Department of Natural Resources and Environment (DONRE)	<p>DONRE is responsible for state management on environmental issues within province's territory. As part of this responsibility, DONRE will review the EA report and determine whether an EIA report is required. If an EIA is not required, DONRE will issue an Environmental Permit for the project. During EMP implementation, DONRE will act as external regulator. Its duties will include:</p> <ul style="list-style-type: none"> - Monitoring the implementation of mitigation measures to minimize the project impacts in the construction and operation stage - Controlling and checking health of workers, operators and inhabitants - Managing and checking protection measures in relation to the impact caused by the project
Communes' People's Committees (CPC)	<p>The CPC's responsibilities include:</p> <ul style="list-style-type: none"> - Working with consultants to specify the potential impacts of the Project. - Monitoring environmental impact mitigation and protection process within the commune during Project's construction phase
Project Affected Households (PAHs)	<p>PAHs will directly participate in the survey on PAH duties and entitlements. Through these surveys they will: 1) have the opportunity to express their requirements and concerns to the above institutions; and 2) have input to the method and units of compensation. After compensation is complete, PAHs are responsible for co-operating with Contractor to clear relevant sites in a timely manner.</p> <p>In order to ensure that PAHs are well informed on the project, local authorities will provide PAHs with basic knowledge on project-related activities, and the negative and positive impacts they can have on the natural/social environment.</p> <p>PAHs will be able to have a role in monitoring the environmental effects of the project and the environmental performance of the contractor. PAHs will also be consulted during the project in relation to relevant environmental issues.</p> <p>PAHs will be allowed to bring legal action to an appropriate court if the PAH considers its claim for participation or information is ignored, groundlessly refused, or if provided information by local authorities was inadequate.</p>

8. PUBLIC CONSULTATION AND INFORMATION DISSEMINATION

8.1. The Need and Benefits of Public Consultation and Information Dissemination

The reasons for public consultation and information dissemination in the Project are manifold and include the following issue.

8.1.1. GOV Requirements

Project approval is contingent upon PAHs and local governments to agree:

- On the scope of the Project
- To participate in the Project, and
- To pay the connection and operating costs for the Project. It is expected that the proposed public consultation and disclosure process will improve channels of communication between stakeholders and thereby enable PAHs and local governments to support the Project.

8.1.2. WB Requirements

According to OP 4.01, borrowers of Category B projects are to make available the Category B environmental review summary to PAHs and local NGOs. This need to be done in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted. Category B projects are also required to make their environmental information available through World Bank InfoShop.

In addition to satisfying the above requirements, the benefits of a public consultation and disclosure programme include:

- Reduced risk of misunderstanding/tension between stakeholders
- Improved effectiveness of the environment management plan
- Improved social and economic benefits for Project beneficiaries and;
- Reduced risk of Project delays.

8.2. Public Consultation and Information Dissemination During the Pre-Construction Phase

During project preparation stage (2001-2003), the following activities were carried out:

8.2.1. Activity 1: Information and Discussion with Local Authorities on the Line Route

During the field survey for the FS, the consultant discussed project line routes with commune authorities in order to find the best route with the minimum need for compensation and minimum negative impact on the environment. After the preliminary alignments were designed, the consultants sent alignment information to the communes for their further comments.

8.2.2. Activity 2: Impact Survey and Statistics

Based on the agreed-upon alignment, survey teams detailed the alignment route on site and coordinated with the commune officials to make a list of PAHs' affected land and

crops. The socio-economic survey forms were delivered to affected households. The survey was carried out by the District Compensation Committee, with the participation of the commune authority.

8.2.3. Activity 3: Meetings with PAHs

When the survey was completed, District Compensation Committee (in coordination with the commune officials) held meetings with PAHs having land in the line ROW and with village representatives. During the meetings, the Consultant presented numerous materials, including: Project Summary, draft RAP and draft EIA, maps of the project site, figures, tables, photos, pictures, and other support materials. Meeting officials informed participants of the Project purpose; presented the Project impacts on land and crops in detail; introduced the principles and policies of compensation and advised people not to build new structures in the line ROW. PAHs were consulted on the entitlement policy, property affected, and the compensation amount to each household. Questions posed by the PAHs were addressed and recommendations/concerns of PAHs and PC were recorded.

Summary of Public Consultation Meeting for the Project

- Time	28 November 2003
- Location	Meeting room of Camau People Committee
- Participants	Project's PAPs, PC of Camau, DONRE of Camau, Department of Industry, Women Union of Camau Province, DPC of related districts...
- Chairpersons of the Meeting	PC2 staffs and Camau Power Company Staffs.
- Contents of the Meeting	PC2 introduced the project, proposed ROW, initial environmental and socio-economic impacts, PAPs, stakeholders raise their opinions on the project
- Opinion of PAHs and stakeholders on environmental issues of the Project	DONRE required the project to well design ROW to avoid encroachment into sensitive ecosystem and military zones; other stakeholders required on measures for pollution control, limitation in tree cutting, and support the PAHs (See Appendix 2)

8.2.4 Activity 4: Receiving Further Feedback from PAHs

All interested parties submit their comments and concerns to the Project components through their authorized representatives, e.g. governmental agencies (the People Committee, People Council) and/or socio-political organizations (Fatherland Front, Farmers Association, Women Union etc.) or non-governmental organizations (e.g. Vietnam Association for the Conservation of the Nature and Environment, Biological Association, Economic Association, Foresters Association etc.). These organizations collect all comments from the local people and send them to the environmental management authorities (DONRE at provincial level or MONRE at central level) or

even to provincial People's Council or National Assembly. During the environmental review process, all comments and requirements should be discussed and conclusions be reported to the PMU, so that the project can develop proper alternatives and implement measures for mitigation of the negative impacts.

8.2.5 Activity 5: Approval and Clearance of the RAP

After working with the communes, the draft compensation document was sent the Provincial Steering Committee, which includes: Finance-Pricing Department, Planning and Investment Department, Agriculture and Rural Development Department and DONRE. The committee reviewed documents and recommended to the Chairman of the People Committee for signing the compensation document.

8.2.6 Activity 6: Consultation and Clearance on EIA

The Project will receive an investment license only after appropriate modification of location, design, capacity and/or technology of the project to meet the requirement of environmental protection and resettlement. To address disclosure requirements of OP 4.01, PC2 will:

- Provide Vietnamese-language copies of the IEE, EMP reports, RAP, and Project Summary to each commune-level and provincial-level People's Committee in the Project area.
- Advertise in major local newspapers several times over a two-month period. The advertisement will state the IEE, EMP, RAP, and Project Summary is available for public review for a two month period during normal working hours at the following locations: 1) the Camau People's Committees; and 2) The commune level Peoples' Committees.
- English and Vietnamese-language copies of the EIA report will also be sent to the Vietnam Information Development Centre at 63 Ly Thai To in Hanoi, for access by NGOs and public.
- English language copies of the IEE and EMP report will be sent to World Bank for publication on World Bank InfoShop.

REFERENCES

1. Law on Environmental Protection of Vietnam, issued on 10th January 1994 (in Vietnamese).
2. Government of Vietnam - Decree N175/CP 18 October 1994 (in Vietnamese).
3. MOSTE - Circular N490/1998/TT-KHCNMT 29th April 1998 (in Vietnamese).
4. MOSTE - Vietnamese Standards for the Environment, 1995 and 2001.
5. World Bank - Environmental Assessment (OP 4.01, October 1998); Natural Habitat (OP 4.04 November 1998). Indigenous Peoples (OD 4.20, September 1991); Involuntary Resettlement (OD 4.30 June 1990) and Public Disclosure (September 1998).
6. PC2 F/S Report for the RE project for Camau Province, December 2003.
7. PC2 RAP Report for the RE Project for Camau Province, December 2003.
8. UNDP - WB Project VIE 87/031 - "Mekong Delta Master Plan", Thematic Report on "Sensitive Ecological Zones in the Mekong Delta" prepared by Le Tu Trinh. NEDECO, 1993.
9. Camau Province, 2003 – Modification of Master Plan for Socio – Economic Development to 2010, March 2003
10. DOSTE - State of the Environment of Camau Province. 2002
11. PC Thoi Binh District - State of Socio-economy of Thoi Binh District, 2002
12. PC Dam Doi District – Master Plan for Landuse of Dam Doi District, 2002
13. Reports on socio-economy of various communes in the RE Project area in Camau. 2002. 2003
14. State of the Environment of Camau Province and plans for natural conservation. Project Report conducted by Le Trinh et al, 1999
15. VESDEC-EPC. Results of Environmental Monitoring for the WB's Project of Southern waterway and Cantho Port Rehabilitation, 2000-2003

ANNEXES

ANNEX 1: ENVIRONMENTAL SCREENING CHECKLIST

The screening data checklist is intended to be a largely qualitative assessment of the environmental implications of an identified project. All the pertinent environmental issues have been listed and a simple matrix designed to allow the predominant impacts of the project to be appraised. The checklist affords a practical means whereby decision and policy makers can determine whether the project is environmentally sustainable and should progress to the preliminary design phase

• **Project Data**

Title:	Project Description: Major Components: Key Environmental Issues: Construction Contract Period: Environment Classification: Category B
Province:	
District:	
Commune:	
Cost Estimate:	

• **Scoring Guideline for Screening**

<p>Positive Impacts 3: Major improvements 2: Minor improvement 1: Uncertain, but potential positive impact 0: No impact</p>	<p>Negative Impacts 3: Serious significant impacts, project should be abandoned 2: Impacts can be mitigated 1: Uncertain, but potential negative impact 0: No impact</p>
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• **Example Screening Matrix**

Potential Impact	Score		Possible Mitigation Measures for Negative Impacts
	Plus	Minus	
Pre-Construction			
Project Affected Households (PAHs)	•	•	<ul style="list-style-type: none"> Align route to avoid resettlement Provide compensation for PAHs
Land Acquisition	•	•	<ul style="list-style-type: none"> Align route to avoid land acquisition Provide compensation for land acquisition
ROW clearance	•	•	<ul style="list-style-type: none"> Get permission for tree cutting on public lands and natural reserves

Cultural Property	•	•	<ul style="list-style-type: none"> • Align route to avoid cultural property • Remove, relocate, and/or compensate for loss of cultural property
Health Risks Related to Explosives, and Toxic Substances	•	•	<ul style="list-style-type: none"> • Work with People's Committee to identify UXO and toxic waste locations. • Conduct removal of UXOs/toxic waste
Construction			
ROW clearance	•	•	<ul style="list-style-type: none"> • Avoid clear cutting • Replanting if required for endemic and rare species • Avoid burning of woody residues
Transport of building materials and equipment	•	•	<ul style="list-style-type: none"> • Cover trucks • Avoid using heavy vehicles on rural roads
Disposal of construction waste	•	•	<ul style="list-style-type: none"> • Clean-up after construction • Dispose waste at permitted dump sites
Soil Erosion	•	•	<ul style="list-style-type: none"> • Excavate erosion-prone areas during dry season only • Fill in borrow areas to avoid erosion • Ensure drainage works installed whenever appropriate
Petroleum and Hazardous Waste Spills	•	•	<ul style="list-style-type: none"> • Ensure no PCBs or asbestos used during construction
Temporary Loss of Productive Land	•	•	<ul style="list-style-type: none"> • Provide proper compensation • Rectify impact after construction

Impacts of Temporary Access Roads	•	•	<ul style="list-style-type: none"> • Use alternatives to building temporary access roads • After construction, restore temporary access roads to their pre-project state.
- Impacts on Noise and Dust	•	•	<ul style="list-style-type: none"> • Use water sprays on roads and piles of dirt • Avoid night works in sensitive areas
Electricity Hazards	•	•	<ul style="list-style-type: none"> • Work with Provincial Power Department to make sure relevant parts of system are turned off. • Ensure workers wear safety clothes and work with approved safety tools.
Environmental Impacts Caused Construction Workers	•	•	<ul style="list-style-type: none"> • Ensure all solid waste is dumped in location approved by relevant authorities • Provide adequate sewage facilities (latrines) for workers.
Social Impacts Caused by Construction Workers	•	•	<ul style="list-style-type: none"> • Hire local people whenever possible • Maintain relations with PC and unions during construction • After construction, remove and rehabilitate worker camp areas.
Health and Safety of Construction Workers	•	•	<ul style="list-style-type: none"> • Ensure adequate safety equipment and safety training for construction workers • Ensure access to adequate medical facilities for construction workers
Health and Safety of the General Public	•	•	<ul style="list-style-type: none"> • Public information campaign

ANNEX 2: CHECKLIST FOR ASSESSMENT OF ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

Data should be collected during field visits and desk studies. Checklists for collecting the most relevant environmental and social information are given below as an example. A reference list of consulted documents and reports (if any) may be included as an Annex. Field visits should mainly focus on an initial field inspection of the concerned area and consultations with the local environmental administration (DONRE) and the relevant Peoples Committees.

• Checklist for Assessment of Baseline Environmental Conditions

Environmental Conditions	To be Checked	Information Sources
Atmosphere	<ul style="list-style-type: none"> • Current air quality in the Project area. Most helpful parameter is total suspended solids (TSS). Air quality should be reported for both rainy and dry season, if possible. • Current noise levels in the Project Area. Most helpful parameter is dB(A). Noise levels should be separated by night-time and day-time, if possible. • Text on current local stresses to air quality and noise levels (highways, factories, etc). • Information on annual rainfall/monthly rainfall in project area 	<ul style="list-style-type: none"> • Provincial or district DONRE Hydrometeorological Service • If provincial/district information not available, request information from MONRE Hydrometeorological Service (provincial)
Aquasphere	<ul style="list-style-type: none"> • Location and size of surface waters (lakes, rivers, irrigation canals) • Comments on major drainage patterns in the project area. 	<ul style="list-style-type: none"> • Provincial or district DONRE • Provincial or district DARD water resources division
Geosphere	<ul style="list-style-type: none"> • Description of major geological forms and soil conditions in the Project area. • Comments on current erosion patterns and values. Comments on the current impacts of this erosion on productive, residential, and commercial land. 	<ul style="list-style-type: none"> • Provincial or district DONRE division for cartography or land use. • Provincial or district DARD
Biosphere	<ul style="list-style-type: none"> • Description of major ecosystems in the Project area • Identification of any rare/endangered plants and animals 	<ul style="list-style-type: none"> • Provincial DONRE Environmental Management Division • Birdlife International Website

- Identification of any sensitive (e.g. wetlands, natural forests, cultural and historical sites) (www.birdlife.org.)
- Identification of any protected areas. This includes national parks, RAMSAR sites, special use forests, and areas protected under the GOV 661 Programme.

• Checklist for Assessment of Baseline Social Conditions

Social Conditions	To be Checked	Information Sources
Demographics	<ul style="list-style-type: none"> • Basic demographic information could include: <ul style="list-style-type: none"> - Population of each commune; - Main occupation and income of each commune; - Percentage of Kinh, minority groups in each commune (this should be in a table) - Number of households living below the GOV poverty line; - Information on education levels and literacy rates of local people 	<ul style="list-style-type: none"> • Commune Peoples' Committee
Public Health and Education	<ul style="list-style-type: none"> • Access of local people to health and education facilities 	<ul style="list-style-type: none"> • Provincial or District Department of Health
Solid Waste Management	<ul style="list-style-type: none"> • Assess general cleanliness of the project area • Check existing arrangements for garbage collection and disposal 	<ul style="list-style-type: none"> • Commune People's Committee

ANNEX 3: ENVIRONMENTAL PERMIT FOR THE PROJECT

UBND tỉnh Cà Mau
SỞ TÀI NGUYÊN VÀ MÔI TRƯỜNG

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc.

Số: 099/KCM.

Cà Mau, ngày 02 tháng 12 năm 2003.

PHIẾU XÁC NHẬN
BẢN ĐĂNG KÝ ĐẠT TIÊU CHUẨN MÔI TRƯỜNG
Dự án Năng lượng nông thôn II, tỉnh Cà Mau

GIÁM ĐỐC SỞ TÀI NGUYÊN VÀ MÔI TRƯỜNG
XÁC NHẬN

Điều 1: Công ty Điện lực II - Tổng Công ty Điện lực Việt Nam đã trình nội dung Bản đăng ký đạt tiêu chuẩn môi trường cho Dự án năng lượng nông thôn II - Tỉnh Cà Mau

Điều 2: Công ty điện lực II - Tổng Công ty Điện lực Việt Nam có trách nhiệm thực hiện đúng những nội dung đã được nêu trong Bản đăng ký đạt tiêu chuẩn môi trường.

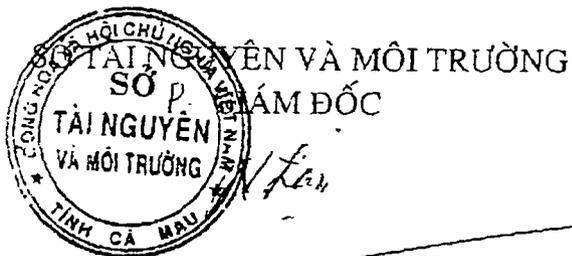
Điều 3: Bản đăng ký đạt tiêu chuẩn môi trường cho Dự án năng lượng nông thôn II - Tỉnh Cà Mau do Công ty Điện lực II - Tổng Công ty Điện lực Việt Nam lập là cơ sở pháp lý để cơ quan quản lý nhà nước về bảo vệ môi trường kiểm tra việc thực hiện bảo vệ môi trường của Dự án.

Điều 4: Trong quá trình triển khai Dự án. Công ty Điện lực II - Tổng Công ty Điện lực Việt Nam phải thực hiện đầy đủ các biện pháp giảm thiểu ô nhiễm, bảo vệ môi trường và đảm bảo xử lý các chất thải đạt các tiêu chuẩn môi trường Việt Nam.

Điều 5: Phòng Môi trường, Thanh tra Sở Tài nguyên và Môi trường theo dõi, giám sát quá trình thực hiện của Dự án.

Nơi nhận:

- Chủ dự án
- Phòng MT, Thanh tra.



Lý Nhơn

ANNEX 4: RECORDS OF PUBLIC CONSULTATION FOR THE PROJECT

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc Lập - Tự Do - Hạnh Phúc

BIÊN BẢN HỌP THAM VẤN CỘNG ĐỒNG

Nội dung: Các ý kiến thắc mắc và đóng góp của cộng đồng về tác động môi trường (EIA) của các xã thuộc Dự án Năng lượng nông thôn II - tỉnh Cà Mau.

Thời gian: 1 giờ 10 phút, ngày 28 tháng 11 năm 2003.

Địa điểm: Văn phòng Điện lực tỉnh Cà Mau.

Thành phần: Gồm đại diện các cơ quan, ban ngành, đoàn thể, tổ chức xã hội, nhân dân có trong danh sách đính kèm.

Diễn biến cuộc họp:

Đại diện của chủ đầu tư Dự án Năng lượng nông thôn II - tỉnh Cà Mau trình bày tóm tắt nội dung của Dự án

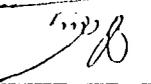
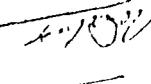
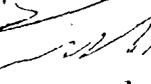
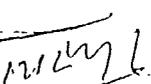
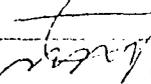
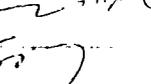
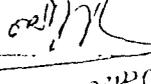
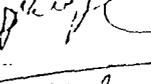
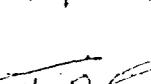
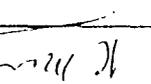
Đại diện Xí nghiệp Tư vấn Thiết kế Điện trình bày tóm tắt báo cáo đánh giá tác động môi trường (EIA) bao gồm các tác động môi trường và các biện pháp giảm thiểu ảnh hưởng trong 03 giai đoạn của Dự án: Tiền xây dựng, xây dựng và vận hành. Các tác động môi trường của Dự án gồm các loại: Nhà bị giải tỏa, đất bị chiếm dụng để trồng cột và hành lang tuyến, cây cối trong hành lang tuyến bị chặt hạ, bụi - tiếng ồn - rác thải - xói mòn - ô nhiễm nguồn nước do vận chuyển nguyên vật liệu và thi công, điện từ trường - tai nạn điện - rò rỉ dầu máy biến áp trong giai đoạn vận hành và các ảnh hưởng về mặt xã hội và tài nguyên khác.

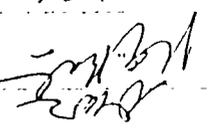
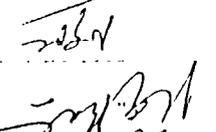
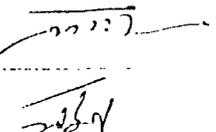
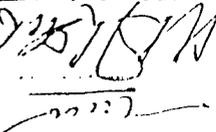
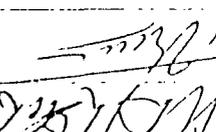
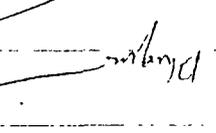
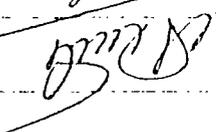
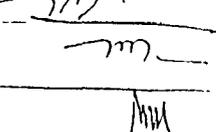
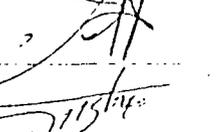
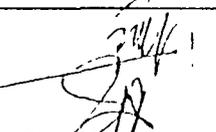
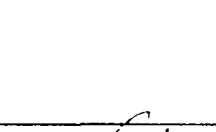
Các đại biểu tham gia có các ý kiến thắc mắc, đóng góp và trả lời như sau:

- Ý kiến của Sở Tài Nguyên Môi trường:
- Trong quá trình thi công, phải giải tỏa, phải quan tâm ảnh hưởng đến môi trường địa phương, phải chú ý bụi, tiếng ồn, phải quản lý đất bị chặt hạ, hạn chế việc chặt hạ cây cối.
- Đảm bảo môi trường phải có hệ thống không chặt phá.
- Tuyệt đối không lấy đất làm nơi chôn lấp rác thải, phải có biện pháp an ninh quốc phòng, rừng bảo vệ của quốc gia.
- Ý kiến của đại diện Xí nghiệp Tư vấn Thiết kế Điện:
- Thấy đất đai làm giảm diện tích trồng cây, môi trường của đại diện địa phương.
- Ý kiến của đại diện UBND huyện và xã:
- Trong quá trình thi công nên chú ý nhân công ở địa phương và tập huấn kỹ nhân công về bảo vệ môi trường. Sau này họ là người trực tiếp bảo vệ môi trường ở địa phương.
- Ý kiến của đại diện UBND huyện và xã:

DANH SÁCH ĐẠI BIỂU THAM DỰ CUỘC HỌP THAM VẤN CÔNG ĐỘNG VẬT CỘNG MÔI TRƯỜNG

Đính kèm theo: Biên bản cuộc họp ngày 28 tháng 11 năm 2007
 Tại văn phòng Điện lực tỉnh Cà Mau.

Họ và tên	Địa chỉ	Thành phần xã hội	Ký tên
Đông Văn Châu	UBND Tỉnh Cà Mau	ông xã	
Đào Gia Toàn	Sở Công Nghiệp	Trưởng Ban QL Môi	
Ngô Chi Hùng	Sở Tài Nguyên và Môi Trường	Trưởng Ban QL Môi	
Nguyễn Kim Ngân	Hội Liên hiệp Phụ Nữ Tỉnh	Chủ nhân Xã Hội Học	
Trần Thanh Hải	Xã Tân Hưng - Cái Nước	Nông dân	
Đào Văn Lạc	Xã Tân Hưng - Cái Nước	Nông dân	
Nguyễn Văn Hải	Phong Cảnh - Tân Xuân	Chủ tịch Ủy Ban	
Đặng Quốc Khánh	Xã Tân An - Mỹ Xuyên	Nông dân	
Hà Văn Đăng	Phong Cảnh - Mỹ Xuyên	Chủ tịch CT	
Le Hai Phuong	Xã Tân Hưng Đông - Mỹ Xuyên	Nông dân	
Vo Thanh Tung	Xã Tân Hưng Đông - Mỹ Xuyên	Nông dân	
Phan Văn Bội	Xã Tân Hưng Đông - Mỹ Xuyên	Nông dân	
Trương Kim Loan	Xã Tân Hưng - Cái Nước	Nông dân	

Họ và tên	Địa chỉ	Thành phần xã hội	Ký tên
Trương Minh Đôn	Xã Phú Hưng - Chi Núc	Ngũ dân	
Nguyễn Văn Bả	Xã Tân Lạc Đông - Thái Bình	Ngũ dân	
Đông Thế Ngọc	Xã Tân Lạc Bắc - Thái Bình	Ngũ dân	
Nguyễn Văn Nổi	Xã Tân Lạc Bắc - Thái Bình	Ngũ dân	
Ngô Minh Thịnh	Phung Canh Tế - Đầm Dơi	Xã phường KT	
Trần Văn Dũng	Ti An Khương Giang - Đầm Dơi	Ngũ dân	
Đông Văn Mừng	Ti An Khương Giang - Đầm Dơi	Ngũ dân	
Trương Minh Hiền	Túy Sơn Địch - Đầm Dơi	Xã phường KT	
Lê Minh Dũng	Cố Cầm - Chi Minh Địch - Địch	CB NV - gia đình Địch - Địch	
Nguyễn Văn Song	Cố Cầm - Chi Minh Địch - Địch	CB NV - gia đình Địch - Địch	
Trương Văn Sách	Chi Minh Địch Tân V. Thái	CB NV	
Hồng Hồng Quân	Chi Minh Địch - Tân V. Thái	CB NV	
Nguyễn Văn Sơn	Chi Minh Địch Ngạc Hiền	CB NV	
Chi Minh Long	Chi Minh Địch Ngạc Hiền	CB NV	
Nguyễn Đức Hùng	Chi Minh Địch Chi Núc	CB NV	

ANNEX 5: LIST OF THE REPORT PREPARERS

1. Nguyen Duc Trung	Consulting center - PC1	<i>Team leader</i>
2. Ho Ngoc Thanh	Consulting center - PC1	<i>Member</i>
3. Vo Ngoc Hoang	Consulting center - PC1	<i>Member</i>
4. Le Hoang Minh	Consulting center - PC1	<i>Member</i>
5. Le Trinh	Environmental Independent Consultant	<i>Consultant</i>
6. Le Thi Ngoc Quynh	Electricity of Vietnam	<i>Supervisor</i>